









VacuTools

Vakuum-Component-Catalog

1

BASICS

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Vacuum - An idea makes its way

The idea of vacuum has already been known for a long time. At least since 1654, when Otto von Guericke carried out his famous experiment with the "Hemispheres of Magdeburg". In the course of the rapid development of the automatization

processes, vacuum engineering, however, only found its way into the industry within the last 40 years. The applications mostly occur in the field of coarse vacuum.

Conversion Table Vacuum/ Pressure Units										
Meas.Unit	(Unit)	=	bar	mbar	kPa	at	Torr.	m WS	psi	inch Hg
1 bar	(10 ⁵ N/m ²)	=	1	1000	100	1,019	750,2	10,19	14,51	29,53
1 mbar	(10 ² N/m ²)	=	0,001	1	0,1	0,001019	0,7502	0,01019	0,01451	0,02953
1 kPa	(10 ³ N/m ²)	=	0,01	10	1	0,01019	7,502	0,1019	0,1451	0,2953
1 at	(10 ⁴ kp/m ²)	=	0,9807	980,7	98,07	1	735,7	10	14,23	28,96
1 Torr	(mm Hg)	=	0,001333	1,333	0,1333	0,001359	1	0,01359	0,01934	0,03936
1 m WS	(m H ₂ O)	=	0,09807	98,07	9,807	0,01	73,57	1	1,423	2,896
1 psi	(lb/in ²)	=	0,06893	68,93	6,893	0,07029	51,71	0,7029	1	2,035
1 inch Hg	(in Hg)	=	0,03387	33,87	3,387	0,03453	25,41	0,3453	0,4913	1

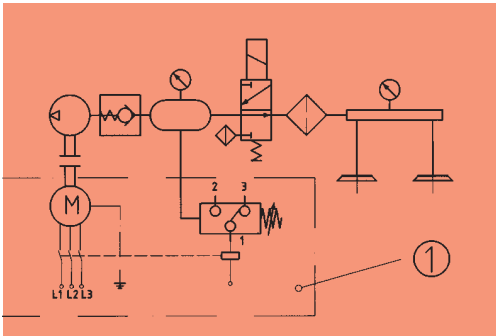
According to DIN 28400, vacuum is the state of a gas, whose pressure is smaller than the state of the atmosphere. In the field of coarse vacuum, the level of achieved vacuum is mostly indicated in percent. The pressure - conversion table on the right gives an overview over units often employed and their relationship to each other.

Pressure- Conversion Table								
Relative Vacuum (%)	Absolute Pressure p _{abs} (mbar)	Atmospherical Pressure Difference in Normal Atmosphere						
		P _e = P _{abs} - P _{amb} (P _{amb} = 1013.25 mbar according to DIN 5450)						
		(bar)	(kPa)	(at)	(Torr)	(m WS)	(psi)	(in Hg)
0	1013	0	0	0	0	0	0	0
10	911,9	-0,1013	-10,13	-0,1033	-75,99	-1,033	-1,470	-2,991
20	810,6	-0,2027	-20,27	-0,2027	-152,1	-2,027	-2,941	-5,986
30	709,3	-0,3040	-30,40	-0,3099	-228,1	-3,099	-4,410	-8,977
40	607,9	-0,4053	-40,53	-0,4133	-304,1	-4,133	-5,880	-11,97
50	506,6	-0,5066	-50,66	-0,5166	-380,1	-5,166	-7,350	-14,96
60	405,3	-0,6079	-60,79	-0,6199	-456,0	-6,199	-8,819	-17,95
70	304,0	-0,7093	-70,93	-0,7233	-532,1	-7,233	-10,29	-20,95
80	202,7	-0,8106	-81,06	-0,8266	-608,1	-8,266	-11,76	-23,94
90	101,3	-0,9119	-91,19	-0,9299	-684,1	-9,299	-13,23	-26,93

Vacuum and Altitude

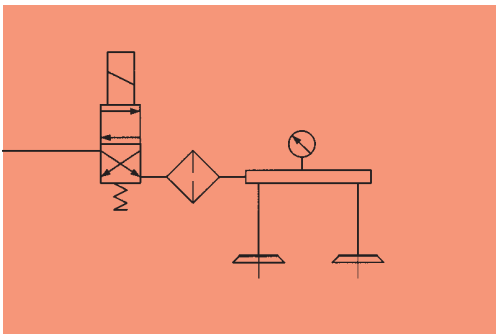
When calculating the required size of Vacuum Generators, one has to consider the altitude. The air pressure takes off approximately 12.5 mbar per 100 m of height. That means, if one takes a Vacuum Generator, which produces a pressure balance of 800 mbar at a height of 200 m, then the same Generator only reaches a pressure of 660 mbar at a level of 1500 m.

Air Pressure p in dependence of height h (Normal Atmosphere)	
Height h (m)	Air Pressure p (mbar)
0	1013,25
100	1001,3
200	989,5
300	977,7
400	966,1
500	954,6
600	943,2
700	931,9
800	920,8
900	909,7
1000	898,8
1200	877,2
1400	856,0
1600	835,3
1800	814,9
2000	795,0



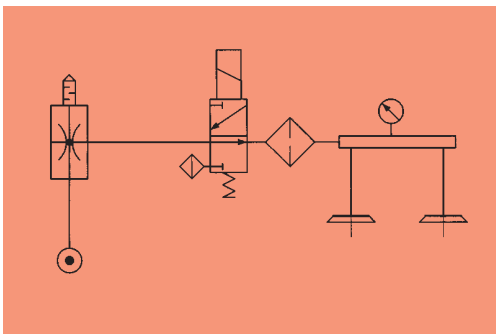
Vacuum circuit with vacuum pump

Used mainly with the handling of dense transport goods. The vacuum is created by an electric pump. This pump evacuates a tank. By means of an underpressure switch the vacuum in this tank is controlled. The vacuum-controlled motor switch (1) turns the pump on / off, when the actual values fall below / rise above the adjusted vacuum in the tank. This enlarges the lifespan of the pump and saves energy.



Vacuum circuit with blower

Blowers are mainly used with the handling of porous work pieces, such as MDF- or chipboards. The vacuum is created by a blower. A valve controls the "suck / release" - function. The use of a vacuum tank is not recommended, because of the high volume streams of blowers.



Vacuum circuit with ejector

By means of compressed air, ejectors create a vacuum. The suction cups/ plates can directly be connected to the ejector. Depending on the fact whether compressed air is available, the work piece will be sucked on or released. In more complicated systems further valves can be attached to the distribution conductor to control individual suction cups/ plates or suction circuits.

Vacuum engineering in practice:

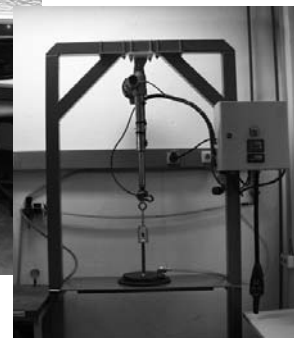
When choosing among vacuum systems, it should be considered that higher vacuums also mean higher costs in energy. Vacuum engineering usually works with low air pressures of 60 - 80 % with pumps and 20 - 30 % with blowers. That depends, of course, on the transported work pieces.






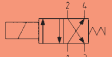









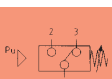

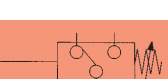

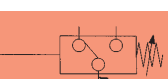








When transporting porous work pieces or work pieces without ideal density, the working vacuum can also be at 20 - 30 %. In special applications it is necessary to conduct various trials prior to choosing the final systems.



Carrying out tests to determine the best vacuum components.

Tests to determine the holding power of the various suction cups / suction plates.



	Vacuum pump		3/2-way impulse valve
	Vacuum blower		Vacuum-controlled 3/2-way valve
	Ejector		Solenoid Valve 4/2-way valve
	Flat suction cups		Flow valve
	Bellow type cups		Non-return valve
	Suction plates with flat sealing		Stylus valve
	Suction plate with roof type lip sealing		Vacuum regulating valve
	Suction plate with froth rubber sealing		Mechanical underpressure switch
	Special suction plates		Electronic underpressure switch
	2/2-way ball valve		Digital underpressure switch
	3/2-way ball valve		Filter
	3/2-way hand slide valve		Water separator
	3/2-way foot interruptor		Tanks
	3/2-way solenoid valve		Gauge (control gauge)

Sealing profile of suction cups/ plates

When choosing among suction cups and suction plates, many things have to be taken into consideration, before the optimal suction cup can be determined. The sealing between the suction cup and the work piece is of great importance.

The better the sealing, the more energy can be saved during the working process. Available are various sealing profiles, which all have special functions.

Flat suction cup

- suitable for:
- metal parts
 - cartonage
 - electronic parts
 - food products

with extra sealing

- suitable for:
- scaly metal sheets
 - bended parts

with roof type lip

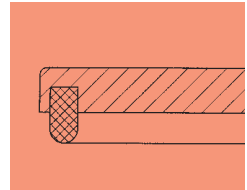
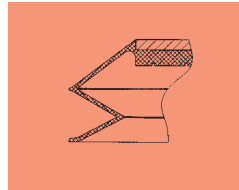
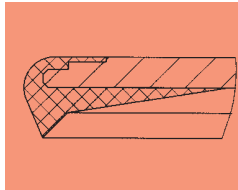
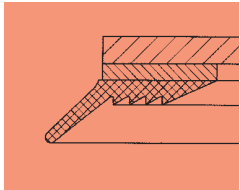
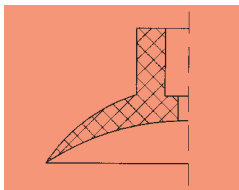
- suitable for:
- chequered / beaded sheets
 - structured glass
 - stones
 - saw-rough wood

Bellows type cup

- suitable for:
- bended parts
 - warped parts
 - uneven parts
 - separate parts from a pile

Sponge-/ froth

- suitable for:
- saw-rough wood
 - split strips/ coils
 - chequered/ beaded sheets
 - paper rolls



The table on the right shows common surface structures and the possible suction cups / plates.

You will find more information about the choice of the right material and the right dimensioning on the following pages.

Please read chapters 2 and 3 to find information about available sizes.

Dimensioning help for suction cups and different surfaces

Surface Type:	smooth	rough	structured	damp oily	bent	wavy	round material	long goods
FS-G	✓✓✓	✓		✓	✓	✓		
FS-GR	✓✓✓	✓		✓✓	✓	✓		
FBS-GF	✓✓✓	✓		✓	✓✓✓	✓✓✓	✓	✓
FBS-GFD	✓✓✓	✓		✓	✓✓✓	✓✓✓	✓✓	✓✓
DP-FSRL	✓✓✓	✓		✓✓	✓	✓		
DP-FSL	✓✓	✓✓	✓	✓	✓✓✓	✓✓		
DP-FSD	✓	✓✓✓	✓✓✓	✓	✓✓	✓		
DP-FSM	✓✓	✓✓✓	✓✓	✓				
SP-KPHL	✓✓✓	✓✓		✓	✓✓✓	✓✓		
SP-(K)PHM	✓✓	✓✓✓	✓✓✓					
SP-PHZ	✓✓	✓✓	✓✓✓					
DP-FS	✓✓✓	✓		✓	✓		✓	✓✓
DP-FBS	✓✓✓	✓		✓	✓✓✓	✓✓✓	✓✓✓	✓

- without not suitable
- ✓ partly suitable
- ✓✓ well suitable
- ✓✓✓ very well suitable

- Abbreviations/ Features suction plates:**
- FS-G Flat suction cup
 - FS-GR Flat suction cup w/ gr. rubber lining
 - FBS-GF Bellows type cup with 1.5 creases
 - FBS-GFD Bellows type cup with 2.5 creases
 - DP-FSRL Suction plate with grooves
 - DP-FSL Suction plate without grooves
 - DP-FSD Suction plate with roof type sealing
 - DP-FSM Suction plate w/ sponge rubber sealing
 - DP-FBS Suction plate bellows type

DIMENSIONING OF VACUUM COMPONENTS

Which holding forces and dimensions are necessary?

Quantity of suction cups/plates:

To determine the quantity of suction cups/ plates only the inherent stability of the material is relevant. For instance, a 30 mm thick steel plate can be transported with less suction plates than a 1 mm thick plate.

To exactly dimension the quantity one has to consider the maximum possible overhang in connection with the **minimum** material thickness. This put into relation to the max. length and width one can fairly easily determine the required quantity.

max. overhang allowed "Ü" on various materials (mm):

Materialdicke	Stahl	Alu	Holz
< 0,5 mm	300	300	300
< 1,0 mm	400	400	400
< 2,0 mm	600	600	600
< 4,0 mm	800	800	800
< 8,0 mm	1.200	1.300	1.000
> 12,0 mm	1.800	2.000	1.500

The required quantity is determined by:

Long direction : $n_L = \frac{L}{2 \times \ddot{U}}$

Cross direction: $n_B = \frac{B}{2 \times \ddot{U}}$

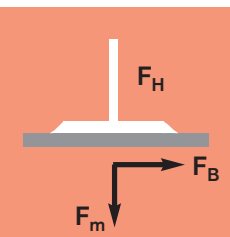
Total quantity: $n_G = n_L \times n_B$

n_L Quantity of suction plates in long direction
 n_B Quantity of suction plates in cross direction
 n_B Total quantity of suction plates required
 \ddot{U} max. possible overhang (see table)

Determination of suction cup/plates:

Once the required quantity of suction plates is determined one must decide on the dimensions and holding forces. The catalogue states the holding force of any suction cup/plate at 60% vacuum w/o safety factor. The correct holding force depends on the following factors:

- Kind of handling (horizontal or vertical)
- Occuring cross acceleration forces, especially in automatic processes or in robot operations
- Friction factor between workpiece and suction plate
- Safety factors



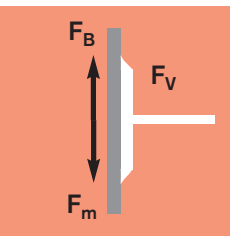
Horizontal handling with cross acceleration:

$$F_H = (F_m + F_B) \times S = \left(m \times g + \frac{m}{\mu} \times a \right) \times S ; \quad F_H = m \times \left(g + \frac{a}{\mu} \right) \times S$$

On horizontal transport with little cross acceleration (e.g. manual handling devices), the holding force is calculated as follows:

$$F_H = m \times g \times S$$

F_H total holding force on horizontal handling
 F_V total holding force on vertical handling
 F_m mass force of the work piece
 F_B occuring maximum acceleration forces
 m weight of work piece(kg)
 $g = 9,81 \text{ m/s}^2$
 a cross acceleration in m/s^2
 μ friction factor on work piece (see.table)
 S safety factor
 $S=2$, as per DIN EN 13155



Vertikales Handling mit Querbewegung:

$$F_V = (F_m + F_B) \times S = \left(\frac{m}{\mu} \times g + \frac{m}{\mu} \times a \right) \times S ; \quad F_V = \frac{m}{\mu} \times (g + a) \times S$$

Bei vertikalem Transport bei denen keine wesentlichen Vertikalbeschleunigungen herrschen (z.B. manuelle Handhabungsgeräte), errechnet sich die Haltekraft wie folgt:

$$F_V = \frac{m}{\mu} \times g \times S$$

Reibwerte einiger Werkstoffe

Oberfläche	Reibwert
rauh bis strukturiert	0,6 - 0,7
glatt und trocken	0,5
nass bis feucht	0,3 - 0,4
ölig	0,1 - 0,2

Resulted holding force H per suction cup/plate:

$$H_E = \frac{F_H \text{ (bzw. } F_V)}{n_G}$$

F_H total holding force on horizontal handling
 F_H total holding force on vertical handling
 n_G total quantity of suction cups/plates
 H_E single holding force per suction cup/plate

The right material makes the difference

Important for the lifespan of the suction cup/ suction plate and the working security of the vacuum system is not only the right dimensioning, but also the right material of the suction cup.

High temperatures, usage in the food industry or usage in connection with oils, acids or lyes demand special materials. Depending on demand and usage, you can easily find the right material in the table shown below.

Overview over Features of the different Materials										
Bezeichnung	Perbunane	Silicone	Neoprene	Buna Rubber	Norserexe	Polyurethane	Vitone	Natural Rubber	Sponge Rubber	Froth Rubber
Abbreviation	NBR	SI	CR	BK	NRS	PU	VI	NK	M	Z
Wear resistance	✓✓	✓	✓	✓✓	✓✓	✓✓✓	✓✓	✓	✓	✓
Weather resistance	✓✓	✓✓✓	✓✓✓	✓	✓	✓✓✓	✓✓✓	✓✓	✓✓	✓✓
Ozone resistance	✓	✓✓✓	✓✓	✓	✓✓	✓✓	✓✓✓	✓	✓	✓
Oil resistance	✓✓✓	✓	✓✓			✓✓✓	✓✓✓	✓	✓	✓
Solvent resistance	✓✓	✓✓	✓✓			✓	✓✓✓	✓	✓	✓
Acid resistance	✓	✓	✓	✓✓✓		✓	✓✓	✓	✓	✓
Repositioning capability	✓✓	✓✓	✓✓	✓✓	✓✓	✓	✓	✓✓✓	✓✓	✓✓✓
Food suitability		✓✓✓								
Small imprint		✓✓✓	✓✓✓		✓	✓	✓✓		✓✓✓	✓✓
Abrasion resistance	✓	✓✓	✓✓	✓	✓	✓✓✓	✓✓	✓✓	✓✓	✓✓
Tensile strength at 20°C (N/mm²)	ca. 25	ca. 10	ca. 25	ca. 25	ca. 8	ca. 35	ca. 17	ca. 28	ca. 20	ca. 20
Tensile extension in (%)	ca. 500	ca. 500	ca. 450	ca. 450	ca. 550	ca. 600	ca. 300	ca. 600	---	---
Temp. resistance long term (°C)	-10 + 80	-20 + 200	-10 + 100	-30 + 100	-10 + 70°	-30 + 100	-10 + 200°	-20 + 80	-10 + 80	-10 + 80
Temp. resistance short term (°C)	-20° + 120°	-50° + 230°	-20 + 130°	-30 + 110°	-10 + 75°	-40 + 120°	-10 + 200°	-30 + 100°	-10 + 90°	-10 + 90
spec. resistance (antistat. type.)	800 - 1000 Ω / cm	5 - 15 Ω / cm								
Colour/ Feature	black/ grey	transparent/ red/ black	white/ black	black	black	blue/ grey	grey	light brown	black/ grey	red
Shore strength(A)	25 + 80	30 + 80	50	35 + 90	20 + 65	40 + 60	50	30 + 60	30	30

- without not suitable
- ✓ partly suitable
- ✓✓ well suitable
- ✓✓✓ very well suitable

How do suction cups/ plates have to be built in?

Mounting of suction cups/plates

An unqualified mounting of suction cups and suction plates often is the cause for defective functionality. The fixing of suction cups and suction plates is a very important feature of their mounting. On the one hand the weight has to be taken on in a secure manner, on the other hand, it has to be distributed evenly over the entire surface.

FEZER not only offers you a fully developed programme for vacuum suction cups, but also the right fixing elements for every type. The various elements can be combined discretionarily, so you will find the optimal fixing for each case!

Overview over the various fixing possibilities

rigid



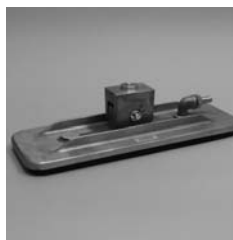
Basic fixing for suction cups and rigid suction plates. Simple and inexpensive solution, especially suitable for stable goods and for a number of up to 4 suction plates (no equalization of weight necessary).

articulated



The articulated fixing is mainly used for bended or slightly uneven parts. An excellent adaption to the unevenness of the surface is achieved with this fixing.

hinged



This fixing is mainly used for the transportation of rather long and slim parts. An excellent adaption to the bowing of the parts is achieved with this fixing.

non-spring loaded



This fixing is mainly used for stable goods or with a small number of suction cups or suction plates. It is a very inexpensive and in many cases sufficient fixing.

spring loaded



Due to the use of springs, all materials will be treated very gently and an even weight distribution is guaranteed. Especially recommended for bended materials and wavy parts.

Overview over fixing of suction cups and suction plates

Requirements:	rigid	articulated	hinged	non-spring loaded	spring loaded
Small parts	x			x	
Stable goods	x			x	
Formed parts		x		x	
Bent parts		x	x		x
Wavy parts		x	x		x
Sensitive surfaces		x	x		x
High acceleration		x			x
Height adjustment					x

x recommended

Please note:

This table only shows a small overview. Please read the advice and safety information in chapter 5 "Fixing Elements". Please contact our Sales Specialists if further questions should appear!

Determination of the right spring:

To determine the right spring the following data is required:

- ✓ **bolt diameter used D:**
results from the used suction cups/plates and the given connection dimensions.
- ✓ **Quantity of suction cups/plates n:**
they determine the proportional force for one spring
- ✓ **Maximum weight of the work piece: F_W**
pertinent for dimensioning the upper spring and thus an even load distribution amongst all suction cups/plates
- ✓ **desired force and own weight on lifting device: F_{AE}**
they determine the proportional force of the lower spring

$$F_{DF-top} = \frac{F_W}{n}$$

$$F_{DF-bottom} = \frac{F_{AE}}{n}$$

F_{DF-top} force of upper spring (N)
 F_W max. weight of work piece (N)
 F_{AE} pressing force and own weight of lifting device(N)
 n quantity of mounted suction cups/ plates

$F_{DF-bottom}$ force or lower spring (N)
 F_W max. weight of work piece (N)
 F_{AE} pressing force and own weight of lifting device(N)
 n quantity of mounted suction cups/ plates

Spring diameter:

The inner diameter of the spring results from the construction of the suction cup/plate. Depending on tappet diameter and type the following inner diameters of the springs result:

Required spring per bolt type				
Diameter	12 mm	16 mm/6-KT-14	20 mm	30 mm
bolt type				
STN-	DF-13-L60	DF-17-L70	DF-21-L80	---
STG-	DF-13-L60	DF-17-L70	DF-21-L80	DF-33-L90
ST-6KT-	---	DF-17-L70	---	---
ST-KPL-	---	---	DF-21-L80	---
ST-KPS-	---	---	DF-21-L80	---
ST-KPT-	---	---	---	DF-33-L90

Please contact our sales specialists for the dimensioning when using the bolt types KPT-30/ 40!

Example for determining the right pressure spring!

Example

For this example we assume a vacuum lifter with the following features:

Carrying capacity: 240 kg $F_W = 2400 \text{ N}$
Own weight: 60 kg $F_{AE} = 600 \text{ N}$
Suction plates: KGHRL 160
Bolt: STN-16-M12-285
Number of plates: $n = 4$

Determination upper spring

$$F_{DF-top} = \frac{2\,400 \text{ N}}{4} = 600 \text{ N}$$

Determination lower spring

$$F_{DF-bottom} = \frac{600 \text{ N}}{4} = 150 \text{ N}$$

When using suspension bolt type STN-16-M12-285 the inner diameter of the spring, according to the table, is $DI = 17$. Corresponding with the „Technical Data“ this results in the following spring sizes:

Upper spring: DF-L70-DI17-DS3,5
Spring force 690 N
max. elasticity 31 mm

Lower spring: DF-L70-DI17-DS2
Spring force 150 N
max. elasticity 49 mm

Please note:

When choosing among the springs it is recommended to always select the spring with the next higher spring force (see example).



Basic Information

The creation of a vacuum is the basic element of every vacuum system. Many vacuum generators are available and each of them has its own characteristics and advantages. Available are

- ✓ Vacuum Pumps
- ✓ Vacuum Blowers
- ✓ Ejectors

Vacuum pumps are again divided into oil-lubricated and oilless pumps.

When the dimensioning of a system has to be considered, it is decisive whether a vacuum tank or a vacuum generator without any further tanks is used.

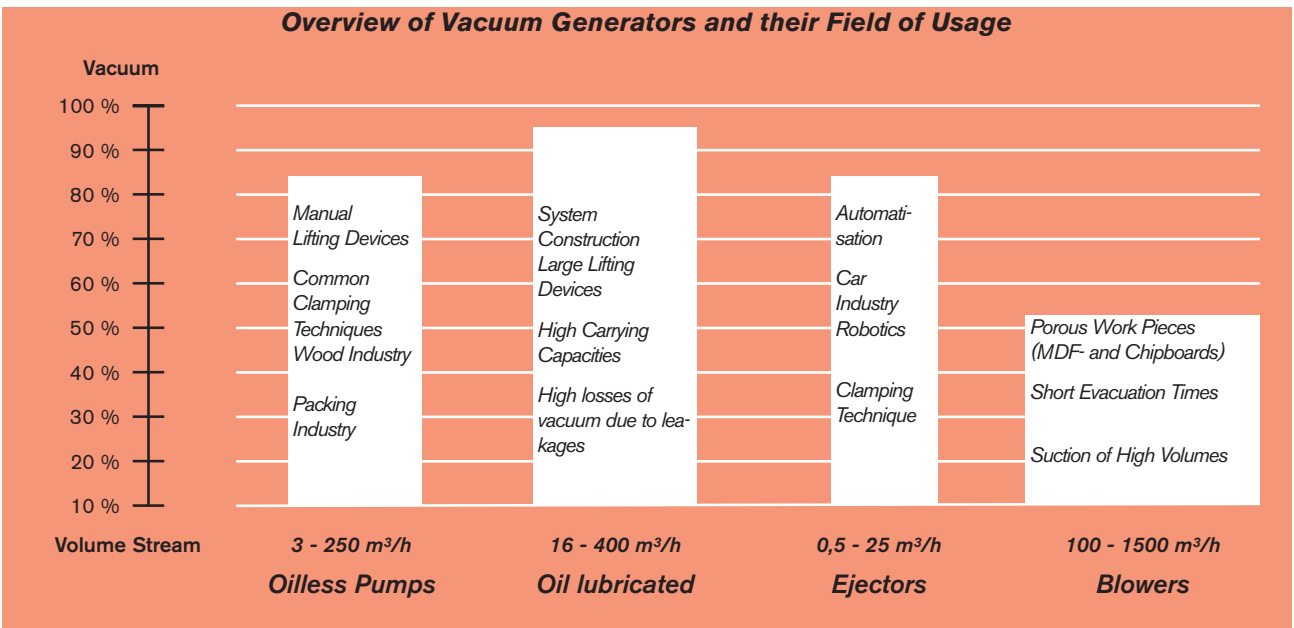
Advantages of the use of vacuum tanks are:

- increase of safety standards, especially when power failures occur.
- shorter suction times
- smaller vacuum generator necessary, especially with a small switching frequency, which means a reduction of energy and other costs.
- protection of the pump when using in connection with vacuum-controlled motor switching units

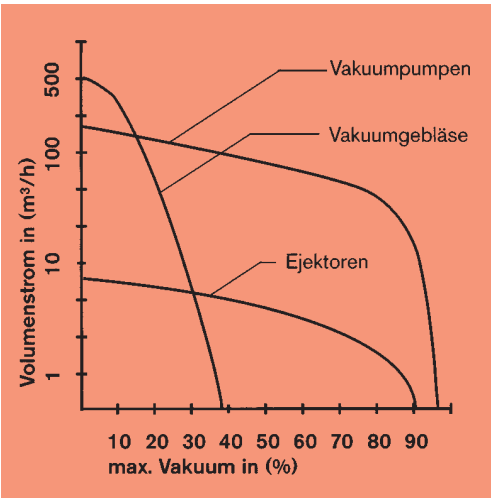
The chart on the right shows a comparison of the various vacuum generators and it enables you to make a quick choice:

Comparing Vacuum Generators				
Requirements	Oilless Pumps	Oil Lubricated Pumps	Ejectors	Blower
max. Vacuum	✓✓	✓✓✓	✓✓	✓
max. Volume stream	✓✓	✓✓	✓	✓✓✓
Mounting Position	discretionary	horizontal	discretionary	discretionary
Own Weight	✓✓	✓✓✓	✓	✓✓✓
Evacuation Times	✓✓	✓✓	✓	✓✓✓
Low Noise	✓✓	✓✓✓	✓✓	✓
Maintenance Frequency	✓✓	✓✓✓	✓✓✓	✓✓
Efficiency	✓✓	✓	✓✓	✓

- ✓ partly suitable
- ✓✓ well suitable
- ✓✓✓ very well suitable



What has to be achieved?



It depends on several factors, which vacuum generator is the right one:

- ✓ Which basic way of creating a vacuum is preferred: electronic or pneumatic?
- ✓ How dense is the sealing of the suction cups?
- ✓ Is the work piece dense or porous?
- ✓ Which suction times have to be achieved?
- ✓ Do any requirements (ex-proof regulations, noise regulations, etc.) have to be met?
- ✓ Which measurements or other factors have to be considered for mounting the unit?

Use of a vacuum tank

When using a vacuum tank, it should be dimensioned in such a way, that the overall vacuum (primary and secondary vacuum) does not fall below 60 % during sucking. This guarantees a satisfying operational vacuum after the suction process.

The dimensioning of the pump-size depends on the needed cycle. Within this cycle the vacuum pump has to increase the vacuum from 60 % to 80 %. This leads to the following pump-size:

$$V_S = 3 \times S \times V_R$$

$$\dot{V} = 3,25 \times S \times \frac{V_S}{t}$$

V_S	(l)	Volume of the vacuum tank
V_R	(l)	Volume to be evacuated
S		Safety factor, advised 2.0
t	(s)	Time between 2 cycles ($t = 60 \text{ s} / \text{number of cycles}$)
\dot{V}	(m³/h)	Volume stream of the pump

Please note:

When choosing among different vacuum generators, always take the next higher production series in comparison to the calculated figure into consideration, in order to compensate leakage losses which were not considered.

Dimensioning of control valves

To control the vacuum mainly 2/2- and 3/2-way valves are used. It is important to choose the right type and, moreover, the right size.

Use of 2/2-way valves:
 individual suction plates can be switched on and off when various transport goods have to be transported.

Use of 3/2-way valves:
 mainly to control "suction" and "release". The suction plate is ventilated by outside air when "release" is chosen.

The ventilation process is often underestimated. The nominal diameter of the valves should be at least as big as the exit of the used vacuum pump, in order to get short ventilation times.

First of all, the size of the valves depends on the suction resp. ventilation times which is required. With the vacuum system's rest volume and the suction and ventilation times known, the necessary flow for the valve can be calculated by using the table shown below. All valves come along with their flow-value, so a suitable valve can be chosen..

The formula and the chart shown below support the determination of suitable valves!

$$\dot{V} = 3,6 \times \frac{V_R}{n \times t}$$

- V_R (l) Volume of the vacuum circuit (l)
- n Number of valves
- t (s) Evacuation time
- \dot{V} (m³/h) Flow of the valve (l/min)

Chart for vacuum valves:

After determining the rest volume (sum of distribution line, suction cup, suction plate volume and other elements), the necessary flow of the valve can be determined over the evacuation, resp. ventilation time.

Example:

The rest volume of the vacuum circuit was calculated and equals 4.8 l. The necessary suction time cannot be more than 0.5 s.

Using the chart on the right, the following can be calculated:

rest volume 5 l
 time 0.5 s
 a flow of 36 m³/h

You can choose among the different valves in chapter 7 "Control Valves and Measuring Units".

Necessary flow (m³/h) of the valves with certain rest volume (l) and ventilation times (s)

Restvol. (l)	0,1 s	0,25 s	0,5 s	1,0 s	1,5 s	2,0 s
1	36	14	7	4	2	1
2	72	29	14	7	5	4
3	108	43	22	11	7	5
4	144	58	29	14	10	7
5	180	72	36	18	12	9
6	216	86	43	22	14	11
7	252	101	50	25	17	13
8	288	115	58	29	19	14
9	324	130	65	32	22	16
10	360	144	72	36	24	18
15	540	216	108	54	36	27
20	720	288	144	72	48	36

Please note:

Since the effect of post-suction (especially for suction plates with a large volume and long sealing rings) can occur during ventilation, it is advised to choose bigger valves than determined.

How is the vacuum supervised?

Choice of vacuum measuring units

In order to make sure that the operational vacuum is always sufficient enough, vacuum switches and vacuum gauges (control gauges) are installed in every vacuum system. While vacuum gauges only serve for optical checks, vacuum switches can be used for checks as well as a control instrument.

There are cases in which the vacuum generator can be shut off for some time, for example when working with dense pieces, or when not using often enough. This feature takes care of the vacuum pump and at the same time reduces costs. Vacuum switches are divided into mechanical and electronic features.

MECHANICAL VACUUM SWITCHES

are mainly used in the field of vacuum transport and handling-engineering. Features as safety, durability and robustness are especially important. Mechanical vacuum switches exist in two different versions: with installed hysteresis and with a freely adjustable switch (preadjusted to 60 % resp. 80 %- vacuum).

ELECTRONIC VACUUM SWITCHES

are mainly used in situations, where it depends on precise switching, shortest switch circuits and on high and precise repetition. Further advantages of electronic vacuum switches are their small size, as well as the stepless and very precise adjustment possibilities of switch and hysteresis.

Brief overview over vacuum switches

Requirements	mechanical	elektrical
Measuring precision	✓✓	✓✓✓
Repetition precision	✓	✓✓✓
Size and weight	✓	✓✓✓
Lifespan	✓✓✓	✓✓
Robustness	✓✓✓	✓✓
Measuring area vacuum	5 - 100 %	5 - 100 %
Temperature range	0 bis + 50° C	0 bis + 50°C
Class	IP 55	IP 65

- ✓ medium
- ✓✓ good
- ✓✓✓ very good

Advice:

You will find further information about the various vacuum switches in chapter 7 "Control Valves and Measuring Units"!

Filters and Connection Elements

The right dimensioning and especially the steady maintenance of filters and connection elements is an important feature for the optimal functioning and operability.

This is why you should definitely consider choosing elements, which are not too small. We recommend to choose the diameter of filters and connection elements at least as big as the exits of the vacuum generator, resp. the valves.

Hose Connections

In order to prevent unnecessary leakage losses and to give the highest possible safety, hose connections have to be secured with nuts or with hose clips. When dimensioning vacuum hoses in narrow rooms, it also has to be considered that you do not fall below the minimal bending radius. Otherwise the hose might be bent and destroyed.

Flow Resistance in Vacuum Circuits

When setting up distributor lines, you should consider that the flow resistance within the distributor system is not too big.

That means:

- ✓ *Big dimensioning of cross sections*
- ✓ *Keep distributor lines short, don't produce unnecessary lengths*
- ✓ *Choose straight ways, do not use any unnecessary angles, exits or other distributor pieces*

Installation of Filters and Maintenance

- ✓ *Check, clean and change filters regularly!*
- ✓ *When cleaning the filters with air pressure, they should always be blown against the way of the stream!*
- ✓ *When installing vacuum filters, the clean air nozzle should always be on top!*
- ✓ *When changing the filter cartridges, make sure that no dirt particles get inside the tube!*

Please note:

FEZER offers you a variety of functional and safe standard vacuum distribution elements. Please pay attention to the various products!

VACUUM-COMPONENT DIMENSIONING CHECKLIST

The easy way to a fast solution!

Company:.....
 Contact:
 Street:
 Zip Code/ Place:
 Phone:..... Fax:
 e-mail:

Many influential factors have to be considered when dimensioning a vacuum system. The following checklist offers you a list of basic information about the dimensioning of a vacuum system:
 Feel free to contact our Sales Specialists for difficult questions! They will be there for you!

Phone no.: (07 11) 3 60 09 - 0
Fax-No: (07 11) 3 60 09 - 34

- ✓ **What material do you use?**
- ✓ **Dimensions**
- ✓ **Surface**
- ✓ **Suction capability**
- ✓ **Extras**

Metal Wood Glass Plastic Carton/Paper

Others:

	min:	max:	min:	max:
Length (mm):	Width (mm):
Thickness (mm):	Weight (kgs):

smooth rough structured dry wet/damp/oily

dense slightly porous very porous suction try-out necessary

Temperature:..... (°C) Others:

- ✓ **Transportation of work piece**

horizontally vertically swivel 90° turn 180°

automatically cycle time:.....(s) max. acc. forces: (m/s²)

- ✓ **Vacuum generator**

oilless oil-lubricated blower pneumatically (Ejektor)

230/400V, 50Hz 230V, 50 Hz 24V= V,Hz

- ✓ **Vacuum control**

manual electric 24V= 230V, 50Hz

Others:

- ✓ **Supervision of vacuum**

optical (vacuum gauge) mechanical (VSM) electronical (VSE) digital (VSD)

- ✓ **Additional Information**

.....

2

SUCTION CUPS



Flat suction cup FS-G 10 to G 60 2.2



Flat suction cup FS-G 1,5 to G 95 2.4



Flat suction cup FS-GR 75 to GR 115 2.6



Flat suction cup FS-G 20 VU to G 100 VU 2.8



Bellows type suction cup FBS-GF 30 to GF 115 2.10



Bellows type suction cup FBS-GF 10 to GF 75 2.12



Bellows type suction cup FBS-GF 20VU to GF 85VU 2.14



Bellows type suction cup FBS-GFD 5 to GF 90 2.16



Bellows type suction cup FBS-GFD 20 VU to 85 VU 2.18

Description

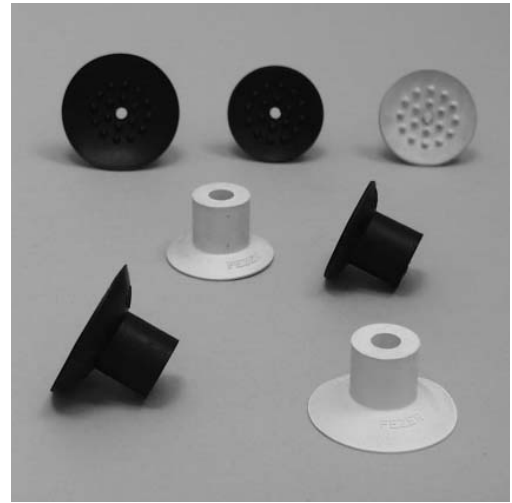
Very elastic rubber suction cup for sticking onto connection nipples. Suitable for holding or transporting small parts, thin-walled materials with even or slightly uneven surface or large-surface parts as thin sheet metals, plastics, etc. When worn out, the suction cup can just be pulled off the connection nipple and replaced by a new one.



Suction cup G 38-CR-W



Suction cup GN with nipples



Suction cup G 10 - G 60

Type	Article Numbers				
	NBR-S	SI-T	CR-W	Connection nipple	
				1/4-A	M 5-A
FS-G 10	1.01.1.0004	1.01.1.0007	1.01.1.0001	--	1.31.1.0002
FS-G 20	1.01.1.0017	1.01.1.0021	1.01.1.0015	1.31.1.0012	1.31.1.0011
FS-G 28	1.01.1.0030	1.01.1.0031	1.01.1.0029	1.31.1.0012	1.31.1.0011
FS-G 38	1.01.1.0050	1.01.1.0051	1.01.1.0049	1.31.1.0014	1.31.1.0013
FS-GN 38	1.01.1.0082	1.01.1.0083	1.01.1.0081	1.31.1.0014	1.31.1.0013
FS-G 47	1.01.1.0058	1.01.1.0059	1.01.1.0057	1.31.1.0014	1.31.1.0013
FS-GN 47	1.01.1.0085	1.01.1.0086	1.01.1.0084	1.31.1.0014	1.31.1.0013
FS-G 60	---	1.01.1.0072	1.01.1.0066	1.31.1.0006	1.31.1.0013

1) Please order connection nipples separately; article numbers only refer to suction cup without connection nipples. GN design with nipple sealing.

Material:

NBR-S Perbunane, black
 SI-T Silicone, transparent
 CR-W Neoprene, white

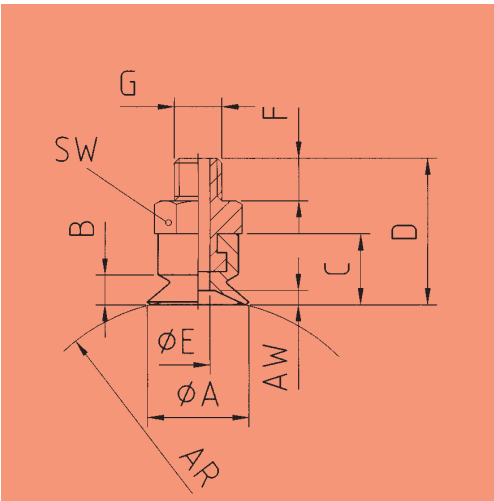
Technical Data				
Type	Hold. force ²⁾ (N)	Weight (g)	Volume ³⁾ (ml)	Bolt type
FS-G 10	3,9	1	0,02	STN-12
FS-G 20	13	6	0,1	STN-16
FS-G 28	20	7	4	STN-16
FS-G 38	46	14	4	STN-16
FS-GN 38	45	14	4	STN-16
FS-G 47	60	15	14	STN-16
FS-GN 47	61,5	15	14	STN-16
FS-G 60	93	22	16	STN-16

2) Holding Forces in N with operational vacuum of 60 % without safety margin relate to even, smooth and dry surfaces

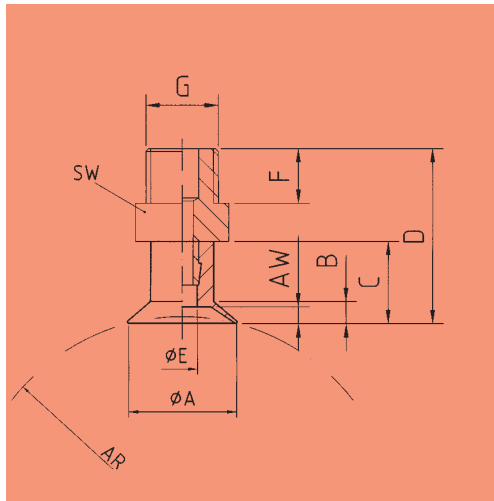
3) Volume with suction cup in released condition

FLAT SUCTION CUP G 10 - G 60, GN 38 - GN 47

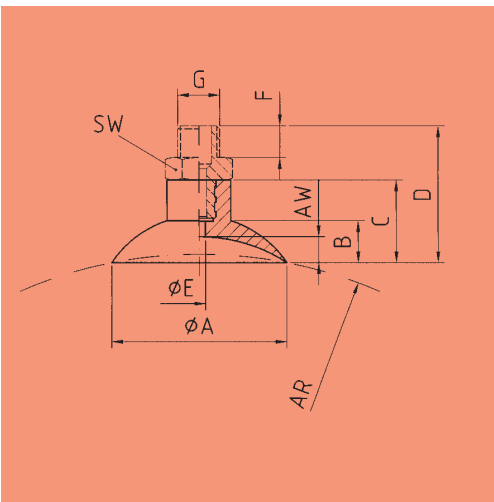
(Perbunane, Silicone, Neoprene)



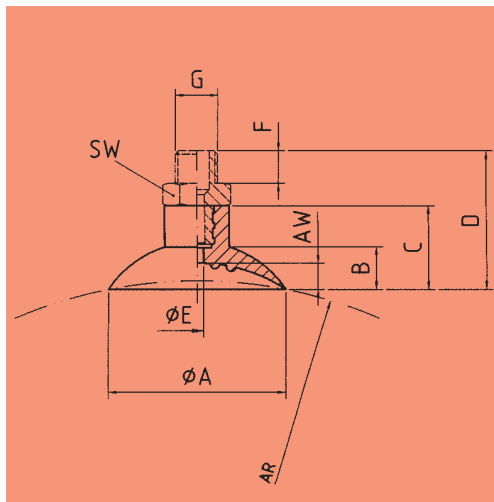
Suction cup G 10



Suction cup G 20 - G 28



Suction cup G 38 - G 60



Suction cup GN 38 und GN 47

Dimensions										
Type	A	B	AW	AR	C	D	E	F	G	SW
FS-G 10	10	3,5	1,5	6	7,5	15,5	2,5	4,5	M 5	8
FS-G 20	20	4	3	15	15	32	5,5	10	R 1/4"	17
FS-G 28	28	4	3	20	15	32	5,5	6	R 1/4"	17
FS-G 38	38	6	3,5	30	23,5	40,5	4,5	10	R 1/4"	19
FS-GN 38	38	6	4	37	23,5	40,5	4,5	10	R 1/4"	19
FS-G 47	47	8	5,5	35	26	43	4,5	10	R 1/4"	19
FS-GN 47	47	8	6	37	26	43	4,5	10	R 1/4"	19
FS-G 60	55	13	8	35	26	43	4	10	R 1/4"	19

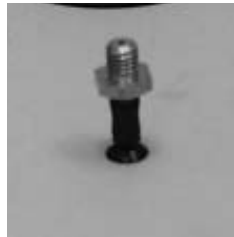
(Perbunane, Silicone, Neoprene, Polyurethane, Vitone)

Description

Very elastic rubber suction cup for sticking onto connection nipples. Suitable for holding or transporting small parts, thin-walled materials or plates.

Antistatic version suitable for electro- and electrical industry for furnishing printed circuit boards.

Suction cups made from polyurethane are very wear-resistant and are mainly used in long-time shifts. Suction cups made of FKM-AF (Vitone) are manufactured in imprint-free design.



Suction cup G 5 with nipple



CD-Rom transport



Suction cup G 2 - G 20

Technical Data

Type	Hold. force ²⁾ (N)	Weight (g)	Volume ³⁾ (ml)	Bolt type	Connection nipple ⁴⁾	
					M5-A	R1/4-A
FS-G 2	0,12	1	0,01	STN-12	1.31.1.0001	---
FS-G 3,5	0,45	1	0,01	STN-12	1.31.1.0001	---
FS-G 5	0,6	1	0,01	STN-12	1.31.1.0002	---
FS-G 6	0,9	1	0,01	STN-12	1.31.1.0002	---
FS-G 8	1,8	1	0,01	STN-12	1.31.1.0002	---
FS-G 10	3,9	1	0,02	STN-12	1.31.1.0002	---
FS-G 15	6	5	0,05	STN-12	1.31.1.0002	---
FS-G 20	12	6	0,1	STN-16	---	1.31.1.0005
FS-G 25	23	7	0,9	STN-16	---	1.31.1.0005
FS-G 30	33	8	1,5	STN-16	---	1.31.1.0005
FS-G 35	46	10	3,6	STN-16	---	1.31.1.0005
FS-G 40	62	12	5,5	STN-16	---	1.31.1.0005
FS-G 50	78	25	7,5	STN-16	---	1.31.1.0004
FS-G 60	139	34	12	STN-16	---	1.31.1.0006
FS-G 80	275	48	25	STN-16	---	1.31.1.0006
FS-G 95	360	62	40	STN-16	---	1.31.1.0006

2) Holding force in N at 60 % operational vacuum w/o safety factor for even, smooth and dry surfaces

3) Volume in disengaged, unloaded position of the suction cup

4) Connection nipple with different connections on request!

Werkstoffe:

NBR-S Perbunane, black

NBR-AS Perbunane antistatic, black

SI-T Silicone, transparent

SI-AS Silicone antistatic, black

CR-GR Neoprene, green

PU Polyurethane, blue

FKM Vitone, black

FKM-AF Vitone, imprint-free, black

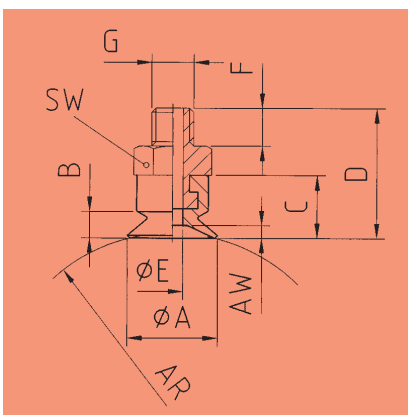
FLAT SUCTION CUP G 1,5 - G 95

(Perbunane, Silicone, Neoprene, Polyurethane, Vitone)

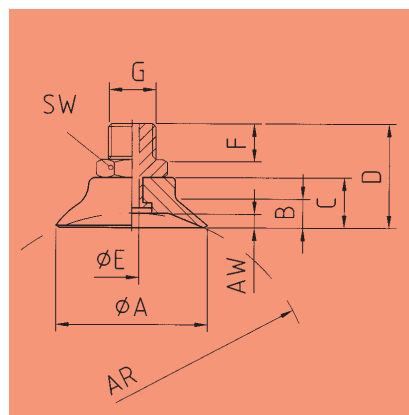
Article number								
Typ	NBR	NBR-AS	SI-T	SI-AS	CR	PU	FKM	FKM-AF
FS-G 2	1.01.1.0034	1.01.1.0033	1.01.1.0037	1.01.1.0036	1.01.1.0032	1.01.1.0035	1.01.1.0114	---
FS-G 3,5	1.01.1.0040	1.01.1.0039	1.01.1.0043	1.01.1.0042	1.01.1.0038	1.01.1.0041	1.01.1.0115	---
FS-G 5	1.01.1.0116	1.01.1.0117	1.01.1.0118	1.01.1.0119	1.01.1.0120	1.01.1.0121	1.01.1.0122	---
FS-G 6	1.01.1.0077	1.01.1.0075	1.01.1.0080	1.01.1.0079	1.01.1.0074	1.01.1.0078	1.01.1.0123	1.01.1.0131
FS-G 8	1.01.1.0124	1.01.1.0125	1.01.1.0126	1.01.1.0127	1.01.1.0128	1.01.1.0129	1.01.1.0130	1.01.1.0132
FS-G 10	1.01.1.0004	1.01.1.0133	1.01.1.0007	1.01.1.0006	1.01.1.0001	1.01.1.0005	1.01.1.0134	1.01.1.0135
FS-G 15	1.01.1.0010	1.01.1.0009	1.01.1.0013	1.01.1.0012	1.01.1.0008	1.01.1.0011	1.01.1.0136	1.01.1.0137
FS-G 20	1.01.1.0017	1.01.1.0016	1.01.1.0021	1.01.1.0020	1.01.1.0015	1.01.1.0019	1.01.1.0138	1.01.1.0139
FS-G 25	1.01.1.0140	1.01.1.0141	1.01.1.0142	1.01.1.0143	1.01.1.0144	1.01.1.0145	1.01.1.0146	1.01.1.0147
FS-G 30	1.01.1.0148	1.01.1.0044	1.01.1.0149	1.01.1.0047	1.01.1.0150	1.01.1.0046	1.01.1.0151	1.01.1.0152
FS-G 35	1.01.1.0153	1.01.1.0154	1.01.1.0155	1.01.1.0156	1.01.1.0157	1.01.1.0158	1.01.1.0159	1.01.1.0160
FS-G 40	1.01.1.0161	1.01.1.0053	1.01.1.0162	1.01.1.0056	1.01.1.0163	1.01.1.0055	1.01.1.0164	1.01.1.0165
FS-G 50	1.01.1.0166	1.01.1.0061	1.01.1.0167	1.01.1.0064	1.01.1.0168	1.01.1.0063	1.01.1.0169	1.01.1.0170
FS-G 60	1.01.1.0171	1.01.1.0067	1.01.1.0172	1.01.1.0071	1.01.1.0173	1.01.1.0070	1.01.1.0174	1.01.1.0175
FS-G 80	1.01.1.0176	1.01.1.0177	1.01.1.0178	1.01.1.0179	1.01.1.0180	1.01.1.0181	1.01.1.0182	1.01.1.0183
FS-G 95	1.01.1.0184	1.01.1.0185	1.01.1.0186	1.01.1.0187	1.01.1.0188	1.01.1.0189	1.01.1.0190	1.01.1.0192

1) Please order connection nipple separately, Article number only refers to suction cup w/o connection nipple.

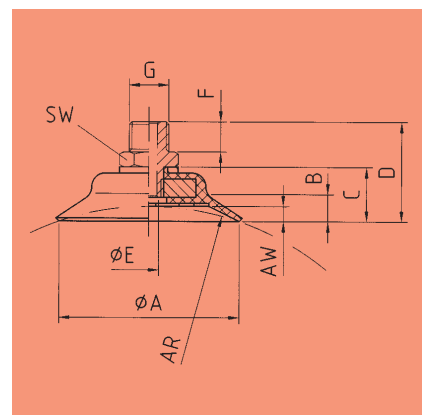
Abmessungen										
Typ	A	B	AW	AR	C	D	E	F	G	SW
FS-G 2	2	---	0,5	2	2,5	12	2,5	4,5	M 5	8
FS-G 3,5	3,5	---	0,5	4	2,5	12	2,5	4,5	M 5	8
FS-G 5	5	2	0,5	5	4	14,5	2,5	4,5	M 5	8
FS-G 6	6	2	0,8	5	4	14,5	2,5	4,5	M 5	8
FS-G 8	8	3	1	6	5,5	15,5	2,5	4,5	M 5	8
FS-G 10	10	3,5	1,5	6	8	16	2,5	4,5	M 5	8
FS-G 15	15	4	2	8	8	16	2,5	4,5	M 5	8
FS-G 20	20	5,5	2	15	10	27,5	3	10	G 1/4"	17
FS-G 25	25	7	2	20	14	29	4	10	G 1/4"	17
FS-G 30	29	7	1,7	25	12	27	4	10	G 1/4"	17
FS-G 35	35	7	3	30	14	29	4	10	G 1/4"	17
FS-G 40	40	8	3,8	35	14	29	4	10	G 1/4"	17
FS-G 50	50	8,5	3,8	50	14	30	4	10	G 1/4"	17
FS-G 60	60	8,5	5	80	18	33	5,5	10	G 1/4"	17
FS-G 80	80	12	6	150	21	36	5,5	10	G 1/4"	17
FS-G 95	100	12	6	250	21	36	5,5	10	G 1/4"	17



Suction cup G 2 - G 16



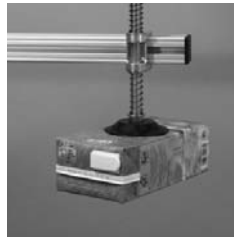
Suction cup G 20 - G 50



Suction cup G 60 - G 95

Description

Very robust and versatile suction cup with connection nipple vulcanized into it. A grooved lining supports the entire suction surface. Suitable for material with smooth and even surface. Because of the grooved lining especially suitable for vertical applications and ones with very high cross accelerations.



Suction cup GR 95



Suction cup GR view from below



Suction cup GR

Materials :

- NBR-S Perbunane, black
- NBR-S Perbunane, grey
- SI-T Silicone, transparent

Article numbers

Type	NBR-S	NBR-G	SI-T	Conn. nipple
FS-GR 75	1.01.2.0006	1.01.2.0005	1.01.2.0007	vulcanized
FS-GR 95	1.01.2.0010	1.01.2.0008	1.01.2.0011	vulcanized
FS-GR 115	1.01.2.0003	1.01.2.0002	1.01.2.0004	vulcanized

Technical Data

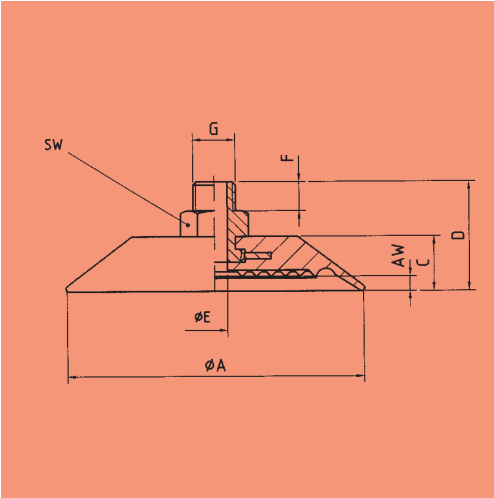
Type	Hold.force ²⁾ (N)	Weight (g)	Volume ³⁾ (ml)	Bolt type
FS-GR 75	169,5	60	30	STN-16
FS-GR 95	270	90	40	STN-16
FS-GR 115	379,5	130	60	STN-16

2) Holding forces in N at 60 % operational vacuum without safety factor, on even, smooth and dry surfaces

3) Volume in released, unloaded condition of the suction cup

FLAT SUCTION CUP GR 75 - GR 115

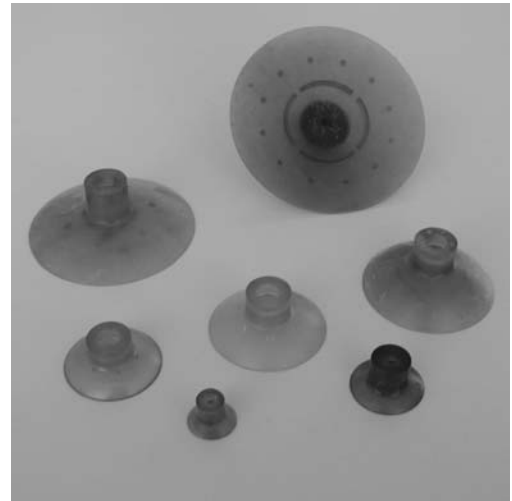
(Perbunane, Silicone, Neoprene)



Dimension								
Type	A	AW	C	D	E	F	G	SW
FS-GR 75	73	4,5	17	34	8	9	R 1/4"	19
FS-GR 95	93	4,5	17	34	8	9	R 1/4"	19
FS-GR 115	113	5	17	34	8	9	R 1/4"	19

Description

Very robust and extremely resistant suction cup made of vulkollane. Vulkollane has an up to 10 times higher life time is especially suitable for use in multi-shift operations. Mainly suitable in automated processes and in the plastic and packing industries. After they are worn out they can be easily removed from the connection nipple and replaced.



Suction cup G 20 VU - G 100 VU made of vulkollane

Materials:

VU-BR Vulkollane brown

Article numbers

Type	VU-BR	conn. nipple 1/8-A	conn. nipple 1/4-A
FS-G 20 VU	1.01.1.0100	1.31.1.0018	---
FS-G 30 VU	1.01.1.0101	1.31.1.0018	---
FS-G 40 VU	1.01.1.0102	---	1.31.1.0019
FS-G 50 VU	1.01.1.0103	---	1.31.1.0019
FS-G 60 VU	1.01.1.0104	---	1.31.1.0019
FS-G 80 VU	1.01.1.0105	---	1.31.1.0019
FS-G 100 VU	1.01.1.0106	---	1.31.1.0019

1) Please order connection nipples separately; article numbers only refer to suction cup without connection nipples.

Technical Data

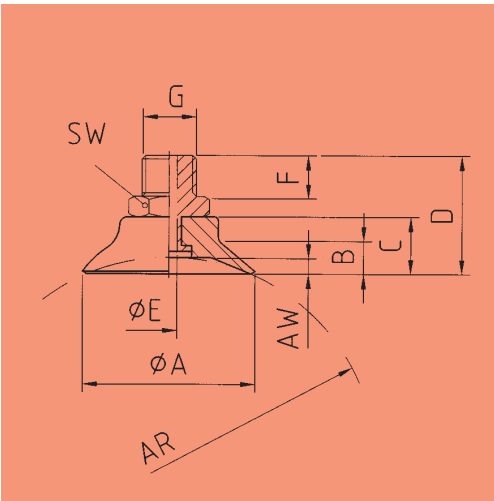
Type	Hold. force ²⁾ (N)	Weight (g)	Volume ³⁾ (ml)	Bolt type
FS-G 20 VU	16	8	0,3	STN-12
FS-G 30 VU	45	12	2,8	STN-12
FS-G 40 VU	68	14	5,8	STN-16
FS-G 50 VU	82	25	9,0	STN-16
FS-G 60 VU	128	34	16	STN-16
FS-G 80 VU	225	85	63	STN-16
FS-G 100 VU	300	120	180	STN-16

2) Holding forces in N at 60 % operational vacuum without safety factor, on even, smooth and dry surfaces

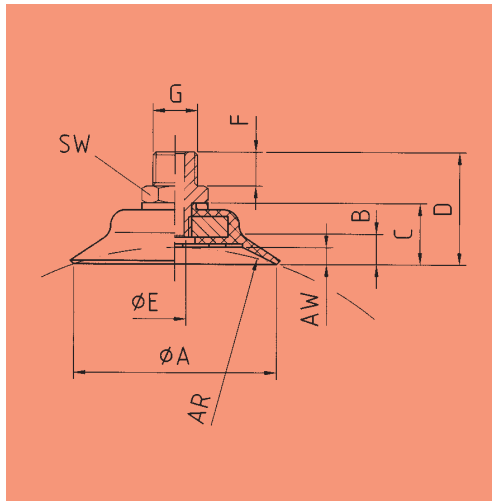
3) Volume in released, unloaded condition of the suction cup

FLAT SUCTION CUP G 20 - G 100

Vulkollane



Suction cup G 20 - G 30 VU



Suction cup G 40 - G 100 VU

Suction cup 2

Dimensions										
Type	A	B	AW	AR	C	D	E	F	G	SW
FS-G 20 VU	20	8	9	15	13	28,5	3	9,5	G 1/8	14
FS-G 30 VU	30	10	14	25	17	32,5	3	9,5	G 1/8	14
FS-G 40 VU	40	7	11	35	17	35	6	10	G 1/4	17
FS-G 50 VU	50	12	16	50	22	40	6	10	G 1/4	17
FS-G 60 VU	60	17	20	80	27	45	6	10	G 1/4	17
FS-G 80 VU	80	12	19	160	26	44	6	10	G 1/4	17
FS-G 100 VU	100	22	22	340	32	50	6	10	G 1/4	17

Description

Very robust and wear-resistant suction cup with 1.5 creases. Suitable for thin-walled materials with smooth or formed surface. Because of the suspension of the suction cup, it is especially suitable for sensitive transporting goods. Because of the elasticity of the creases the suction cup adjusts to the work piece in every situation. Creases pull together when suction process is activated (relatively high suction way).

Suction cup 2



Cups GF 95 and GF 115



Cup GF 55



Cup GF

Materials:

NBR-S Perbunane, black
 SI-R Silicone, red

Article numbers

Type	NBR-S	SI-R	conn. nipple R 1/4"-A
FBS-GF 30	1.02.1.0018	1.02.1.0021	1.31.1.0014
FBS-GF 55	1.02.1.0028	1.02.1.0031	1.31.1.0014
FBS-GF 75	1.02.1.0034	1.02.1.0037	1.31.1.0014
FBS-GF 95	1.02.2.0003	---	vulcanized
FBS-GF 115	1.02.2.0001	---	vulcanized

1) Please order connection nipples separately; article numbers only refer to suction cup without connection nipples.

Technical Data

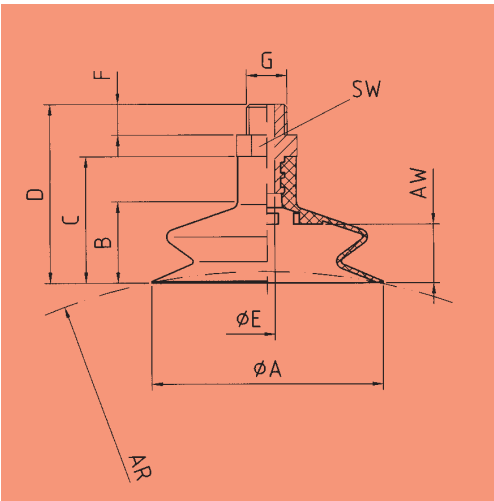
Type	Hold. force ²⁾ (N)	Weight (g)	Volume ³⁾ (ml)	Bolt type
FBS-GF 30	26	13	8	STN-16
FBS-GF 55	57	31	35	STN-16
FBS-GF 75	92	90	100	STN-16
FBS-GF 95	171	100	100	STN-16
FBS-GF 115	320	200	210	STN-16

2) Holding forces in N at 60 % operational vacuum without safety factor, on even, smooth and dry surfaces

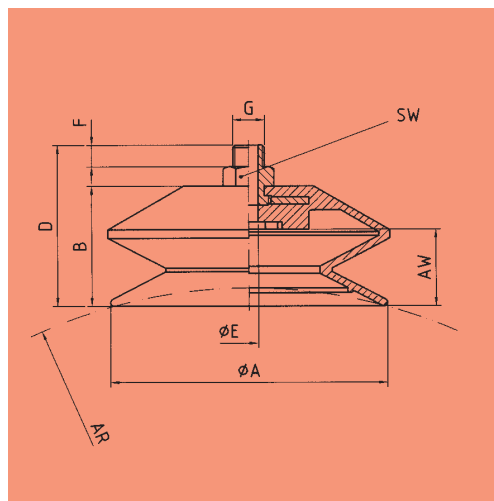
3) Volume in released, unloaded condition of the suction cup

BELLOWS TYPE CUP 30 - GF 115

(Perbunane, Silicone, Neoprene)



Bellows type cups GF 30, GF 55, GF 75



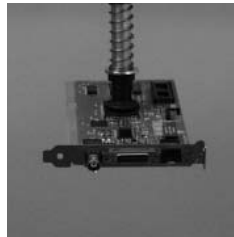
Bellows type cups GF 95 und GF 115

Suction cup 2

Dimensions										
Type	A	B	AW	AR	C	D	E	F	G	SW
FBS-GF 30	30	15	11	12	31	48	5	10	R 1/4"	19
FBS-GF 55	55	24	15	30	41	58	5	10	R 1/4"	19
FBS-GF 75	75	26	19	40	41	58	5	10	R 1/4"	19
FBS-GF 95	95	36	22	50	---	53	8	9	R 1/4"	19
FBS-GF 115	115	50	32	65	---	67	8	9	R 1/4"	19

Description

Very robust and resistant suction cup with 1,5 creases and reinforcement. Suitable for thin-walled materials with smooth or formed surface. Due to the suspension of the suction cup especially suitable for sensitive transporting goods. Antistatic design for furnishing of printed circuit boards and design in polyurethane suitable for higher wear-resistance are both available. Imprint-free design in vitone.



Cup GF 30 S



Cup GF 75 S



Cup GF in NBR AS, SI AS, PU with connection nipple

Articl numbers

Type	NBR	NBR-AS	SI-T	SI-AS	CR	PU	FKM	NR
FBS-GF 10 S	1.02.1.0160	1.02.1.0001	1.02.1.0161	1.02.1.0004	1.02.1.0162	1.02.1.0003	1.02.1.0163	1.02.1.0164
FBS-GF 15 S	1.02.1.0165	1.02.1.0006	1.02.1.0166	1.02.1.0009	1.02.1.0167	1.02.1.0008	1.02.1.0168	1.02.1.0169
FBS-GF 20 S	1.02.1.0170	1.02.1.0012	1.02.1.0171	1.02.1.0015	1.02.1.0172	1.02.1.0014	1.02.1.0173	1.02.1.0174
FBS-GF 30 S	1.02.1.0175	1.02.1.0017	1.02.1.0176	1.02.1.0020	1.02.1.0177	1.02.1.0019	1.02.1.0178	1.02.1.0179
FBS-GF 40 S	1.02.1.0180	1.02.1.0022	1.02.1.0181	1.02.1.0025	1.02.1.0182	1.02.1.0024	1.02.1.0183	1.02.1.0184
FBS-GF 50 S	1.02.1.0185	1.02.1.0027	1.02.1.0186	1.02.1.0030	1.02.1.0187	1.02.1.0195	1.02.1.0188	1.02.1.0189
FBS-GF 75 S	1.02.1.0190	1.02.1.0033	1.02.1.0191	1.02.1.0036	1.02.1.0192	1.02.1.0035	1.02.1.0193	---

1) Please order connection nipples separately; article numbers only refer to suction cup without connection nipples.

Technical Data

Type	Hold. force ²⁾ (N)	Weight (g)	Volume ³⁾ (ml)	Bolt typ	Conn. nipple ⁴⁾	
					M5-A	R1/4-A
FBS-GF 10 S	1	1	0,01	STN-12	1.31.1.0002	---
FBS-GF 15 S	6	2	1	STN-12	1.31.1.0002	---
FBS-GF 20 S	12	5	2,5	STN-16	---	1.31.1.0005
FBS-GF 30 S	33	13	8	STN-16	---	1.31.1.0005
FBS-GF 40 S	55	19	14	STN-16	---	1.31.1.0005
FBS-GF 55 S	89	31	35	STN-16	---	1.31.1.0004
FBS-GF 75 S	197	90	100	STN-16	---	1.31.1.0006

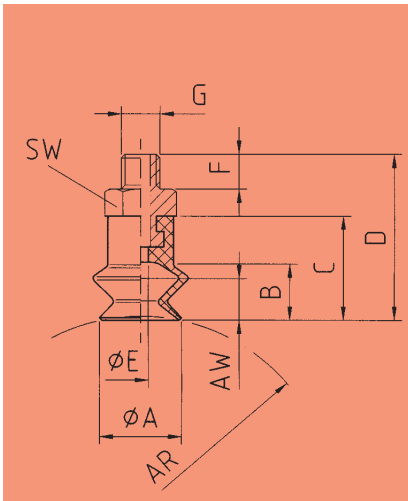
2) Holding forces in N at 60 % operational vacuum without safety factor, on even, smooth and dry surfaces

3) Volume in released, unloaded condition of the suction cup

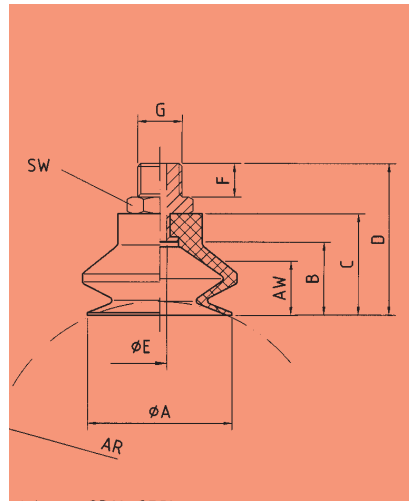
4) Connection nipples with other connection threads on request!

BELLOWS TYPE CUP GF 10 - GF 75

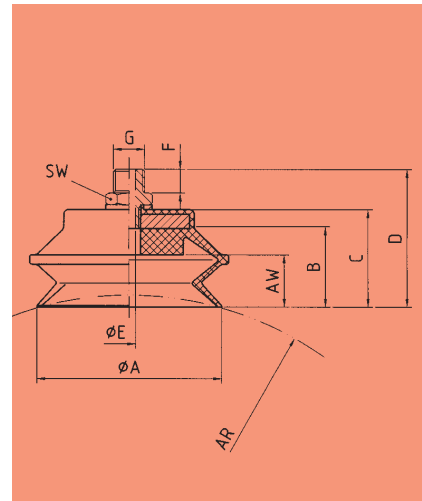
(Perbunane, Silicone, Neoprene, Polyurethan, Vitone, Natural rubber)



Bellows type cups GF 10 S - GF 15 S



FBellows type cups GF 20 S - GF 50 S



Bellows type cup GF 75 S

Dimensions										
Typ	A	B	AW	AR	C	D	E	F	G	SW
FBS-GF 10 S	10	7	4	5	13,5	21,5	2,5	4,5	M 5	8
FBS-GF 15 S	15	10	4	8	16	24	2,5	4,5	M 5	8
FBS-GF 20 S	20	14	9	10	22	37	3	10	G 1/4"	17
FBS-GF 30 S	30	18	13	12	30,5	45,5	4	10	G 1/4"	17
FBS-GF 40 S	40	20	12,5	20	30,5	45,5	4	10	G 1/4"	17
FBS-GF 55 S	50	25	20	25	36,5	51,5	4	10	G 1/4"	17
FBS-GF 75 S	75	34	22	35	41	58	4	10	G 1/4"	17

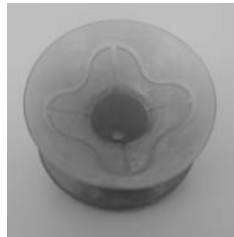
Materials:

- NBR-S Perbunane, black
- NBR-AS Perbunane antistatic, black
- SI-T Silicone, transparent
- SI-AS Silicone antistatic, black
- CR-GR Neoprene, green
- PU Polyurethane, blue
- FKM Vitone, black
- NR Natural rubber, brown

Description

Very robust and extremely resistant cup made of vulkollane with 1 1/2 creases. Vulkollane has an up to 10 times higher life time is especially suitable for use in multi-shift operations. Mainly suitable in automated processes and in the plastic and packing industries. After they are worn out they can be easily removed from the connection nipple and replaced.

Design -ÖN with special oil groove for high cross forces.



GF 85 VU-ÖN with oil groove



Bellows type cup GF 20 VU - GF 85 VU made of vulkollane

Materials:

VU-BR Vulkollane, brown

Article numbers

Type	VU-BR	conn. nipple 1/4-A
FS-GF 20 VU	1.02.1.0100	1.31.1.0021
FS-GF 30 VU	1.02.1.0101	1.31.1.0021
FS-GF 40 VU	1.02.1.0102	1.31.1.0020
FS-GF 40 VU-ÖN	1.02.1.0103	1.31.1.0020
FS-GF 50 VU	1.02.1.0104	1.31.1.0019
FS-GF 60 VU	1.02.1.0105	1.31.1.0022
FS-GF 60 VU-ÖN	1.02.1.0106	1.31.1.0022
FS-GF 85 VU	1.02.1.0107	1.31.1.0022
FS-GF 85 VU-ÖN	1.02.1.0108	1.31.1.0022

1) Please order connection nipples separately; article numbers only refer to suction cup without connection nipples.

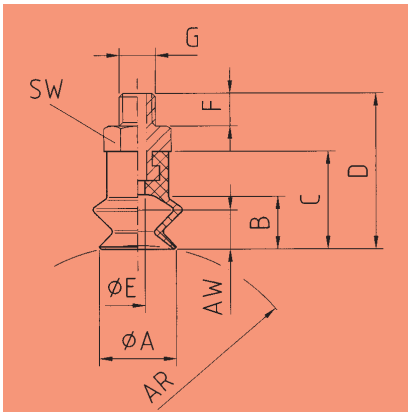
Technical Data

Type	Hold. force ²⁾ (N)	Weight (g)	Volume ³⁾ (ml)	Bolt type
FS-GF 20 VU	25	8	2,8	STN-16
FS-GF 30 VU	39	15	6,5	STN-16
FS-GF 40 VU	73	21	13	STN-16
FS-GF 40 VU-ÖN	75	20	15	STN-16
FS-GF 50 VU	106	28	28	STN-16
FS-GF 60 VU	160	39	34	STN-16
FS-GF 60 VU-ÖN	170	35	38	STN-16
FS-GF 85 VU	220	98	92	STN-16
FS-GF 85 VU-ÖN	230	90	98	STN-16

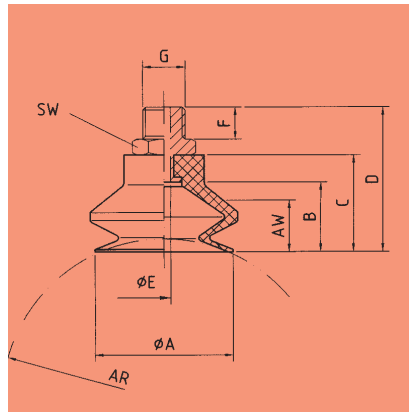
2) Holding forces in N at 60 % operational vacuum without safety factor, on even, smooth and dry surfaces

3) Volume in released, unloaded condition of the suction cup

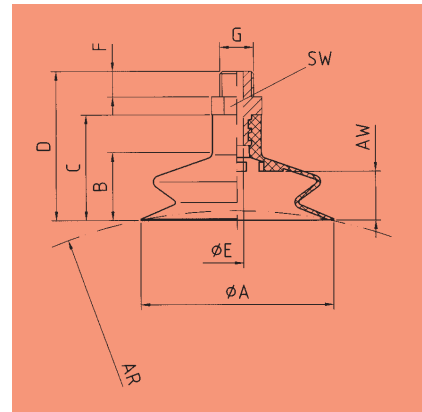
Vulkollane



Bellows type cups GF 20 - GF 30 VU



Bellows type cups GF 40 - GF 85 VU



Bellows type cups GF 40, 60 and 85 VU-ÖN

Dimensions										
Type	A	B	AW	AR	C	D	E	F	G	SW
FS-GF20VU	20	7	13	10	18	30	6	12	G 1/4	19
FS-GF30VU	30	7	13	12	22	34	6	12	G 1/4	19
FS-GF40VU	40	12	17	20	30	47	6	12	G 1/4	19
FS-GF40VU-ÖN	40	12	17	20	30	47	6	12	G 1/4	19
FS-GF50VU	51	17	24	30	41	59	6	10	G 1/4	17
FS-GF60VU	60	20	28	40	40	55	6	10	G 1/4	19
FS-GF60VU-ÖN	60	20	16	40	40	55	6	10	G 1/4	19
FS-GF85VU	85	20	26	50	57	72	6	10	G 1/4	19
FS-GF85VU-ÖN	85	20	26	50	57	72	6	10	G 1/4	19

(Perbunane, Silicone, Neoprene, Polyurethan, Vitone, Natural rubber)

Beschreibung

Very robust and resistant suction cup with 2.5 creases. Suitable for thin-walled materials with smooth or formed surface. Because of the suspension of the suction cup especially suitable for sensitive transporting goods. Because of the elasticity of the creases the suction cup adjusts to the work piece in every situation. Creases pull together when suction process is activated (relatively high suction way).



Cup GFD 30



GFD 90 w/ conn. nipple



Cup GFD w/ connection nipple

Suction cup 2

Article numbers

Type	NBR	NBR-AS	SI-T	SI-AS	CR	PU-B	FKM	NR
FBS-GFD 5	1.02.1.0116	1.02.1.0117	1.02.1.0118	1.02.1.0119	1.02.1.0120	1.02.1.0121	---	1.02.1.0122
FBS-GFD 7	1.02.1.0123	1.02.1.0124	1.02.1.0125	1.02.1.0126	1.02.1.0127	1.02.1.0128	---	1.02.1.0129
FBS-GFD 10	1.02.1.0038	1.02.1.0130	1.02.1.0040	1.02.1.0131	1.02.1.0132	1.02.1.0039	---	1.02.1.0133
FBS-GFD 15	1.02.1.0041	1.02.1.0134	1.02.1.0043	1.02.1.0135	1.02.1.0136	1.02.1.0042	---	1.02.1.0137
FBS-GFD 18	1.02.1.0138	1.02.1.0139	1.02.1.0140	1.02.1.0141	1.02.1.0142	1.02.1.0143	1.02.1.0144	1.02.1.0145
FBS-GFD 20	1.02.1.0044	1.02.1.0146	1.02.1.0046	1.02.1.0147	1.02.1.0148	1.02.1.0045	1.02.1.0149	1.02.1.0150
FBS-GFD 30	1.02.1.0047	1.02.1.0151	1.02.1.0049	1.02.1.0152	1.02.1.0153	1.02.1.0048	1.02.1.0154	1.02.1.0155
FBS-GFD 40	1.02.1.0050	1.02.1.0156	1.02.1.0052	1.02.1.0157	1.02.1.0158	1.02.1.0051	---	1.02.1.0159
FBS-GFD 60	1.02.1.0056	---	1.02.1.0058	---	---	1.02.1.0057		
FBS-GFD 90	1.02.1.0059	---	1.02.1.0061	---	---	---		

1) Please order connection nipples separately; article numbers only refer to suction cup without conn. nipples.

Technical Data

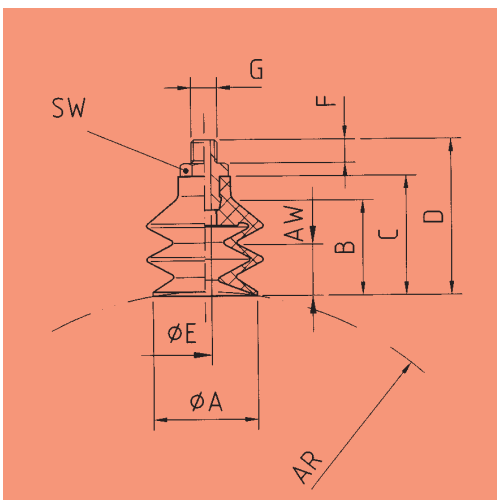
Type	Hold. force ²⁾ (N)	Weight (g)	Volume ³⁾ (ml)	Bolt type	Conn. nipple	
					M5-A	R1/4-A
FBS-GFD 5 S				STN-12	1.31.1.0002	---
FBS-GFD 7 S				STN-12	1.31.1.0002	---
FBS-GFD 10 S	1	4	0,4	STN-12	1.31.1.0003	---
FBS-GFD 15 S				STN-12	1.31.1.0003	---
FBS-GFD 18 S	6	4	1	STN-12	1.31.1.0003	---
FBS-GFD 20 S	13	5	2,5	STN-12	1.31.1.0003	---
FBS-GFD 30 S	30	34	10	STN-16	---	1.31.1.0005
FBS-GFD 40 S	51	40	19	STN-16	---	1.31.1.0005
FBS-GFD 60 S	96	80	55	STN-16	---	1.31.1.0005
FBS-GFD 90 S	246	198	140	STN-16	---	1.31.1.0008

2) Holding forces in N at 60 % operational vacuum without safety factor, on even, smooth and dry surfaces

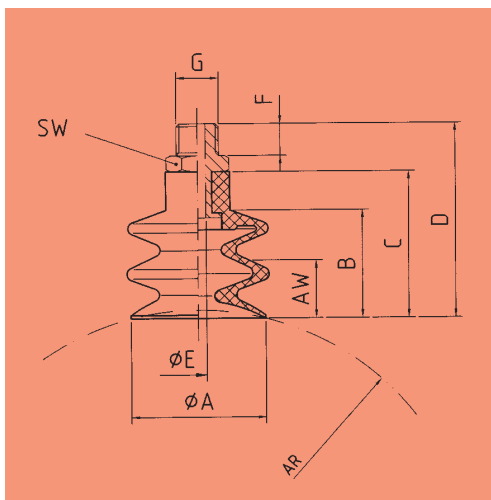
3) Volume in released, unloaded condition of the suction cup

FALTENBALGSAUGER GFD 5 - GFD 90

(Perbunane, Silicone, Neoprene, Polyurethane, Vitone, Natural rubber)



Cup GFD 10 - GFD 20



Cup GFD 30 - GFD 90

2
Suction cup

Dimensions										
Type	A	B	AW	AR	C	D	E	F	G	SW
FBS-GFD 5 S	5	6	3	---	10	18	2,5	4,5	M 5	8
FBS-GFD 7 S	7	6	3	---	10	18	2,5	4,5	M 5	8
FBS-GFD 10 S	9	8	3	4	15	22	3,5	4,5	M 5	8
FBS-GFD 15 S	14	16	7	6	23	30	3,5	4,5	M 5	8
FBS-GFD 18 S	18	16	8	7	23	30	3,5	4,5	M 5	8
FBS-GFD 20 S	20	17,5	9	8	23	30	3,5	4,5	M 5	8
FBS-GFD 30 S	32	26	14	10	37,5	52,5	3,5	10	G 1/4"	17
FBS-GFD 40 S	42	34	17	15	46	61	3,5	10	G 1/4"	17
FBS-GFD 60 S	62	50	23	25	55	70	3,5	10	G 1/4"	17
FBS-GFD 90 S	88	76	27	50	87,5	102,5	3,5	10	G 1/4"	17

Materials:

- NBR-S Perbunane, black
- NBR-AS Perbunane antistatic, black
- SI-T Silicone, transparent
- SI-AS Silicone antistatic, black
- CR-GR Neoprene, green
- PU Polyurethane, blue
- FKM Vitone, black
- NR Natural rubber, brown

Description

Very robust and extremely resistant cup made of vulkollane with 2 1/2 creases. Vulkollane has an up to 10 times higher life time is especially suitable for use in multi-shift operations. Mainly suitable in automated processes and in the plastic and packing industries. After they are worn out they can be easily removed from the connection nipple and replaced. Design -ÖN with special oil groove for high cross forces.



Cup GFD 20 VU - GFD 85 VU made of vulkollane

Suction cup 2

Materials:

VU-BR Vulkollane, brown

Article numbers

Type	VU-BR	conn. nipple 1/4-A
FS-GFD 20 VU	1.02.1.0110	1.31.1.1.0021
FS-GFD 30 VU	1.02.1.0111	1.31.1.1.0021
FS-GFD 50 VU	1.02.1.0112	1.31.1.1.0020
FS-GFD 60 VU	1.02.1.0113	1.31.1.1.0020
FS-GFD 85 VU	1.02.1.0114	1.31.1.1.0022
FS-GFD 85 VU-ÖN	1.02.1.0115	1.31.1.1.0022

1) Please order connection nipples separately; article numbers only refer to suction cup without conn. nipples.

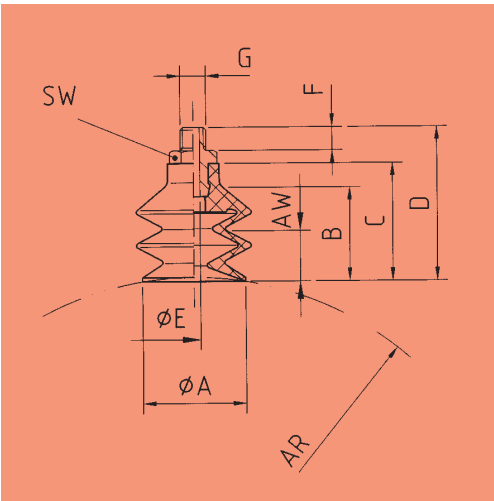
Technische Daten

Typ	Haltekraft ²⁾ (N)	Gewicht (g)	Volumen ³⁾ (ml)	Stößel- typ
FS-GFD 20 VU	24	19	4,0	STN-16
FS-GFD 30 VU	38	24	11	STN-16
FS-GFD 50 VU	95	31	48	STN-16
FS-GFD 60 VU	150	42	63	STN-16
FS-GFD 85 VU	280	112	170	STN-16
FS-GFD 85 VU-ÖN	290	112	170	STN-16

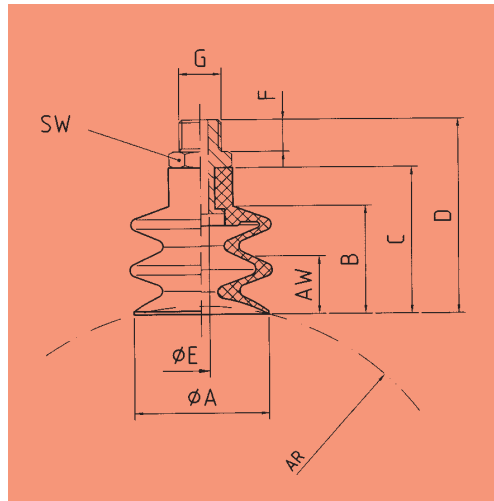
2) Holding forces in N at 60 % operational vacuum without safety factor, on even, smooth and dry surfaces

3) Volume in released, unloaded condition of the suction cup

Vulkollane



Cups GFD 20 - GFD 30 VU



















Cups GFD 50 - GFD 85 VU

Dimensions										
Type	A	B	AW	AR	C	D	E	F	G	SW
FS-GFD 20 VU	20	18	16	10	25	37	6	12	G 1/4	19
FS-GFD 30 VU	30	25	16	12	32	44	6	12	G 1/4	19
FS-GFD 50 VU	51	35	20	20	45	62	6	12	G 1/4	19
FS-GFD 60 VU	60	55	31	25	70	87	6	12	G 1/4	19
FS-GFD 85 VU	85	61	41	50	81	96	6	10	G 1/4	19
FS-GFD 85 VU-ÖN	85	61	41	50	81	96	6	10	G 1/4	19

3

SUCTION PLATES

Suct. Plates 3

	<i>Suction plates FSRL 110 - 600</i>	3.3
	<i>Suction plates FSL 110 - 630</i>	3.5
	<i>Suction plates FSD 85 - 250</i>	3.7
	<i>Suction plates FSM 100 - 310</i>	3.9
	<i>Suction plates FSBL 110</i>	3.11
	<i>Suction plates FS 55x85 - FS 80x370</i>	3.13
	<i>Suction plates FSL 100x200 - FSRL 180x500</i>	3.15
	<i>Suction plates KPHL 450x850</i>	3.17
	<i>Bellows type plate GF 120 - GF 350</i>	3.19
	<i>Bellows type plate GF 60x140 - GF 100x200</i>	3.21
	<i>Bellows type plate GFD 150</i>	3.23
	<i>Suction plate FSHB 90 - FSHB 250</i>	3.25
	<i>Suction plate KPHLI 250</i>	3.27
	<i>Suction plate KPHM 100 -320</i>	3.29
	<i>Suction plate KPHL 100x200 - 100x300</i>	3.31
	<i>Suction plate KPHM 100x300</i>	3.33

3

SUCTION PLATES

	<i>Suction plates 80x460 - KPHM 250x460</i>	3.35
	<i>Suction plates PHZ 35x170 - PHM 250x460</i>	3.37
	<i>Suction plates (W)PHM 90x110 - (W)PHM 90x1570</i>	3.39
	<i>Suction plates EP 23x13 - EP 105x35</i>	3.41
	<i>Holding plates EP 45x40 - EP 105x35</i>	3.43
	<i>Holding plates DP-FS 30x100 - DP-FS 30x300</i>	3.45
	<i>Sealing profiles</i>	3.47
	<i>Special glue for sealing profiles</i>	3.49
	<i>Textile cover for suction plates TÛZ</i>	3.50

Description

Sealing plate with vulcanised seal, a short sealing lip and grooves.

Suitable for even workpieces with a smooth surface and for thin-walled parts.

The vulcanized seal ensures a high degree of operating safety.

The sealing plates are simply screwed onto the rigid or articulated suction plate retainer SAS or SAK and can easily be exchanged in the case of wear and tear. The sealing plates are optionally available with central or lateral vacuum supply



FSRL 160



FSRL 220 with bolt connection



Suction plate DP-FSRL 400 with plate retainer SAK-M20

Suct. plates 3

Materials:

NBR-G Perbunane, grey
 SI-T Silicone, transparent

Article numbers

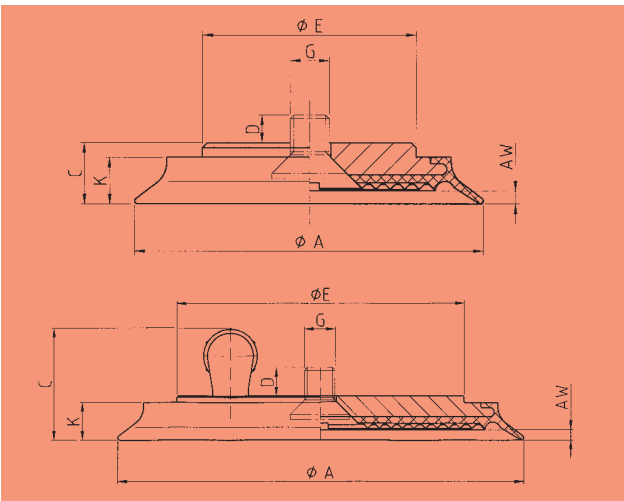
Type	Suction plate		conn. screw	
	NBR-G	SI-T	Type	Part no.
DP-FSRL 110 Z	1.11.1.0103	1.11.1.0104	ASB-M12-18	1.31.2.0003
DP-FSRL 110 S	1.11.1.0101	1.11.1.0102	AS-M12-18	1.31.2.0010
DP-FSRL 160 Z	1.11.1.0107	1.11.1.0108	ASB-M12-18	1.31.2.0003
DP-FSRL 160 S	1.11.1.0105	1.11.1.0106	AS-M12-18	1.31.2.0010
DP-FSRL 220 Z	1.11.1.0111	1.11.1.0112	ASB-M16-25	1.31.2.0007
DP-FSRL 220 S	1.11.1.0109	1.11.1.0110	AS-M16-25	1.31.2.0014
DP-FSRL 280 Z	1.11.1.0115	1.11.1.0116	ASB-M16-25	1.31.2.0007
DP-FSRL 280 S	1.11.1.0113	1.11.1.0114	AS-M16-25	1.31.2.0014
DP-FSRL 340 S	1.11.1.0141	1.11.1.0142	AS-M24-32	1.31.2.0029
DP-FSRL 400 S	1.11.1.0143	1.11.1.0144	AS-M24-32	1.31.2.0029
DP-FSRL 500 S	1.11.1.0145	1.11.1.0146	AS-M24-32	1.31.2.0029
DP-FSRL 600 S	1.11.1.0147	1.11.1.0148	AS-M24-32	1.31.2.0029

Z with central vacuum supply
 S with lateral vacuum supply

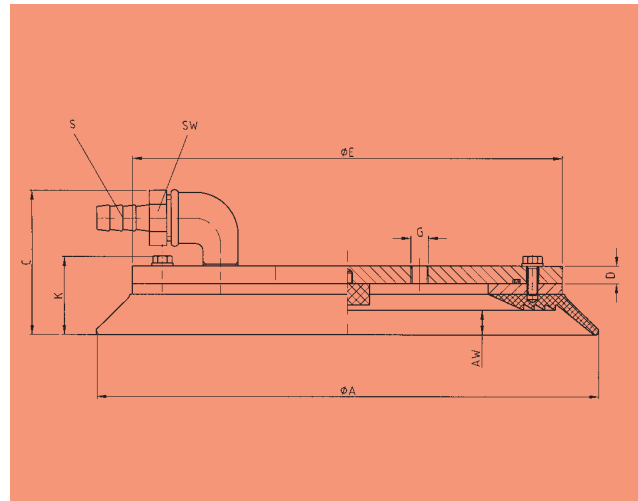
Technical Data

Type	Hold.force ¹⁾ (N)	Weight (kg)	Volume ²⁾ (l)
DP-FSRL 110 Z	495	0,31	0,06
DP-FSRL 110 S	495	0,32	0,06
DP-FSRL 160 Z	1129	0,47	0,12
DP-FSRL 160 S	1129	0,53	0,12
DP-FSRL 220 Z	2130	1,22	0,2
DP-FSRL 220 S	2130	1,30	0,2
DP-FSRL 280 Z	3139	1,70	0,78
DP-FSRL 280 S	3139	1,78	0,78
DP-FSRL 340 S	3645	4,5	1,3
DP-FSRL 400 S	4000	6,0	2,6
DP-FSRL 500 S	6750	11,8	4,3
DP-FSRL 600 S	9000	18,4	6,8

1) Holding Forces in N with operational vacuum of 60 % without safety margin relate to even, smooth and dry surfaces
 2) Volume with suction cup in released condition



FSrL 110 to 280 Z/S with central (above) and lateral (below) vacuum supply



FSRL 340 to 600 S with lateral vacuum supply

Dimensions

Type	A	AW	C	D	E	G	K	S (LW)	SW
DP-FSRL 110 Z	110	4,5	19	9,5	66	M 12	14,5	---	---
DP-FSRL 110 S	110	4,5	34	9,5	66	M 12	14,5	6*	8
DP-FSRL 160 Z	160	4,5	19	9,5	112	M 12	14,5	---	---
DP-FSRL 160 S	160	4,5	44	9,5	112	M 12	14,5	10	19
DP-FSRL 220 Z	220	5,5	26	10	74	M 16	18	---	---
DP-FSRL 220 S	220	5,5	52	10	74	M 16	18	1/2"	27
DP-FSRL 280 Z	280	5,5	25	10	74	M 16	18	---	---
DP-FSRL 280 S	280	5,5	52	10	74	M 16	18	1/2"	27
DP-FSRL 340 S									
DP-FSRL 400 S									
DP-FSRL 500 S									
DP-FSRL 600 S									

*) for pneumatic tube VS-6-B

Overview table for suitable connection elements

	Suction plate retainer rigid		Suction plate retainer articulated		Flow valves	Touch valves	Bolt type	Hose connection
	SAS-M12	Part no:	SAK-M12	Part no:				
DP-FSRL 110 Z	SAS-M12	1.31.2.0020	SAK-M12	1.31.2.0018	SV-M12	TV-M12	STN-16-M12	VS-10-T
DP-FSRL 110 S	SAS-M12	1.31.2.0020	SAK-M12	1.31.2.0018	SVS-1/4"	---	STG-16-M12	VS-6-B
DP-FSRL 160 Z	SAS-M12	1.31.2.0020	SAK-M12	1.31.2.0018	SV-M12	TV-M12	STN-16-M12	VS-10-T
DP-FSRL 160 S	SAS-M12	1.31.2.0020	SAK-M12	1.31.2.0018	SVS-1/4"	---	STG-16-M12	VS-10-T
DP-FSRL 220 Z	SAS-M16	1.31.2.0021	SAK-M16	1.31.2.0019	SV-M16	TV-M16	STN-20-M16	VS-1/2-T
DP-FSRL 220 S	SAS-M16	1.31.2.0021	SAK-M16	1.31.2.0019	SVS-1/2"	---	STG-20-M16	VS-1/2-T
DP-FSRL 280 Z	SAS-M16	1.31.2.0021	SAK-M16	1.31.2.0019	SV-M16	TV-M16	STN-20-M16	VS-1/2-T
DP-FSRL 280 S	SAS-M16	1.31.2.0021	SAK-M16	1.31.2.0019	SVS-1/2"	---	STG-20-M16	VS-1/2-T
DP-FSRL 340 S	SAS-M20	1.31.2.0027	SAK-M20	1.31.2.0025	SVS 1/2"	---	STG-20-M20	VS-1/2-T
DP-FSRL 400 S	SAS-M20	1.31.2.0027	SAK-M20	1.31.2.0025	SVS 1/2"	---	STG-20-M20	VS-1/2-T
DP-FSRL 500 S	SAS-M30	1.31.2.0028	SAK-M30	1.31.2.0026	SVS 3/4"	---	STG-30-M30	VS-3/4-T
DP-FSRL 600 S	SAS-M30	1.31.2.0028	SAK-M30	1.31.2.0026	SVS 3/4"	---	STG-30-M30	VS-3/4-T

Description

Suction plate with vulcanized seal, a longer sealing lip, without grooves but with a support ring. Suitable for workpieces with a slightly rough or oxidized surface as well as for slack parts. The vulcanised seal guarantees a high degree of operating safety.

The sealing plates are simply screwed onto the rigid or articulated suction plate retainers SAS or SAK and can easily be exchanged if they are worn. The sealing plates are optionally available with central or lateral vacuum supply.

The connection screw is supplied with the sealing plate.



FSL 230w/o sealing



FSL 160with installation kit



Suction plates DP-FSL 110 - 290

Article numbers

Type	Suction plate		Replacement sealing		conn. screw	
	NBR-G	SI-T	NBR-G	SI-T	Type	Part no.
DP-FSL 110 Z	1.11.1.0087	1.11.1.0088	---	---	ASB-M12-18	1.31.2.0003
DP-FSL 110 S	1.11.1.0085	1.11.1.0086	---	---	AS-M12-18	1.31.2.0010
DP-FSL 160 Z	1.11.1.0091	1.11.1.0092	---	---	ASB-M12-18	1.31.2.0003
DP-FSL 160 S	1.11.1.0089	1.11.1.0090	---	---	AS-M12-18	1.31.2.0010
DP-FSL 230 Z	1.11.1.0095	1.11.1.0096	---	---	ASB-M16-25	1.31.2.0007
DP-FSL 230 S	1.11.1.0093	1.11.1.0094	---	---	AS-M16-25	1.31.2.0014
DP-FSL 290 Z	1.11.1.0099	1.11.1.0100	---	---	ASB-M16-25	1.31.2.0007
DP-FSL 290 S	1.11.1.0097	1.11.1.0098	---	---	AS-M16-25	1.31.2.0014
DP-FSL 360 S			1.13.1.0029	1.13.1.0031	AS-M24-32	1.31.2.0029
DP-FSL 400 S			1.13.1.0032	1.13.1.0034	AS-M24-32	1.31.2.0029
DP-FSL 450 S			1.13.1.0038	1.13.1.0040	AS-M24-32	1.31.2.0029
DP-FSL 540 S			1.13.1.0041	1.13.1.0043	AS-M24-32	1.31.2.0029
DP-FSL 630 S			1.13.1.0044	1.13.1.0046	---	---

Z with central vacuum supply
S with lateral vacuum supply

Materials:

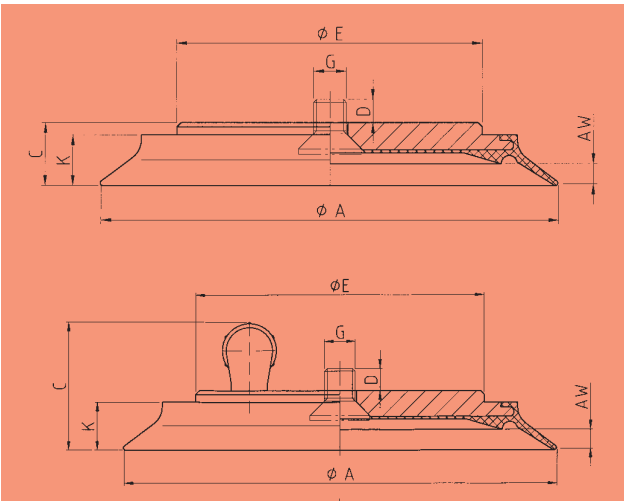
NBR-G Perbunane, grey
SI-T Silicone, transparent

Technical Data

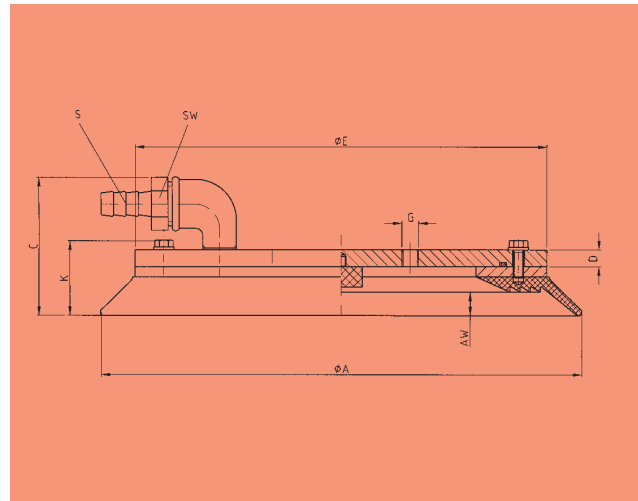
Type	Hold.force ¹⁾	Weight	Volume ²⁾
	(N)	(kg)	(l)
DP-FSL 110 Z	375	0,33	0,85
DP-FSL 110 S	375	0,34	0,85
DP-FSL 160 Z	900	0,45	0,12
DP-FSL 160 S	900	0,51	0,12
DP-FSL 230 Z	2049	1,07	0,43
DP-FSL 230 S	2049	1,15	0,43
DP-FSL 290 Z	3579	1,68	0,96
DP-FSL 290 S	3579	1,68	0,96
DP-FSL 360 S	5230	8,8	2,0
DP-FSL 400 S	6140	10	2,35
DP-FSL 450 S	7500	16,5	4,5
DP-FSL 540 S	12500	17,4	6,8
DP-FSL 630 S	16600	36	12,1

1) Holding Forces in N with operational vacuum of 60 % without safety margin relate to even, smooth and dry surfaces

2) Volume with suction cup in released condition



FSL 110 to 290 Z/S with central (above) and lateral (below) vacuum supply



FSL 360 to 540 S with lateral vacuum supply
 Suspension FSL 630 w/ suspension bracket AB 40 and bolt ST-KPT-40

Suct. plates 3

Dimensions									
Type	A	AW	C	D	E	G	K	S (LW)	SW
DP-FSL 110 Z	110	7,5	23	9,5	66	M12	18,5	---	---
DP-FSL 110 S	110	7,5	38	9,5	66	M12	18,5	6*	8
DP-FSL 160 Z	160	8	23	9,5	102	M 12	18,5	---	---
DP-FSL 160 S	160	8	23	9,5	102	M 12	18,5	10	19
DP-FSL 230 Z	230	8	29	10	74	M 16	22	---	---
DP-FSL 230 S	230	8	29	10	74	M 16	22	1/2"	27
DP-FSL 290 Z	290	10	33	10	74	M 16	26	---	---
DP-FSL 290 S	290	10	33	10	74	M 16	26	1/2"	27
DP-FSL 360 S	360	6	94	12	322	R 3/4"	34	3/4"	32
DP-FSL 400 S	400	14	89	12	346	R 3/4"	29	3/4"	32
DP-FSL 450 S	450	17	111	15	375	R 3/4"	50	3/4"	32
DP-FSL 540 S	540	17	120	15	465	R 3/4"	50	3/4"	32
DP-FSL 630 S	630	17	120	15	555	R 1"	50	1"	36

*) for pneumatic tube VS-6-B

	Suction plate retainer rigid		Suction plate retainer articulated		Flow valve	Touch valve	Bolt type	Hose connection
	Part no:	Part no:	Part no:	Part no:				
DP-FSL 110 Z	SAS-M12	1.31.2.0020	SAK-M12	1.31.2.0018	SV-M12	TV-M12 ^{*)}	STN-16-M12	VS-10-T
DP-FSL 110 S	SAS-M12	1.31.2.0020	SAK-M12	1.31.2.0018	SVS-1/4"	---	STG-16-M12	VS-6-B
DP-FSL 160 Z	SAS-M12	1.31.2.0020	SAK-M12	1.31.2.0018	SV-M12	TV-M12 ^{*)}	STN-16-M12	VS-10-T
DP-FSL 160 S	SAS-M12	1.31.2.0020	SAK-M12	1.31.2.0018	SVS-1/4"	---	STG-16-M12	VS-10-T
DP-FSL 230 Z	SAS-M16	1.31.2.0021	SAK-M16	1.31.2.0019	SV-M16	TV-M16	STN-20-M16	VS-1/2-T
DP-FSL 230 S	SAS-M16	1.31.2.0021	SAK-M16	1.31.2.0019	SVS-1/2"	---	STG-20-M16	VS-1/2-T
DP-FSL 290 Z	SAS-M16	1.31.2.0021	SAK-M16	1.31.2.0019	SV-M16	TV-M16	STN-20-M16	VS-1/2-T
DP-FSL 290 S	SAS-M16	1.31.2.0021	SAK-M16	1.31.2.0019	SVS-1/2"	---	STG-20-M16	VS-1/2-T
DP-FSL 360 S	SAS-M20	1.31.2.0027	SAK-M20	1.31.2.0025	SVS 1/2"	---	STG-20-M20	VS-1/2-T
DP-FSL 400 S	SAS-M20	1.31.2.0027	SAK-M20	1.31.2.0025	SVS 1/2"	---	STG-20-M20	VS-1/2-T
DP-FSL 450 S	SAS-M30	1.31.2.0028	SAK-M30	1.31.2.0026	SVS 3/4"	---	STG-30-M30	VS-3/4-T
DP-FSL 540 S	SAS-M30	1.31.2.0028	SAK-M30	1.31.2.0026	SVS 3/4"	---	STG-30-M30	VS-3/4-T
DP-FSL 630 S	---	---	AB-40	1.31.2.0034	---	---	ST-KPT-40	VS-1-T

Description

Sealing plate with vulcanised seal, a soft sealing lip and no bearing surface.

Suitable for workpieces with a very rough or structure surface, as well as for roughly sawn wood.

The vulcanised seal guarantees maximum operating safety.

The sealing plates are simply screwed onto the rigid or articulated suction plate retainers SAS or SAK and can easily be exchanged if they are worn. The sealing plates are optionally available with central or lateral vacuum supply.

The connection screw is supplied with the sealing plate.



FSD 250



FSD 90 with installation kit



Sealing plates DP-FSD 90 - 260 with central vacuum supply

Materials:

NRS Norsorex, grey, shore hardness 20°

SI-T Silicone, transparent, shore hardness 50°

Article numbers

Type	Suction plate		conn. screw	
	NRS-G	SI-T	Type	Part no.
DP-FSD 85 Z	1.11.1.0078	1.11.1.0079	ASB-M12-18	1.31.2.0003
DP-FSD 85 S	1.11.1.0076	1.11.1.0077	AS-M12-18	1.31.2.0010
DP-FSD 140 Z	1.11.1.0066	1.11.1.0067	ASB-M12-18	1.31.2.0003
DP-FSD 140 S	1.11.1.0064	1.11.1.0065	AS-M12-18	1.31.2.0010
DP-FSD 200 Z	1.11.1.0070	1.11.1.0071	ASB-M16-25	1.31.2.0007
DP-FSD 200 S	1.11.1.0068	1.11.1.0069	AS-M16-25	1.31.2.0014
DP-FSD 230 Z	1.11.1.0133	1.11.1.0138	ASB-M16-25	1.31.2.0007
DP-FSD 230 S	1.11.1.0139	1.11.1.0140	AS-M16-25	1.31.2.0014
DP-FSD 260 Z	1.11.1.0074	1.11.1.0075	ASB-M16-25	1.31.2.0007
DP-FSD 260 S	1.11.1.0072	1.11.1.0073	AS-M16-25	1.31.2.0014

Z with central vacuum supply

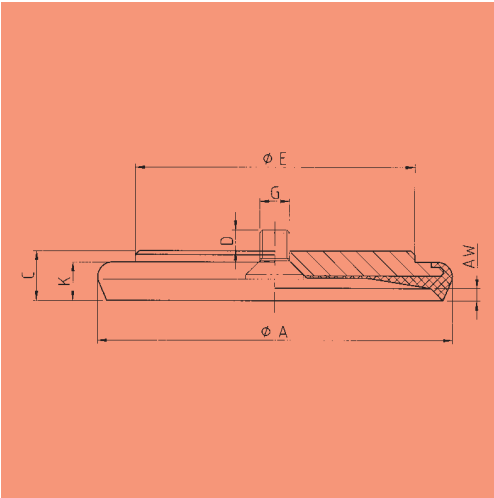
S with lateral vacuum supply

Technical Data

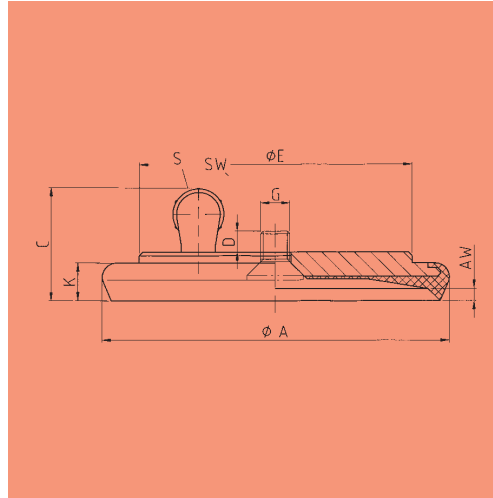
Type	Hold.force ¹⁾ (N)	Weight (kg)	Volume ²⁾ (ml)
DP-FSD 85 Z	300	0,13	70
DP-FSD 85 S	300	0,14	70
DP-FSD 140 Z	759	0,40	130
DP-FSD 140 S	759	0,46	130
DP-FSD 200 Z	1579	1,20	240
DP-FSD 200 S	1579	1,28	240
DP-FSD 230 Z	2050	1,26	580
DP-FSD 230 S	2050	1,34	580
DP-FSD 260 Z	2600	1,32	950
DP-FSD 260 S	2600	1,40	950

1) Holding Forces in N with operational vacuum of 60 % without safety margin relate to even, smooth and dry surfaces

2) Volume with suction cup in released condition



Suction platen DP-FSD ... Z with central vacuum supply



Suction platen DP-FSD ... S with lateral vacuum supply

Dimensions									
Type	A	AW	C	D	E	G	K	S (LW)	SW
DP-FSD 85 Z	85	5	20	9,5	66	M 12	15,5	---	---
DP-FSD 85 S	85	5	35	9,5	66	M 12	15,5	6*	8
DP-FSD 140 Z	140	5	20	9,5	112	M 12	15,5	---	---
DP-FSD 140 S	140	5	45	9,5	112	M 12	15,5	10	19
DP-FSD 200 Z	200	5	25	10	75	M 16	18	---	---
DP-FSD 200 S	200	5	52	10	75	M 16	18	1/2"	27
DP-FSD 230 Z	230	5	25	10	75	M 16	18	---	---
DP-FSD 230 S	230	5	25	10	75	M 16	18	1/2"	27
DP-FSD 260 Z	260	5	25	10	75	M 16	18	---	---
DP-FSD 260 S	260	5	52	10	75	M 16	18	1/2"	27

*) for pneumatic tube VS-6-B

	Suction plate retainer rigid		Suction plate retainer articulated		Flow valve	Touch valve	Bolt type	Hose connection
	SAS-M12	Part no:	SAK-M12	Part no:				
DP-FSD 85 Z	SAS-M12	1.31.2.0020	SAK-M12	1.31.2.0018	SV-M12	TV-M12	STN-16-M12	VS-10-T
DP-FSD 85 S	SAS-M12	1.31.2.0020	SAK-M12	1.31.2.0018	SVS-1/4"	---	STG-16-M12	VS-6-B
DP-FSD 140 Z	SAS-M12	1.31.2.0020	SAK-M12	1.31.2.0018	SV-M12	TV-M12	STN-16-M12	VS-10-T
DP-FSD 140 S	SAS-M12	1.31.2.0020	SAK-M12	1.31.2.0018	SVS-1/4"	---	STG-16-M12	VS-10-T
DP-FSD 200 Z	SAS-M16	1.31.2.0021	SAK-M16	1.31.2.0019	SV-M16	TV-M16	STN-20-M16	VS-1/2-T
DP-FSD 200 S	SAS-M16	1.31.2.0021	SAK-M16	1.31.2.0019	SV-M16	---	STN-20-M16	VS-1/2-T
DP-FSD 230 Z	SAS-M16	1.31.2.0021	SAK-M16	1.31.2.0019	SV-M16	TV-M16	STN-20-M16	VS-1/2-T
DP-FSD 230 S	SAS-M16	1.31.2.0021	SAK-M16	1.31.2.0019	SVS-1/2"	---	STG-20-M16	VS-1/2-T
DP-FSD 260 Z	SAS-M16	1.31.2.0021	SAK-M16	1.31.2.0019	SV-M16	TV-M16	STN-20-M16	VS-1/2-T
DP-FSD 260 S	SAS-M16	1.31.2.0021	SAK-M16	1.31.2.0019	SVS-1/2"	---	STG-20-M16	VS-1/2-T

Description

Suction plates with sponge rubber sealing and nipple or grooves. The sponge rubber sealing is glued to the sealing groove and can be easily replaced when worn out. Suitable for the transport of materials with slightly structured or formed surface, like sawed wooden boards etc. The suction plates are simply screwed onto the rigid or articulated suction plate retainer SAS or SAK and can be easily replaced in case of wear and tear. The suction plates are optionally available with central or lateral vacuum supply.



Suction plate FSM 100



Suction plate FSM 100 - 210

Suct. plates 3

Materials:

M-S Sponge rubber
 black

Article numbers

Type	Saugplatte	Ersatzdichtung	Ersatzauflage	conn. screw	
	M-S	M-S	NBR-S	Type	Part no:
SP-FSM 100	1.11.1.0163	2.13.2.0043	2.13.2.0005	ASB-M12-18	1.31.2.0003
DP-FSM 160	1.11.1.0164	2.13.2.0047	2.13.2.0007	ASB-M12-18	1.31.2.0003
DP-FSM 210	1.11.1.0165	2.13.2.0048	2.13.2.0009	ASB-M16-25	1.31.2.0007
DP-FSM 320	1.11.1.0166	2.13.2.0050	2.13.2.0084 ³⁾	ASB-M16-25	1.31.2.0007

3) The indicated pad for suction plate DP-FSM 320 only covers half of the plate. A full pad is available as part no. 2.13.2.0085.

Materials: Sealing: Sponge rubber, black, Pad: Perbunane, black

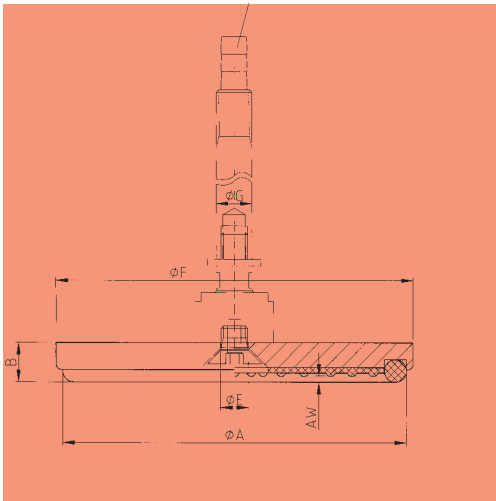
Technical Data

Type	Hold.force ¹⁾	Weight	Volume ²⁾
	(N)	(kg)	(ml)
DP-FSM 100	300	0,6	40
DP-FSM 160	900	0,8	50
DP-FSM 210	1550	1,2	130
DP-FSM 320	3580	3,4	330

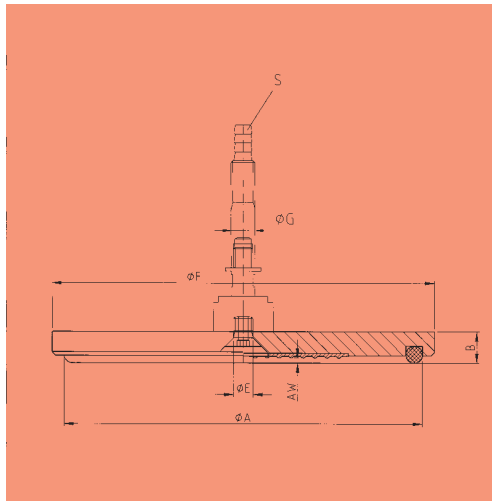
1) Holding Forces in N with operational vacuum of 60 % without safety margin relate to even, smooth and dry surfaces

2) Volume with suction cup in released condition

SUCTION PLATE FSM 100 - 320



Suction plate FSM 100 - 210



Suction plate FSM 320

Suct. plates **3**

Dimensions									
Type	A	B	AW	C	F	G	K	S	SW
								LW	
DP-FSM 100	84	18	3	12,2	100	16	---	10	---
DP-FSM 160	144	18	3	12,2	160	16	---	10	---
DP-FSM 210	186	18	3	16,2	200	20	---	1/2"	---
DP-FSM 320	286	26	4	16,2	308	20	--	1/2"	---

Overview table for suitable connection elements								
	Suction plate retainer rigid		Suction plate retainer articulated		Flow valve	Touch valve	Bolt type	Hose connection
	SAS-M12	Part no:	SAK-M12	Part no:				
DP-FSM 100 Z	SAS-M12	1.31.2.0020	SAK-M12	1.31.2.0018	SV-M12	TV-M12	STN-16-M12	VS-10-T
DP-FSM 160 Z	SAS-M12	1.31.2.0020	SAK-M12	1.31.2.0018	SV-M12	TV-M12	STN-16-M12	VS-10-T
DP-FSM 210 Z	SAS-M16	1.31.2.0021	SAK-M16	1.31.2.0019	SV-M16	TV-M16	STN-20-M16	VS-1/2-T
DP-FSM 320 Z	SAS-M16	1.31.2.0021	SAK-M16	1.31.2.0019	SV-M16	TV-M16	STN-20-M16	VS-1/2-T

Description

Sealing plate with vulcanised seal, a short sealing lip and a spherical bearing surface. Suitable for lifting individual plates of a stack. The spherical bearing surface aids the separation of the individual workpiece plates. The sealing plate is simply screwed onto the rigid or articulated suction plate retainer SAS or SAK and can easily be exchanged if it is worn. The sealing plate is optionally available with a central or lateral vacuum supply. The connection screw is supplied with the sealing plate.



FSBL 110 with lateral vacuum supply



Suction platen DP-FSBL 110 with central vacuum supply

Suct. plates 3

Materials:

NBR-G Perbunane, grey
 SI-T Silicone, transparent

Article numbers

Type	Suction plate		conn. screw	
	NBR-G	SI-T	Type	Part no.
DP-FSBL 110 Z	1.11.1.0062	1.11.1.0063	ASB-M12-18	1.31.2.0003
DP-FSBL 110 S	1.11.1.0060	1.11.1.0061	AS-M12-18	1.31.2.0010

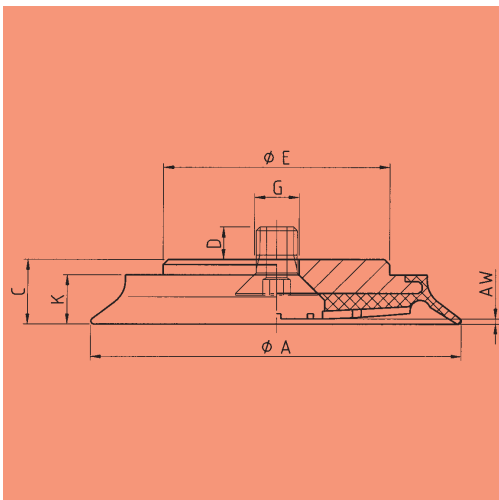
Z with central vacuum supply
 S with lateral vacuum supply

Technical Data

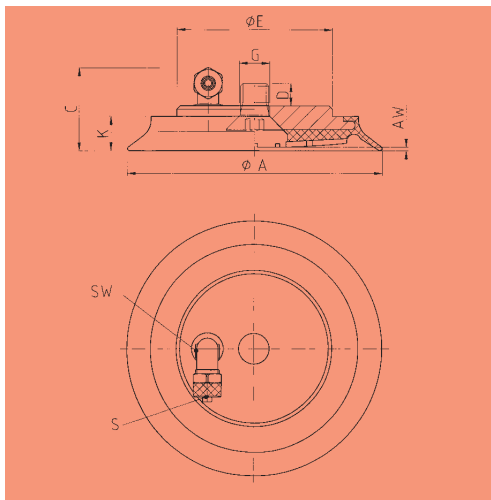
Type	Hold.force ¹⁾ (N)	Weight (kg)	Volume ²⁾ (ml)
DP-FSBL 110 Z	459	0,33	30
DP-FSBL 110 S	459	0,33	30

1) Holding Forces in N with operational vacuum of 60 % without safety margin relate to even, smooth and dry surfaces
 2) Volume with suction cup in released condition

SUCTION PLATE FSBL 110



Suction plate FSBL 110 with central vacuum supply



Suction plate FSBL 110 with lateral vacuum supply

Dimensions									
Type	A	AW	C	D	E	G	K	S	SW
								(LW)	
DP-FSBL 110 Z	110	2	19	9,5	66	M 12	14,5	---	---
DP-FSBL 110 S	110	2	34	9,5	66	M 12	14,5	6*	8

*) for pneumatic tube VS-6-B

Overview table for suitable connection elements									
	Suction plate retainer rigid		Suction plate retainer articulated		Flow valve	Touch valve	Bolt type	Hose connection	
	SAS-M12	Part no:	SAK-M12	Part no:					
DP-FSBL 110 Z	SAS-M12	1.31.2.0020	SAK-M12	1.31.2.0018	SV-M12	TV-M12	STN-16-M12	VS-10-T	
DP-FSBL 110 S	SAS-M12	1.31.2.0020	SAK-M12	1.31.2.0018	SVS-1/4"	---	STG-16-M12	VS-6-B	

Description

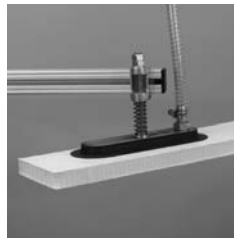
Special suction plates with long lip seal and support of the entire suction area. Suitable for the transport of particularly small or narrow work pieces and round materials. The sealing is vulcanized on the steel plate (on request aluminium possible)

DP-FL 55 x 85 to 55 x 200: The suspension is done by hexagonal bolt with suiting clamp (safety against rotation), the vacuum supply by the angle connection on the bolt.

DP-FL 55 x 250 to 80 x 370: The suction plate is suspended from two rigidly mounted bolts, separate vacuum supply.



DP-FS 80 x 200



DP-FS 55 x 250 to 80 x 370



DP-FS 55 x 85 to 55 x 200

Article numbers

Type	Suction plate BK-S	Suction plate NBR-G	Suction plate SI-T	suitable conn. screw	Part no:
DP-FS 20 x 60	1.11.1.0007	1.11.1.0008	1.11.1.0009	ASB-M5-M5	1.31.2.0030
DP-FS 30 x 80	1.11.1.0023	1.11.1.0024	1.11.1.0025	ASB-M5-M5	1.31.2.0030
DP-FS 40 x 110	1.11.1.0029	1.11.1.0030	1.11.1.0031	ASB-M5-M5	1.31.2.0030
DP-FS 35 x 200	1.11.1.0026	1.11.1.0027	1.11.1.0028	2 x AS-M5-M5	1.31.2.0032
DP-FS 55 x 85	1.11.1.0050	1.11.1.0051	1.11.1.0052	ASB-M12-M12	1.31.2.0031
DP-FS 55 x 100	1.11.1.0032	1.11.1.0033	1.11.1.0034	ASB-M12-M12	1.31.2.0031
DP-FS 55 x 125	1.11.1.0035	1.11.1.0036	1.11.1.0037	ASB-M12-M12	1.31.2.0031
DP-FS 55 x 150	1.11.1.0038	1.11.1.0039	1.11.1.0040	ASB-M12-M12	1.31.2.0031
DP-FS 55 x 200	1.11.1.0041	1.11.1.0042	1.11.1.0043	2 x AS-M12-M12	1.31.2.0033
DP-FS 55 x 250	1.11.1.0044	1.11.1.0045	1.11.1.0046	2 x AS-M12-M12	1.31.2.0033
DP-FS 55 x 300	1.11.1.0047	1.11.1.0048	1.11.1.0049	2 x AS-M12-M12	1.31.2.0033
DP-FS 80 x 250	1.11.1.0054	1.11.1.0055	1.11.1.0056	2 x AS-M12-18	1.31.2.0010
DP-FS 80 x 370	1.11.1.0057	1.11.1.0058	111.1.0059	2 x AS-M12-18	1.31.2.0010

Materials:

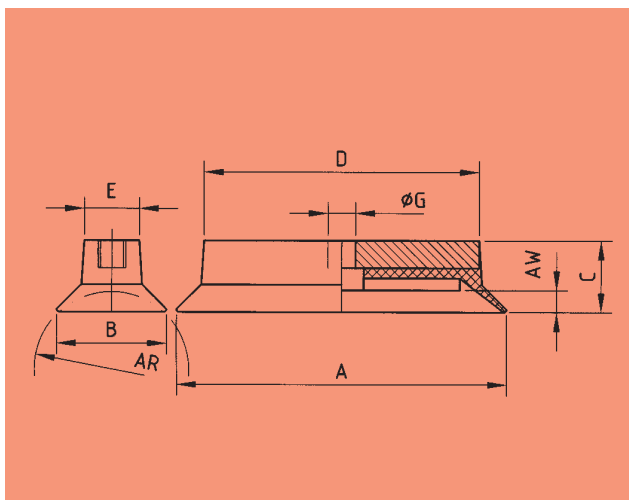
BK-S Buna rubber, black
NBR-G Perbunane, grey
SI-T Silicone, transparent

Technical Data

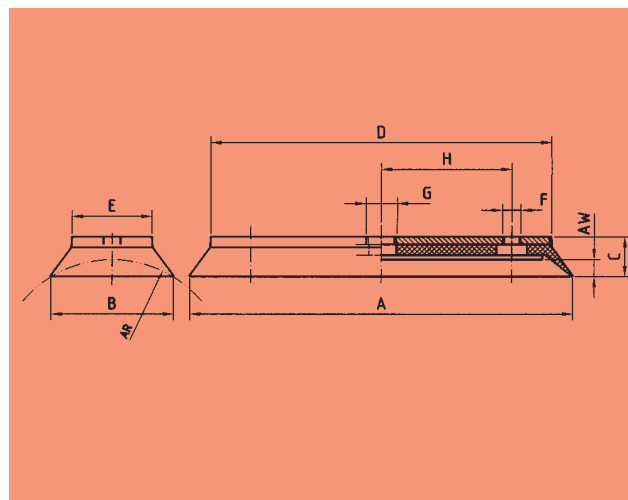
Type	Hold.force ¹⁾ (N)	Weight (kg)	Volume ²⁾ (ml)
DP-FS 20 x 60	48	25	4
DP-FS 30 x 80	85	44	10
DP-FS 40 x 110	160	68	35
DP-FS 35 x 200	230	518	55
DP-FS 55 x 85	145	0,108	35
DP-FS 55 x 100	220	0,141	40
DP-FS 55 x 125	260	0,19	50
DP-FS 55 x 150	350	0,255	60
DP-FS 55 x 200	450	0,33	90
DP-FS 55 x 250	550	0,43	100
DP-FS 55 x 300	650	0,52	110
DP-FS 80 x 250	840	0,733	190
DP-FS 80 x 370	1 280	1,17	260

1) Holding Forces in N with operational vacuum of 60% without safety margin relate to even, smooth and dry surfaces

2) Volume with suction cup in released condition



Suction plates DP-FS 520x60 to 40x110 and DP-FS 55x85 to 55x125



Suction plates DP-FS 35x200 and DP-FS 55x150 to 80x370

Dimensions										
Type	A	B	AW	AR	C	D	E	F	G	H
DP-FS 20 x 60	60	20	4	10	13	50	10	--	M5	--
DP-FS 30 x 80	80	30	5	17	14	65	15	--	M5	--
DP-FS 40 x 110	110	40	10	20	20	85	15	--	M5	--
DP-FS 35 x 200	195	35	9	20	19	173	15	M 5	M 12	75
DP-FS 55 x 85	85	55	8	46	21	62	32	--	M 12	--
DP-FS 55 x 100	100	55	9	46	21	70	32	--	M 12	--
DP-FS 55 x 125	125	55	9	46	21	100	32	--	M 12	--
DP-FS 55 x 150	150	55	9	46	21	125	32	M12	M 12	50
DP-FS 55 x 200	200	55	9	46	21	160	32	M12	M 12	75
DP-FS 55 x 250	250	55	8	46	21	220	32	M12	M 12	90
DP-FS 55 x 300	300	55	8	46	21	277	32	M12	M12	110
DP-FS 80 x 250	250	80	10	75	26	222	52	R1/2"	12,2	85
DP-FS 80 x 370	370	80	10	75	26	347	52	R1/2"	12,2	140

Overview table for suitable connection elements								
	Suction plate retainer rigid		Suction plate retainer articulated		Angle connection	Bolt type 1	Bolt type 2	Hose connection
	Part no:	Part no:	Part no:	Part no:				
DP-FS 20 x 60	---	---	---	---	WA-M5-M5	STN-12-M5	ST-6kt-M5	VS-10-T
DP-FS 30 x 80	---	---	---	---	WA-M5-M5	STN-12-M5	ST-6kt-M5	VS-10-T
DP-FS 40 x 110	---	---	---	---	WA-M5-M5	STN-12-M5	ST-6kt-M5	VS-10-T
DP-FS 35 x 200	---	---	---	---	---	STG-12-M5 ^{*)}	---	VS-10-T
DP-FS 55 x 85	---	---	---	---	WA-R1/4-M12	STN-16-M12	ST-6kt-M12	VS-10-T
DP-FS 55 x 100	---	---	---	---	WA-R1/4-M12	STN-16-M12	ST-6kt-M12	VS-10-T
DP-FS 55 x 125	---	---	---	---	WA-R1/4-M12	STN-16-M12	ST-6kt-M12	VS-10-T
DP-FS 55 x 150	---	---	---	---	WA-R1/4-M12	STN-16-M12	ST-6kt-M12	VS-10-T
DP-FS 55 x 200	---	---	---	---	---	STG-16-M12 ^{*)}	---	VS-10-T
DP-FS 55 x 250	---	---	---	---	---	STG-16-M12 ^{*)}	---	VS-10-T
DP-FS 55 x 300	---	---	---	---	---	STG-16-M12 ^{*)}	---	VS-10-T
DP-FS 80 x 250	SAS-M12 ^{*)}	1.31.2.0020	SAK-M12 ^{*)}	1.31.2.0018	---	STG-16-M12 ^{*)}	---	VS-1/2"
DP-FS 80 x 370	SAS-M12 ^{*)}	1.31.2.0020	SAK-M12 ^{*)}	1.31.2.0018	---	STG-16-M12 ^{*)}	---	VS-1/2"

^{*)} Suction plates and bolts each 2 x

Description

Suction plate with sealing vulcanized onto it and inner sealing ring. FSL series without, FSRL with grooves. Suitable for narrow goods and materials with a rough or slightly structured surface, as scaly sheet metals, slightly structured, laminated (wood-) plates, etc. Also suitable for transporting cartonnage etc. The suction plates are vulcanized onto a steel plate and guarantee a high level of safety. On request available with aluminium plate.

The suction plates are connected to two bolts and are available with articulated or rigid suspension.



FSL 100x200 und FSL100x300



FSL 100x200 mit SAK-M12



Suction plates DP-FSRL 150 x 450 to 180 x 500 with grooves

Suct. plates 3

Article numbers					
Type	Suction plate			conn. screw	
	BK-S	NBR-G	SI-T	Type	Part no:
DP-FSL 100x200	1.11.1.0157 ^{*)}	1.11.1.0158	1.11.1.0159	AS-M12-18	1.31.2.0010
DP-FSL 100x300	1.11.1.0160 ^{*)}	1.11.1.0161	1.11.1.0162	AS-M12-18	1.31.2.0010
DP-FSRL 150x450	1.11.1.0001	1.11.1.0002	1.11.1.0003	AS-M16-25	1.31.2.0014
DP-FSRL 180x500	1.11.1.0004	1.11.1.0005	1.11.1.0006	AS-M16-25	1.31.2.0014
DP-FSRL 200x750	1.11.1.0167	1.11.1.0168	1.11.1.0169	AS-M16-25	1.31.2.0014

^{*)} Design NBR-S

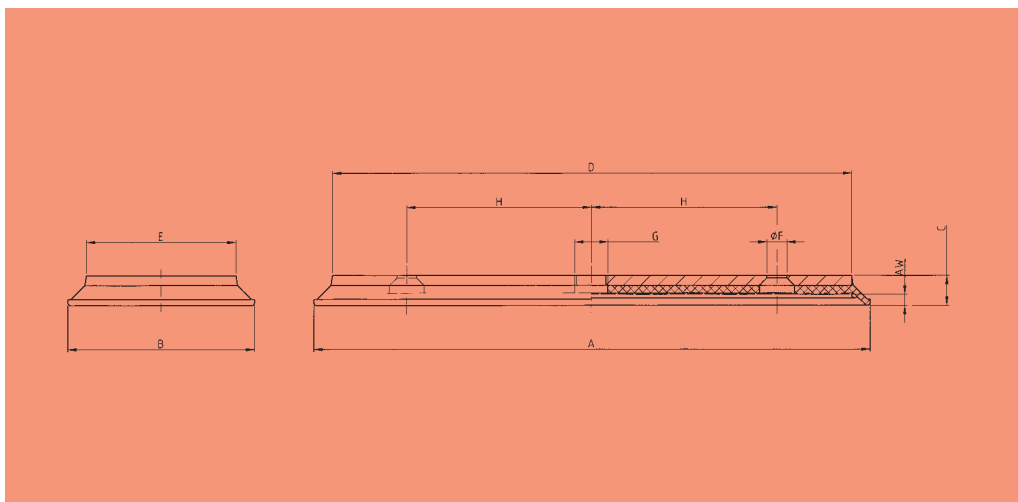
Materials:

- BK-S Buna rubber, black
- NBR-G Perbunane, black
- NBR-G Perbunane, grey
- SI-T Silicone, transparent

Technical Data			
Type	Hold.force ¹⁾ (N)	Weight (kg)	Volume ²⁾ (l)
DP-FSL 100 x 200	750	1,25	0,17
DP-FSL 100 x 300	1250	1,6	0,28
DP-FSRL 150x450	2780	3,4	0,48
DP-FSRL 180x500	3080	4,1	1,4
DP-FSRL 200x750	4120	6,3	4,2

1) Holding Forces in N with operational vacuum of 60% without safety margin relate to even, smooth and dry surfaces

2) Volume with suction cup in released condition



Suction plates FSL 100x200 to FSRL 180x500

Dimensions									
Typ	A	B	AW	C	D	E	F	G	H
DP-FSL 100x200	200	100	7	23	160	65	12,2	R 1/4"	50
DP-FSL 100x300	300	100	7	23	260	65	12,2	R 1/4"	100
DP-FSRL 150x450	450	150	9	24	410	120	16,2	R 1/2"	250
DP-FSRL 180x500	500	180	20	42	450	120	16,2	R 1/2"	300
DP-FSRL 200x750	750	200	29	54	550	120	16,2	R3/4"	500

Overview table for suitable connection elements								
	Suction plate retainer rigid		Suction plate retainer articulated		Flow valve	Touch valve	Bolt type	Hose connection
	SAS-M12*)	Part no:	SAK-M12*)	Part no:				
DP-FSL 100x200	SAS-M12*)	1.31.2.0020	SAK-M12*)	1.31.2.0018	SV-M12	---	STG-16-M12*)	VS-10-T
DP-FSL 100x300	SAS-M12*)	1.31.2.0020	SAK-M12*)	1.31.2.0018	SV-M12	---	STG-16-M12*)	VS-10-T
DP-FSRL 150x450	SAS-M16*)	1.31.2.0021	SAK-M16*)	1.31.2.0019	SV-M16	---	STG-20-M16*)	VS-1/2-T
DP-FSRL 180x500	SAS-M16*)	1.31.2.0021	SAK-M16*)	1.31.2.0019	SV-M16	---	STG-20-M16*)	VS-1/2-T
DP-FSRL 200x750	SAS-M20*)	1.31.2.0027	SAK-M20*)	1.31.2.0025	SVS 3/4"	---	STG-20-M20*)	VS-3/4-T

*) Suction plates and bolts each 2 x

Mounting advice:

On suspension with two bolts only one bolt suspension may be tightly clamped. The other must remain mobile to avoid the bolts become stuck when using the articulated design.

Description

Suction plate with long sealing ring and several inner sealing rings as well as support on the entire sealing area. The sealing is vulcanised onto the main suction body and guarantees the highest safety standards. The suction plate is especially suitable for the transport of heavy work pieces with an even as well as a scaly surface and in connection with a blower for the handling of porous materials.

Available are versions in perbunane black and silicone transparent with a steel main body and two suspension clamps for suspension bolt ST-KPT.

The version in perbunane, grey with Aluminium-baseplate is available with suspension threads.



Suction plate KPHL 850 x 450



Suction plate KPHL 850 x 450, design perbunane grey

Article numbers

Type	Suction plate			Replacement suction plate		
	NBR-S	NBR-G	SI-T	NBR-S	NBR-G	SI-T
SP-KPHL450x850	1.13.2.0013	1.13.2.0012	1.13.2.0014	1.11.1.0119	1.11.1.0117	1.11.1.0120

in perbunane black and perbunane grey ex stock delivery
delivery time for material silicone transparent and aluminium plate on request

Materials:

NBR-S Perbunane, black (ca. 50 Shore A)
NBR-G Perbunane, grey (ca. 30 Shore A)
SI-T Silicone, transparent

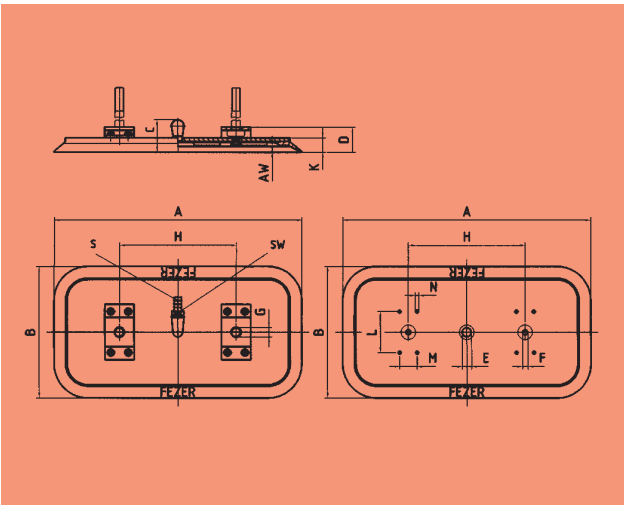
Technical Data

Type	Hold.force ¹⁾ (N)	Weight (kg)	Volume ²⁾ (l)
SP-KPHL450x850-NBR-S	18 750	29,2	8,2
SP-KPHL450x850-SI-T	18 750	29,2	8,2
SP-KPHL450x850-NBR-G	18 750	13,0	8,2

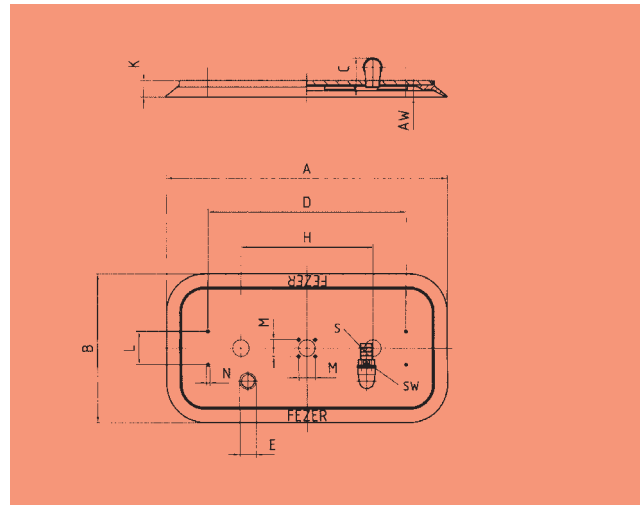
1) Holding Forces in N with operational vacuum of 60 % without safety margin relate to even, smooth and dry surfaces

2) Volume with suction cup in released condition

SUCTION PLATE KPHL 450 X 850



Suction plate KPHL 850 x 450 NBR-S and SI-T



Suction plate KPHL 850 x 450 NBR-G

Suct. plates 3

Dimensions

Type	A	B	AW	C	D	E	F	G	H	K	L	M	N	S	SW
SP-KPHL450x850-NBR-S	850	450	20	111	89	R1	M 20	32	400	49	140	60	M 12	1"	36
SP-KPHL450x850-NBR-G	850	450	20	119	600	R11/4	---	---	360	49	100	50	M 10	38	46

Overview table for suitable connection elements

	Suction plate retainer rigid		Suction plate retainer articulated		Flow valve	Touch valve	Bolt type	Hose connection
	SAS-M30	Part no:	SAK-M30	Part no:				
450x850-NBR-S**)	SAS-M30	1.31.2.0027*)	SAK-M30	1.31.2.0026*)	SVE-3/4	TV-11/4	STG-30	VS-1-T
450x850-NBR-G	---	---	---	---	SVE-3/4	TV-11/4	STG-30	VS-1-T

*) Suction plates and bolts 2 x each

***) Connection is done by an intermediate plate 200x100 with hole design 140x60, Part-No:2.31.2.0001

Description

Very robust sealing plate with 1.5 creases. The sealing is vulcanized onto a steel plate (aluminium possible on request). Suitable for materials with a smooth, even or formed surface. Because of the suspension of the suction cup especially suitable for sensitive transporting goods. The elasticity of the sealing plate makes it especially suitable for sensitive goods and adjusts to the work piece in every position. The creases pull together in the suction process (relatively high suction way).

Sealing plate GF 120 - 150: Central vacuum feeding, through the suspension bolt.

Sealing plate GF 200 - GF 350:

Sealing plate with separate vacuum feeding.



Suction plates GF 200 - 350



Suction plate GF 150



Suction plates GF 120 - 150

Article numbers

Type	Suction plate BK-S	Suction plate NBR-G	Suction plate SI-T	Suitable conn. screw	Part no:
DP-GF 120 Z	1.12.1.0004	1.12.1.0005	1.12.1.0006	ASB-M16-25	1.31.2.0007
DP-GF 150 Z	1.12.1.0007	1.12.1.0008	1.12.1.0009	ASB-M16-25	1.31.2.0007
DP-GF 200 S	1.12.1.0010	1.12.1.0011	1.12.1.0013	AS-M16-25	1.31.2.0014
DP-GF 250 S	1.12.1.0014	1.12.1.0015	1.12.1.0017	AS-M16-25	1.31.2.0014
DP-GF 300 S	1.12.1.0018	1.12.1.0019	1.12.1.0020	AS-M16-25	1.31.2.0014
DP-GF 350 S	1.12.1.0021	1.12.1.0022	1.12.1.0023	AS-M16-25	1.31.2.0014

Z with central vacuum supply
 S with lateral vacuum supply

Materials:

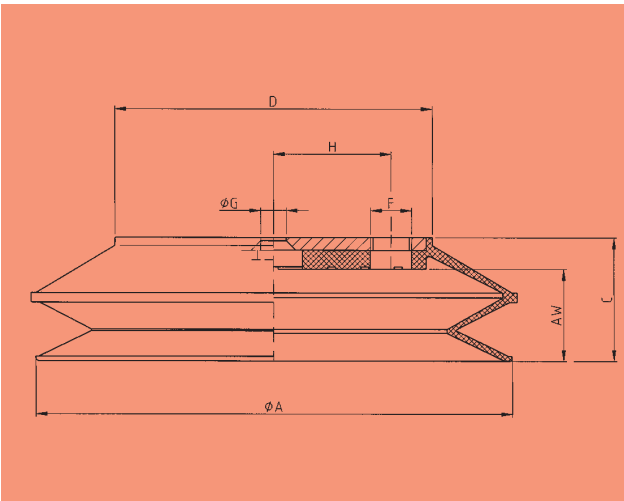
BK-S Buna rubber, black
 NBR-G Perbunane, grey
 SI-T Silicone, transparent

Technical Data

Type	Hold.force 1) (N)	Weight (kg)	Volume 2) (l)
DP-GF 120 Z	350	0,21	0,29
DP-GF 150 Z	500	0,4	0,48
DP-GF 200 S	900	0,99	0,88
DP-GF 250 S	1630	1,85	1,4
DP-GF 300 S	2390	2,95	3,15
DP-GF 350 S	3230	4,4	4,2

1) Holding Forces in N with operational vacuum of 60 % without safety margin relate to even, smooth and dry surfaces

2) Volume with suction cup in released condition



Suction plates DP-GF 120 - 350

Suct. plates 3

Dimensions							
Type	A	AW	C	D	F	G	H
DP-GF 120 Z	120	35	55	82	---	16,2	---
DP-GF 150 Z	150	41	65	102	---	16,2	---
DP-GF 200 S	200	38	55	128	---	16,2	---
DP-GF 250 S	250	42	59	178	R 3/4"	16,2	65
DP-GF 300 S	300	58	78	200	R 3/4"	16,2	74
DP-GF 350 S	350	57	82	248	R 3/4"	16,2	95

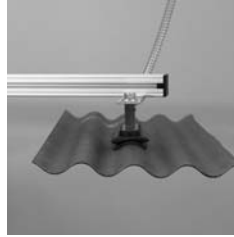
Overview table for suitable connection elements								
	Suction plate retainer rigid		Suction plate retainer articulated		Flow valve	Touch valve	Bolt typ	Hose connection
	SAS-M16	Part no:	SAK-M16	Part no:				
DP-GF 120 Z	SAS-M16	1.31.2.0021	SAK-M16	1.31.2.0019	SV-M16	---	STN-20-M16	VS-1/2-T
DP-GF 150 Z	SAS-M16	1.31.2.0021	SAK-M16	1.31.2.0019	SV-M16	---	STN-20-M16	VS-1/2-T
DP-GF 200 S	SAS-M16	1.31.2.0021	SAK-M16	1.31.2.0019	SV-M16	---	STN-20-M16	VS-1/2-T
DP-GF 250 S	SAS-M16	1.31.2.0021	SAK-M16	1.31.2.0019	SVS-3/4"	---	STN-20-M16	VS-3/4-T
DP-GF 300 S	SAS-M20	1.31.2.0027	SAK-M20	1.31.2.0025	SVS-3/4"	---	STG-20-M20	VS-3/4-T
DP-GF 350 S	SAS-M20	1.31.2.0027	SAK-M20	1.31.2.0025	SVS-3/4"	---	STG-20-M20	VS-3/4-T

Description

Very robust oval sealing plate with 1.5 creases. The sealing is vulcanized onto a steel plate (aluminium possible on request). Suitable for materials with smooth, even or formed surface, as well as round materials. Because of the suspension of the suction cup especially suitable for sensitive transporting goods. The elasticity of the sealing plate makes it especially suitable for sensitive goods and it adjusts to the work piece in every situation.

DP-GF 60 x 140: Suspended with a hexagon suspension bolt, vacuum feeding over angle connection

DP-GF 100 x 200: Suspended with two suspension bolts and separate vacuum feeding.



DP-GF 60 x 140



DP-GF 60 x 140



DP-GF 60 x 140 and 100 x 200

Article numbers

Type	Suction plate BK-S	Suction plate NBR-G	Suction plate SI-T	Suitable conn. screw	Part no:
DP-GF 60x140	1.12.1.0024	1.12.1.0025	1.12.1.0026	ASB-M12-M12	1.31.2.0031
DP-GF 100x200	1.12.1.0001	1.12.1.0002	1.12.1.0003	2 x AS-M12-18	1.31.2.0010

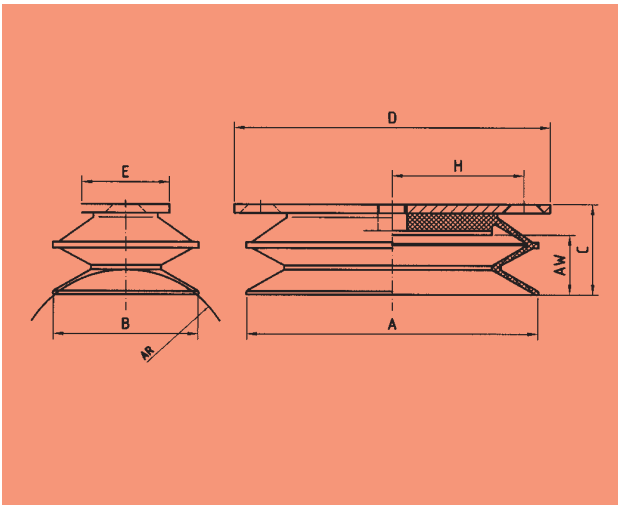
in perbunane black and perbunane grey ex stock delivery
delivery time and minimum quantity for material silicone transparent on request

Technical Data

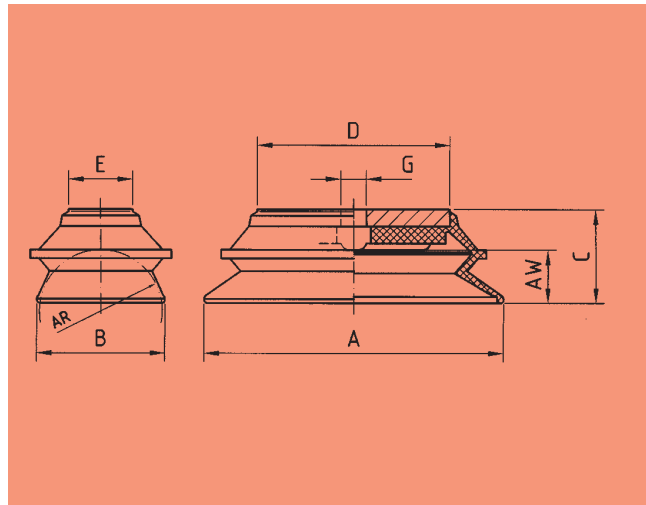
Type	Hold.force ¹⁾ (N)	Weight (kg)	Volume ²⁾ (ml)
DP-GF 60x140	190	0,238	150
DP-GF 100x200	440	0,995	500

1) Holding Forces in N with operational vacuum of 60 % without safety margin relate to even, smooth and dry surfaces

2) Volume with suction cup in released condition



Suction plate DP-GF 100 x 200



Suction plate DP-GF 60 x 140

Dimensions

Type	A	B	AW	AR	C	D	E	F	G	H
DP-GF 60 x 140	140	60	25	40	44	90	30	--	12,2	--
DP-GF 100 x 200	200	100	41	40	62	216	60	12,2	R 1/2"	90

Overview table of suitable connection elements

	Suction plate retainer rigid		Suction plate retainer articulated		Winkel connection	Bolt type 1	Bolt type 2	Hose connection
	---	Part no:	---	Part no:				
DP-GF 60 x 140	---	---	---	---	WA-M12-M12	STG-20-M12	ST-6kt-M12	VS-R1/4"
DP-GF 100x200	---	---	SAK-M12*)	1.31.2.0018	---	STG-16-M12*)	---	VS-1/2"

*) Suction plate and bolt 2 x each

Description

Very robust sealing plate with 2.5 creases. The sealing is vulcanized onto a steel plate (Aluminium possible on request). Suitable for materials with smooth, even or formed surface. Because of the suspension of the suction cup especially suitable for sensitive transporting goods and also adjusts to the work piece in every position.

Creases pull together when suspended (relatively high suction gap).



Sealing plate DP-GFD 150



Suction plate DP-GFD 150

Suct. plates 3

Article numbers

Type	Suction plate BK-S	Suction plate NBR-G	Suction plate SI-T	Suitable conn. screw	Suitable angle connection
DP-GFD 150 Z	1.12.1.0027	1.12.1.0028	1.12.1.0029	ASB-M16-25	1.31.2.0007

Z with central vacuum supply
 S with lateral vacuum supply

Materials:

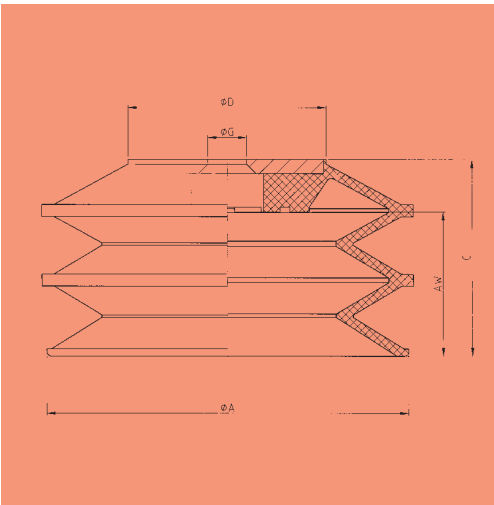
BK-S Perbunane, black
 NBR-G Perbunane, grey
 SI-T Silicone, transparent

Technical Data

Type	Hold.force ¹⁾ (N)	Weight (kg)	Volume ²⁾ (l)
DP-GFD 150	600	0,584	0,72

1) Holding Forces in N with operational vacuum of 60% without safety margin relate to even, smooth and dry surfaces

2) Volume with suction cup in released condition



Suction plate DP-GFD 150

Dimensions					
Type	A	AW	C	D	G
DP-GFD 150 Z	150	60	82	82	16,2

Overview table of suitable connection elements								
	Suction plate retainer rigid		Suction plate retainer articulated		Flow valve	Touch valve	Bolt type	Hose connection
	SAS-M16	Part no: 1.31.2.0021	SAK-M16	Part no: 1.31.2.0019				
DP-GFD-150 Z	SAS-M16	1.31.2.0021	SAK-M16	1.31.2.0019	SV-M16	---	STN-20-M16	VS-1/2-T

Description

Heat-proof suction plate with felt lining on the suction side. The sealing is on the main body and clamped with a plate. When worn out, the sealing can easily be exchanged. The suction plate is suspended on a suspension bolt, the vacuum feed is effectuated through an angle connection on the suspension bolt.



SP-FSHB 90 - 120



SP-FSHB 180 - 250



Suction plates FSHB

Materials:

VI-T Viton, black: very resistant material against oil, petrol and solvents.
 Temperatures up to 230° C, short-term even up to 400° C

Article numbers

Type	Saugplatte VI-S	Ersatzdichtung VI-S	connection- schraube	Part no:
SP-FSHB 90	1.11.1.0084	2.11.2.0004	ASB-M12-R3/8	1.31.2.0004
SP-FSHB 120	1.11.1.0080	2.11.2.0001	ASB-M12-R3/8	1.31.2.0004
SP-FSHB 180	1.11.1.0081	2.11.2.0002	ASB-M12-R3/8	1.31.2.0004
SP-FSHB 250	1.11.1.0083	2.11.2.0003	ASB-M16-R1/2	131.2.0008

Please note:

The felt lining offers no optimal sealing of the work piece, therefore the vacuum pump needs higher dimensioning to compensate for resulting leakages!

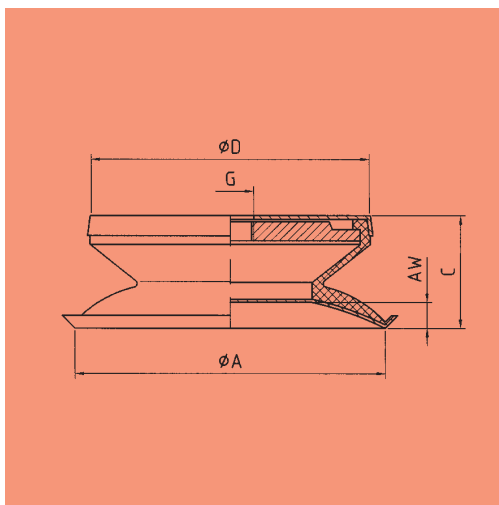
Technical Data

Type	Hold.force ¹⁾ (N)	Weight (kg)	Volume ²⁾ (ml)
SP-FSHB 90	290	0,338	125
SP-FSHB 120	500	0,56	210
SP-FSHB 180	1190	0,819	255
SP-FSHB 250	2080	1,8	686

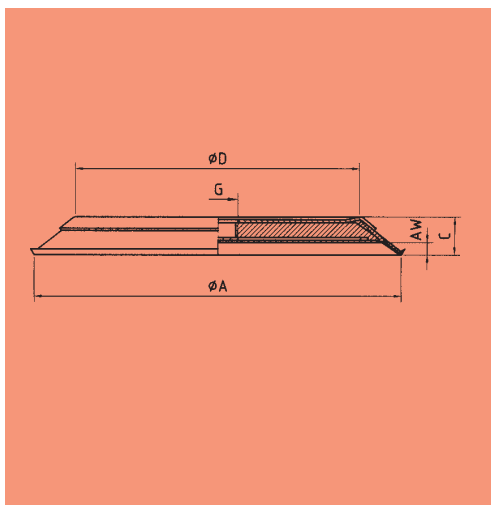
1) Holding Forces in N with operational vacuum of 60 % without safety margin relate to even, smooth and dry surfaces
 2) Volume with suction cup in released condition

SUCTION PLATES FSHB 90 - FSHB 250

heat-proof suction plates with felt lining



Plates FSHB 90 and 120



Plates FSHB 180 and 250

Dimensions

Type	A	AW	C	D	G
SP-FSHB 90	90	10	38	90	R 3/8"
SP-FSHB 120	120	14	44,5	110	R 3/8"
SP-FSHB 180	180	8,5	26	126	R 3/8"
SP-FSHB 250	250	8,5	26	194	R 1/2"

Overview table of suitable connection elements

	Suction plate retainer rigid		Suction plate retainer articulated		Flow valve	Touch valve	Bolt type	Hose connection
	Part no:	Part no:	Part no:	Part no:				
SP-FSHB 90	---	---	---	---	---	---	STN-16-M12	VS-10-T
SP-FSHB 120	---	---	---	---	---	---	STN-16-M12	VS-10-T
SP-FSHB 180	---	---	---	---	---	---	STN-16-M12	VS-10-T
SP-FSHB 250	---	---	---	---	---	---	STN-20-M16	VS-1/2-T

Description

Suction plate with long sealing ring and additional Impulse Fixture in the centre of the suction plate. The suction plate has a vacuum- and a compressed air connection. The sealing is set on the main plate and clamped with a clamping band, which makes it easily exchangeable.

Suitable for the transport of permeable materials, as chipboards. The inner sealing ring is supplied with compressed air by means of the impulse fixture (max. 1.5 bar). This guarantees that several plates of porous work pieces will not be engaged at the same time.



Suction plate KPHLI 250



Suction plate KPHLI 250

Article numbers

Type	Suction plate		Outer replacement sealing		Inner replacement sealing	
	NBR-G	SI-T	NBR-G	SI-T	NBR-G	SI-T
SP-KPHLI 250	1.13.1.0087	1.13.1.0088	2.13.2.0030	2.13.2.0031	2.13.2.0033	2.13.2.0035

in perbunane grey ex stock delivery, delivery time for material silicone transparent on request

Materials:

NBR-S Perbunan, black
NBR-G Perbunane, grey
SI-T Silikon, transparent

Technical Data

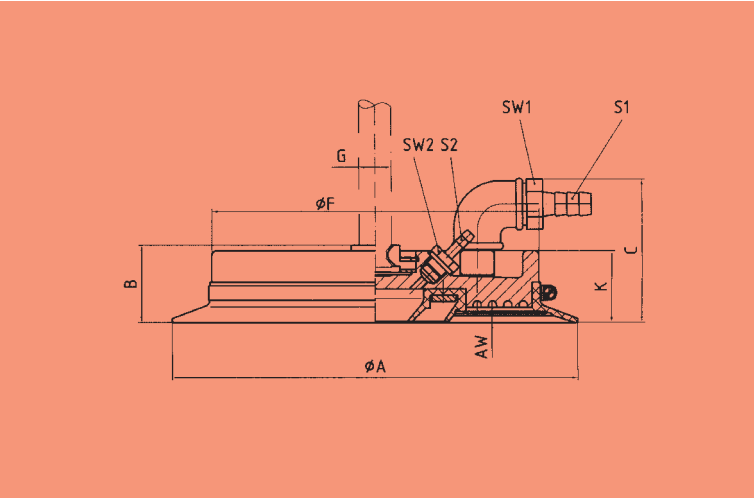
Type	Hold.force ¹⁾ (N)	Weight (kg)	Volume ²⁾ (ml)
SP-KPHLI 250	1780	2	320

1) Holding Forces in N with operational vacuum of 60 % without safety margin relate to even, smooth and dry surfaces

2) Volume with suction cup in released condition

Advice:

The holding force depends on the air penetrability of the transport goods. Before using this suction plate suction tests should be run.



Saugplatte KPHLI 250

Suct. plates **3**

Dimensions										
Type	A	B	AW	C	F	G	S 1 LW	SW 1	S 2 LW	SW 2
SP-KPHLI 250	250	45	7	89	202	20	1/2"	27	6	17

Overview table of suitable connection elements								
Type	Halte- scheibe	Part no:	Druck- pilz	Part no:	Druck- feder	Part no:	Bolt type	Hose connection
SP-KPHLI 250	HS 250	2.13.1.0025	DP 250	2.13.1.0027	DF 250	6.21.4.0045	ST-KPL	VS-1/2-T

Sicherungsring für Haltescheibe 50x2, Part no: 6.21.3.0036
 Anschluß für Druckluft LW 6 mm

Description

Suction plates with sponge rubber sealing and nap, resp. grooved rubber lining on the suction surface. The sponge rubber sealing is glued into the sealing groove and when wearing off, can be easily exchanged. Suitable for transporting materials with heavily structure or formed surface, as chequered or beaded sheets, saw-rough wood etc. The cardanic suspension (all sides 8°) adjusts to the incline of the transported good



Suction plate KPHM



Suction plate KPHM 100 - 210

Saugplatten 3

Materials:

M-S Sponge rubber-black

Article numbers

Type	Suction plate	Replacement seal	Replacement pad
	M-S	M-S	NBR-S
SP-KPHM 100	1.13.1.0089	2.13.2.0043	2.13.2.0005
SP-KPHM 160	1.13.1.0095	2.13.2.0047	2.13.2.0007
SP-KPHM 210	1.13.1.0097	2.13.2.0048	2.13.2.0009
SP-KPHM 320	1.13.1.0100	2.13.2.0050	2.13.2.0084 ³⁾

3) The stated pad for suction plate SP-KPHM 320 covers only half of the area. A complete pad is available as part no.: 2.13.2.0085

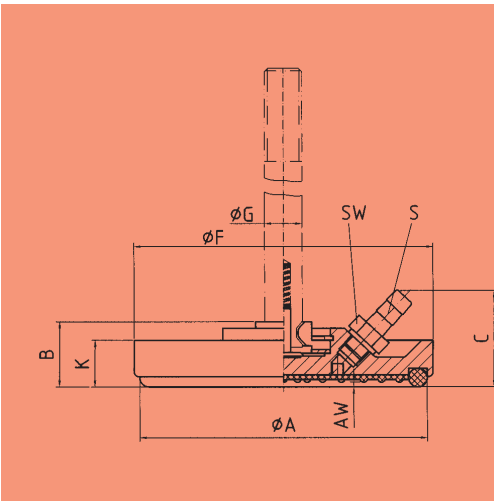
Materials: Sealing sponge rubber black, Pad: perbunane black

Technical Data

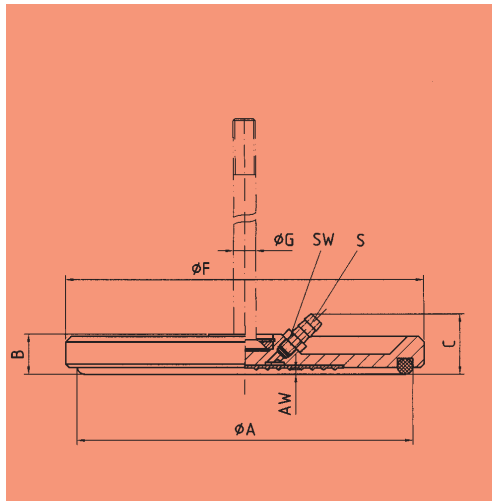
Type	Hold.force ¹⁾	Weight	Volume ²⁾
	(N)	(kg)	(ml)
SP-KPHM 100	300	0,6	40
SP-KPHM 160	900	0,8	50
SP-KPHM 210	1550	1,2	130
SP-KPHM 320	3580	3,4	330

1) Holding Forces in N with operational vacuum of 60 % without safety margin relate to even, smooth and dry surfaces

2) Volume with suction cup in released condition



Suction plates KPHM 100 - 210



Suction plate KPHM 320

Dimensions									
Type	A	B	AW	C	F	G	K	S	SW
								LW	
SP-KPHM 100	84	47	3	58	100	20	24	1/2"	19
SP-KPHM 160	144	33	1,5	41	160	20	22	1/2"	19
SP-KPHM 210	186	31	1,5	44	200	20	22	1/2"	19
SP-KPHM 320	286	33	4	51	308	20	--	1/2"	19

Overview table of suitable connection elements								
Type	Holding disk	Part no:	Pressure mushroom	Part no:	Pressure spring	Part no:	Bolt type	Hose connection
SP-KPHM 100	HS 250	2.13.1.0025	DP 250	2.13.1.0027	DF 250	2.13.1.0025	ST-KPL-20	VS-1/2-T
SP-KPHM 160	HS 250	2.13.1.0025	DP 250	2.13.1.0027	DF 250	2.13.1.0025	ST-KPL-20	VS-1/2-T
SP-KPHM 210	HS 250	2.13.1.0025	DP 250	2.13.1.0027	DF 250	2.13.1.0025	ST-KPL-20	VS-1/2-T
SP-KPHM 320	HS 300	2.13.1.0021	---	---	---	---	ST-KPS-20	VS-1/2-T

Safety ring for holding disk 50x2, Part. no: 6.21.3.0036

Description

Suction plate with sealing vulcanized onto it and inner sealing ring. Suitable for narrow goods and materials with a rough or slightly structured surface, as scaly sheet metals, slightly structured, laminated (wood-) plates, etc. Also suitable for transporting cartilage etc. The cardanic suspension (all sides 8°) adjusts to the incline of the transported good. The suction plate can also be mounted rigidly, attached directly to the threads.



Suction plates KPHL 100 x 200 and KPHL 100 x 300

Article numbers						
Type	Suction plate			Replacement sealing plate		
	NBR-S	NBR-G	SI-T	NBR-S	NBR-G	SI-T
SP-KPHL 100x200	1.13.1.0060	1.13.1.0059	1.13.1.0061	1.13.1.0004	1.13.1.0003	1.13.1.0005
SP-KPHL 100x300	1.13.1.0063	1.13.1.0062	1.13.1.0064	1.13.1.0007	1.13.1.0006	1.13.1.0008

Materials:

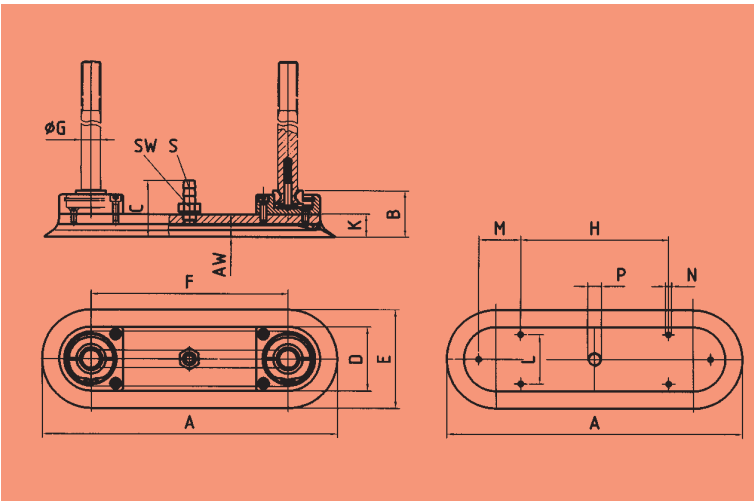
- NBR-S Perbunane, black
- NBR-G Perbunane, grey
- SI-T Silicone, transparent

Technical Data			
Type	Hold.force ¹⁾ (N)	Weight (kg)	Volume ²⁾ (ml)
SP-KPHL 100x200	750	1,25	170
SP-KPHL 100x300	1250	1,6	280

1) Holding Forces in N with operational vacuum of 60% without safety margin relate to even, smooth and dry surfaces
 2) Volume with suction cup in released condition

Mounting advice:

On suspension with two bolts only one connection may be tightly clamped. The other must be mobile to avoid the bolts becoming stuck on articulated suspension.



Suction plates KPHL 100 x 200 and KPHL 100 x 300

Dimensions																
Type	A	B	AW	C	D	E	F	G	H	K	L	M	N	P	S	SW
															LW	
SP-KPHL 100x200	200	44	7	57	65	100	100	20	50	23	50	42,5	M 6	R 1/4"	10	19
SP-KPHL 100x300	300	44	7	57	65	100	200	20	150	23	50	42,5	M 6	R 1/4"	10	19

Overview table of suitable connection elements									
Type	Holding disk ^{*)}	Part no:	Pressure mushroom ^{*)}	Part no:	Pressure spring ^{*)}	Part no:	Bolt type ^{*)}	Hose connection	
SP-KPHL 100x200	HS 250	2.13.1.0025	DP 250	2.13.1.0027	DF 250	6.21.4.0045	ST-KPL-20	VS-10-T	
SP-KPHL 160x300	HS 250	2.13.1.0025	DP 250	2.13.1.0027	DF 250	6.21.4.0045	ST-KPL-20	VS-10-T	

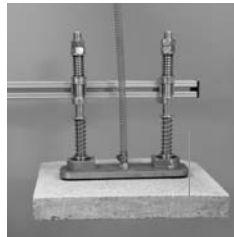
^{*)} required 2 x

2 x safety ring for holding disk 50x2, part. no: 6.21.3.0036

Description

Narrow suction plate with sponge rubber sealing. The sponge rubber sealing is glued into the sealing groove and when wearing off can be exchanged easily. Suitable for transporting materials with heavily structured or formed surface, as chequered or beaded sheets, saw-rough wood etc.

The cardanic suspension (all sides 8°) adjusts to the incline of the transported good.



SP-KPHM 100 x 300



SP-KPHM 100 x 300



Suction plate KPHM 100 x 300

Materials:

M-G Sponge rubber-grey (PGO 10x20)

Article numbers

Type	Suction plate M-G	Replacement seal M-G
SP-KPHM 100x300	1.13.1.0090	2.13.2.0044

Technical Data

Type	Hold.force ¹⁾ (N)	Weight (kg)	Volume ²⁾ (l)
SP-KPHM 100x300	1 180	1,25	0,26

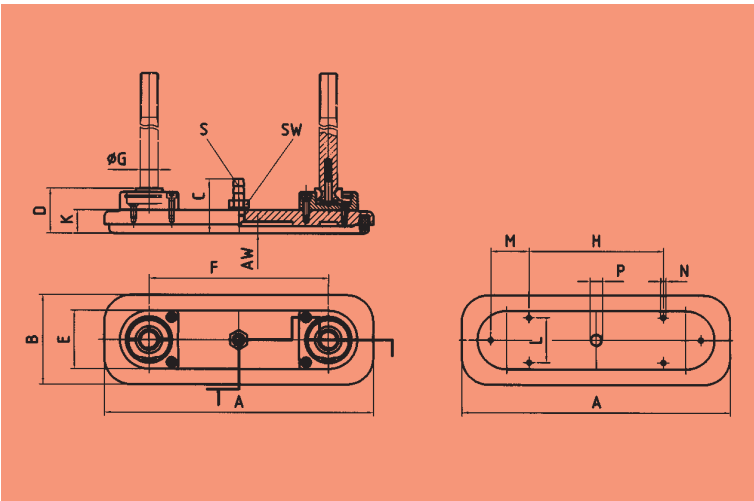
1) Holding forces in N with operational vacuum of 60 % without safety margin relate to even, smooth and dry surfaces

2) Volume with suction cup in released condition

Mounting advice:

On suspension with two bolts only one connection may be tightly clamped. The other must be mobile to avoid the bolts becoming stuck on articulated suspension.

SUCTION PLATE KPHM 100 x 300



Suction plate KPHM 100 x 300

Suct. plates **3**

Dimensions

Type	A	B	AW	C	D	E	F	G	H	K	L	M	N	P	S	SW
SP-KPHM 100 x 300	300	100	8	60,5	50	65	200	20	150	26	50	42,5	M 6	R 1/4	1/2"	19

Overview table of suitable connection elements

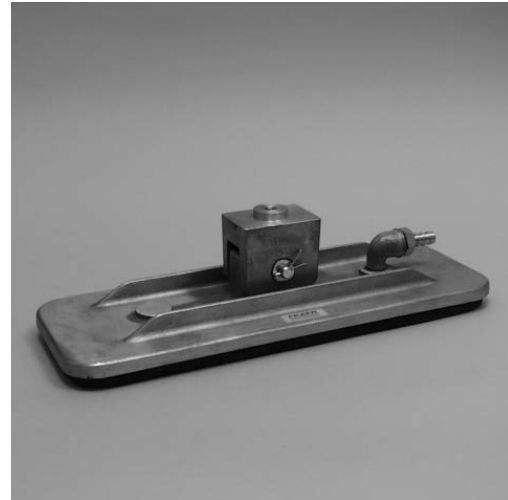
Type	Halte- scheibe ^{*)}	Part no:	Druck- pilz ^{*)}	Part no:	Druck- feder ^{*)}	Part no:	Bolt type ^{*)}	Hose connection
SP-KPHM100x300	HS 250	2.13.1.0025	DP 250	2.13.1.0027	DF 250	6.21.4.0045	ST-KPL-20	VS-1/2-T

^{*)} require 2 x

2 x safety ring for holding disk 50x2, part no: 6.21.3.0036

Description

Narrow suction plates with sponge rubber sealing. The sponge rubber sealing is glued into the sealing groove, and when wearing off, can easily be replaced. Suitable for transporting materials with heavily structured or formed surface, as chequered or beaded sheets, saw-rough wood, etc. The suction plate can be mounted on a thread and is suspended in an oscillating way, so it can adjust to the bending of longer planks or woods



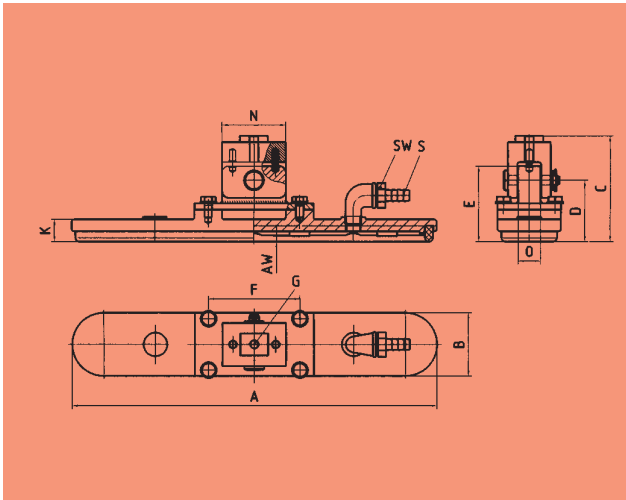
Suction plate KPHM 100 x 460 to 250 x 460

Article numbers			
Type	with yoke M-G	without yoke M-G	sealing M-G
SP-WPHM 80x460	1.13.2.0025	1.13.1.0101	2.13.2.0042
SP-WPHM 100x460	1.13.2.0021	1.13.1.0092	2.13.2.0037
SP-WPHM 120x460	1.13.2.0022	1.13.1.0094	2.13.2.0038
SP-WPHM 170x460	1.13.2.0023	1.13.1.0096	2.13.2.0040
SP-WPHM 250x460	1.13.2.0024	1.13.1.0099	2.13.2.0041

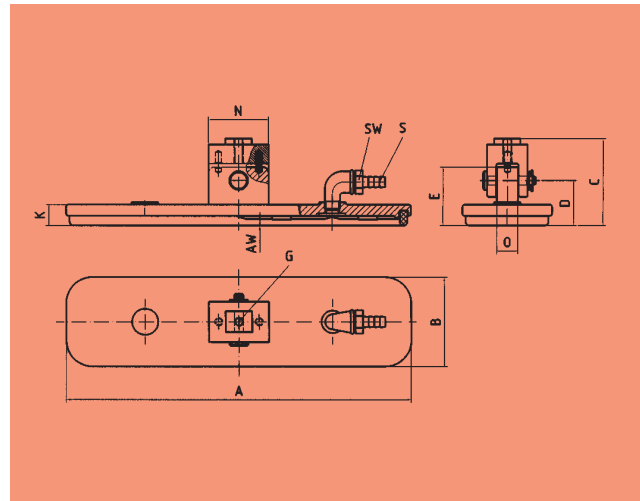
Technical Data			
Type	Hold.force ¹⁾ (N)	Weight (kg)	Volume ²⁾ (l)
SP-WPHM 80x460	1 130	1,55	0,2
SP-WPHM 100x460	1 719	2,55	0,39
SP-WPHM 120x460	2 199	2,7	0,58
SP-WPHM 170x460	3 399	3,5	0,88
SP-WPHM 250x460	5 420	5,6	1,2

1) Holding forces in N with operational vacuum of 60 % without safety margin relate to even, smooth and dry surfaces
 2) Volume with suction cup in released condition

Materials:
 M-G Sponge rubber-grey (PGO 10x20)



Suction plate KPHM 80 x 460



Suction plate KPHM 100 x 460 up to KPHM 250 x 460

Suct. plates 3

Dimensions

Type	A	B	AW	C	D	E	F	G	K	N	O	S LW	SW
SP-WPHM 80 x 460	460	80	8	133	77	95	115	M 12	28	80	28	1/2"	27
SP-WPHM 100 x 460	460	100	8	116	60	78	--	M 12	28	80	28	1/2"	27
SP-WPHM 120 x 460	460	120	8	116	60	78	--	M 12	28	80	28	1/2"	27
SP-WPHM 170 x 460	460	170	8	116	60	78	--	M 12	28	80	28	1/2"	27
SP-WPHM 250 x 460	460	250	8	116	60	78	--	M 12	28	80	28	1/2"	27

Overview table of suitable connection elements

Type	Yoke	Part no:	Bolt	Part no:	Disk ^{*)}	Part no:	Bolt type	Hose connection
SP-WPHM 80x460	EG 20	2.34.6.0002	B 20	2.13.1.0049	U 21	6.21.1.0005	---	VS-1/2-T
SP-WPHM 100x460	EG 20	2.34.6.0002	B 20	2.13.1.0049	U 21	6.21.1.0005	---	VS-1/2-T
SP-WPHM 120x460	EG 20	2.34.6.0002	B 20	2.13.1.0049	U 21	6.21.1.0005	---	VS-1/2-T
SP-WPHM 170x460	EG 20	2.34.6.0002	B 20	2.13.1.0049	U 21	6.21.1.0005	---	VS-1/2-T
SP-WPHM 250x460	EG 20	2.34.6.0002	B 20	2.13.1.0049	U 21	6.21.1.0005	---	VS-1/2-T

*) required 2 x

Description

Narrow suction plates with sponge rubber sealing. The sealing is glued into the sealing groove and when worn out can be exchanged easily. Suitable for transporting materials with heavily structured or formed surface as chequered or beaded sheets, saw-rough woods etc.

The suction plate is suspended on two rigidly mounted suspension bolts, separate vacuum feeding.



Suction plate PHM



Suction plate PHM 75x180 and PHZ 75x180



Suction plate PHM 80 x 460

Article numbers			
Type	Suction plate M-G	Replacement seal M-G	Connection screw
SP-PHZ 35x170	1.13.1.0134 ³⁾	2.13.2.0076 ³⁾	1.31.2.0017
SP-PHM 75x180	1.13.1.0126	2.13.2.0071	1.31.2.0017
SP-PHM 80 x 460	1.13.1.0127	2.13.2.0042	1.31.2.0015
SP-PHM 100 x 460	1.13.1.0122	2.13.2.0037	1.31.2.0015
SP-PHM 120 x 460	1.13.1.0123	2.13.2.0038	1.31.2.0015
SP-PHM 170 x 460	1.13.1.0124	2.13.2.0040	1.31.2.0015
SP-PHM 250 x 460	1.13.1.0125	2.13.2.0041	1.31.2.0015

3) sealing made of froth rubber (Z-R)

Materials:

M-G Sponge rubber-grey (PGO 10x20)
Z-R Froth rubber-red (PGR)

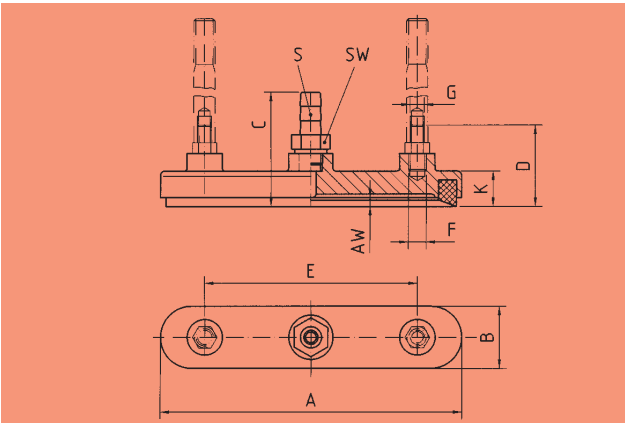
Technical Data			
Type	Hold.force ¹⁾ (N)	Weight (kg)	Volume ²⁾ (l)
SP-PHZ 35x170	180	0,21	0,02
SP-PHM 75x180	430	0,75	0,11
SP-PHM 80x460	1130	1,45	0,2
SP-PHM 100x460	1719	2,45	0,39
SP-PHM 120x460	2199	2,6	0,58
SP-PHM 170x460	3399	3,4	0,88
SP-PHM 250x460	5420	5,5	0,2

1) Holding forces in N with operational vacuum of 60 % without safety margin relate to even, smooth and dry surfaces

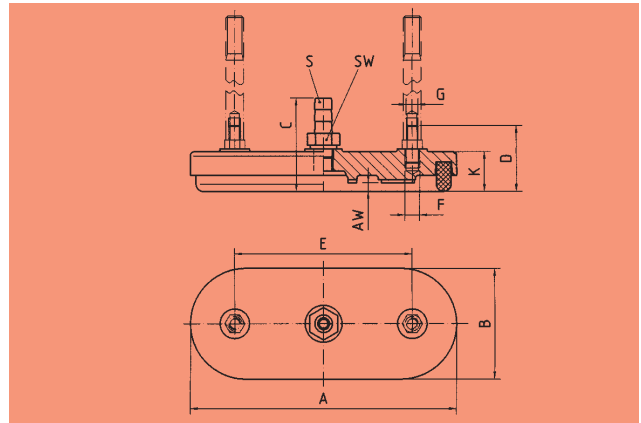
2) Volume with suction cup in released condition

Mounting advice:

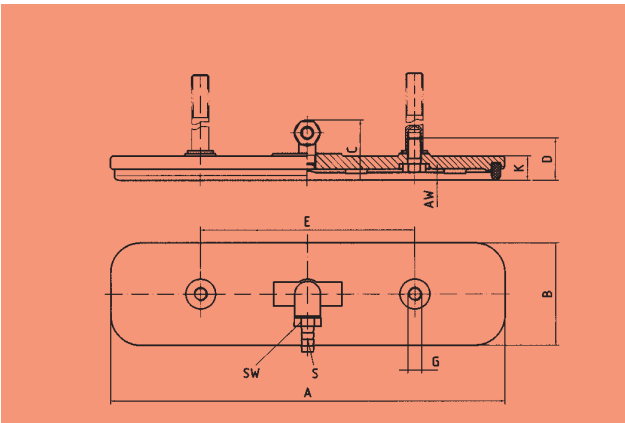
On suspension with two bolts only one connection may be tightly clamped. The other must be mobile to avoid the bolts becoming stuck on articulated suspension.



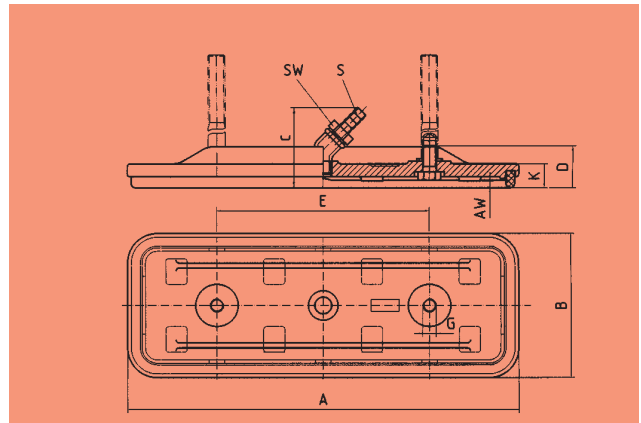
Saugplatte PHZ 35 x 170



Saugplatte PHM 75 x 180



Saugplatte PHM 80 x 460 bis 120 x 460



Saugplatte PHM 170 x 460 bis 250 x 460

Dimensions

Type	A	B	AW	C	D	E	F	G	K	S	SW
SP-PHZ 35 x 170	170	35	5	64,5	46	120	M 10	M 8	20	1/2"	19
SP-PHM 75 x 180	180	75	8	63,5	45	120	M 10	M 8	27	1/2"	19
SP-PHM 80 x 460	460	80	8	71	49	250	---	M 16	29	1/2"	27
SP-PHM 100 x 460	460	100	8	71	49	250	---	M 16	29	1/2"	27
SP-PHM 120 x 460	460	120	8	71	49	250	---	M 16	29	1/2"	27
SP-PHM 170 x 460	460	170	8	71	49	250	---	M 16	29	1/2"	27
SP-PHM 250 x 460	460	250	8	71	49	250	---	M 16	29	1/2"	27

Overview table of suitable connection elements

Type	Halte-scheibe	Part no:	Druck-pilz	Part no:	connection schraube ^{*)}	Part no:	Bolt type ^{*)}	Hose connection
SP-PHZ 35x170	---	---	---	---	AS-M8-M10	1.31.2.0017	STG-12-M8	VT-1/2-T
SP-PHM 75x180	---	---	---	---	AS-M8-M10	1.31.2.0017	STG-12-M8	VT-1/2-T
SP-PHM 80x460	---	---	---	---	AS-M16-30	1.31.2.0015	STG-20-M16	VT-1/2-T
SP-PHM 100x460	---	---	---	---	AS-M16-30	1.31.2.0015	STG-20-M16	VT-1/2-T
SP-PHM 120x460	---	---	---	---	AS-M16-30	1.31.2.0015	STG-20-M16	VT-1/2-T
SP-PHM 170x460	---	---	---	---	AS-M16-30	1.31.2.0015	STG-20-M16	VT-1/2-T
SP-PHM 250x460	---	---	---	---	AS-M16-30	1.31.2.0015	STG-20-M16	VT-1/2-T

*) required 2 x

Description

Narrow suction plates with sponge rubber sealing. The sponge rubber sealing is glued into the sealing groove, and when wearing off, can easily be replaced. Suitable for transporting materials with heavily structured or formed surface, as chequered or beaded sheets, saw-rough wood, etc.
 The suction plate will be suspended by two rigidly mounted bolts or by a hinged yoke suspension, separate vacuum feeding.



Suction plate WPHM

Article numbers					
Type	Suction plate for yoke	Yoke	Suction plate for 2 bolts	Connection screw	Replacement seal M-G
SP-WPHM 90 x 1100	1.13.1.0153	2.34.6.0002	--	--	2.13.2.0082
SP-WPHM 90 x 1570	1.13.1.0154	2.34.6.0002	--	--	2.13.2.0083
SP-PHM 90 x 1100	--	--	1.13.1.0128	1.31.2.0015	2.13.2.0082
SP-PHM 90 x 1570	--	--	1.13.1.0129	1.31.2.0015	2.13.2.0083

Materials:

M-G Sponge rubber-grey (PGO 10x20)

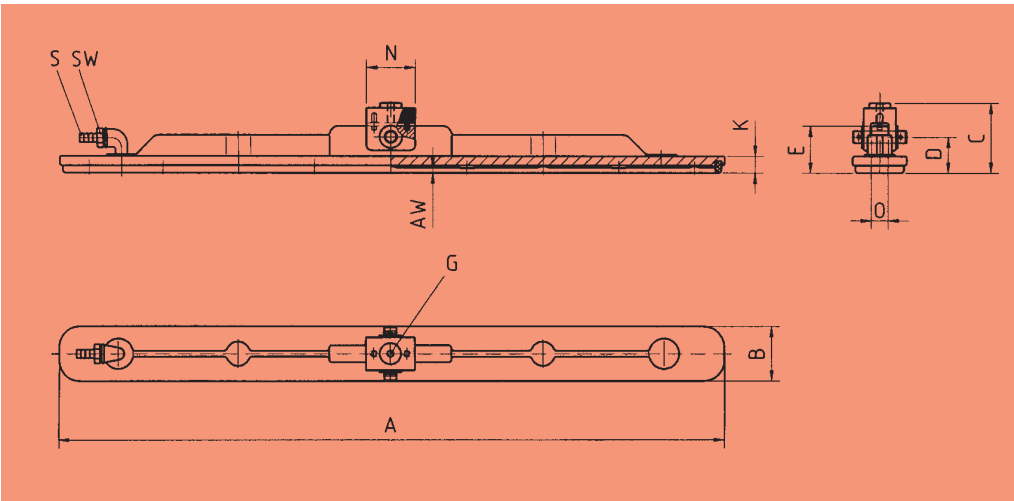
Technical Data			
Type	Hold.force ¹⁾ (N)	Weight (kg)	Volume ²⁾ (l)
SP-WPHM 90 x 1100	3000	6	0,9
SP-WPHM 90 x 1570	3500	8,5	0,9
SP-PHM 90 x 1100	3000	5,5	0,9
SP-PHM 90 x 1570	3500	8	0,9

1) Holding forces in N with operational vacuum of 60 % without safety margin relate to even, smooth and dry surfaces
 2) Volume with suction cup in released condition

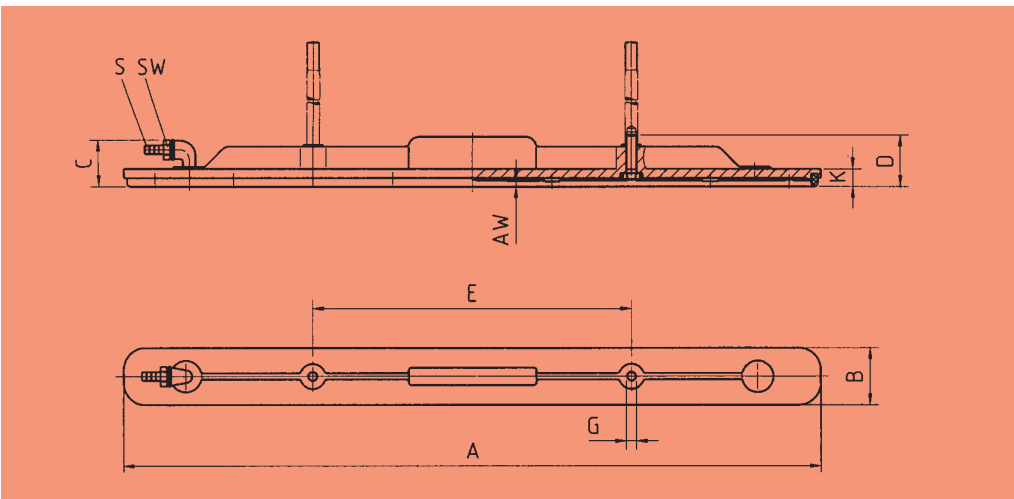
Mounting advice:

On suspension with two bolts only one connection may be tightly clamped. The other must be mobile to avoid the bolts becoming stuck on articulated suspension.

SUCTION PLATES(W)PHM 90 x 1100 AND 90 x 1570



Suction plates WPHM 90 x 1100 and WPHM 90 x 1570



Suction plates PHM 90 x 1100 and PHM 90 x 1570

Dimensions											
Type	A	B	AW	C	D	F	G	K	O	S	SW
SP-WPHM 90 x 1100	1100	90	8	116	60	78	M 12	28	28	LW	27
SP-WPHM 90 x 1570	1570	90	8	116	60	78	M 12	28	28	1/2"	27
SP-PHM 90 x 1100	1100	90	8	71	81	500	M 16	28	--	1/2"	27
SP-PHM 90 x 1570	1570	90	8	71	81	500	M 16	28	--	1/2"	27

Overview table of suitable connection elements									
Type	Yoke	Part no:	Bolt	Part no:	Disk ^{*)}	Part no:	Bolt type	Hose connection	
SP-WPHM 90x1100	EG 20	2.34.6.0002	B 20	2.13.1.0049	U 21	6.21.1.0005	---	VS-1/2-T	
SP-WPHM 90x1570	EG 20	2.34.6.0002	B 20	2.13.1.0049	U 21	6.21.1.0005	---	VS-1/2-T	

^{*)} required 2 x

Description

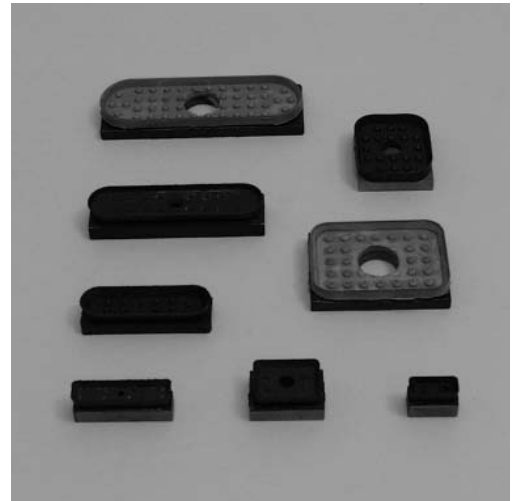
Special suction plates for holding or transporting extra small or narrow work pieces, as wood strips, small profiles, etc.
 The sealing (partly bump-rubber lining) is vulcanized onto the main plate (steel body).
 Read "Mounted holding plates" for fitting mounting plates and vacuum connections.



DP-EP 96 x 96



Sealing plate EP



Sealing plates EP

Materials:

NBR-S Perbunane, black
 NBR-G Perbunane, grey
 SI-T Silicone, transparent

Article numbers

Type	Suction plate NBR-S	Suction plate NBR-G	Suction plate SI-T
DP-EP 42 x 42	1.16.1.0008	---	1.16.1.0009
DP-EP 43 x 13	1.16.1.0010	---	1.16.1.0011
DP-EP 45 x 40	1.16.1.0012	---	1.16.1.0013
DP-EP 58 x 19	1.16.1.0015	---	1.16.1.0016
DP-EP 65 x 25	---	1.16.1.0017	1.16.2.0018
DP-EP 65 x 33	---	1.16.1.0019	1.16.2.0014
DP-EP 65 x 47	---	1.16.1.0021	1.16.2.0022
DP-EP 83 x 23	1.16.1.0023	---	1.16.1.0024
DP-EP 96 x 96	---	1.16.1.0025	1.16.1.0026
DP-EP 105 x 35	---	1.16.1.0001	1.16.1.0003

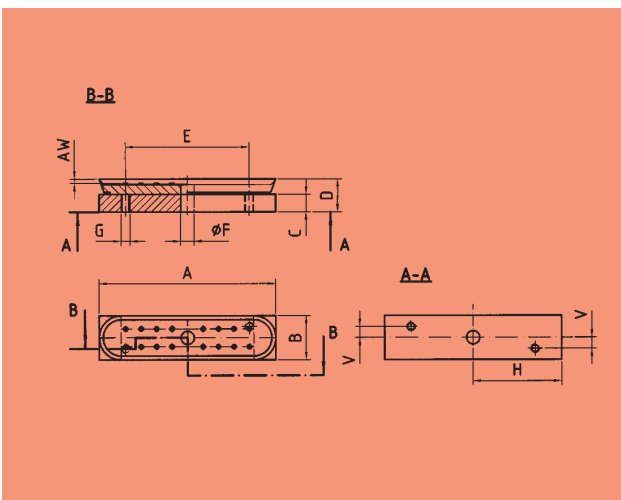
In perbunane ex stock delivery, delivery time for material silicone transparent on request.

Technical Data

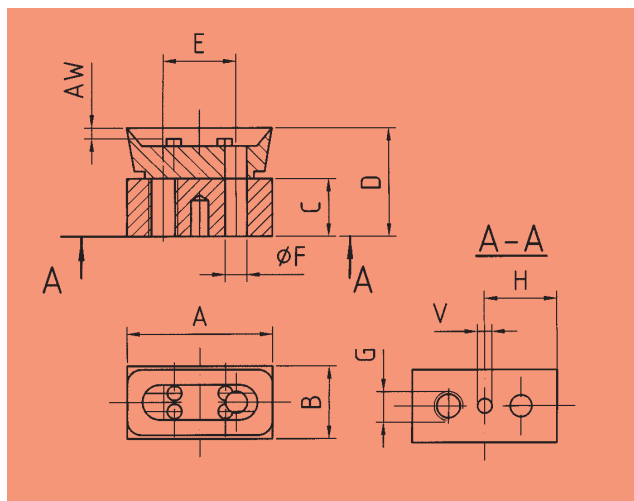
Type	Hold.force ¹⁾ (N)	Weight (g)	Volume ²⁾ (ml)
DP-EP 42 x 42	73	80	6
DP-EP 43 x 13	21	20	1,5
DP-EP 45 x 40	73	60	6
DP-EP 58 x 19	36	60	3
DP-EP 65 x 25	45	60	5
DP-EP 65 x 33	72	70	9
DP-EP 65 x 47	123	110	11
DP-EP 83 x 23	36	100	6
DP-EP 96 x 96	440	410	50
DP-EP 105 x 35	141	140	14

1) Holding forces in N with operational vacuum of 60 % without safety margin relate to even, smooth and dry surfaces

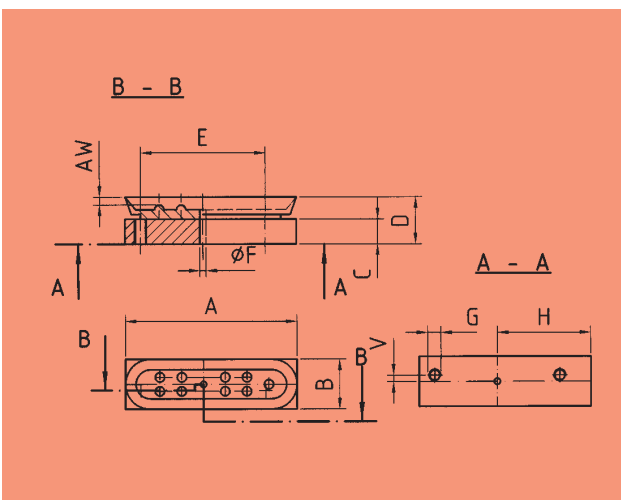
2) Volume with suction cup in released condition



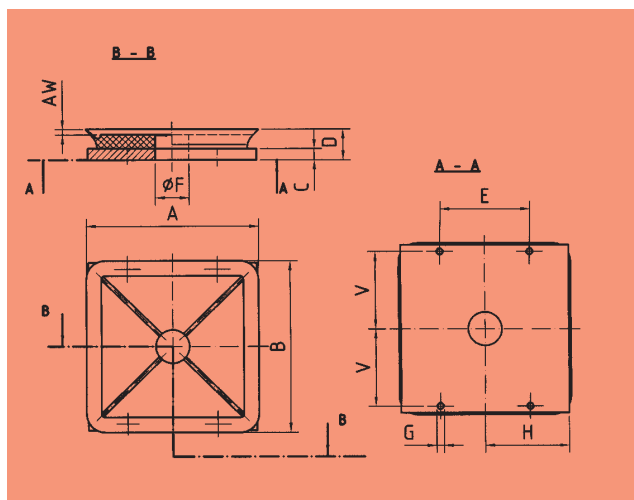
Sealing plates EP except for 23 x 13, 58 x 19, 96 x 96



Sealing plate EP 23 x 13



Sealing plate EP 58 x 19



Sealing plate EP 96 x 96

Dimensions										
Type	A	B	AW	C	D	E	F	G	H	V
DP-EP 42 x 42	42	42	2,5	6	13	33	8	M 4	21	--
DP-EP 43 x 13	40	10	2	8	15	20	3	M 4	20	--
DP-EP 45 x 40	40	35	2,5	6	13	33	10	M 4	17,5	--
DP-EP 58 x 19	55	16	2,5	8	15	40	2	M 4	30	2
DP-EP 65 x 25	60	20	2	6	13	40	6	M 4	30	--
DP-EP 65 x 33	60	28	2,5	6	13	40	10	M 4	30	--
DP-EP 65 x 47	60	42	2,5	6	13	40	18	M 4	30	--
DP-EP 83 x 23	80	20	2	8	15	56	6	M 4	40	5
DP-EP 96 x 96	92	92	3	6	16,5	48	18	M 4	45	41,5
DP-EP 105 x 35	100	32	2,5	6	13	60	18	M 4	50	--

Description

The mounted holding plates are special holding plates for holding or transporting extra small and narrow work pieces, as wood strips, small profiles, etc.

The mounted holding plates can be fixed through two drilled holes in the main plate. The sealing plate is screwed onto the main body and can be exchanged easily.

There is a choice of directly screwed in hose nipple, T-Piece and two hose nipples or angle connection with hose nipple.

Please look at "Sealing plates" for replacement sealing plates!



Holding plate EP 105 x 35



Holding plates EP

Article numbers

Type	Holding plate	Holding plate	Holding plate	Replacement sealing plate	
	NBR-S	NBR-G	SI-T	NBR	SI-T
SP-EP 45 x 40	1.16.2.0007	---	1.16.2.0008	1.16.1.0012	1.16.1.0013
SP-EP 65 x 25	---	1.16.2.0011	1.16.2.0012	1.16.1.0017	1.16.1.0018
SP-EP 65 x 33	---	1.16.2.0013	1.16.2.0014	1.16.1.0019	1.16.1.0020
SP-EP 65 x 47	---	1.16.2.0015	1.16.2.0016	1.16.1.0021	1.16.1.0022
SP-EP 105 x 35	---	1.16.2.0003	1.16.2.0004	1.16.1.0001	1.16.1.0003

In perbunane ex stock delivery, delivery time for material silicone transparent on request.

Materials:

NBR-S Perbunane, black
NBR-G Perbunane, grey
SI-T Silicone, transparent

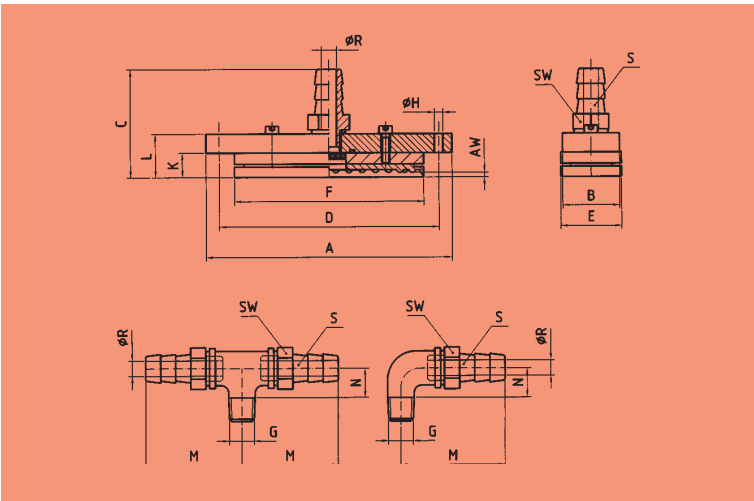
Technical Data

Type	Hold.force ¹⁾ (N)	Weight (g)	Volume ²⁾ (ml)
SP-EP 45 x 40	73	250	6
SP-EP 65 x 25	45	220	5
SP-EP 65 x 33	72	310	9
SP-EP 65 x 47	123	410	11
SP-EP 105 x 35	141	470	14

1) Holding forces in N with operational vacuum of 60% without safety margin relate to even, smooth and dry surfaces

2) Volume with suction cup in released condition

HOLDING PLATES EP 45 x 40 to 105 x 35



Holding plates EP

Dimensions								
Type	A	B	AW	C	D	E	F	G
SP-EP 45 x 40	60	35	2,5	57	50	35	40	R 1/4"
SP-EP 65 x 25	90	20	2	57	75	20	60	R 1/4"
SP-EP 65 x 33	90	30	2,5	57	75	28	60	R 1/4"
SP-EP 65 x 47	90	40	2,5	57	75	42	60	R 1/4"
SP-EP 105 x 35	130	30	2,5	57	116	32	100	R 1/4"

Dimensions									
Type	H	K	L	M	N	P	R	S LW	SW
SP-EP 45 x 40	4,5	13	23	51	15,5	55	8	1/2"	19
SP-EP 65 x 25	4,5	13	23	51	15,5	55	8	1/2"	19
SP-EP 65 x 33	4,5	13	23	51	15,5	55	8	1/2"	19
SP-EP 65 x 47	4,5	13	23	51	15,5	55	8	1/2"	19
SP-EP 105 x 35	4,5	13	23	51	15,5	55	8	1/2"	19

Description

Holding plates are special suction plates for holding or transporting extra small or narrow work pieces, as wood strips, small profiles, etc. The holding plates can be mounted on the main plate through two drilled holes. The sealing is screwed onto the main plate.



Holding plates DP-FS 30 x 100 to 30 x 300

Materials:

- BK-S Buna rubber, black
- NBR-G Perbunane, grey
- SI-T Silicone, transparent

Connection nipple:

For the vacuum supply we recommend connection nipple SN-R1/8-6. see Chapter 8.

Article numbers

Type	Holding plate	Holding plate	Holding plate
	BK-S	NBR-G	SI-T
DP-FS 30 x 100	1.11.1.0010	1.11.1.0012	1.11.1.0014
DP-FS 30 x 200	1.11.1.0015	1.11.1.0017	1.11.1.0018
DP-FS 30 x 300	1.11.1.0019	1.11.1.0021	1.11.1.0022

In perbunane black ex stock delivery

Delivery time for materials perbunane grey and silicone transparent on request

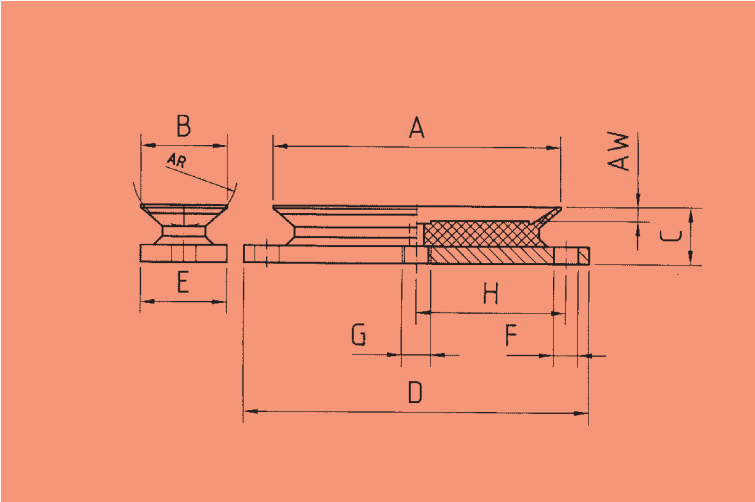
Technical Data

Type	Hold.force ¹⁾ (N)	Weight (kg)	Volume ²⁾ (ml)
DP-FS 30 x 100	115	0,18	17
DP-FS 30 x 200	230	0,33	25
DP-FS 30 x 300	365	0,52	40

1) Holding forces in N with operational vacuum of 60 % without safety margin relate to even, smooth and dry surfaces

2) Volume with suction cup in released condition

HOLDING PLATES 75 x 180 and 80 x 460, hinged



DP-FS 30 x 100 to 30 x 300

Dimensions										
Type	A	B	AW	AR	C	D	E	F	G	H
DP-FS 30 x 100	100	30	5	16	20	120	30	8,5	R 1/8"	52
DP-FS 30 x 200	200	30	5	16	20	220	30	8,5	R 1/8"	102
DP-FS 30 x 300	300	30	5	16	20	320	30	8,5	R 1/8"	152

Description

Suitable as sealing for suction and clamping plates in various forms and sizes. The sealing profiles have to be glued in the corresponding grooves with special glue.
 Look at the table below for necessary groove measures!



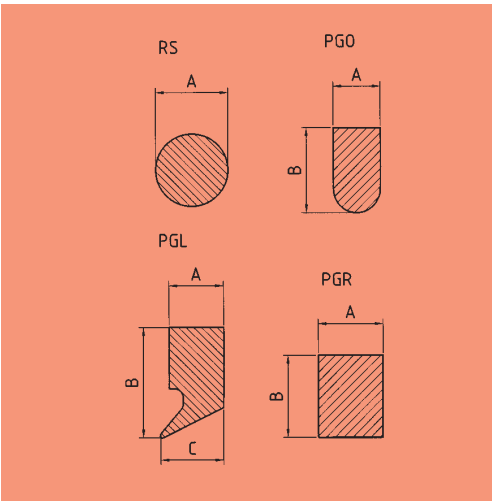
Sealing profiles

Materials:

- D-RS Sponge rubber, black
Silicone, white
- D-PGO Buna rubber, black
- D-PGL Sponge rubber, black
- D-PGR HO-rubber, grey

Article numbers		
Type	M-S (m)	M-SI-W
D-RS 5	6.14.3.0009	6.14.3.0013
D-RS 6	6.14.3.0014	6.14.3.0015
D-RS 8	6.14.3.0016	6.14.3.0017
D-RS 10	6.14.3.0001	6.14.3.0002
D-RS 12	6.14.3.0003	6.14.3.0004
D-RS 15	6.14.3.0005	6.14.3.0006
D-PGO 6x8	2.19.2.0060	---
D-PGO 10x20	2.19.2.0056	---
D-PGO 12x17	2.19.2.0057	---
D-PGL 11x23	2.19.2.0028	---
D-PGR 10x10	2.19.2.0009	---
D-PGR 10x18	2.19.2.0018	---
D-PGR 20x25	2.19.2.0038	---

Sponge rubber black ex stock delivery
 Delivery time for silicone white on request



Sealing profiles

Dimensions						
Type	Form	A	B	C	Groove width ca.	Gr. depth ¹⁾ ca.
D-RS 5	RS	5	--	--	5,5 - 6	0,7 x A
D-RS 6	RS	6	--	--	6,5 - 7	0,7 x A
D-RS 8	RS	8	--	--	8,5 - 9	0,7 x A
D-RS 10	RS	10	--	--	10,5 - 11	0,7 x A
D-RS 12	RS	12	--	--	12,5 - 13	0,7 x A
D-RS 15	RS	15	--	--	15,5 - 16	0,7 x A
D-PGO 6x8	PGO	6	8	--	6,5 - 7	0,5 - 0,7 x B
D-PGO 10x20	PGO	10	20	--	10,5 - 11	0,5 - 0,7 x B
D-PGO 12x17	PGO	12	17	--	12,5 - 13	0,5 - 0,7 x B
D-PGL 11x23	PGL	11	23	14	11,5 - 12	0,5 - 0,7 x B
D-PGR 10x10	PGR	10	10	--	10,5 - 11	0,5 - 0,7 x B
D-PGR 10x18	PGR	10	18	--	10,5 - 11	0,5 - 0,7 x B
D-PGR 20x25	PGR	20	25	--	20,5 - 21	0,5 - 0,7 x B

1) depending on surface conditions of the transport good

Description

For protection of sensitive transport good surfaces, as polished sheet metals. The textile cover is pulled over the suction plate and held with a rubber band

Please note:
 The carrying capacities of suction plates can be reduced when using textile covers, because the friction between suction plate and transport good is reduced.



Textile cover TÛ

Article numbers	
Type	Textile cover
TÛ-SP-90	1.55.2.0014
TÛ-SP-100	1.55.2.0002
TÛ-SP-110	1.55.2.0003
TÛ-SP-130	1.55.2.0004
TÛ-SP-160	1.55.2.0006
TÛ-SP-180	1.55.2.0007
TÛ-SP-210	1.55.2.0009
TÛ-SP-220	1.55.2.0010
TÛ-SP-250	1.55.2.0011
TÛ-SP-300	1.55.2.0012

Technical Data	
Textile cover	for suctionplate diameter (mm)
TÛ-SP-90	90
TÛ-SP-100	100
TÛ-SP-110	110
TÛ-SP-130	130
TÛ-SP-160	160
TÛ-SP-180	180
TÛ-SP-210	210
TÛ-SP-220	220
TÛ-SP-250	250
TÛ-SP-300	300



Thinner, Special glue

Description

















A special glue should be used in order to get a safe and solid connection of the sealing profile or of the sealing on the suction plate.

Article numbers

Type	Unit (g)	Part number
Special glue for rubber- metal connections (perbunane) - can	750	1.55.9.0004
Special glue for rubber- metal connections (perbunane) - can	70	1.55.9.0003
Special glue for rubber- metal connections (silicone) - cartridge	300	1.55.9.0002
Thinner for special glue - can	750	1.55.9.0001

4

FIXING ELEMENTS

	<i>Connection nipple AN</i>	4.4
	<i>Connection screw AS</i>	4.6
	<i>Suction plate suspension SAS, SAK</i>	4.8
	<i>Mounting sets for AL-profiles EBS</i>	4.10
	<i>Mounting sets for square profiles EBS</i>	4.12
	<i>Angle connection WA</i>	4.14
	<i>Bolt suspension SBF</i>	4.16
	<i>Fixing plates BFP, BFW</i>	4.17
	<i>Cross clamping pieces KKS</i>	4.18
	<i>Clamping plates KP-GFK, AL and ST</i>	4.20
	<i>Suspension bolt STN</i>	4.22
	<i>Suspension bolt STG</i>	4.24
	<i>Suspension bolt ST-KPL, KPS, KPT</i>	4.26
	<i>Suspension bolt ST-6KT</i>	4.28
	<i>Pressure springs DF</i>	4.30
	<i>Accessories</i>	4.32

General Information

The way of fixing and mounting suction cups and plates depends on several factors. In chapter 1 "Basics" you will find a detailed list, when a spring-mounted or non-spring-mounted mounting is possible resp. necessary.

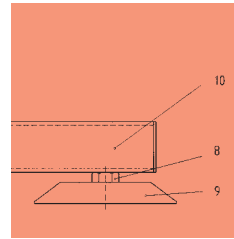
We offer a modular construction system with fixing elements, which can be combined, for our suction cup / plate program.

This guarantees highest flexibility and at the same time a very high functionality.

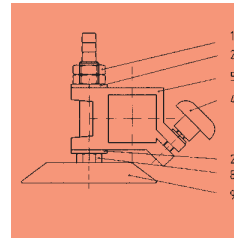
Terms for Mounting Examples

No: Term:

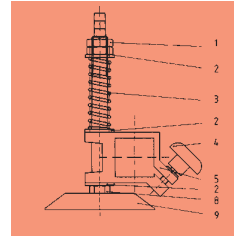
- 1 Nut
- 2 Disk
- 3 Upper spring
- 4 Clamping screw
- 5 Cross clamping piece
- 6 Lower spring
- 7 Suspension bolt
- 8 Connection nipple
- 9 Suction cup
- 10 Distribution pipe
- 11 Suspension (on site)
- 12 Sealing ring
- 13 Hose nipple
- 14 Angle connection
- 15 Upper clamping plate
- 16 Guide bush
- 17 Clamping lever
- 18 Lower clamping plate
- 19 Connection fitting
- 20 Sealing resp. suction plate



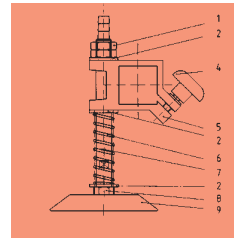
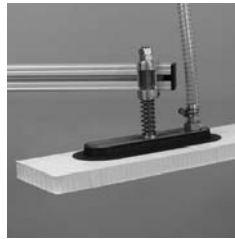
Direct mounting in distribution circuit. The suction cups / plates are directly screwed into hollow profiles by the use of connection nipples or connection screws.



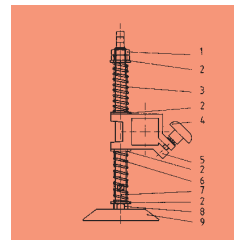
Rigid suspension by use of cross clamping pieces or clamping plates on hollow profiles. For all suction cups and suction plates are corresponding suspension bolt models available, i.e. with incorporated or separated vacuum feeding.



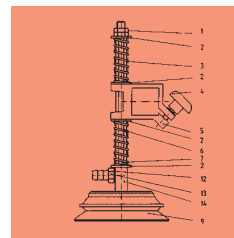
One-sided spring-mounted suspension with upper spring. This fixing element is used when bent parts have to be taken up from even and stable surfaces. An even weight distribution is guaranteed.



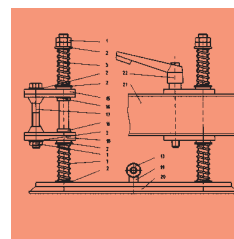
One-sided spring-mounted suspension with lower spring. Recommended for using suction cups / plates on sensitive parts. The springs guarantee a sensitive handling of the materials. Available for cushioning of pushes when lifting goods are cushioning discs.



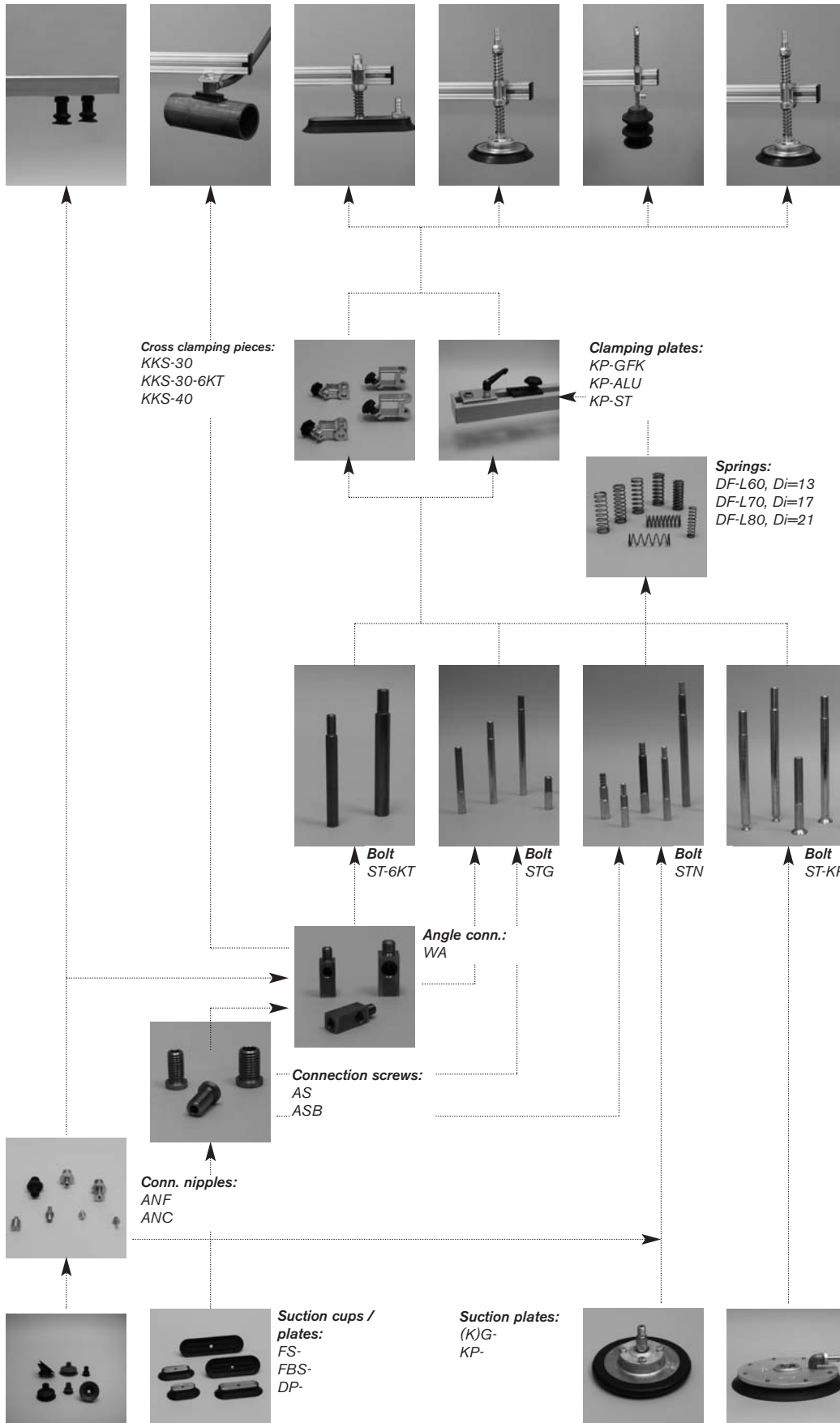
Suspension spring-mounted on both sides with upper and lower spring. The best mounting option for suction cups / plates. This set-up guarantees sensitive handling and an even distribution of weight.



Turn-proof mounting by use of hexagon suspension bolt and clamping piece. Vacuum-fed by means of angle connection or separately on the suction cup / plate. Various lengths of suspension bolts are available for all suspension types.



Turn-proof mounting by means of parallel suspension bolt. Ideal mounting of big oval suction plates with high holding forces in connection with clamping plates. Various lengths of suspension bolts for spring-mounted and non-spring-mounted mounting are available.



Mounting examples:

- Mounting in distribution line
- Rigid through angle connection
- spring-mounted and turn-proof with hexagon bolt
- Rigid with cross clam. piece
- spring-mounted on one and on both sides

Cross clamping pieces and clamping plates for mounting on profiles 30 x 30 and 40 x 40 or double profiles with distance of 40 mm and 60 mm.

Springs for mounting of suction cups/ plates spring-mounted on one side and both sides. Lengths of suspension bolts depends on mounting.

Bolts in different lengths for different suspensions. With integrated vacuum feeding, in turn-proof version, in connection with angle connection or special versions for all KP-suction plates.

Angle connection as connection element between construction- sided mounting and suction cup / sealing plate / suction plate or between sealing plate and bolts STG / ST-6KT with vacuum feeding on the side.

Connection screw as connection element between sealing plate / suction plate and bolts STN, STG, ST-6KT partly with vacuum flow

Connection nipple for direct mounting of suction cups in the distributor line or as connection element between suction cups and bolts STN, STG, ST-6KT.

Suction cups, sealing and suction plates for various surface structures and work piece dimensions.

Description

Connection nipple with outer thread (M5 or R1/4") for flat suction cups or bellows type cups.

The suction cup has to be stuck on the connection nipple. As a safety feature against unintentional pulling off the suction cup can be clamped on the connection nipple, glued in or secured with a simple clip. When worn out, the suction cups can simply be pulled off and easily be replaced by new ones.

Connection nipples ANC-5.5-R1/4:

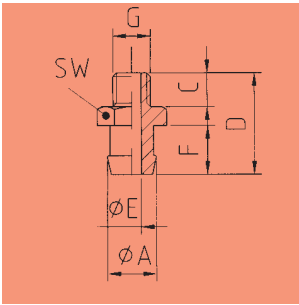
Nipples with threads on both sides for screwing in suction cups with inner thread connections.



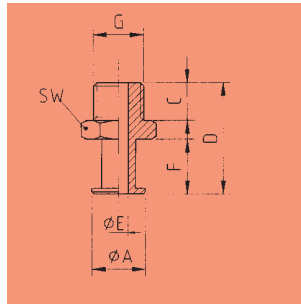
Conn. nipple ANF and ANC

Technical Data	
Type	Weight (g)
ANF-6-M5	2,5
ANF-6-R1/4	21
ANF-8-M5	10
ANF-8-R1/4	10
ANC-1,2-M5	10
ANC-2,5-M5	3
ANC-3,5-M5	10
ANC-4-R1/4	20
ANC-4,5-R1/4	8,5
ANC-5-R1/4	24
ANC-5,5-R 1/4	7
ANC-8-R1/4	8,5
ANA-8-R1/8	10
ANA-9-R1/4	18
ANA-29-R1/4	21
ANA-32-R1/4	27
ANA-41-R1/4	32

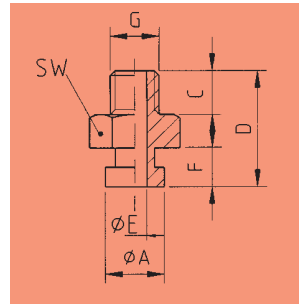
Article numbers	
Type	Connection nipple
ANF-6-M5	1.31.1.0011
ANF-6-R1/4	1.31.1.0012
ANF-8-M5	1.31.1.0013
ANF-8-R1/4	1.31.1.0014
ANC-1,2-M5	1.31.1.0001
ANC-2,5-M5	1.31.1.0002
ANC-3,5-M5	1.31.1.0003
ANC-4-R1/4	1.31.1.0005
ANC-4,5-R1/4	1.31.1.0004
ANC-5-R1/4	1.31.1.0007
ANC-5,5-R1/4	1.31.1.0006
ANC-8-R1/4	1.31.1.0008
ANA-8-R1/8	1.31.1.0018
ANA-9-R1/4	1.31.1.0019
ANA-29-R1/4	1.31.1.0021
ANA-32-R1/4	1.31.1.0020
ANA-41-R1/4	1.31.1.0022



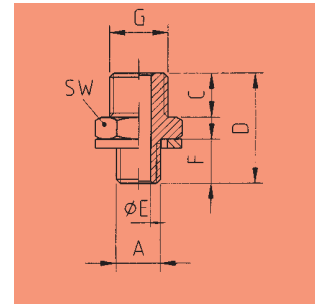
ANF-6-M5 and ANF-6-R1/4



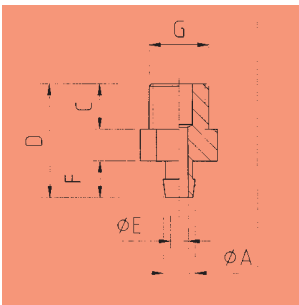
ANF-8-M5



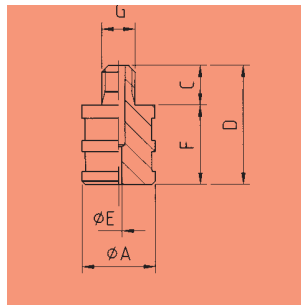
ANF-8-R1/4



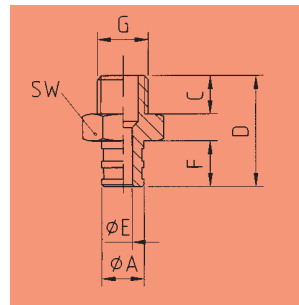
ANC-5,5-R1/4



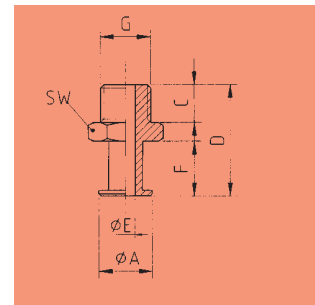
ANC-3,5-M5



ANC-4-R1/4, ANC-4,5-R1/4, ANC-5-R1/4,
ANC-8-R1/4



ANC-1,2-M5, ANC-2,5-M5



ANA-9-R1/8 - ANA-41-R1/4

Dimensions

Type	A	C	D	E	F	G	SW
ANF-6-M5	7	6	18	1	8	M 5	9
ANF-6-R1/4	7	10	25	4	8	R 1/4"	17
ANF-8-M5	11	6	18	1	12	M 5	--
ANF-8-R1/4	11,5	10	29	5	12	R 1/4"	19
ANC-1,2-M5	3	4,5	10,5	1,2	2,5	M 5	8
ANC-2,5-M5	6	4,5	12	2,5	4	M 5	8
ANC-3,5-M5	6,5	4,5	13,5	3,5	6,5	M 5	8
ANC-4-R1/4	10	10	23,5	4	8,5	G 1/4"	17
ANC-4,5-R1/4	14	10	23,5	4	8,5	G 1/4"	17
ANC-5-R1/4	14	10	29,5	5	14,5	G 1/4"	17
ANC-5,5-R1/4	M 10 x 1,25	10	25	5,5	10	G 1/4"	17
ANC-8-R1/4	18	10	37	8	22	G 1/4"	17
ANA-8-R1/8	7	9,5	21	3	5,5	G 1/8"	14
ANA-9-R1/4	13	10	26	6	6	G 1/4"	17
ANA-29-R1/4	12	12	29	6	12	G 1/4"	19
ANA-32-R1/4	12	12	26	6	9	G 1/4"	19
ANA-41-R1/4	12	10	46	6	10	G 1/4"	19

Description

Connection screws made of galvanized steel.
 As a connection element between sealing plate/
 suction plate and bolts STN / STG / ST-6KT or
 between suction plate and angle connection. For
 suction plates, which do not have separate vacu-
 um feeding with passage drill for an integrated
 vacuum feeding through the bolt resp. angle
 connection.



ASB-M5 to ASB-M16



ASB-M12-R3/8 to ASB-M16-R1/2



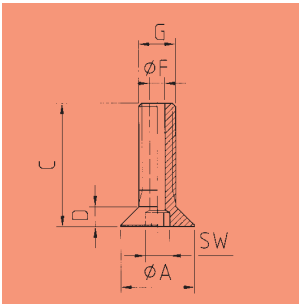
Connection crews for suction cups/plates

Technical Data		
Type	Weight (g)	Nominal width (mm)
ASB-M12-18	12	6
ASB-M16-25	35	8
ASB-M5	2	2
ASB-M12	16	6
ASB-M16	21	10
ASB-M5-M5	20	2
ASB-M12-M12	30	6
ASB-M12-R3/8	32	6
ASB-M16-R1/2	45	8
AS-M12-18	28	---
AS-M16-25	75	---
AS-M24-32	130	---
AS-M12-20	30	---
AS-M12-25	46	---
AS-M16-25	76	---
AS-M16-30	87	---
AS-M16-60	117	---
AS-M5-M5	22	---
AS-M8-M10	24	---
AS-M12-M12	32	---

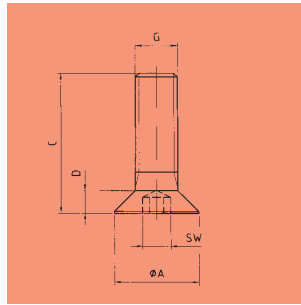
Article numbers	
Type	Part No:
ASB-M12-18	1.31.2.0003
ASB-M16-25	1.31.2.0007
ASB-M5	1.31.2.0009
ASB-M12	1.31.2.0002
ASB-M16	1.31.2.0005
ASB-M5-M5	1.31.2.0030
ASB-M12-M12	1.31.2.0031
ASB-M12-R3/8	1.31.2.0004
ASB-M16-R1/2	1.31.2.0008
AS-M12-18	1.31.2.0010
AS-M16-25	1.31.2.0014
AS-M24-32	1.31.2.0029
AS-M12-20	1.31.2.0011
AS-M12-25	1.31.2.0012
AS-M16-25	1.31.2.0013
AS-M16-30	1.31.2.0015
AS-M16-60	1.31.2.0016
AS-M8-M10	1.31.2.0017
AS-M5-M5	1.31.2.0032
AS-M12-M12	1.31.2.0033

Advice:

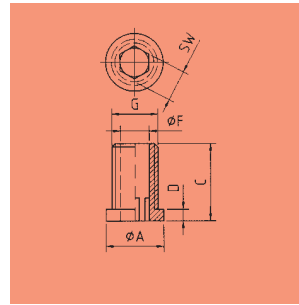
Please read the beginning of the chapter "Fixing elements in combination" for usage- and combination possibilities!



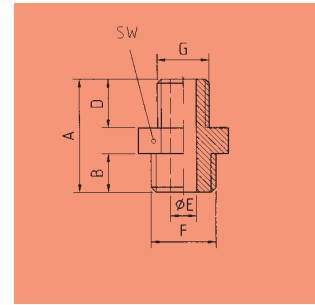
ASB M12-18 and ASB M16-25



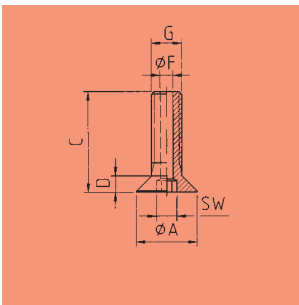
AS M12-20 and AS M24-36



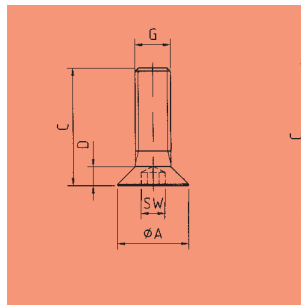
ASB-M12 and ASB-M16



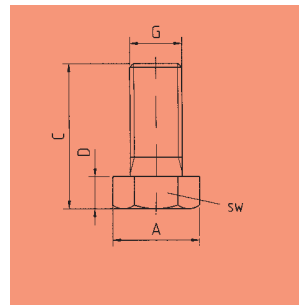
ASB-M12-R3/8, ASB-M16-R1/2,
AS-M5-M5, AS-M8-M10, AS-M12-M12



ASB-M5



AS-M12-20



AS-M12-25, M16-25, M16-30 and M16-60

Dimensions								
Type	A	B	C	D	E	F	G	SW
ASB-M12-18	24	---	18	6,5	---	6	M 12	8
ASB-M16-25	30	---	25	7,5	---	8	M 16	10
ASB-M5	10	---	20	2,8	---	2	M 5	3
ASB-M12	16	---	22	3	---	6	M 12	6
ASB-M16	20	---	27	3	---	8	M 16	8
ASB-M5-M5	15	5	---	5	2	M 5	M 5	8
ASB-M12-M12	30	10	---	10	6	M 12	M 12	18
ASB-M12-R3/8	30	12	---	12	6	R 3/8"	M 12	19
ASB-M16-R1/2	35	12	---	15	8	R 1/2"	M 16	24
AS-M12-18	24	---	18	6,5	---	---	M 12	8
AS-M16-25	30	---	25	7,5	---	---	M 16	10
AS-M24-32	42	---	32	9,5	---	---	M 24	14
AS-M12-20	24	---	26,5	6,5	---	---	M 12	8
AS-M12-25	20,7	---	32,5	7,5	---	---	M 12	19
AS-M16-25	27,7	---	35	10	---	---	M 16	24
AS-M16-30	27,7	---	40	10	---	---	M 16	24
AS-M16-60	27,7	---	70	10	---	---	M 16	24
AS-M8-M10	26	10	---	10	---	M 10	M 8	12
AS-M5-M5	15	5	---	5	---	M 5	M 5	8
AS-M12-M12	30	10	---	10	---	M 12	M 12	18

Description

Stable and robust suction plate retainers for all sealing plates with an even base. The innovative seal between the retainer and the sealing plate guarantees a connection that is absolutely vacuum-tight. No additional sealing materials and work is required. Even if the sealing plates have to be exchanged, the absolute tightness of the system seals is guaranteed.

The cardanic design makes the optimal adaptation of the sealing plates possible, even if the workpieces are uneven. The compensation angle on all sides is 15°.



SAS-M12 - M16



SAK-M20 - M30



Suction plate retainer SAK-M12 - M16

Article numbers	
Type	rigid design
SAS-M12	1.31.2.0020
SAS-M16	1.31.2.0021
SAS-M20	1.31.2.0027
SAS-M30	1.31.2.0028

Article numbers	
Type	articulated design
SAK-M12	1.31.2.0018
SAK-M16	1.31.2.0019
SAK-M20	1.31.2.0025
SAK-M30	1.31.2.0026

Technical Data rigid design						
	Compensation angle max:	Weight (kg)	Volume (ml)	Connection thread	F _Z (N)	M (Nm)
SAS-M12	---	0,10	0,65	M 12	2.000	40
SAS-M16	---	0,15	1,60	M 16	4.000	75
SAS-M20	---	0,45	---	M 24	8.000	100
SAS-M30	---	0,42	---	M 24	16.000	150

F_Z, M max. tensile load and max. bending force

Technical Data articulated design						
	Compensation angle max:	Weight (kg)	Volume (ml)	Connection thread	F _Z (N)	M (Nm)
SAK-M12	ca. 15°	0,1	1,41	M 12	2.000	40
SAK-M16	ca. 15°	0,27	5,50	M 16	4.000	75
SAS-M20	---	0,10	0,65	M 12	8.000	100
SAS-M30	---	0,15	1,60	M 16	16.000	150

F_Z, M max. tensile load and max. bending force.

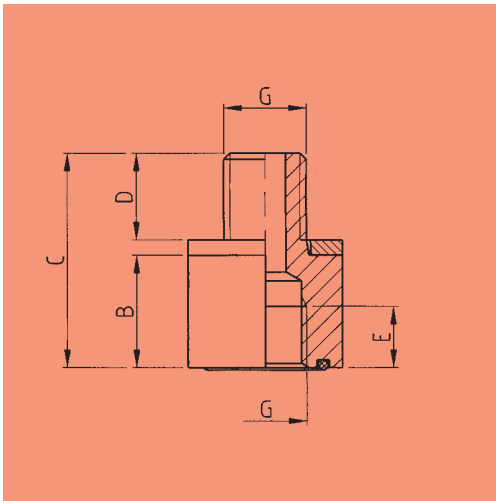
Advice:

Recommended torque for the link between the sealing plates and the suction plate retainer if a connection screw is used

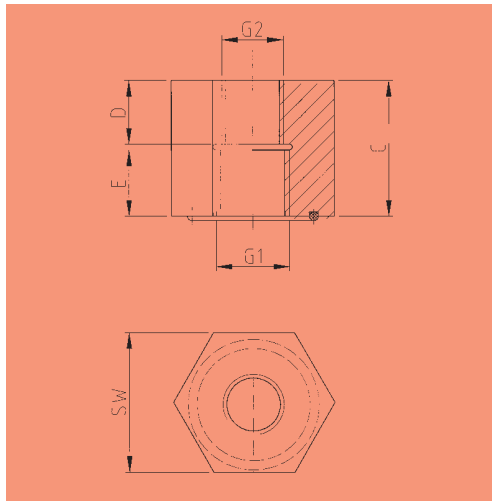
- ASB-M12-18: 70 (Nm)
- AS/ASB-M16-25: 80 (Nm)

SUCTION PLATE RETAINER SAS

Quick-Joint-System



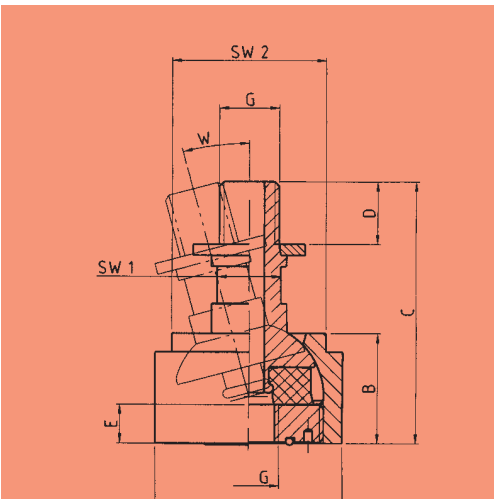
Suction plate retainer SAS-M12 and SAS M16



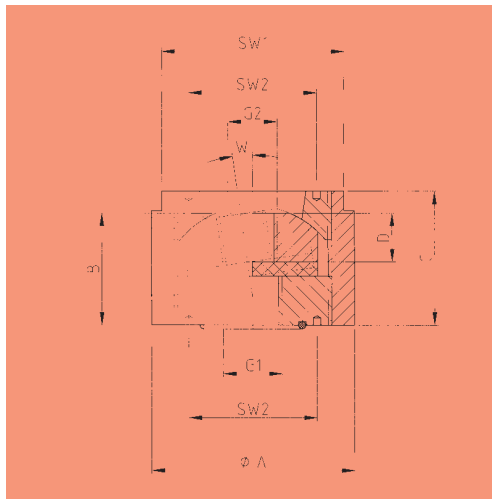
Suction plate retainer SAS-M20 and SAS M30

Dimensions starre Aufnahme

Type	A	B	C	D	E	G	G1	G2	SW 1
SAS-M12	---	20	35	12	10	M 12	---	---	27
SAS-M16	---	22	42	17	12	M 16	---	---	30
SAS-M20	---	---	55	25	25	---	M 24	M 20x1,5	56
SAS-M30	---	---	55	25	25	---	M 24	M 30x1,5	56



Suction plate retainer SAK-M12 and SAK M16



Suction plate retainer SAK-M20 and SAK M30

Dimensions articulated design

Type	A	B	C	D	E	G	G1	G3	SW 1	SW 2	W
SAK-M12	35	22,5	49,5	12	8	M 12			13	30	15°
SAK-M16	50	29,5	70,5	17	10	M 16			17	41	15°
SAK-M20	80	47	55	20	---	---	M24	M20x1,5	74	52	10°
SAK-M30	80	47	55	20	---	---	M24	M30x1,5	74	52	8°

Description

Komplett vormontierte Befestigungssets für den schnellen und sicheren Einbau an Aluminiumprofilen mit T-Nuten. Die Befestigungssets gibt es in ein- und beidseitig gefederter Ausführung je nach Anwendungs- und Belastungsfall der Dichtplatten.

An den Befestigungssets können alle Sauger und Saugplatten angebracht werden. Die Auslegung der Federn erfolgt nach dem Auslegungsschema im Hauptkatalog oder durch unsere Verkaufsspezialisten.

Nicht im Lieferumfang enthalten sind die Nutensteine sowie die Befestigungsschrauben für das Aluminiumprofil.



One-sided install.kit with SAK



Double-sided install.kit with SAS



EBS-AP-M5 installation kits with various suction head designs

4
Fixing
elements

Article numbers			
<i>Installation Kit - angular</i>	<i>Part No:</i>	<i>Installation Kit - straight</i>	<i>Part No:</i>
EBS-E-AW-8-M5-90	1.34.2.0016	EBS-E-AG-M5-90	1.34.2.0012
EBS-B-AW-8-M5-130	1.34.3.0024	EBS-B-AG-M5-130	1.34.3.0020
EBS-E-AW-16-M12-190	1.34.2.0013	EBS-E-AG-M12-190	1.34.2.0009
EBS-B-AW-16-M12-245	1.34.3.0021	EBS-B-AG-M12-245	1.34.3.0017
EBS-E-AW-16-R1/4-190	1.34.2.0014	EBS-E-AG-R1/4-190	1.34.2.0010
EBS-B-AW-16-R1/4-245	1.34.3.0022	EBS-B-AG-R1/4-245	1.34.3.0018
EBS-E-AW-20-M16-205	1.34.2.0015	EBS-E-AG-M16-205	1.34.2.0011
EBS-B-AW-20-M16-310	1.34.3.0023	EBS-B-AG-M16-310	1.34.3.0019

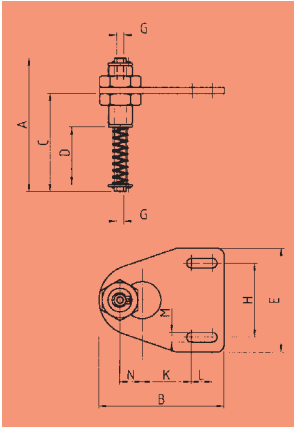
EBS-E Installation kit with springs on one side (bottom)
AW Connection plate angular

EBS-B Installation kit with springs on both sides
AG Connection plate straight

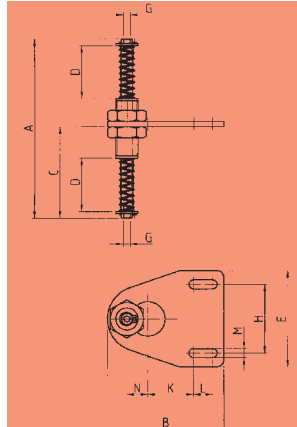
Technical Data						
<i>Installation kit</i>	<i>Weight ca. (g)</i>	<i>Volume (ml)</i>	<i>Connection thread</i>	<i>Diameter</i>	<i>F_Z (N)</i>	<i>M (Nm)</i>
EBS-E-AW-8-M5-90	0,25	0,45	M 5	8	800	2,5
EBS-B-AW-8-M5-130	0,30	0,65	M 5	8	800	2,5
EBS-E-AW-16-M12-190	0,60	16	M 12	16	3.000	20
EBS-B-AW-16-M12-245	0,70	18	M 12	16	3.000	20
EBS-E-AW-16-R1/4-190	0,60	16	R 1/4"	16	2.500	15
EBS-B-AW-16-R1/4-245	0,70	18	R 1/4"	16	2.500	15
EBS-E-AW-20-M16-205	1,20	34	M 16	20	5.000	60
EBS-B-AW-20-M16-310	1,40	44	M 16	20	5.000	60
EBS-E-AG-8-M5-90	0,25	0,45	M 5	8	800	2,5
EBS-B-AG-8-M5-130	0,30	0,65	M 5	8	800	2,5
EBS-E-AG-16-M12-190	0,60	16	M 12	16	3.000	20
EBS-B-AG-16-M12-245	0,70	18	M 12	16	3.000	20
EBS-E-AG-16-R1/4-190	0,60	16	R 1/4"	16	2.500	15
EBS-B-AG-16-R1/4-245	0,70	18	R 1/4"	16	2.500	15
EBS-E-AG-20-M16-205	1,20	34	M 16	20	5.000	60
EBS-B-AG-20-M16-310	1,40	44	M 16	20	5.000	60

F_Z, M max. tensile load and max. bending force.

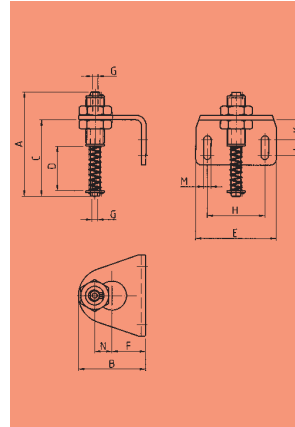
INSTALLATION KITS FOR SUCTION HEADS/PLATES for aluminium profiles



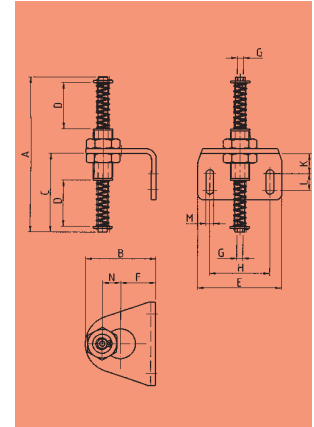
EBS-E-AG-8-M5-90



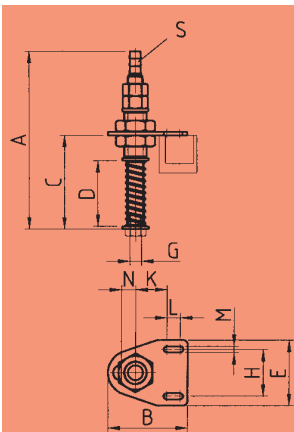
EBS-B-AG-8-M5-130



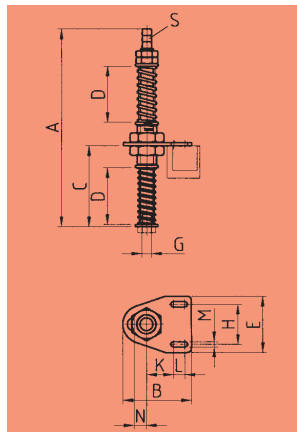
EBS-E-AW-8-M5-90



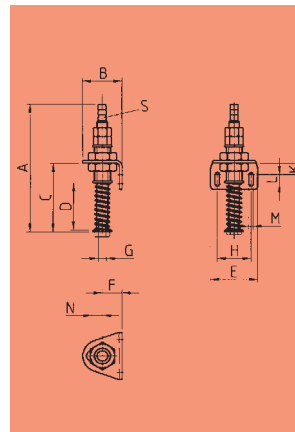
EBS-B-AW-8-M5-130



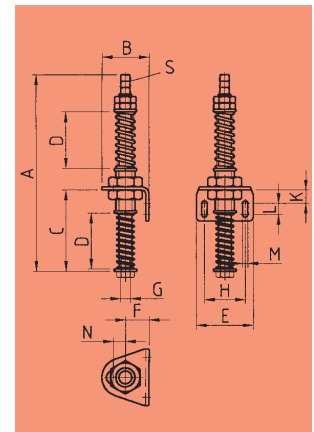
EBS-E-AG-16 and 20



EBS-B-AG-16 and 20



EBS-E-AW-16 and 20



EBS-B-AW-16 and 20

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Dimensions													
Type	A	B	C	D	E	F	G	H	K	L	M	N	S
EBS-E-AW-8-M5-90	90	58	66	38,6	70	29	M 5	50	16,9	14	6,5	15	---
EBS-B-AW-8-M5-130	130	58	66	38,6	70	29	M 5	50	16,9	14	6,5	15	---
EBS-E-AW-16-M12-190	190	58	102	70	70	29	M 12	50	16,9	14	6,5	15	LW 10
EBS-B-AW-16-M12-245	245	58	102	70	70	29	M 12	50	16,9	14	6,5	15	LW 10
EBS-E-AW-16-R1/4-190	190	58	102	70	70	29	R 1/4"	50	16,9	14	6,5	15	LW 10
EBS-B-AW-16-R1/4-245	245	58	102	70	70	29	R 1/4"	50	16,9	14	6,5	15	LW 10
EBS-E-AW-20-M16-205	205	68	115	80	90	38	M 16	60	16,7	10	8,5	---	LW 1/2"
EBS-B-AW-20-M16-310	310	68	115	80	90	38	M 16	60	16,7	10	8,5	---	LW 1/2"
EBS-E-AG-8-M5-90	90	84	43,4	38,6	70	---	M 5	50	33	14	6,5	15	---
EBS-B-AG-8-M5-130	130	84	66	38,6	70	---	M 5	50	33	14	6,5	15	---
EBS-E-AG-16-M12-190	190	84	73	70	70	---	M 12	50	33	14	6,5	15	LW 10
EBS-B-AG-16-M12-245	245	84	100	70	70	---	M 12	50	33	14	6,5	15	LW 10
EBS-E-AG-16-R1/4-190	190	84	73	70	70	---	R 1/4"	50	33	14	6,5	15	LW 10
EBS-B-AG-16-R1/4-245	245	84	73	70	70	---	R 1/4"	50	33	14	6,5	15	LW 10
EBS-E-AG-20-M16-205	205	114	83	80	90	---	M 16	60	50	10	8,5	---	LW 1/2"
EBS-B-AG-20-M16-310	310	114	83	80	90	---	M 16	60	50	10	8,5	---	LW 1/2"

Description

Completely premounted mounting sets in the rigid version, spring mounted on one or both sides for fast and safe mounting of suction plates and suction cups on square profiles 30 x 30 or 40 x 40.

The mounting sets consist of :

- Suspension bolt with lower connection thread M5, M12, M16 or R 1/4" and hose nipple turned onto it.
- upper and / or lower spring (option)
- cross clamping piece with clamping screw
- disks and nuts.



Mounting example rigid suspension



Mounting example, suspension spring-mounted on one side



Mounting example, suspension spring-mounted on both sides

Article numbers	
Type	Part no.
EBS-S-30-12-M5-90	1.34.1.0001
EBS-E-30-12-M5-150	1.34.2.0001
EBS-B-30-12-M5-210	1.34.3.0001
EBS-S-30-16-M12-115	1.34.1.0002
EBS-E-30-16-M12-190	1.34.2.0002
EBS-B-30-16-M12-245	1.34.3.0002
EBS-S-30-16-R1/4-115	1.34.1.0003
EBS-E-30-16-R1/4-190	1.34.2.0003
EBS-B-30-16-R1/4-245	1.34.3.0003

Technical Data					
Mounting set for Profile 30 x 30	Weight ca. (g)	Volume (ml)	Conn. thread	F _Z (N)	M (Nm)
EBS-S-30-12-M5-90	240	1	M 5	800	2,5
EBS-E-30-12-M5-150	300	2	M 5	800	2,5
EBS-B-30-12-M5-210	360	3	M 5	800	2,5
EBS-S-30-16-M12-115	310	11	M 12	3.000	20
EBS-E-30-16-M12-190	450	16	M 12	3.000	20
EBS-B-30-16-M12-245	530	18	M 12	3.000	20
EBS-S-30-16-R1/4-115	310	11	R 1/4"	2.500	15
EBS-E-30-16-R1/4-190	450	16	R 1/4"	2.500	15
EBS-B-30-16-R1/4-245	530	18	R 1/4"	2.500	15

F_Z, M max. tensile load and max. bending force.

Article numbers	
Type	Part no.
EBS-S-40-16-M12-115	1.34.1.0004
EBS-E-40-16-M12-245	1.34.2.0005
EBS-B-40-16-M12-245	1.34.3.0008
EBS-S-40-16-R1/4-115	1.34.1.0005
EBS-E-40-16-R1/4-245	1.34.2.0006
EBS-B-40-16-R1/4-245	1.34.3.0009
EBS-S-40-20-M16-120	1.34.1.0006
EBS-E-40-20-M16-205	1.34.2.0007
EBS-B-40-20-M16-310	1.34.3.0010

Technical Data					
Mounting set for Profile 40 x 40	Weight ca. (g)	Volume (ml)	Conn. thread	F _Z (N)	M (Nm)
EBS-S-40-16-M12-115	390	11	M 12	3.000	20
EBS-E-40-16-M12-245	575	18	M 12	3.000	20
EBS-B-40-16-M12-245	625	18	M 12	3.000	20
EBS-S-40-16-R1/4-115	390	11	R 1/4"	2.500	15
EBS-E-40-16-R1/4-245	575	18	R 1/4"	2.500	15
EBS-B-40-16-R1/4-245	625	18	R 1/4"	2.500	15
EBS-S-40-20-M16-120	530	22	M 16	5.000	65
EBS-E-40-20-M16-205	720	34	M 16	5.000	65
EBS-B-40-20-M16-310	885	44	M 16	5.000	65

F_Z, M max. tensile load and max. bending force.

Abbreviations:

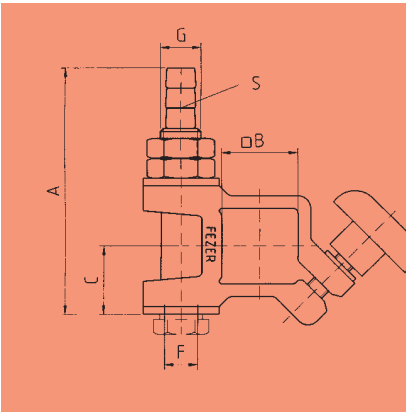
- EBS-S Mounting set rigid
- EBS-E Mounting set spring mounted on one side (below)
- EBS-B Mounting set spring mounted on both sides

Advice:

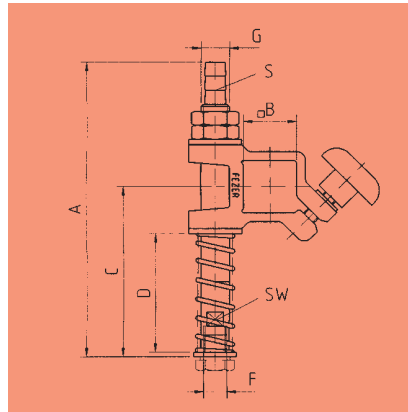
If spring-mounted mounting sets are required please indicate in any case the application conditions.
Our experienced sales personal will stipulate the required springs for you.

MOUNTING SET FOR SUCTION HEADS/PLATES

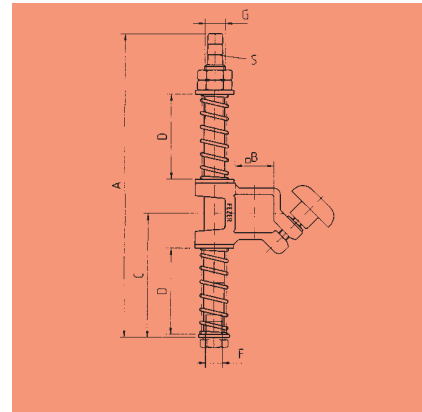
for square profiles



Mounting set rigid EBS-S



Mounting set spring-loaded on one side EBS-E



Mounting set spring-loaded on both sides EBS-B

Dimensions							
Type	A	B	C	D	F	G	S
EBS-S-30-12-M5-90	90	30	27	---	M 5	M 12	10
EBS-E-30-12-M5-150	150	30	80	50	M 5	M 12	10
EBS-B-30-12-M5-210	210	30	76 - 83	48 - 55	M 5	M 12	10
EBS-S-30-16-M12-115	115	30	27	---	M 12	M 16	10
EBS-E-30-16-M12-190	190	30	100	70	M 12	M 16	10
EBS-B-30-16-M12-245	245	30	100	70	M12	M 16	10
EBS-S-30-16-R1/4-115	115	30	27	---	R 1/4"	M 16	10
EBS-E-30-16-R1/4-190	190	30	100	70	R 1/4"	M 16	10
EBS-B-30-16-R1/4-245	245	30	100	70	R 1/4"	M 16	10

Dimensions							
Type	A	B	C	D	F	G	S
EBS-S-40-16-M12-115	115	40	29	---	M 12	M 16	10
EBS-E-40-16-M12-245	245	40	152	120	M 12	M 16	10
EBS-B-40-16-M12-245	245	40	102	70	M 12	M 16	10
EBS-S-40-16-R1/4-115	115	40	29	---	R 1/4"	M 16	10
EBS-E-40-16-R1/4-245	245	40	152	120	R 1/4"	M 16	10
EBS-B-40-16-R1/4-245	245	40	102	70	R 1/4"	M 16	10
EBS-S-40-20-M16-120	120	40	33	---	M 16	M 20	1/2"
EBS-E-40-20-M16-205	204	40	116	80	M 16	M 20	1/2"
EBS-B-40-20-M16-310	310	40	116	80	M 16	M 20	1/2"

Description

Angle connections made of galvanized steel.

Suitable for space-saving mounting of suction cups / plates / sealing plates. A vacuum feeder is integrated in the side of the angle connection.

Serves as a connection element between sealing plate, connection screw and suspension bolt STG, or for turn-proof mounting with suspension bolt ST-6KT, when a lateral vacuum feeding is required.



Mounting example suction cup with angle connection

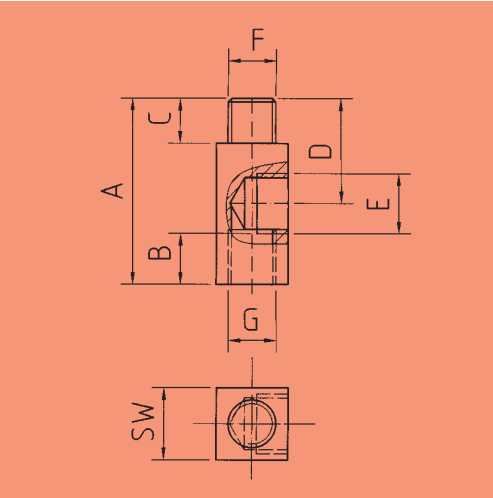


Angle connection WA-M12-M5 to WA-M16-M16

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Article numbers	
Type	
WA-M8-M5	1.31.3.0005
WA-M12-M5	1.31.3.0002
WA-M12-R1/4	1.31.3.0003
WA-M12-M12	1.31.3.0001
WA-M16-M16	1.31.3.0004

Technical Data		
Type	Weight (g)	Nominal width (mm)
WA-M8-M5	32	4,1
WA-M12-M5	30	4,1
WA-M12-R1/4	25	10,1
WA-M12-M12	19	10,1
WA-M16-M16	32	13,8



Angle connection WA

Dimensions								
Type	A	B	C	D	E	F	G	SW
WA-M8-M5	52,5	15	15	30,5	R 1/4"	M 8	M 5	18
WA-M12-M5	52,5	15	15	30,5	R 1/4"	M 12	M 5	18
WA-M12-R1/4	52,5	15	15	30,5	R 1/4"	M 12	R 1/4	18
WA-M12-M12	52,5	15	15	30,5	R 1/4"	M 12	M 12	18
WA-M16-M16	62	17	15	35	R 1/2"	M 16	M 16	24

Hinweis:

For possibilities of use and combination, please look at the beginning of the chapter "Fixing Elements in Combination"!

Description

Slide attachment in brass for installation on plates or sections with a drill-hole. The slide attachments are height-adjustable by means of the outer thread of the guide bushing, making it possible to compensate for unevenness and evening out the level of the connected sealing plates.



Mounting example

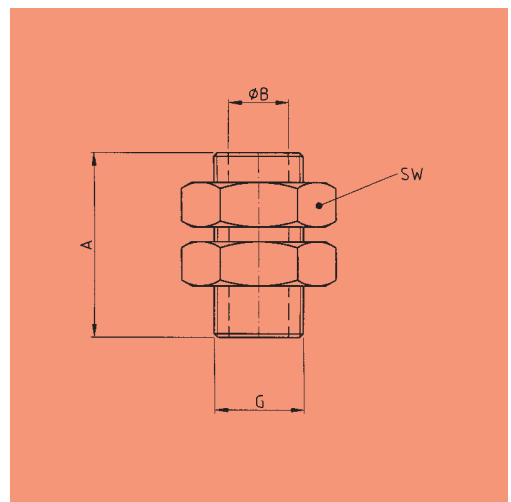
The slide attachments can be ideally combined with our fastening plates and angle sections for installation on aluminium sections.



Slide attachment SBF-8 to SBF-20

Technical Data				
	Weight (kg)	Bolt diameter	Outer diameter	Adjustable height
SBF-8	0,10	8 mm	16 mm	20 mm
SBF-16	0,25	16 mm	24 mm	20 mm
SBF-20	0,45	20 mm	30 mm	22 mm

Article numbers	
Type	Part No:
SBF-8	1.33.1.0003
SBF-16	1.33.1.0001
SBF-20	1.33.1.0002



Suction plate retainers SAK-M12 and SAK M16

Dimensions				
Type	A	B	G	SW
SBF-8	40	8,1	M 16x1,5	24
SBF-16	50	16,1	M 24x1,5	36
SBF-20	60	20,1	M 30x1,5	46



Befestigungsplatten BFP und BFW

Description

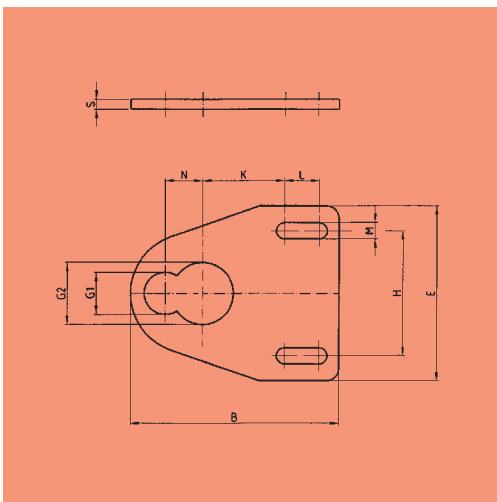
Multi-purpose fastening elements made from galvanised steel, especially for installation on aluminium sections. As the elements may be adjusted along the section grooves as desired, a high degree of flexibility is achieved, particularly if suction plates have to be rapidly adapted to various dimensions. A variety of different suction plate arrangements can be obtained, particularly in combination with the SBF slide fastening elements.

The fastening screws and sliding blocks are not automatically supplied.

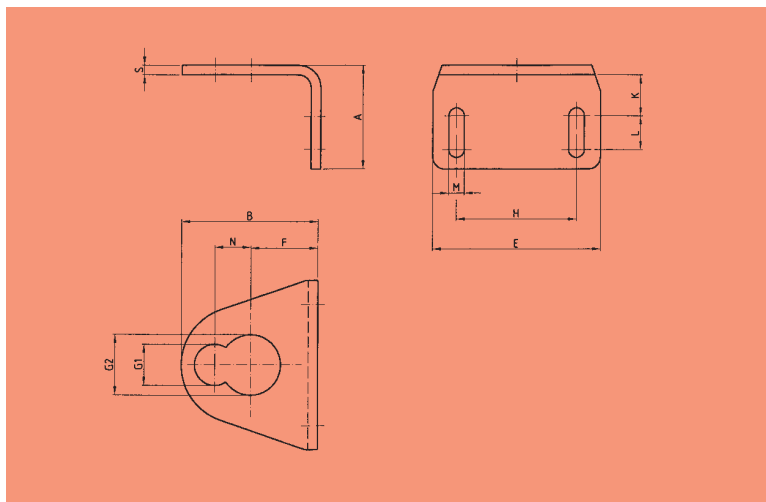
Article numbers	
Type	
BFP 8-16	2.33.1.0002
BFP 20	2.33.1.0001
BFW 8-16	2.33.1.0004
BFW 20	2.33.1.0003

Technical Data				
	Weight (kg)	Fixing screws	max. load horizontal (N)	suitable bolt connection
BFP 8-16	0,12	M 6	1.500	SBF 8 - 16
BFP 20	0,35	M 8	3.000	SBF 20
BFW 8-16	0,12	M 6	1.500	SBF 8 - 16
BFW 20	0,35	M 8	3.000	SBF 20

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Fastening plate BFP



Angle section BFW

Dimensions											
Type	A	B	E	G1	G2	H	K	L	M	N	S
BFP 8-16	---	84	70	17	25	50	33	14	6,5	15	4
BFP 20	---	114	90	31	---	60	50	10	8,5	---	8
BFW 8-16	43	58	70	17	25	50	33	14	6,5	15	4
BFW 20	68	57	90	31	---	60	50	10	8,5	---	6

Description

Robust die-cast aluminium clamping element.

Suitable for mounting of suction cups and suction plates to square profiles (30 x 30 and 40 x 40). When using as a turn-proof for oval suction cups/ plates, the clamping pieces are also available with hexagon guide for hexagon suspension bolts. All cross clamping pieces are delivered with clamping screw and star grip. The clamping guarantees a discretionary adjusting of the suction cups / plates.



Mounting example



Cross clamping piece KKS-40-20 S



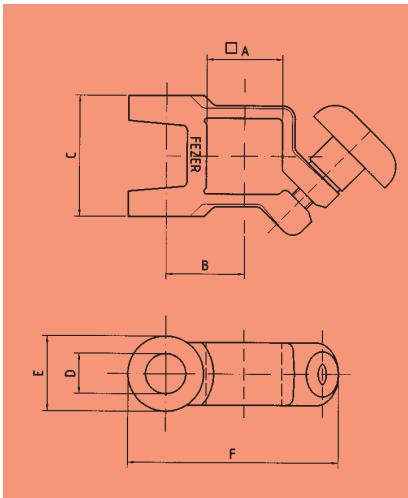
Cross clamping piece KKS

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Fixing elements

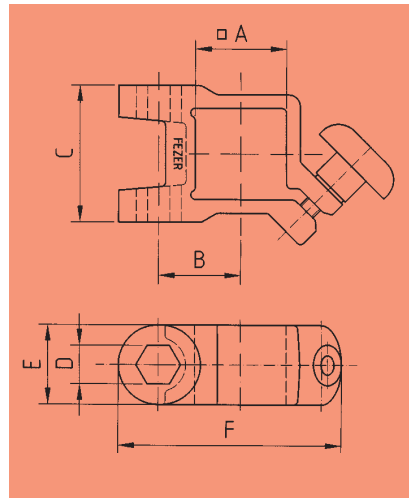
Article numbers	
Type	
KKS-30-12	1.33.2.0001
KKS-30-16	1.33.2.0002
KKS-30-6KT-14	1.33.2.0004
KKS-40-16	1.33.2.0005
KKS-40-20	1.33.2.0006
KKS-40-20 S	1.33.2.0031
KKS-50-20 S	1.33.2.0032
KKS-50-30 S	1.33.2.0033
KKS-60-30 S	1.33.2.0034

Technical Data					
Type	Weight (kg)	Profile dimensions (mm)	Bolt (mm)	F _Z (N)	M (Nm)
KKS-30-12	0,11	30x30	Ø 12	1.000	40
KKS-30-16	0,11	30x30	Ø 16	1.000	40
KKS-30-6KT-14	0,11	30x30	6-kt-14	1.000	40
KKS-40-16	0,15	40x40	Ø 16	5.000	70
KKS-40-20	0,19	40x40	Ø 20	5.000	70
KKS-40-20 S	0,8	40x40	Ø 20	5.000	100
KKS-50-20 S	1,4	50x50	Ø 20	6.000	120
KKS-50-30 S	1,3	50x50	Ø 30	7.500	140
KKS-60-30 S	1,8	60x60	Ø 30	7.500	180

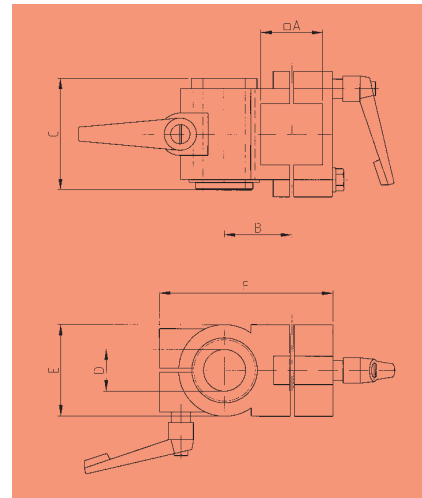
F_Z, M max. tensile load and max. bending force..



Cross clamping piece KKS-30-12 to 40-20 for round bolts



Cross clamping piece KKS-30-6KT-14 for hexagonal bolts



Cross clamping piece KKS-40-20S to 60-30S

Dimensions						
Type	A	B	C	D	E	F
KKS-30-12	30	31	48	12	30	83,5
KKS-30-16	30	31	48	16	30	83,5
KKS-30-6KT-14	30	31	48	14	30	83,5
KKS-40-16	40	36	52	16	30	95,5
KKS-40-20	40	36	60	20	35	98
KKS-40-20-S	40	47	85	20	60	117
KKS-50-20 S	50	70	96	20	86	149
KKS-50-30 S	50	70	96	30	86	149
KKS-60-30 S	60	80	110	30	100	170

Description

Very light and robust clamping plates from GFK for mounting of suction plates.

The clamping plates are suitable for mounting suction plates between two profiles. The clamping guarantees that the suction plates can easily be adjusted and brought into the right position.

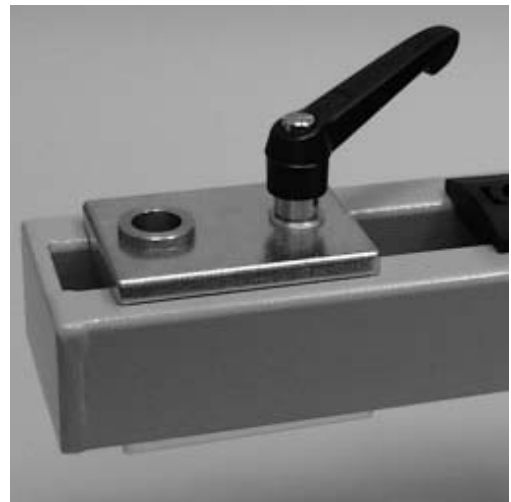
Please read "suspension bolts" and "springs" in this chapter for fitting suspension bolts and springs.



Clamping plates KP-GFK



Clamping plates KP-ST



Clamping plates KP-AL, mounting example

Article numbers

Type	Complete set	Clamping plate KP-top	Clamping plate KP-bottom	Socket FB 16 mm	Socket FB 20 mm	Socket FB 30 mm	Socket FB 40 mm
KPK-GFK-16	1.33.2.0021	1.33.2.0014	1.33.2.0016	---	---	---	---
KPK-GFK-20	1.33.2.0022	1.33.2.0015	1.33.2.0017	---	---	---	---
KPK-AL-16	1.33.2.0018	1.33.2.0035	1.33.2.0036	2.33.1.0005	---	---	---
KPK-AL-20	1.33.2.0019	1.33.2.0012	1.33.2.0013	---	2.33.1.0006	---	---
KPK-ST-30	1.33.2.0023	1.33.2.0025	1.33.2.0026	---	---	2.33.1.0007	---
KPK-ST-40	1.33.2.0024	1.33.2.0025	1.33.2.0026	---	---	---	2.33.1.0008

Technical Data

Type	Clamping screw	Weight (kg)	Profile distance (mm)	Clamp. height (mm)	Bolt (mm)	F _Z (N)	M (Nm)
KPK-GFK-16	M12x90	0,294	40	55 - 75	Ø 16	2.000	50
KPK-GFK-20	M12x90	0,29	40	55 - 75	Ø 20	2.000	50
KPK-AL-16	M12x90	0,957	40	55 - 70	Ø 16	8.000	150
KPK-AL-20	M12x120	0,929	40	70 - 100	Ø 20	8.000	150
KPK-ST-30	M16x120	6,54	60	70 - 100	Ø 30	15.000	200
KPK-ST-40	M16x180	6,44	60	100 - 160	Ø 40	20.000	350

F_Z, M max. tensile load and max. bending force..

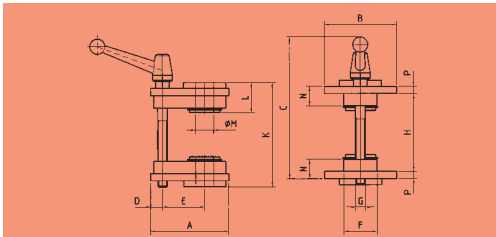
Mounting Advice:

When mounting with two bolts, only one side can be firmly clamped. The other side has to remain flexible, so the bolts will not tilt. The clamping piece on the flexible side can be adjusted with a screw and nut.

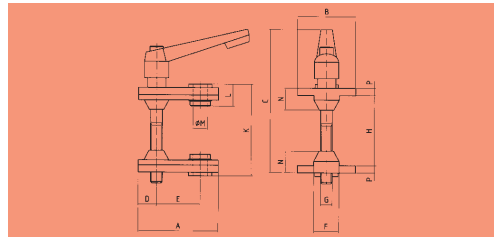
Abbreviations:

- KP Clamping plate
- FB Guide bush, either for
Bolt diameter 16 mm or 20 mm
- KH Clamping lever M 12
- KPK Complete set consisting of upper and lower
clamping plate, guide bush and clamping lever

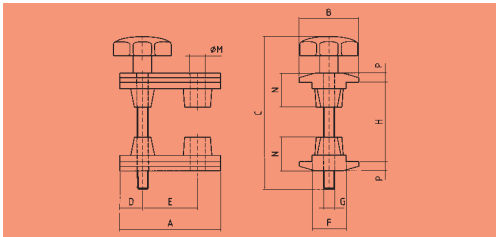
CLAMPING PLATES KP-GFK-AL-ST



Clamping plate KP-ST with clamping screw



Clamping plate ALU with clamping screw



Clamping plate KP-GFK with clamping screw

Dimensions Clamping plates KP-ST

Type	A	B	C	D	E	F	G	H	K	L	M	N	P
KP-ST-17-OBEN	130	120	---	20	70	55	17	100-160	145-205	---	---	32	12
KP-ST-M16-UNTEN	130	120	---	20	70	55	M 16	100-160	145-205	---	---	32	12
FB-SR-30	---	---	---	---	---	---	---	---	---	50	30,5	---	---
FB-SR-40	---	---	---	---	---	---	---	---	---	50	40,5	---	---
KH-M16x120	---	---	205	---	---	---	M 16	---	---	---	---	---	---
KH-M16x180	---	---	265	---	---	---	M 16	---	---	---	---	---	---

Dimensions Clamping plates KP-AL

Type	A	B	C	D	E	F	G	H	K	L	M	N	P
KP-ALU-13-OBEN	110	80	---	25	60	35	13	50-100	80-130	---	---	30	10
KP-ALU-M12-UNTEN	110	80	---	25	60	35	M 12	50-100	80-130	---	---	30	10
FB-SR-16	---	---	---	---	---	---	---	---	---	30	16	---	---
FB-SR-20	---	---	---	---	---	---	---	---	---	30	20	---	---
KH-M12x90	---	---	170	---	---	---	M 12	---	---	---	---	---	---
KH-M12x120	---	---	200	---	---	---	M 12	---	---	---	---	---	---

Dimensions Clamping plates KP-GFK

Type	A	B	C	D	E	F	G	H	M	N	P
KP-GFK-13-OBEN-16	110	65	--	25	60	37	13	55 - 75	16,5	37	10
KP-GFK-13-OBEN-20	110	65	--	25	60	37	13	55 - 75	20,5	37	10
KP-GFK-M12-UNTEN-16	110	65	--	25	60	37	M 12	55 - 75	16,5	37	10
KP-GFK-M12-UNTEN-20	110	65	--	25	60	37	M 12	55 - 75	20,5	37	10
KS-M12x90	--	--	132	--	--	--	M 12	--	--	--	--

with drilled hole and nipple for integrated vacuum feeding

Description

Suspension bolt with central vacuum feeding and connection nipple.

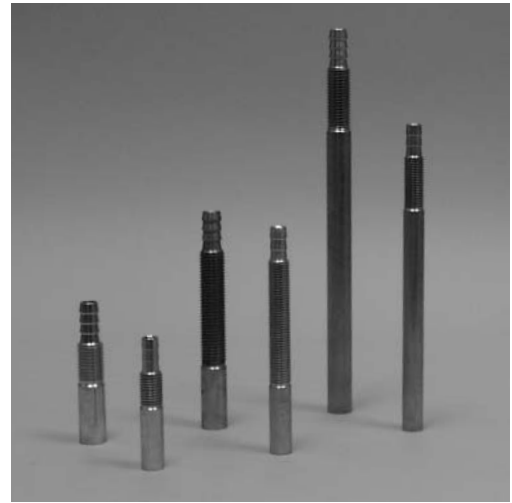
Suitable for fixing suction cups and plates with central connection thread. The bolts consist of a high-precision steel tube and a connection nipple. The suspension bolts are available in different lengths, which, in connection with the cross clamping pieces and clamping plates are suitable for different suspensions of suction cups and plates. Special lengths on request.



Example rigid suspension



Example suspension spring mounted on both sides



Suspension bolt with connection nipple for integrated vacuum feeding

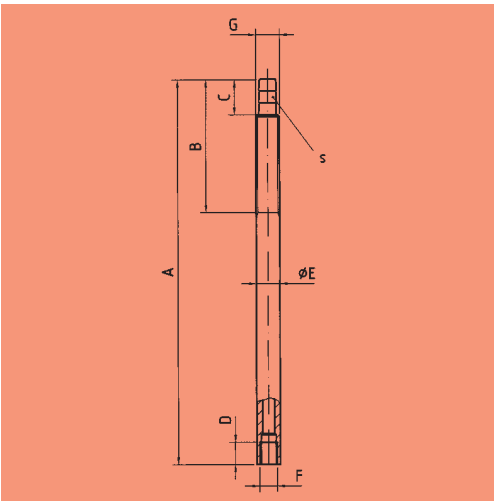
Article numbers	
Type	Bolt
STN-12-M5-90	1.32.3.0013
STN-12-M5-150	1.32.3.0011
STN-12-M5-210	1.32.3.0012
STN-16-M12-115	1.32.3.0014
STN-16-M12-190	1.32.3.0017
STN-16-M12-245	1.32.3.0018
STN-16-M12-285	1.32.3.0019
STN-16-R1/4-115	1.32.3.0025
STN-16-R1/4-190	1.32.3.0026
STN-16-R1/4-245	1.32.3.0027
STN-16-R1/4-285	1.32.3.0028
STN-20-M16-120	1.32.3.0031
STN-20-M16-205	1.32.3.0032
STN-20-M16-310	1.32.3.0033

Technical Data				
Bolt	Weight (kg)	Volume (ml)	F _Z (N)	M (Nm)
STN-12-M5-90	0,09	1	500	25
STN-12-M5-150	0,14	2	500	25
STN-12-M5-210	0,20	3	500	25
STN-16-M12-115	0,15	11	3.000	30
STN-16-M12-190	0,25	16	3.000	30
STN-16-M12-245	0,28	18	3.000	30
STN-16-M12-285	0,30	20	3.000	30
STN-16-R1/4-115	0,15	11	2.500	25
STN-16-R1/4-190	0,25	16	2.500	25
STN-16-R1/4-245	0,28	18	2.500	25
STN-16-R1/4-285	0,30	25	2.000	25
STN-20-M16-120	0,25	22	5.000	65
STN-20-M16-205	0,39	34	5.000	65
STN-20-M16-310	0,50	44	5.000	65

F_Z, M max. tensile load and max. bending force..

SUSPENSION BOLT STN

with drilled hole and nipple for integrated vacuum feeding



Suspension bolt STN with nipple

Dimensions								
Type	A	B	C	D	E	F	G	S (LW)
STN-12-M5-90	90	50	20	15	12	M 5	M 12	6
STN-12-M5-150	150	50	20	15	12	M 5	M 12	6
STN-12-M5-210	210	50	20	15	12	M 5	M 12	6
STN-16-M12-115	115	70	24	15	16	M 12	M 16	10
STN-16-M12-190	190	75	24	15	16	M 12	M 16	10
STN-16-M12-245	245	75	24	15	16	M 12	M 16	10
STN-16-M12-285	285	95	24	15	16	M 12	M 16	10
STN-16-R1/4-115	115	70	24	15	16	R 1/4"	M 16	10
STN-16-R1/4-190	190	75	24	15	16	R 1/4"	M 16	10
STN-16-R1/4-245	245	75	24	15	16	R 1/4"	M 16	10
STN-16-R1/4-285	285	95	24	15	16	R 1/4"	M 16	10
STN-20-M16-120	120	65	30	20	20	M 16	M 20	1/2"
STN-20-M16-205	205	75	30	20	20	M 16	M 20	1/2"
STN-20-M16-310	310	95	30	20	20	M 16	M 20	1/2"

Recommended clamping elements				
Type	Cross clamping piece	Part. No:	Clamping plate	Part. No:
STN-12-M5-...	KKS-30-12	1.33.2.0001	---	---
STN-16-M12-...	KKS-30-16	1.33.2.0002	KPK-GFK-16-90	1.33.2.0021
STN-16-R1/4-...	KKS-40-16	1.33.2.0005	KPK-GFK-16-90	1.33.2.0021
STN-20-M16-...	KKS-40-20	1.33.2.0006	KPK-AL-20-100	1.33.2.0019

with connection thread and separate vacuum feeding

Description

Massive suspension bolt with inner thread for mounting suction plates and sealing plates with separate vacuum feeding.

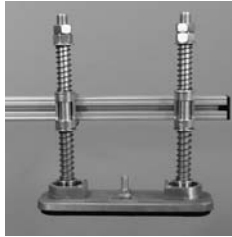
The suction/ sealing plate can be mounted on the suspension bolt either with a connection screw (suction plates with separate vacuum feeding), or with a connection screw and angle connection with integrated vacuum feeding.

The suspension bolts are available in different lengths, which, in connection with the cross clamping pieces and clamping plates, are suitable for different suspensions.

Special lengths on request.



Example, one-spring loaded



Mounting example, suspension spring-mounted on one side



Suspension bolt with connection thread for suction/ sealing plates

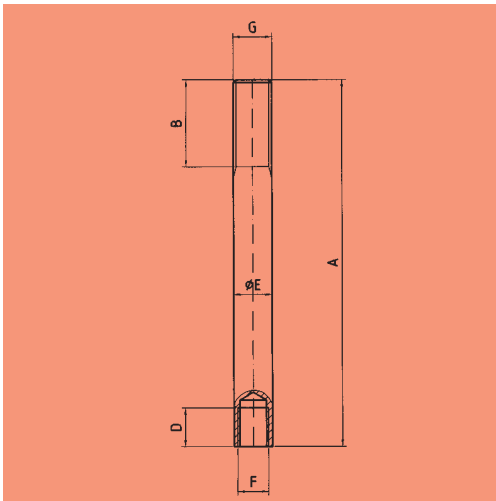
Article numbers	
Type	Bolt
STG-12-M8-125	1.32.2.0003
STG-12-M8-185	1.32.2.0004
STG-16-M12-165	1.32.2.0005
STG-16-M12-260	1.32.2.0006
STG-20-M16-175	1.32.2.0008
STG-20-M16-280	1.32.2.0009
STG-20-M20-175	1.32.2.0024
STG-20-M20-280	1.32.2.0025
STG-30-M30-205	1.32.2.0026
STG-30-M30-310	1.32.2.0027

Technical Data				
Bolt	Weight (kg)	Volume (ml)	F _Z (N)	M (Nm)
STG-12-M8-125	0,11	---	1.000	30
STG-12-M8-185	0,16	---	1.000	30
STG-16-M12-165	0,29	---	3.000	40
STG-16-M12-260	0,37	---	3.000	40
STG-20-M16-175	0,45	---	5.000	80
STG-20-M16-280	0,61	---	5.000	80
STG-20-M20-175	0,45	---	7.500	100
STG-20-M20-280	0,61	---	7.500	100
STG-30-M30-205	1,14	---	10.000	150
STG-30-M30-310	1,72	---	10.000	150

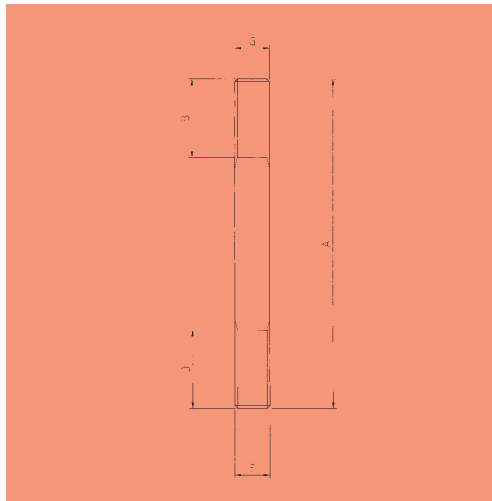
F_Z, M max. tensile load and max. bending force..

SUSPENSION BOLT STG

with connection thread and separate vacuum feeding



Suspension bolt STG with outside thread / inside thread



Suspension bolt STG with outside thread both sides

Dimensions

Type	A	B	D	E	F	G
STG-12-M8-125	125	50	15	12	M 8	M 12
STG-12-M8-185	185	50	15	12	M 8	M 12
STG-16-M12-165	165	50	15	16	M 12	M 16
STG-16-M12-260	260	65	15	16	M 12	M 16
STG-20-M16-175	175	45	20	20	M 16	M 20
STG-20-M16-280	280	80	20	20	M 16	M 20
STG-20-M20-175	175	45	40	20	M 20x1,5	M 20x1,5
STG-20-M20-280	280	80	40	20	M 20x1,5	M 20x1,5
STG-30-M30-205	205	50	40	30	M 30x1,5	M 30x1,5
STG-30-M30-310	310	100	40	30	M 30x1,5	M 30x1,5

Recommended Clamping elements

Type	Cross clamping piece	Part. No:	Clamping plate	Part. No:	Angle connector	Part. No:
STG-12-M8-...	KKS-30-12	1.33.2.0001	---	---	WA-M8-M5	1.31.3.0005
STG-16-M12-...	KKS-30-16	1.33.2.0002	KPK-GFK-16-90	1.33.2.0021	WA-M12-M12	1.31.3.0001
STG-20-M16-...	KKS-40-20	1.33.2.0006	KPK-AL-20-90	1.33.2.0020	WA-M16-M16	1.31.3.0004
STG-20-M20-...	KKS-40-20 S	1.33.2.0031	KPK-AL-20-120	1.33.2.0019	---	---
STN-30-M30-...	KKS-60-30 S	1.33.2.0034	KPK-ST-30-120	1.33.2.0023	---	---

Description

Massive suspension bolt with special threads for KP-suction plates.

Because of their special mounting geometry, these suspension bolts are only suitable for all cardanically mounted KP-suction plates. The suspension bolts are available in different lengths, which, in connection with the cross clamping pieces and clamping plates, are suitable for different suspensions.

Special lengths on request.

Version KPL:

Suitable for oval and rectangular KP-suction plates with two suspension bolts, as well as round KP-suction plates up to a diameter of 250 mm. Maximum holding force per suspension bolt: 1500 N.

Version KPS:

Suitable for round KP-suction plates with a diameter of over 250 mm, as well as for the KPS-suction plates.

Version KPT:

Suitable for round KP-suction plates with a diameter over 450 mm, as well as for the suction plate KPHL 450 x 850 in perbunane black and silicone transparent.

Lengths and versions of suspension bolts on request.



Suspension bolts KPL, KPS, KPT

Article numbers

Type	Bolt
ST-KPL-20-M20-130	1.32.1.0012
ST-KPL-20-M20-200	1.32.1.0013
ST-KPL-20-M20-300	1.32.1.0014
ST-KPS-20-M20-120	1.32.1.0030
ST-KPS-20-M20-200	1.32.1.0031
ST-KPS-20-M20-300	1.32.1.0032
ST-KPT-30-M30	on request
ST-KPT-40-M40	on request

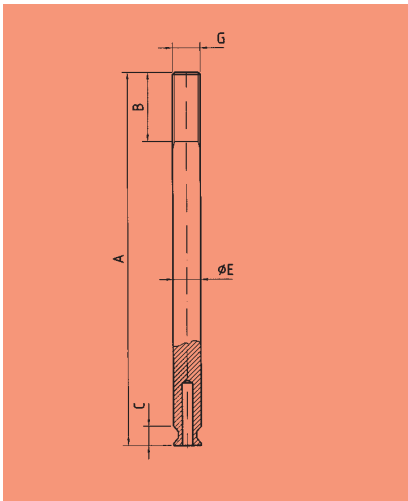
Technical Data

Bolt	Weight (kg)	Volume (ml)	F _Z (N)	M (Nm)
ST-KPL-20-M20-130	0,25	---	2.500	30
ST-KPL-20-M20-200	0,56	---	2.500	30
ST-KPL-20-M20-300	0,68	---	2.500	40
ST-KPS-20-M20-120	0,25	---	6.500	40
ST-KPS-20-M20-200	0,58	---	6.500	80
ST-KPS-20-M20-300	0,70	---	6.500	80
ST-KPT-30-M30	Anfrage	---	12.500	100
ST-KPT-40-M40	Anfrage	---	18.000	100

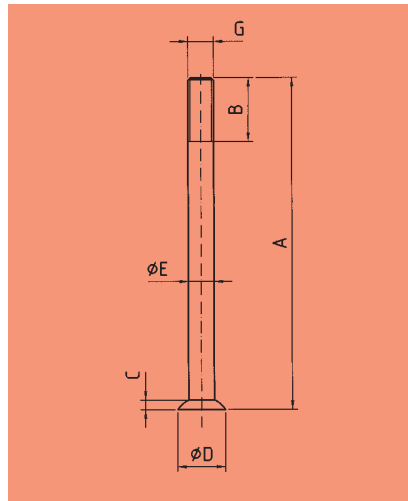
F_Z, M max. tensile load and max. bending force..

SUSPENSION BOLT ST-KPL, KPS, KPT

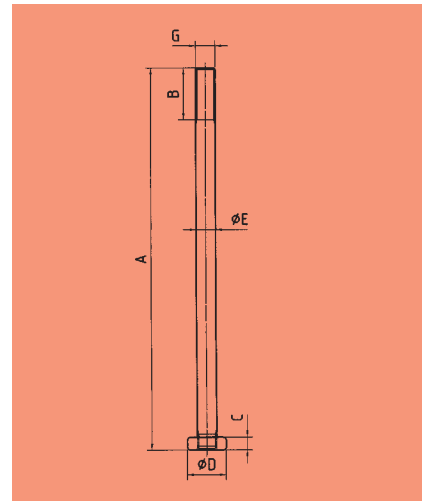
for KP suction plates with separate vacuum feeding



Suspension bolt, design KPL



Suspension bolt, design KPS



Suspension bolt, design KPT

Dimensions						
Type	A	B	C	D	E	G
ST-KPL-20-M20-130	130	110	14	--	20	M 20
ST-KPL-20-M20-200	200	50	14	--	20	M 20
ST-KPL-20-M20-300	300	80	14	--	20	M 20
ST-KPS-20-M20-120	120	110	7,5	37,5	20	M 20
ST-KPS-20-M20-200	200	50	7,5	37,5	20	M 20
ST-KPS-20-M20-300	300	80	7,5	37,5	20	M 20
ST-KPT-30-M30	1)	80	20	60	30	M 30
ST-KPT-40-M40	1)	80	20	60	40	M 40

1) Length of bolt depending on application and enquiry!

Recommended Clamping elements				
Type	Cross clamping piece	Part. No:	Clamping plate	Part. No:
ST-KPL-20-...	KKS-40-20	1.33.2.0006	KPK-AL-20-120	1.33.2.0019
ST-KPS-20-...	KKS-40-20 S	1.33.2.0031	KPK-AL-20-120	1.33.2.0019
ST-KPT-30-...	KKS-60-30 S	1.33.2.0034	KPK-ST-30-120	1.33.2.0023
ST-KPT-40-...	---	---	KPK-ST-40-180	1.33.2.0024

turn-proof version for separate vacuum feeding

Description

Hexagon suspension bolt for turn-proof mounting of oval and rectangular suction cups and suction plates.

In connection with cross clamping pieces KKS-6KT-30/40 these suspension bolts guarantee an easy and absolutely turn-proof mounting possibility of suction cups and plates. The suspension bolts are available in different standard lengths, which, in connection with the cross clamping pieces, are suitable for various suspension. The vacuum feeding is either effectuated separately or through angle connections WA, which can be mounted on the suspension bolts. Special lengths optional.



Mounting example



6KT-suspension bolt for turn-proof mounting of suction cups/ plates

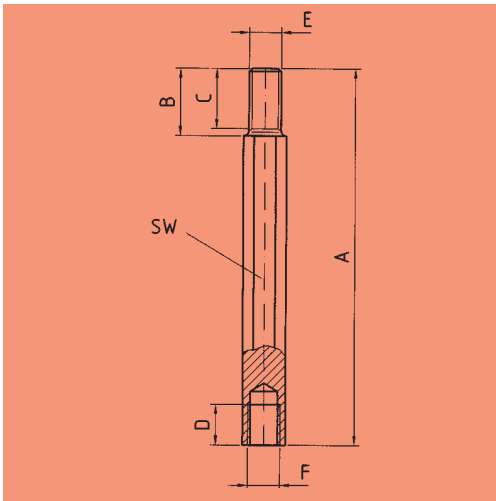
Article numbers	
Type	Bolt
ST-6KT-14-140	1.32.2.0001
ST-6KT-14-215	1.32.2.0002

Technical Data				
Bolt	Weight (kg)	Volume (ml)	F _Z (N)	M (Nm)
ST-6KT-14-140	0,18	---	1.000	30
ST-6KT-14-215	0,28	---	1.000	30

F_Z, M max. tensile load and max. bending force..

HEXAGON SUSPENSION BOLT ST-6KT

Turn-proof version for separate vacuum feeding



Hexagon suspension bolt

Dimensions							
Type	A	B	C	D	E	F	SW
ST-6KT-14-140	140	30	25	15	M 12	M 12	14
ST-6KT-14-215	215	35	30	15	M 12	M 12	14

4
Fixing elements

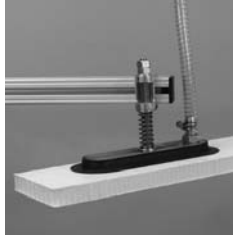
Recommended Clamping pieces				
Type	Cross clamping piece	Part. No:	Angle connection	Part.-No:
ST6KT...	KKS-30-6KT-14	1.33.2.0004	WA-M12-R1/4	1.31.3.0003

Description

Special springs for mounting of suction plates with spring-mounted suspension.

The suspension of the suction cups / plates through springs guarantees a sensitive setting on the work piece (lower spring), and an even weight distribution when using more suction cups / plates (upper spring). Springs are available fitting all suspension bolts with inner diameters of 13 mm, 17 mm and 21 mm.

Please read page 5.21 for dimensioning!



Example spr.-mounted below



Spring made of elastomere DF.-EL



Springs with different lengths and thicknesses

Article numbers				
Type	Pressure spring for bolt 12 mm	Pressure spring for bolt 16 mm/6-KT	Pressure spring for bolt 20 mm	Pressure spring for bolt 30 mm
DF-L60-DI13-DS0,9	6.21.4.0024			
DF-L60-DI13-DS1,4	6.21.4.0023			
DF-L70-DI17-DS1,5		6.21.4.0025		
DF-L70-DI17-DS2		6.21.4.0026		
DF-L70-DI17-DS2,5		6.21.4.0027		
DF-L70-DI17-DS3		6.21.4.0028		
DF-L70-DI17-DS3,5		6.21.4.0029		
DF-L70-DI17-DS4		6.21.4.0030		
DF-L70-DI17-DS4,5		6.21.4.0031		
DF-L80-DI21-DS2			6.21.4.0033	
DF-L80-DI21-DS2,5			6.21.4.0034	
DF-L80-DI21-DS3			6.21.4.0035	
DF-L80-DI21-DS3,5			6.21.4.0036	
DF-L80-DI21-DS4			6.21.4.0037	
DF-L80-DI21-DS4,5			6.21.4.0038	
DF-L80-DI21-DS5			6.21.4.0039	
DF-L80-DI21-DS5,5			6.21.4.0040	
DF-L80-DI21-DS6			6.21.4.0041	
DF-L80-DI21-DS6,5			6.21.4.0042	
DF-L80-DI21-DS8			6.21.4.0044	
DF-L94-DI32-DS5				6.21.4.0065
DF-L100-DI38-DS10				6.21.4.0009
DF-L165-DI38-DS10				6.21.4.0019
DF-L100-DI33-EL				6.21.4.0069

Technical Data						
Type	Spring length	Inner	Wire thickness	max. spring	max. elasticity	Spring rate
	(mm)	diameter (mm)	(mm)	force (N)	(mm)	(N/ mm)
DF-L60-DI13-DS0,9	60	13	0,9	22	50	0,43
DF-L60-DI13-DS1,4	60	13	1,4	71	41	1,74
DF-L70-DI17-DS1,5	70	17	1,5	70	54	1,3
DF-L70-DI17-DS2	70	17	2,0	160	49	3,3
DF-L70-DI17-DS2,5	70	17	2,5	330	45	7,33
DF-L70-DI17-DS3	70	17	3,0	520	38	13,7
DF-L70-DI17-DS3,5	70	17	3,5	690	31	22,3
DF-L70-DI17-DS4	70	17	4,0	1.010	28	36
DF-L70-DI17-DS4,5	70	17	4,5	1.300	24	54,2
DF-L80-DI21-DS2	80	21	2,0	160	51	3,14
DF-L80-DI21-DS2,5	80	21	2,5	190	47	4,04
DF-L80-DI21-DS3	80	21	3,0	350	38	9,21
DF-L80-DI21-DS3,5	80	21	3,5	480	31	15,48
DF-L80-DI21-DS4	80	21	4,0	670	30	22,33
DF-L80-DI21-DS4,5	80	21	4,5	900	23	39,13
DF-L80-DI21-DS5	80	21	5,0	1.170	19	61,58
DF-L80-DI21-DS5,5	80	21	5,5	1.450	17	85,29
DF-L80-DI21-DS6	80	21	6,0	1.740	15	116,0
DF-L80-DI21-DS6,5	80	21	6,5	2.070	13	159,23
DF-L80-DI21-DS8	80	21	8,0	3.170	8	396,25
DF-L90-DI33-DS5	90	33	5,0	817	55	15
DF-L90-DI33-DS6,3	90	33	6,3	1.456	37	39,2
DF-L90-DI33-DS8	90	33	8,0	1.617	40	52,1
DF-L100-DI30-EL	100	30	---	18.000	40	450

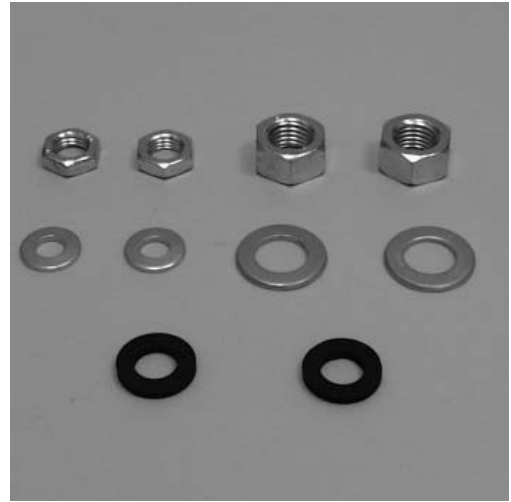
Description

Suspension bolts and other connection elements should be mounted and secured with a nut, counter nut and washer.

When suction cup/plate mounting is spring-mounted on one side, a cushion disk should be used on the non-spring-mounted side. The cushion disk catches slight pushes when lifting resp. setting down.
















Counter nuts on the bolt



Accessories for suction cup and suction plate mounting

Article numbers				
Type	Accessory for susp. bolt		Accessory for susp. bolt	
	12 mm	16 mm	20 mm	30 mm
Hexagon nut DIN 439	6.21.1.0032	6.21.1.0034	6.21.1.0036	6.21.1.0480
Hexagon nut DIN 934	6.21.1.0451	6.21.1.0452	6.21.1.0453	6.21.1.0481
Disk DIN 1440	6.21.1.0002	6.21.1.0016	6.21.1.0017	6.21.1.0482
Cushion disk	2.32.1.0001	2.32.1.0002	2.32.1.0003	2.32.1.0004

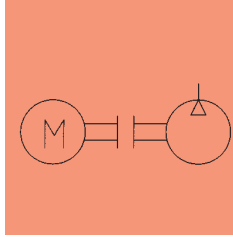
5 VACUUM GENERATORS

	<i>Oil lubricated vacuum pumps VE-O</i>	5.2
	<i>Oilless vacuum pumps VP-T</i>	5.6
	<i>Vacuum energy units VEE</i>	5.10
	<i>Vacuum flat tanks VSF</i>	5.12
	<i>Vacuum-controlled motor switching units VMS</i>	5.14
	<i>Vacuum blowers VG-SD</i>	5.16
	<i>Vacuum blowers VG-D1</i>	5.18
	<i>Vacuum blowers VG-D2</i>	5.20
	<i>Inline ejectors VEI</i>	5.24
	<i>Vacuum ejectors VEP</i>	5.26
	<i>Vacuum ejectors VEP-VSM</i>	5.28
	<i>Vacuum ejectors VEP-VSEM</i>	5.30
	<i>Vacuum ejectors VIP</i>	5.32
	<i>Multi-stage ejectors VEM</i>	5.34

Description

Robust and durable air-cooled vacuum pumps with inner oil circulation, which work after the rotation principle. Oil mist separators guarantee clean exhaust air. The pumps are furnished with a non-return valve and a vacuum filter in series. The oil lubricated vacuum pumps achieve a vacuum of approx. 98%. The pumps are delivered without oil filling. The oil has to be added separately. Optionally available with motor protection switch.

Surrounding temperature: ca. 12 - 30° C
 Operational temperature: ca. 70 - 80° C



Vacuum pumps 010.1 and 016.1



Vacuum pumps 025.1 - 040.1



Vacuum pumps 063.1 - 0100.1



Vacuum pumps 0160.2 - 0250.2 (without vacuum filter)



Vacuum pumps 0400 (without vacuum filter)

Article numbers					
Type	Vacuum pump m. Filter ²⁾	Vacuum filter Type	Vacuum filter Art.-Nr:	Filter cartridge	Motor protec- tion switch ³⁾
VP-010.1-230/400V-0,37kW	1.41.1.0001	VF-3/4	1.53.2.0006	2.53.2.0014	6.33.3.0003
VP-016.1-230/400V-0,55kW	1.41.1.0003	VF-3/4	1.53.2.0006	2.53.2.0014	6.33.3.0003
VP-025.1-230/400V-0,75kW	1.41.1.0007	VF-1 1/4A	1.53.2.0003	2.53.2.0005	6.33.3.0003
VP-040.1-230/400V-1,1kW	1.41.1.0010	VF-1 1/4A	1.53.2.0003	2.53.2.0005	6.33.3.0003
VP-063.1-230/400V-1,5kW	1.41.1.0014	VF-1 1/4A	1.53.2.0003	2.53.2.0005	6.33.3.0003
VP-0100.1-230/400V-2,2kW	1.41.1.0004	VF-1 1/4B	1.53.2.0004	2.53.2.0004	6.33.3.0004
VP-0160.2-230/400V-4,0kW	1.41.1.0006	VF-2 1/2	1.53.2.0005	2.53.2.0006	6.33.3.0004
VP-0250.2-230/400V-5,5kW	1.41.1.0009	VF-2 1/2	1.53.2.0005	2.53.2.0006	6.33.3.0005
VP-0400-400/690V-11,0kW	on request	VF-2 1/2	1.53.2.0005	2.53.2.0006	6.33.3.0006

2) Vacuum filter mounted

3) Motor protection switch with housing

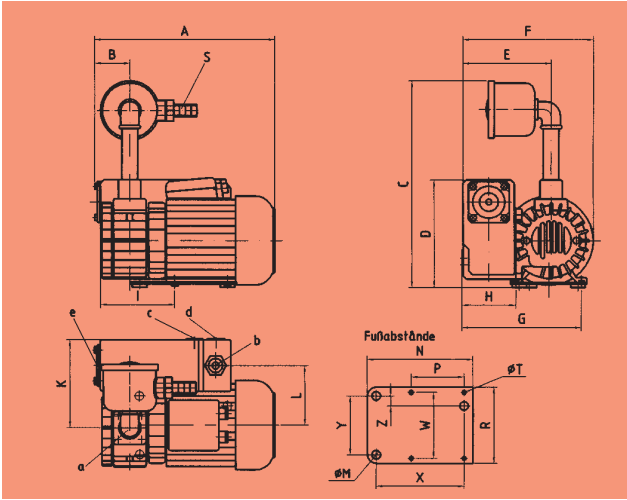
Technical Data								
Type	Voltage	Current consumption	max. vacuum	Suction capacity	Motor speed	Motor rating	Weight	Sound level ¹⁾
	(V)	(A)	(%)	(m ³ /h)	(1/min)	(kW)	(kg)	(dB (A))
VP-010.1-230/400V-0,37kW	230/ 400	2,1/ 1,2	98	10	3000	0,37	16	59
VP-016.1-230/400V-0,55kW	230/ 400	2,6/ 1,5	98	16	3000	0,55	18	60
VP-025.1-230/400V-0,75kW	230/ 400	3,2/ 1,9	98	25	1500	0,75	34	62
VP-040.1-230/400V-1,1kW	230/ 400	4,6/ 2,7	98	40	1410	1,1	38	64
VP-063.1-230/400V-1,5kW	230/ 400	5,8/ 3,3	98	63	1400	1,5	52	65
VP-0100.1-230/400V-2,2kW	230/ 400	8,6/ 5,0	98	100	1500	2,2	70	67
VP-0160.2-230/400V-4,0kW	230/ 400	21/ 14,1	98	160	1500	4	140	70
VP-0250.2-230/400V-5,5kW	230/ 400	13,5/ 8,0	98	250	1500	5,5	190	72
VP-0400-400/690V-11,0kW	400/ 690	27,5/ 15,9	98	400	1000	11	435	77

All values with 50 Hz. special voltages, -frequencies on request

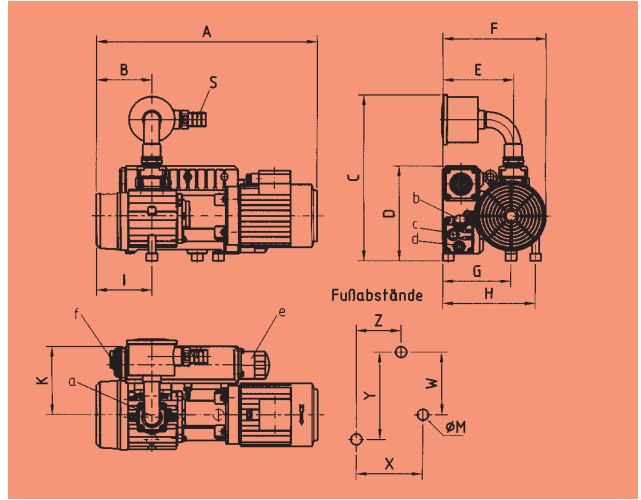
1) Measured according to DIN 45635. The indicated values are valid with a tolerance of ± 10 %

Mounting Advice:

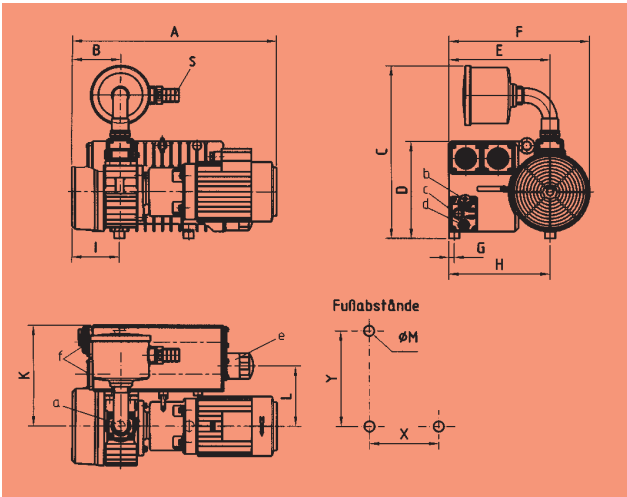
Oil lubricated pumps can only be mounted and operated in horizontal position.
 The pumps are suitable for continuous operation.



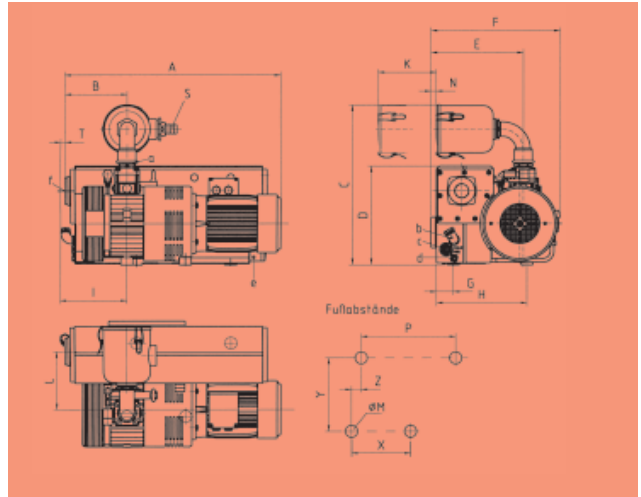
Vacuum pumps 010.1 and 016.1



Vacuum pumps 025.1 and 040.1

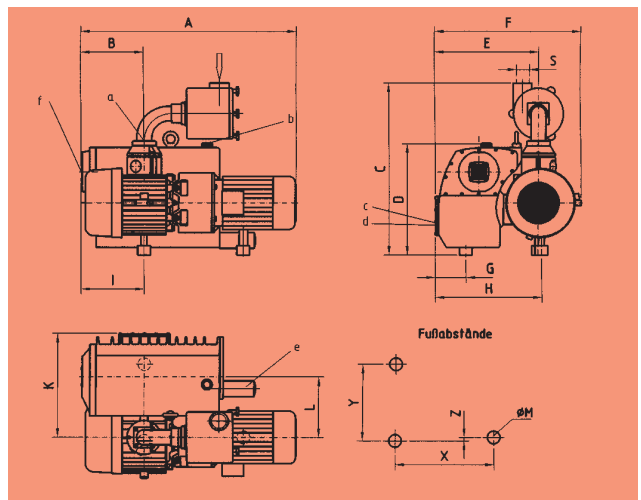


Vacuum pumps 063.1 and 0100.1



Vacuum pumps 0160.2 and 0250.2

- a Suct. connection
- b Oil filling
- c Oil sight glas
- d Oil drain
- e Oil filter
- f Gas discharge



Vacuum pump 0400

Dimensions											
Type	A	B	C	D	E	F	G	H	I	K	L
VP-010.1	271	60	364	196	151	219	204	92	127	151	102
VP-016.1	308	60	340	170	153	224	204	92	127	153	102
VP-025.1	546	131	465	260	193	282	186	252	131	193	136
VP-040.1	609	151	465	260	193	282	186	252	151	193	136
VP-063.1	603	137	492	280	292	406	15	292	137	292	177
VP-0100.1	693	170	507	280	292	406	15	292	170	292	177
VP-0160.2	895	260	661	408	382	535	70	375	279	240	241
VP-0250.2	1029	300	661	408	382	535	21	371	319	240	242
VP-0400	1260	370	1011	668	611	861	181	631	356	611	356

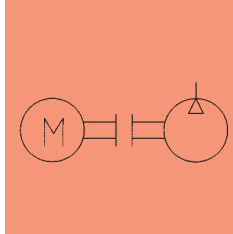
Dimensions										
Type	M	N	P	R	S	T	W	X	Y	Z
					LW					
VP-010.1	M 6	180	90	130	3/4"	7	112	150	100	17
VP-016.1	M 6	180	90	130	3/4"	7	112	150	100	17
VP-025.1	M 8	--	--	--	38	--	171	160	238	120
VP-040.1	M 8	--	--	--	38	--	171	180	238	123
VP-063.1	M 8	--	--	--	38	--	--	200	277	--
VP-0100.1	M 8	--	--	--	38	--	--	227	277	--
VP-0160.2	M 10	22	390	--	G 2 1/2"	19	--	243	305	40
VP-0250.2	M 10	18	390	--	G 2 1/2"	16	--	303	350	--
VP-0400	M 12	--	--	--	G 3"	--	--	581,5	450,5	20,5

Description

Robust, easy-to-maintain and long-lived vacuum pumps, which work after the rotation principle. The small, light pumps are especially suitable for smaller devices and single working places, as for basic stand G or GDS and single suction plates.

The pumps are air-cooled and work absolutely oilless, which also makes the exhaust air oilless. The oilless vacuum pumps can be mounted in every position and are also suitable for devices and units with swivel mechanism. All pumps are furnished with suction filters in series. Suitable for work, in which a maximum vacuum of approx. 85 % is required.

Optionally available with motor protection switches.



Switching diagram pump



Vacuum pumps T 4.4 and T 4.8



Vacuum pumps T 4.16 to T 4.40



Vacuum pumps T 4.60 to T 4.140



Vacuum pumps T 4.250 to T 4.500

Article numbers					
Type	Vacuum pump	Filter cartridge f. integrated filter	Motor protection switch	Additional filter	Filter cartridge f. additional filter
VP-T4.4-230V-0,18kW	1.41.2.0017	2.41.2.0171	---	1.53.2.0002	2.53.2.0009
VP-T4.4-230/400V-0,18kW	1.41.2.0016	2.41.2.0171	6.33.3.0003	1.53.2.0002	2.53.2.0009
VP-T4.8-230V-0,35kW	1.41.2.0019	2.41.2.0172	---	1.53.2.0002	2.53.2.0009
VP-T4.8-230/400V-0,35kW	1.41.2.0018	2.41.2.0172	6.33.3.0003	1.53.2.0002	2.53.2.0009
VP-T4.16-230V-0,55kW	1.41.2.0015	2.41.2.0120	---	1.53.2.0006	2.53.2.0014
VP-T4.16-230/400V-0,55kW	1.41.2.0014	2.41.2.0120	6.33.3.0003	1.53.2.0006	2.53.2.0014
VP-T4.25-230/400V-0,75kW	1.41.2.0004	2.41.2.0099	6.33.3.0003	1.53.2.0003	2.53.2.0014
VP-T4.40-230/400V-1,25kW	1.41.2.0005	2.41.2.0099	6.33.3.0003	1.53.2.0003	2.53.2.0005
VP-T4.60-230/400V-1,5kW	1.41.2.0006	2.41.2.0107	6.33.3.0003	1.53.2.0003	2.53.2.0005
VP-T4.80-230/400V-2,2kW	1.41.2.0007	2.41.2.0107	6.33.3.0004	1.53.2.0004	2.53.2.0005
VP-T4.100-230/400V-3kW	1.41.2.0001	2.41.2.0107	6.33.3.0004	1.53.2.0004	2.53.2.0004
VP-T4.140-230/400V-4kW	1.41.2.0002	2.41.2.0107	6.33.3.0004	1.53.2.0004	2.53.2.0004
VP-T4.250-400/690V-5,5kW	1.41.2.0003	2.41.2.0105	6.33.3.0005	1.53.2.0005	2.53.2.0006
VP-T4.360-400/690V-11kW	on request	on request	6.33.3.0006	1.53.2.0005	2.53.2.0006
VP-T4.500-400/690V-15kW	on request	on request	on request	on request	on request

Motor protection switch with housing

Technical Data								
Type	Voltage	Current consumption	Max. vacuum	Suction capacity	Motor speed	Motor rating	Weight	Sound level ²⁾
	(V)	(A)	(%)	(m ³ /h)	(1/min)	(kW)	(kg)	(dB (A))
VP-T4.4-230V-0,18kW	230	1,65	85	4,05	2800	0,18	7	59
VP-T4.4-230/400V-0,18kW	230/ 400	1,06/ 0,62	85	4,05	2800	0,18	7	59
VP-T4.8-230V-0,35kW	230	3,9	85	7,6	2800	0,35	11,5	58
VP-T4.8-230/400V-0,35kW	230/ 400	2,35/ 1,36	85	7,6	2800	0,35	11,5	58
VP-T4.16-230V-0,55kW	230	4,6	85	16	1420	0,55	22,4	61
VP-T4.16-230/400V-0,55kW	230/ 400	3,8/ 2,2	85	16	1420	0,55	22,4	61
VP-T4.25-230/400V-0,75kW	230/ 400	6/ 3,5	85	25	1420	0,75	26	62
VP-T4.40-230/400V-1,25kW	230/ 400	5,7/ 3,3	85	40	1420	1,25	38,5	67
VP-T4.60-230/400V-1,5kW	230/ 400	6,2/ 3,6	90	55	1420	1,5	62	71
VP-T4.80-230/400V-2,2kW	230/ 400	8,8/ 5,1	90	67	1420	2,2	69	72
VP-T4.100-230/400V-3kW	230/ 400	11,6/ 6,7	90	98	1430	3	90	75
VP-T4.140-230/400V-4kW	230/ 400	15/ 8,7	90	132	1430	4	104	76
VP-T4.250-400/690V-5,5kW	400/ 690	12,3/ 7,2	80	250	960	5,5	312	81
VP-T4.360-400/690V-11kW	400/ 690	23/ 13,5	75	360	1450	11	347	82
VP-T4.500-400/690V-15kW	400/ 690	30,5/ 17,7	75	500	950	15	480	81

1) All values with 50 Hz. special voltages, -frequencies on request
2) Measured with distance of 1 m

Mounting Advice:

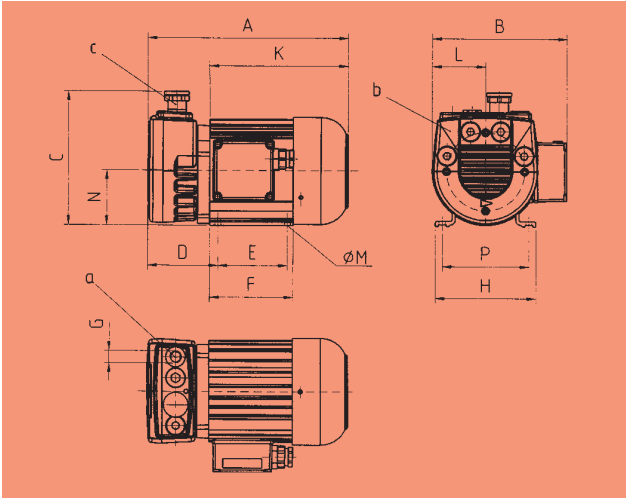
Mounting position discretionary.

For continuous operation we recommend our oil lubricated pumps.

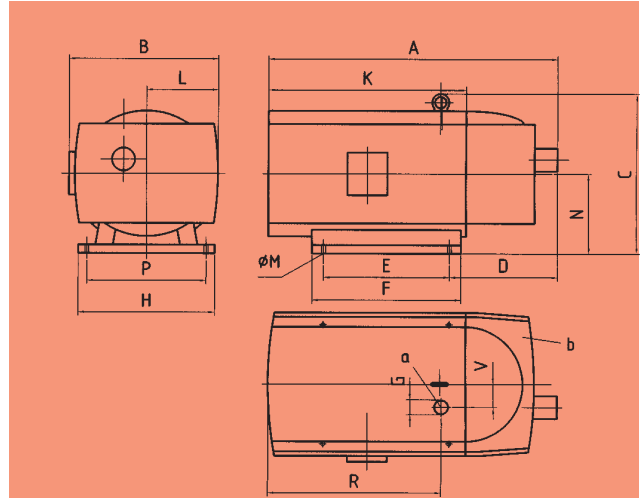
Advice:

Suitable hose nipples see chapter 8.

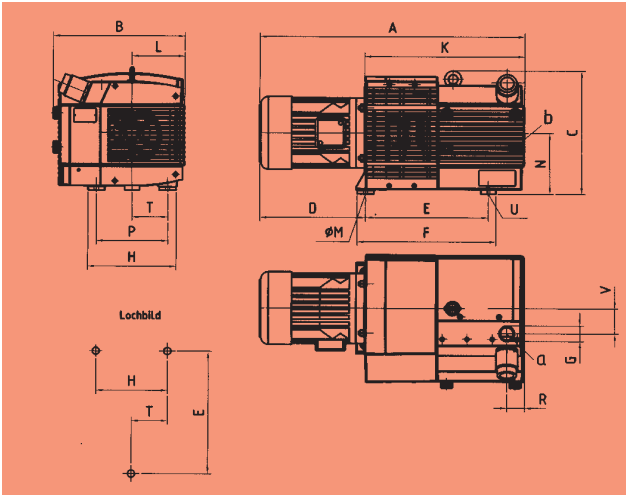
Additional filter see chapter 8.



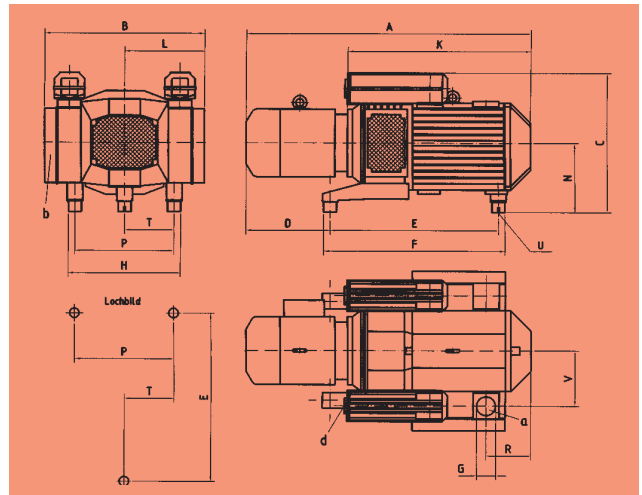
Vacuum pumps T 4.4 and T 4.8



Vacuum pumps T 4.16 to T 4.40



Vacuum pumps T 4.60 to T 4.140



Vacuum pumps T 4.250 to T 4.500

- a Suction connection
- b Suction filter
- c Silencer
- d Exhaust air line

Dimensions									
Type	A	B	C	D	E	F	G	H	K
VP-T4.4	221	155	148	71	80	96	G 1/4"	116	158
VP-T4.8	231	155	154	81	80	96	G 3/8"	116	158
VP-T4.16	451	232	213	177	202	242	G 1/2"	155	321
VP-T4.25	505	260	290	186	220	260	G 3/4"	238	345
VP-T4.40	520	260	290	221	220	260	G 3/4"	238	412
VP-T4.60	650	353	328	253	326	362	G 1"	240	415
VP-T4.80	703	353	328	306	326	362	G 1"	240	415
VP-T4.100	807	470	336	306	398	380	G 1 1/2"	295	539
VP-T4.140	826	470	336	325	398	380	G 1 1/2"	295	539
VP-T4.250	ca. 1092	612	533	ca. 322	645	695	G 2 1/2"	430	684
VP-T4.360	ca. 1233	612	533	ca. 322	645	695	G 2 1/2"	430	714
VP-T4.500	ca. 1451	766	710	ca. 518	768	843	G 4"	555	863

Dimensions									
Type	L	M	N	P	R	T	U	V	
VP-T4.4	62	7	63	100	--	--	--	--	
VP-T4.8	62	7	63	100	--	--	--	--	
VP-T4.16	102	7	116	125	291	--	--	37,5	
VP-T4.25	125	7	143	190	302,5	--	--	40	
VP-T4.40	125	7	143	208	363,5	--	--	40	
VP-T4.60	141	12	162	190	46	95	M 8	65	
VP-T4.80	141	12	162	190	46	95	M 8	65	
VP-T4.100	230	12	162	245	60	122,5	M 8	95	
VP-T4.140	230	12	162	245	60	122,5	M 8	95	
VP-T4.250	306	--	533,5	380	171,5	190	M 10	211,5	
VP-T4.360	306	--	533,5	380	171,5	190	M 10	211,5	
VP-T4.500	383	--	710	480	206	240	M 12	265	

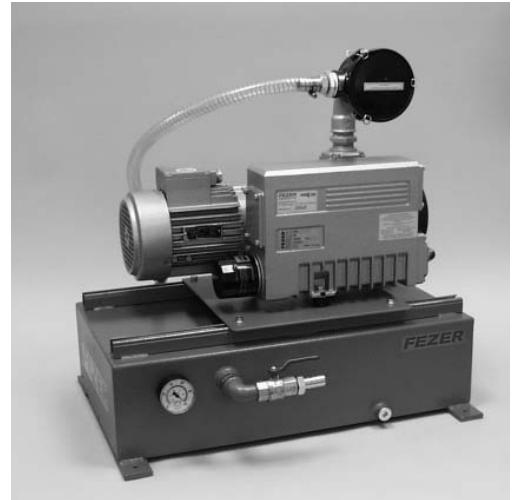
Description

Vacuum-supply-station for lifting devices without integrated tank or for single suction plates. The vacuum energy units consist of vacuum tank, vacuum pump, non-return valve, vacuum filter, vacuum gauge, 2/2-way-ball valve and hose nipples.

By using vacuum energy units in connection with vacuum load lifting devices the suction times can be drastically reduced and the safety standards can be increased.

Options:

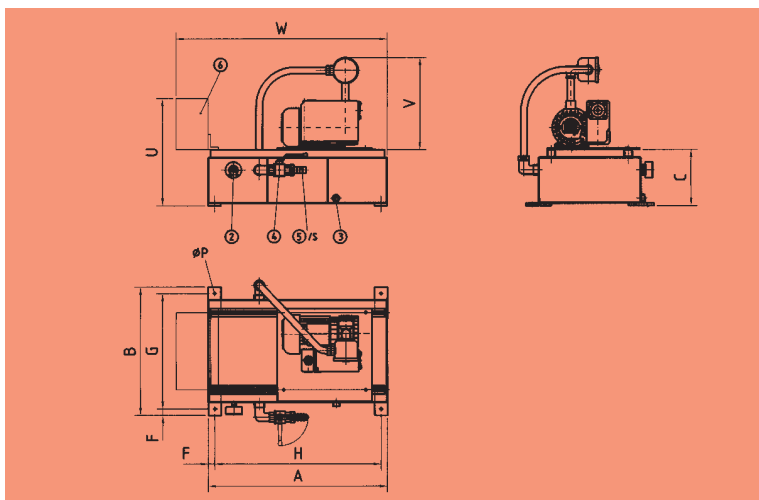
- Motor protection switch
- vacuum-controlled motor switch
- Vacuum generator with a.c. motor
- water level gauge
- drain cock



Vacuum energy unit

Article numbers				
Type	Part No:	Motor	Vacuum controlled	Filter cartridge
		protection switch	motor switch	for vac. generator
VEE-15L-T4.4-230/400V	1.42.2.0015	6.33.3.0003	6.36.1.0004	2.41.2.0171
VEE-15L-T4.8-230/400V	1.42.2.0017	6.33.3.0003	6.36.1.0004	2.41.2.0172
VEE-15L-T4.16-230/400V	1.42.2.0013	6.33.3.0003	6.36.1.0004	2.41.2.0120
VEE-50L-T4.4-230/400V	1.42.2.0031	6.33.3.0003	6.36.1.0004	2.41.2.0171
VEE-50L-T4.8-230/400V	1.42.2.0035	6.33.3.0003	6.36.1.0004	2.41.2.0172
VEE-50L-T4.16-230/400V	1.42.2.0027	6.33.3.0003	6.36.1.0004	2.41.2.0120
VEE-50L-T4.25-230/400V	1.42.2.0029	6.33.3.0003	6.36.1.0004	2.41.2.0099
VEE-50L-T4.40-230/400V	1.42.2.0030	6.33.3.0003	6.36.1.0004	2.41.2.0099
VEE-100L-T4.16-230/400V	1.42.2.0002	6.33.3.0003	6.36.1.0004	2.41.2.0120
VEE-100L-T4.25-230/400V	1.42.2.0004	6.33.3.0003	6.36.1.0004	2.41.2.0099
VEE-100L-T4.40-230/400V	1.42.2.0005	6.33.3.0003	6.36.1.0004	2.41.2.0099
VEE-200L-T4.25-230/400V	1.42.2.0021	6.33.3.0003	6.36.1.0004	2.41.2.0099
VEE-200L-T4.40-230/400V	1.42.2.0022	6.33.3.0003	6.36.1.0004	2.41.2.0099

Article numbers				
Type	Part No:	Motor	Vacuum controlled	Filter cartridge
		protection switch	motor switch	for vac. generator
VEE-15L-016.1-230/400V	1.42.1.0008	6.33.3.0003	6.36.1.0004	2.53.2.0014
VEE-50L-016.1-230/400V	1.42.1.0018	6.33.3.0003	6.36.1.0004	2.53.2.0014
VEE-50L-025.1-230/400V	1.42.1.0019	6.33.3.0003	6.36.1.0004	2.53.2.0005
VEE-50L-040.1-230/400V	1.42.1.0020	6.33.3.0003	6.36.1.0004	2.53.2.0005
VEE-50L-063.1-230/400V	1.42.1.0021	6.33.3.0003	6.36.1.0004	2.53.2.0005
VEE-50L-0100.1-230/400V	1.42.1.0017	6.33.3.0003	6.36.1.0004	2.53.2.0004
VEE-100L-016.1-230/400V	1.42.1.0002	6.33.3.0003	6.36.1.0004	2.53.2.0014
VEE-100L-025.1-230/400V	1.42.1.0004	6.33.3.0003	6.36.1.0004	2.53.2.0005
VEE-100L-040.1-230/400V	1.42.1.0005	6.33.3.0003	6.36.1.0004	2.53.2.0005
VEE-100L-063.1-230/400V	1.42.1.0006	6.33.3.0003	6.36.1.0004	2.53.2.0005
VEE-100L-0100.1-230/400V	1.42.1.0001	6.33.3.0003	6.36.1.0004	2.53.2.0004
VEE-100L-0160.1-230/400V	1.42.1.0003	6.33.3.0004	6.36.1.0005	2.53.2.0006
VEE-200L-016.1-230/400V	1.42.1.0011	6.33.3.0003	6.36.1.0004	2.53.2.0005
VEE-200L-025.1-230/400V	1.42.1.0013	6.33.3.0003	6.36.1.0004	2.53.2.0005
VEE-200L-040.1-230/400V	1.42.1.0015	6.33.3.0003	6.36.1.0004	2.53.2.0005
VEE-200L-063.1-230/400V	1.42.1.0016	6.33.3.0003	6.36.1.0004	2.53.2.0005
VEE-200L-0100.1-230/400V	1.42.1.0010	6.33.3.0004	6.36.1.0004	2.53.2.0004
VEE-200L-0160.2-230/400V	1.42.1.0012	6.33.3.0004	6.36.1.0005	2.53.2.0006
VEE-200L-0250.2-400/690V	1.42.1.0014	6.33.3.0005	6.36.1.0006	2.53.2.0006



- 2: Vacuum gauge
- 3: Condensate release
- 4: Stop cock
- 5: Hose connection
- 6: Electric box with motor protection switch

Vacuum energy unit with oil lubricated vacuum pump

Dimensions											
Type	A	B	C	F	G	H	P	S	U	V	W
								LW			max.
VEE-15L-T4.4	450	380	158	25	330	400	8,5	3/4"	360	170	570
VEE-15L-T4.8	450	380	158	25	330	400	8,5	3/4"	360	170	570
VEE-15L-T4.16	450	380	158	25	330	400	8,5	3/4"	360	215	570
VEE-50L-T4.4	700	500	220	25	450	650	8,5	1"	420	170	820
VEE-50L-T4.8	700	500	220	25	450	650	8,5	1"	420	170	820
VEE-50L-T4.16	700	500	220	25	450	650	8,5	1"	420	215	820
VEE-50L-T4.25	700	500	220	25	450	650	8,5	1"	420	290	820
VEE-50L-T4.40	700	500	220	25	450	650	8,5	1"	420	290	820
VEE-100L-T4.16	700	600	320	25	550	650	8,5	38	520	215	820
VEE-100L-T4.25	700	600	320	25	550	650	8,5	38	520	290	820
VEE-100L-T4.40	700	600	320	25	550	650	8,5	38	520	290	820
VEE-200L-T4.25	1000	800	338	25	750	950	11	38	540	290	1120
VEE-200L-T4.40	1000	800	338	25	750	950	11	38	540	290	1120

Dimensions											
Type	A	B	C	F	G	H	P	S	U	V	W
								LW			max.
VEE-15L-016.1	450	380	158	25	330	400	8,5	3/4"	360	340	570
VEE-50L-016.1	700	500	220	25	450	650	8,5	1"	420	340	820
VEE-50L-025.1	700	500	220	25	450	650	8,5	1"	420	465	820
VEE-50L-040.1	700	500	220	25	450	650	8,5	1"	420	465	820
VEE-50L-063.1	700	500	220	25	450	650	8,5	1"	420	495	820
VEE-50L-0100.1	700	500	220	25	450	650	8,5	1"	420	510	820
VEE-100L-016.1	700	600	320	25	550	650	8,5	38	520	340	820
VEE-100L-025.1	700	600	320	25	550	650	8,5	38	520	465	820
VEE-100L-040.1	700	600	320	25	550	650	8,5	38	520	465	820
VEE-100L-063.1	700	600	320	25	550	650	8,5	38	520	495	820
VEE-100L-0100.1	700	600	320	25	550	650	8,5	38	520	510	1020
VEE-100L-0160.1	700	600	320	25	550	650	8,5	38	520	605	820
VEE-200L-016.1	1000	800	338	25	750	950	11	38	540	340	1120
VEE-200L-025.1	1000	800	338	25	750	950	11	38	540	465	1120
VEE-200L-040.1	1000	800	338	25	750	950	11	38	540	465	1120
VEE-200L-063.1	1000	800	338	25	750	950	11	38	540	495	1120
VEE-200L-0100.1	1000	800	338	25	750	950	11	38	540	510	1120
VEE-200L-0160.1	1000	800	338	25	750	950	11	38	540	605	1120
VEE-200L-0250.1	1000	800	338	25	750	950	11	38	540	665	1120

Description

According to the German UVV* 18 vacuum load lifting devices have to be furnished with devices for balancing vacuum losses. Our vacuum tanks meet these regulations. The provided vacuum prevents the sudden release of work pieces in case of a power failure and can even out leakage losses. The vacuum tanks are suitable for mounting of any vacuum pump and are delivered with 2/2-way-ball valve, hose nipples and vacuum gauge. Water level suction or 2/2-way-ball valve instead of drain screw optional on request.

* UVV = Accident Prevention Regulations



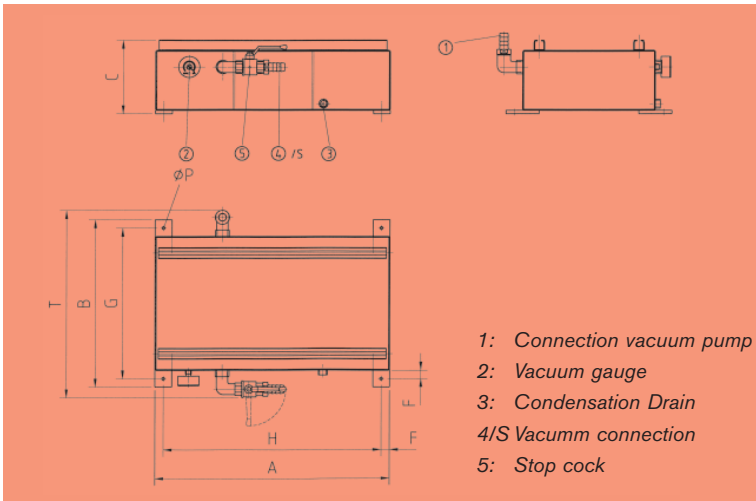
Vacuum flat tank

Article numbers

Type	Vacuum flat tank
VSF-15L	1.42.0.0002
VSF-50L	1.42.0.0004
VSF-100L	1.42.0.0001
VSF-200L	1.42.0.0003

Technical Data

Type	Weight (kg)	Volume (l)	Stop cock
VSF-15L	10	15	R 3/4"
VSF-50L	20	50	R 1"
VSF-100L	48	100	R 1"
VSF-200L	75	200	R 1"



Vacuum flat tank

Dimensions									
Type	A	B	C	D	E	F	G	H	K
VSF-15L	450	380	158	280	103	128	330	400	210
VSF-50L	700	500	220	400	140	190	450	650	300
VSF-100L	700	600	320	500	240	290	550	650	300
VSF-200L	1000	800	338	700	258	308	750	950	300

Dimensions									
Type	L	M	N	P	R	T	1	3	4/S LW
VSF-15L	50	120	350	8,5	30	398	R 3/4"	R 1/2"	3/4"
VSF-50L	100	200	500	8,5	30	560	R 1"	R 1/2"	38
VSF-100L	100	200	500	8,5	30	692	R 1 1/4"	R 1/2"	38
VSF-200L	100	200	800	11	28	912	R 1 1/2"	R 1/2"	38

Description

For vacuum generators, which are run in connection with a vacuum tank. A vacuum limit switch automatically turns on the vacuum generator through an adjustable differential pressure and when reaching the adjusted maximum vacuum it turns off again. This enlargens the lifespan of the pump and saves energy.

Standard scope of supply: Switch housing with transformer, cantactor, motor protection switch and terminal block. One PG-screw per electro-supply and motor connection. Firmly mounted underpressure switch UDSD-1-1-G1/4 with 1.5 m long cable for mounting into vacuum tank.



Vacuum-controlled motor switch with housing

Advice:

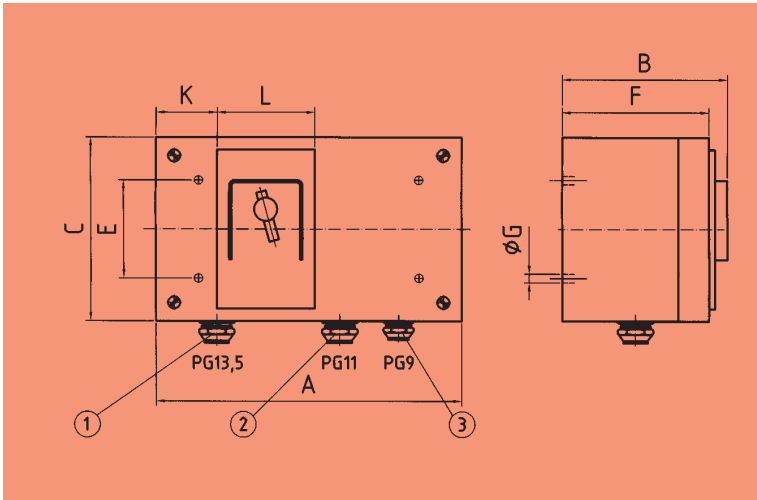
When ordering, always indicate the electrical power of the vacuum pump!

Article numbers

Type	
VMS-2,2KW	6.36.1.0010
VMS-4,0KW	6.36.1.0005
VMS-7,5KW	6.36.1.0006
VMS-12,5KW	6.36.1.0007

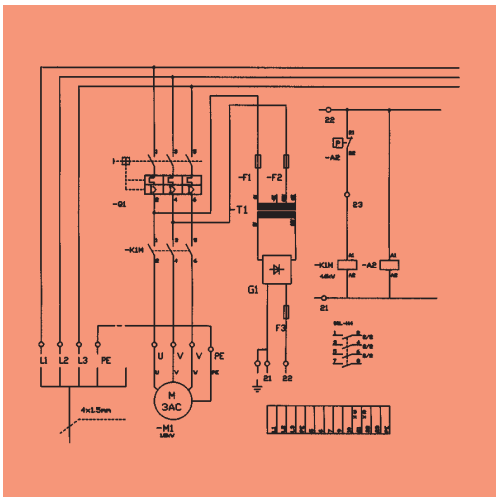
Technical Data

Type	VMS-2,2	VMS-4,0	VMS-7,5	VMS-12,5
Mains Voltage	230 / 3x400V	230 / 3x400V	230 / 3x400V	230 / 3x400V
Control Voltage	24V	24V	24V	24V
max. motor rating	0,25 - 2,2kW	2,3 - 4kW	4,5 - 7,5kW	8 - 12,5kW
Vacuum area	steplessly adjustable with freely selectable hysteresis			



Electric box with vacuum-controlled motor switch

Dimensions									
Type	A	B	C	D	E	F	G	K	L
Motor switch	250	135	150	180	80	120	7	50	80



Electric diagram of vacuum-controlled motor switch

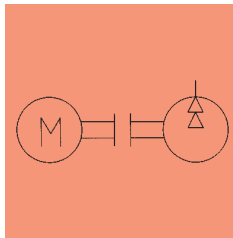
Description

Suitable for work, in which high volume flows and a low vacuum are necessary, as for transport of chipboards, porous stones and other permeable materials.

Robust, for continuous operation suitable side channel compressor with flywheel. (For vacuum load lifting devices according to the German UVV* 18). The flywheel guarantees highest safety standards in case of power failures. All compressor- and motor parts are made of aluminium casting, which makes them non-corroding. Good heat dissipation. Maintenance-free working is guaranteed by well-dimensioned bearings. Mounted silencers keep the noise low.



Reversing



Switching diagram blower



Vacuum blower SD 4 - SD 8

* UVV = Accident Prevention Regulations

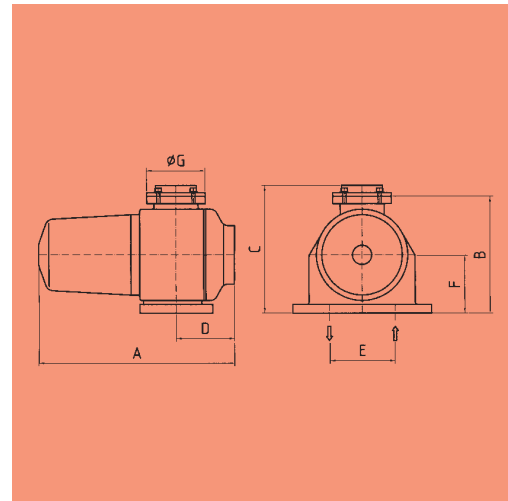
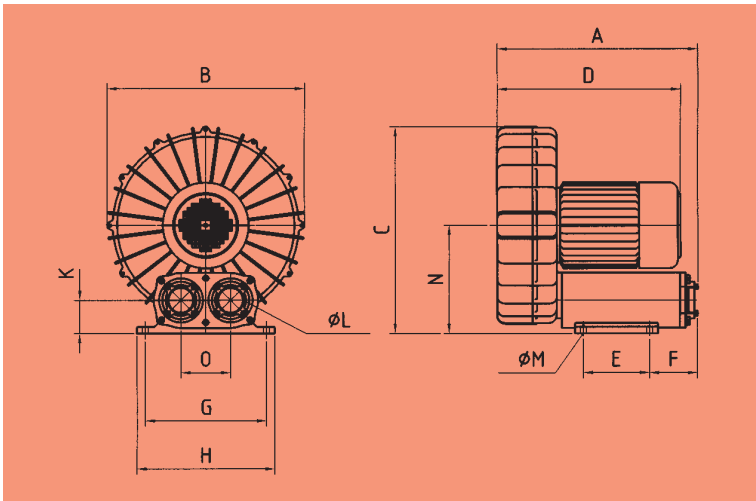
Article numbers				
Type	Vacuum blowers without reversing	Vacuum blowers with Reversing	Reversing RA 230 V	Motor protection switch
VG-SD4	1.43.1.0010	1.43.1.0009	1.43.3.0009	6.33.3.0003
VG-SD6	1.43.1.0013	1.43.1.0012	1.43.3.0010	6.33.3.0004
VG-SD8	1.43.1.0014	1.43.1.0015	1.43.3.0011	6.33.3.0004

*) Blower SD8 without flywheel!
 Motor protection switch with housing

Technical Data Vacuum blower			
	VG-SD4	VG-SD6	VG-SD8
max. under pressure (mbar) ²⁾	180	300	300
suction capacity (m ³ /h) ²⁾	168	276	540
Nominal voltage AC (V)	230/ 400	230/ 400	Δ 400
Current consumption AC (A)	4/ 2,3	9/ 5,2	11,8
Motor rating (kW)	0,95	2,3	5,5
Motor speed (1/min)	2730	2870	2880
Sound level (dB(A))	< 75	< 75	< 75
Weight (kg)	22	33	81
Ambient temperature (°C)	- 20 bis + 40	- 20 bis + 40	- 20 bis + 40
Safety type	IP 54	IP 54	IP 54

1) Measuring according to DIN 45635; when blowing over the hose line
 2) The indicated values are valid with a tolerance of ± 10 %

Technical Data Reversing			
	RA-SD4	RA-SD6	RA-SD8
Switching cycles (1/min)	< 30	< 30	< 30
Switching times(ms)	700	700	700
Temperature range (°C)	-20 bis +40	-20 bis +40	-20 bis +40
Nominal voltage (AC)	230 V, 50 Hz	230 V, 50 Hz	230 V, 50 Hz
Current consumption (A)	0,041	0,041	0,1
Weight (kg)	4,3	5,9	8,7



Vacuum blowers SD 4 - SD 8

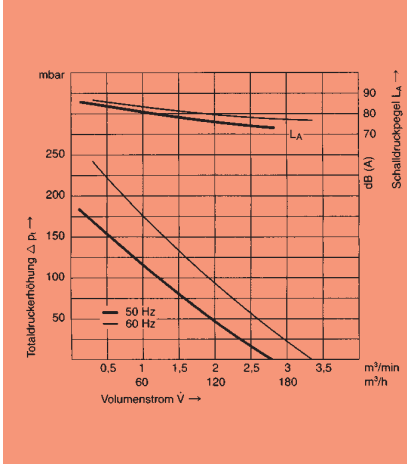
Dimensions Vacuum blower

Type	A	B	C	D	E	F	G	H	K	L	M	N	O
VG-SD 4	357	358	375	332	120	66	220	250	60	45	11	196	90
VG-SD 6	435	396	423	383	160	72	310	350	80	55	13	225	125
VG-SD 8	530	500	532	510	260	43	365	420	85	65	14	282	145

Dimensions

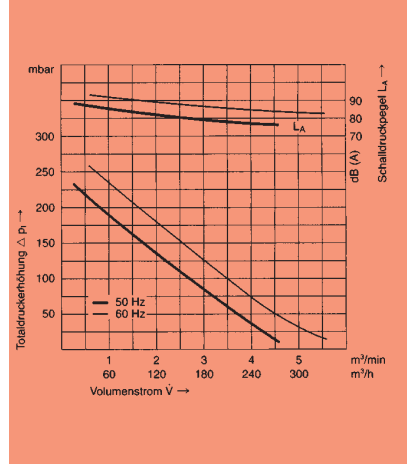
Type	A	B	C	D	E	F	G
RA-SD4	256	160	175	80	90	80	R 1 1/2"
RA-SD6	278	185	200	95	125	95	R 2"
RA-SD8	340	210	230	104	145	105	R 2 1/2"

Underpressure



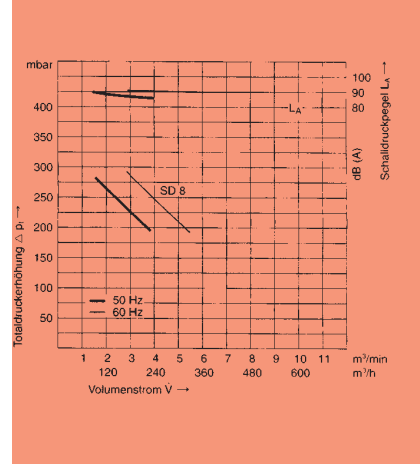
Vacuum blower SD 4

Underpressure



Vacuum blower SD 6

Underpressure

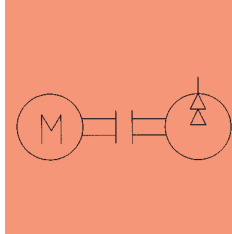


Vacuum blower SD 8

Description

For applications which require a high volume stream and a low vacuum, like transporting chip-board plates, porous stones or other air-penetrable materials.

Single-stage compressors in robust aluminium casting design, suitable for continuous use (VG-500 in grey cast iron design). The non-contact motion allows an almost wear-resistant and maintenance-free operation along with little operation noise due to good sound absorbers. For each blower a reversing unit with "suction/blow" control and neutral position is available. Vacuum blower VG-1100-D1 on request!



Switching diagram blower



Vacuum blowers VG-080-D1 to VG-500-D1

Article numbers

Type	Vacuum blower without reversing	Reversing 230 V	Motor protection switch
VG-080-D1	1.43.1.0016	on request	6.33.3.0003
VG-140-D1	1.43.1.0017	on request	6.33.3.0003
VG-210-D1	1.43.1.0018	on request	6.33.3.0003
VG-315-D1	1.43.1.0019	on request	6.33.3.0003
VG-500-D1	1.43.1.0020	on request	6.33.3.0004

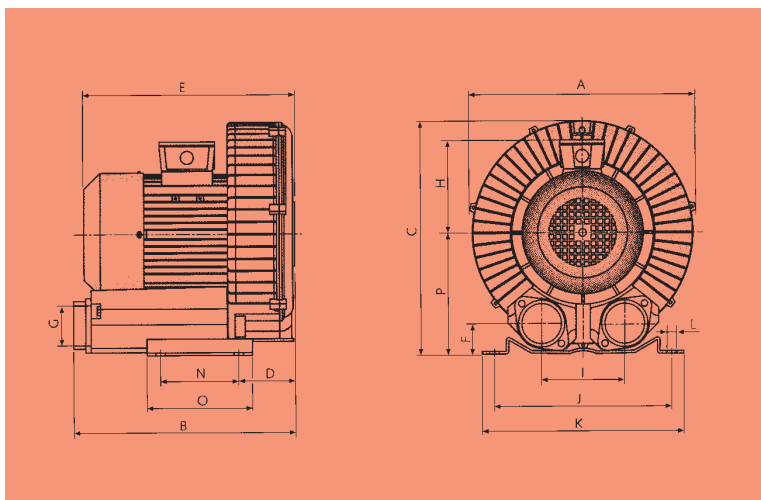
Motor protection switch with housing

Technical Data

	VG-080-D1	VG-140-D1	VG-210-D1	VG-315-D1	VG-500-D1
Mounting position	arbitrary	arbitrary	arbitrary	arbitrary	arbitrary
max. underpressure(mbar) ²⁾	120	120	170	210	170
max overpressure(mbar) ²⁾	130	120	170	200	170
Suction volume (m ³ /h) ²⁾	80	140	210	315	500
Nominal voltage AC (V)	230/400	230/400	230/400	230/400	230/400
Current consumption AC (A)	3,7/1,8	4,3/2,5	5,8/3,0	9,7/5,5	9,6/5,7
Motor rating (kW)	0,4	0,7	1,3	2,2	4,0
Motor speed (1/min)	2850	2850	2850	2850	2850
Sound level (dB (A)) ¹⁾	58	63	66	70	71
Weight (kg)	10	13	20	29	112
Safety type	IP 55	IP 55	IP 55	IP 55	IP 55
Isolationsklasse	F	F	F	F	F

1) Measuring according to DIN 45635; when blowing over the hose line

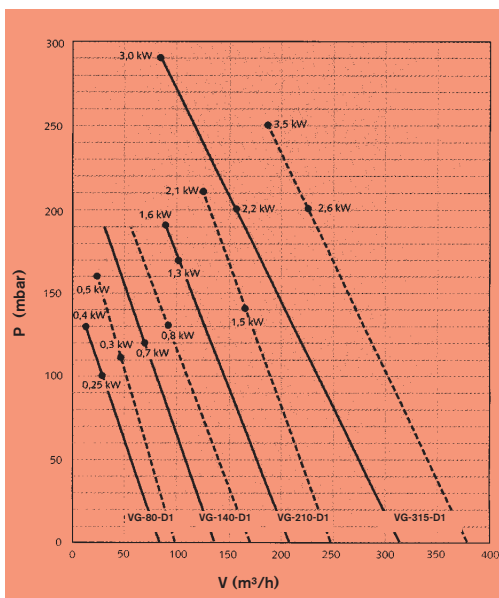
2) The indicated values are valid with a tolerance of ± 10 %



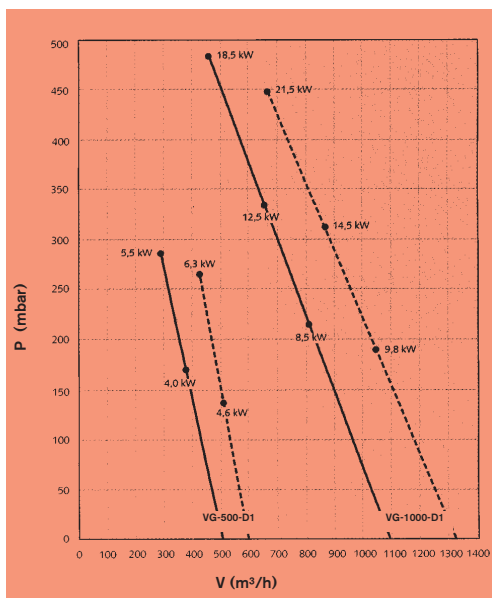
Vacuum blowers VG-080-D1 to VG-500-D1

Dimensions															
Type	A	B	C	D	E	F	G	H	I	J	K	L	N	O	P
VG-080-D1	248	230	250	72	259	39	R11/4	111	90	205	230	10	83	108	130
VG-140-D1	287	241	305	76	272	46	R11/2	131	115	225	225	12	95	130	156
VG-210-D1	336	298	340	87	317	48	R2	159	120	260	295	14	115	155	177
VG-315-D1	383	333	386	109	380	54	G2	183	125	290	325	15	140	180	200
VG-500-D1	500	496	516	35	473	81	G21/2	-	145	365	420	15	280	316	267

5
Vacuum generators



Characteristic lines VG-080-D1 to VG-315-D1



Characteristic lines VG-500-D1

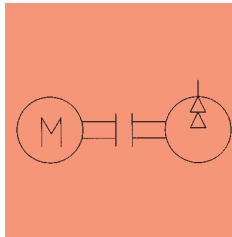
Description

For applications which require a high volume stream and a low vacuum, like transporting chip-board plates, porous stones or other air-penetrable materials.

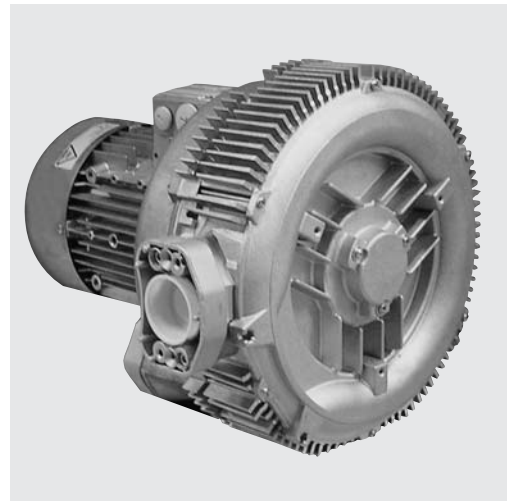
Robust double-stage side channel compressors in light aluminium die-cast design (VG-500 in grey cast iron design). This double-stage design produces a higher difference pressure than the single-stage design which leads to higher holding capacities.

For each blower a reversing unit with "suction-release" control and one neutral setting is available.

Vacuum blower VG-1100-D2 on request!



Switching diagram blower



Vacuum blowers VG-085-D2 to VG-500-D2

Article numbers

Type	Vacuum blower without reversing	Reversing 230 V	Motor protection switch
VG-085-D2	1.43.1.0021	on request	6.33.3.0003
VG-150-D2	1.43.1.0022	on request	6.33.3.0004
VG-210-D2	1.43.1.0023	on request	6.33.3.0004
VG-310-D2	1.43.1.0024	on request	6.33.3.0005
VG-500-D2	1.43.1.0025	on request	6.33.3.0006

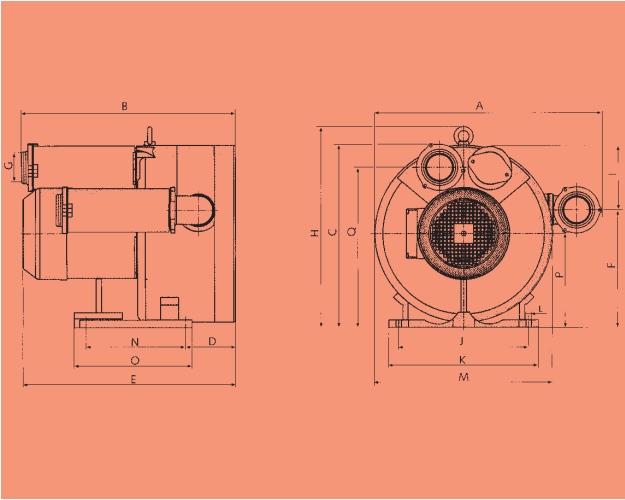
Motor protection switch with housing

Technical Data

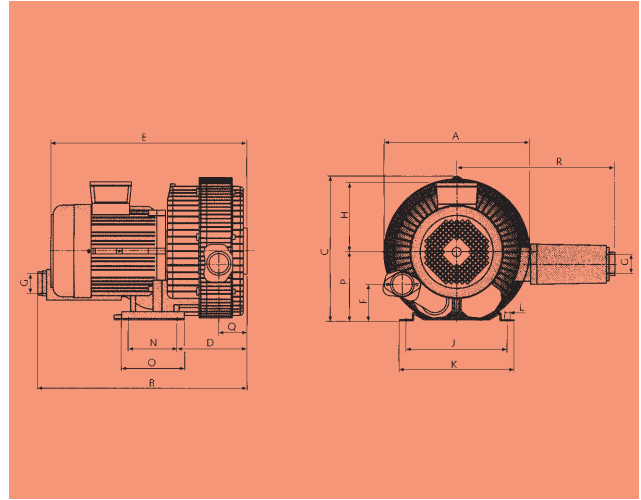
	VG-085-D2	VG-150-D2	VG-210-D2	VG-310-D2	VG-500-D2
Mounting position	beliebig	beliebig	beliebig	beliebig	beliebig
max. underpressure (mbar) ²⁾	210	300	340	360	400
max overpressure (mbar) ²⁾	240	380	410	380	400
Suction volume (m ³ /h) ²⁾	85	150	210	310	500
Nominal voltage AC (V)	230/ 400	230/ 400	230/ 400	230/ 400	230/ 400
Current consumption AC (A)	4,3/2,5	9,7/5,5	12,6/7,4	10,3/6,1	17,0/9,8
Motor rating (kW)	0,7	2,2	3,0	4,3	7,5
Motor speed (1/min)	2850	2850	2850	2850	2850
Sound level (dB (A)) ¹⁾	60	66	74	75	75
Weight (kg)	14	34	39	53	169
Safety type	IP 55	IP 55	IP 55	IP 55	IP 55
Insulation class	F	F	F	F	F

1) Measuring according to DIN 45635; when blowing over the hose line
 2) The indicated values are valid with a tolerance of ± 10 %

VACUUM BLOWER IN DOUBLE-STAGE DESIGN VG-...-D2



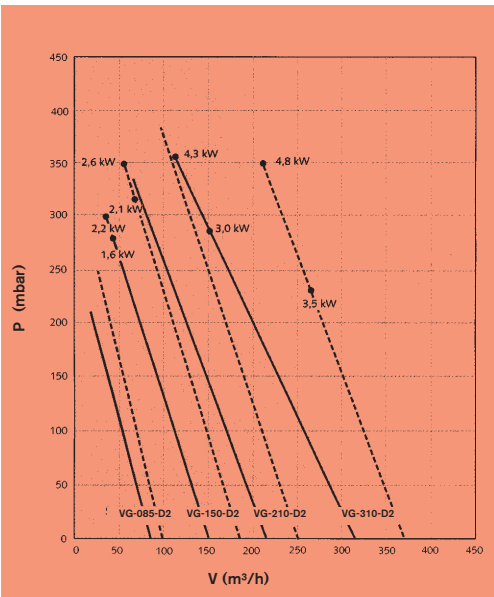
Vacuum blowers VG-085-D2 to VG-310-D2



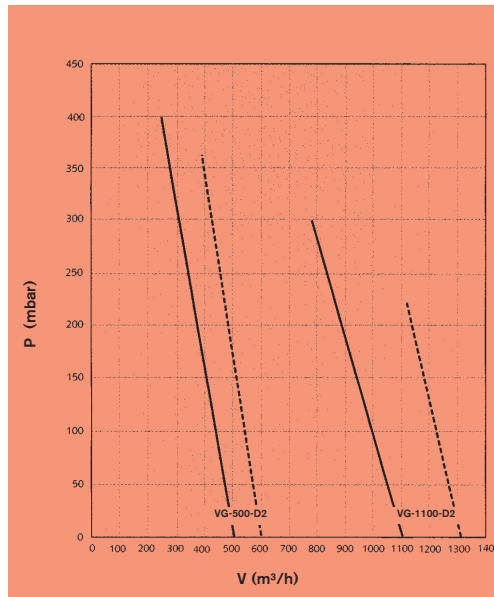
Vacuum blower VG-500-D2

Dimensions																
Type	A	B	C	D	E	F	G	H	J	K	L	N	O	P	Q	R
VG-085-D2	286	289	273	131	319	39	G11/4	111	205	230	10	83	108	130	30	318
VG-150-D2	323	317	318	152	404	46	G11/2	128	225	255	12	95	130	56	46	323
VG-210-D2	372	384	374	135	468	48	G2	135	260	295	14	115	155	177	55	413
VG-310-D2	428	429	423	205	476	54	G2	128	290	325	15	140	180	200	76	426
VG-500-D2	638	603	516	141	601	333	G21/2	569	365	420	15	280	316	267	453	183

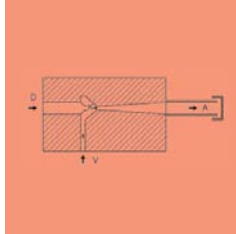
5
Vacuum generators



Characteristic lines VG-085-D2 to VG-310-D2



Characteristic lines VG-500-D2 and VG-1100-D2



How the ejectors work

Ejectors work according to the venturi principle. Filtered and oil-free compressed air D streams into a chamber K. Because of the reduction of the cross-section in this chamber the air is accelerated to supersonic speed. Because of the design of the reduction of the cross-section and the high flow speed a vacuum is created in chamber K. Air is suspended through the connection V. After escaping from chamber K the compressed air expands together with the suspended air into a silencer as exhaust air A.



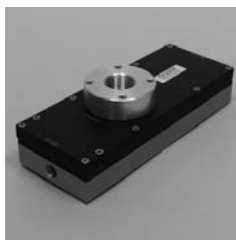
Inline-Ejektoren

Very compact and small ejectors with a volume stream of up to 20 l/min. The inline ejectors are directly screwed onto the suction cup. They are controlled by a pneumatic valve. As soon as the compressed air streams through the ejector a vacuum is created. Once the compressed air is switched off the suction cup is ventilated by the atmosphere at the vent hole.



Basic ejectors

Efficient and robust ejectors with a volume stream of up to 160 l/min. Designs for high vacuum (HS) and high volume stream at lower vacuum (LS). For direct use on big suction plates or for central vacuum supply of bigger suction circuits with several suction cups. Also available with integrated vacuum switches.



Multi-stage ejektors

Multi-stage ejectors consist of several ejectors placed parallel and connected in series, showing an enormous suction (up to 10.000 l/min). The ejectors are suitable for the transport of porous work pieces with a relatively small air consumption.

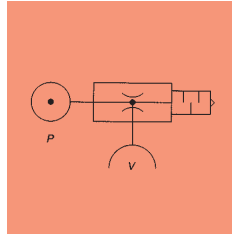
Overview Technical Data of ejectors			
	<i>Inline ejectors</i>	<i>Basic ejectors</i>	<i>Multi-stage ejectors</i>
nozzle diameter (mm):	0,5 - 0,9	0,5 - 3,0	0,5 - 3,0
max. vacuum (%):	90	85	90
Suction volume (l/min):	7 - 21	6 - 350	300 - 9600
Air consumption (l/min):	12 - 36	13 - 385	70 - 2880
Blow rating (l/min):	---	---	---
Weight:	15 g	0,08 - 0,85 kg	0,6 - 9,5 kg

Marking of basic and multi-stage ejectors

VEI	<i>Inline ejector</i>
VEP	<i>Basic ejector</i>
VEP-VSM	<i>Basic ejector with mechanical vacuum switch</i>
VEP-VESM	<i>Basic ejector with electronic vacuum switch</i>
VIP	<i>Basic ejector with pressure reducer and stopcock</i>
VEM	<i>Multi-stage ejector</i>

Description

Inline ejector with small size and weight. The ejector works after the Venturi principle, has no movable parts and is therefore almost maintenance-free. There are connecting threads on either side, thus the ejector can be directly screwed onto the suction cup. Space-saving mounting and very short suction times are possible. Especially suitable for high cycle times, constricted space, on robots or in automation technology.



Switching diagram
 V Vacuum connection
 P Compressed air connection



Inline ejector VEI-A

General Data	
Type	Vacuum ejector
Medium	dry, oil-free air
Operational pressure(bar)	2 to 6
Temperature range (°C)	0 to 80
Material	Aluminium

Article numbers	
Type	Vacuum ejector
VEI-A-05	1.44.1.0001
VEI-A-07	1.44.1.0002
VEI-A-09	1.44.1.0003

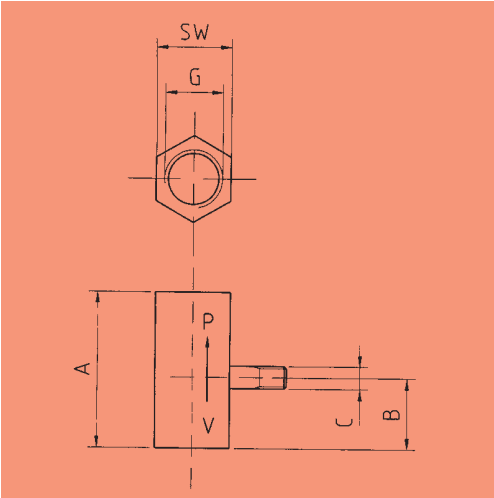
5
Vacuum generators

Technical Data					
Type	Nozzle Ø (mm)	max. vacuum (%)	Volume stream (l/ min)	Air consumption (l/ min)	Weight (g)
VEI-A-05	0,5	87	7	12	15
VEI-A-07	0,7	90	14	21	15
VEI-A-09	0,9	90	21	36	15

*) all indications with 5 bar operational pressure

Evacuation time for evacuating a volume of 1 litre								
	10 % (s)	20 % (s)	30 % (s)	40 % (s)	50 % (s)	60 % (s)	70 % (s)	80 % (s)
VEPA-05	10	11,5	13,3	15,8	21,4	30	46,2	75
VEPA-07	4,7	5,5	6,3	8	9,8	13,3	20	40
VEPA-09	3,2	3,7	4,3	5,4	6,5	8,8	13,3	27,3

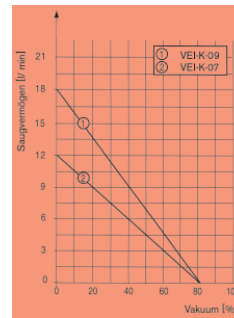
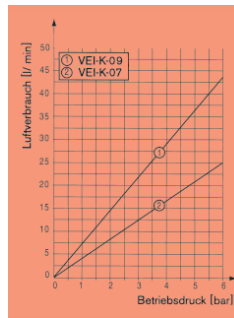
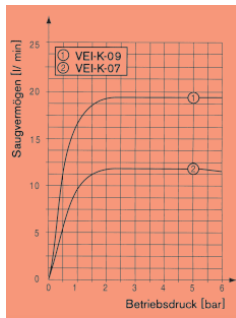
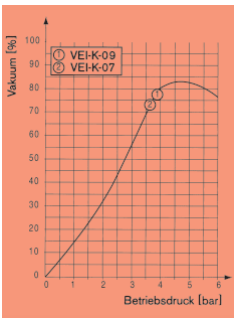
*) all indications with 5 bar operational pressure



Inline ejector VEI-A

Dimensions

Type	A	B	C	G	SW
VEI-A...	35	16	M 5	R 1/4"	17



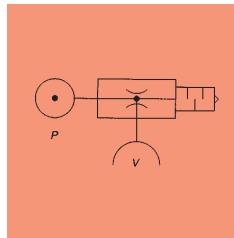
Description

Single-stage ejector of small size and weight, especially suitable for the use in the field of material handling. The ejector works after the Venturi-principle. The ejector does not develop any warmth and has no movable parts and thus is easy to maintain.

The space-saving mounting makes it suitable for use in the smallest areas or for mounting on roboters and other automatization devices.



Vacuum ejector



Switching diagram



Vacuum ejector

General Data

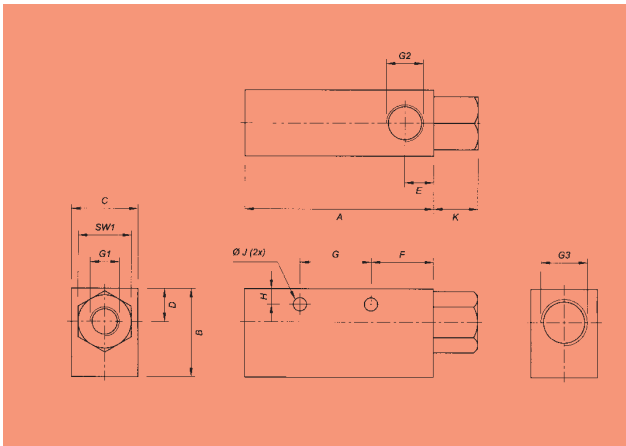
Type	
Medium	dry, oil-free air
Operational pressure(bar)	1 to 8
Temperature range (°C)	0 to 60
Material	anodized aluminium, brass

Article numbers

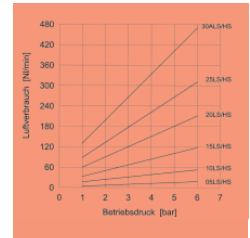
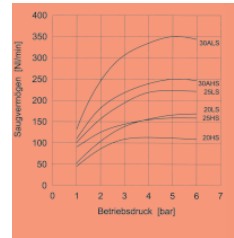
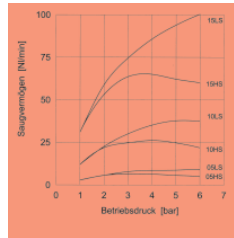
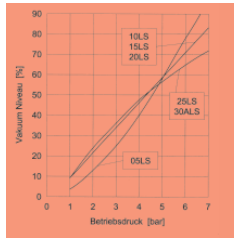
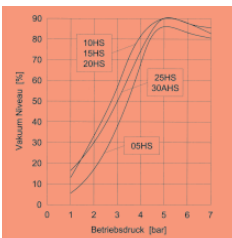
Type	Vacuum ejector	Replacement silencer
VEP-05 HS	1.44.1.0008	2.44.1.0001
VEP-05 LS	1.44.1.0011	2.44.1.0001
VEP-10 HS	1.44.1.0014	2.44.1.0001
VEP-10 LS	1.44.1.0017	2.44.1.0001
VEP-15 HS	1.44.1.0020	2.44.1.0003
VEP-15 LS	1.44.1.0023	2.44.1.0003
VEP-20 HS	1.44.1.0026	2.44.1.0004
VEP-20 LS	1.44.1.0029	2.44.1.0004
VEP-25 HS	1.44.1.0032	2.44.1.0005
VEP-25 LS	1.44.1.0033	2.44.1.0005
VEP-30 HS	1.44.1.0034	2.44.1.0005
VEP-30 LS	1.44.1.0035	2.44.1.0005

Technical Data

Type	Nozzle Ø (mm)	max. vacuum (%)	Volume stream (l/ min)	Air consumption (l/ min)	Weight (kg)
VEP-05 HS	0,5	86	6	13	0,08
VEP-05 LS	0,5	56	9	13	0,08
VEP-10 HS	1,0	82	27	44	0,08
VEP-10 LS	1,0	57	36	44	0,08
VEP-15 HS	1,5	79	63	100	0,14
VEP-15 LS	1,5	60	95	100	0,14
VEP-20 HS	2,0	86	110	180	0,35
VEP-20 LS	2,0	64	165	180	0,35
VEP-25 HS	2,5	89	160	265	0,73
VEP-25 LS	2,5	65	250	265	0,73
VEP-30 HS	3,0	89	225	385	0,85
VEP-30 LS	3,0	64	350	385	0,85



Vacuum ejectors



Dimensions

Type	A	B	C	D	E	F	G	H	J	K	L	M	G1	G2	SW1 LW
VEP-05 HS/LS	45	33	16	10	8	14	20	4,5	4,2	10	36	18,5	G 1/8"	G 1/8"	14
VEP-10 HS/LS	45	33	16	10	8	14	20	4,5	4,2	10	36	18,5	G 1/8"	G 1/8"	14
VEP-15 HS/LS	63	35	20	11	10	20	25	5	4,5	15	45,5	20	G 1/4"	G 1/4"	17
VEP-20 HS/LS	85	40	30	15	13	28	32	7	6	20	60,5	30	G 1/4"	G 3/8"	24
VEP-25 HS/LS	100	60	40	20	16	20	50	5,5	6	17	96	40	G 3/8"	G 1/2"	28
VEP-30 HS/LS	118	60	40	20	20	33	50	5,5	6	20	96	40	G 1/2"	G 3/4"	30

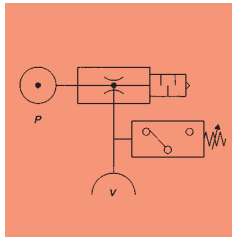
Evacuation time for evacuating a volume of 1 litre

	10 % (s)	20 % (s)	30 % (s)	40 % (s)	50 % (s)	60 % (s)	70 % (s)	80 % (s)
VEP-05 HS	1,12	2,36	3,74	5,52	7,82	11,02	15,2	24,73
VEP-05 LS	0,61	1,31	2,33	3,75	7,07	--	--	--
VEP-10 HS	0,25	0,51	0,89	1,33	1,87	2,5	3,61	5,84
VEP-10 LS	0,17	0,34	0,6	0,94	1,46	2,31	--	--
VEP-15 HS	0,13	0,24	0,4	0,6	0,89	1,22	1,79	3,32
VEP-15 LS	0,09	0,16	0,27	0,45	0,76	1,97	--	--
VEP-20 HS	0,08	0,13	0,22	0,34	0,51	0,7	1,01	1,46
VEP-20 LS	0,05	0,09	0,13	0,21	0,33	0,58	--	--
VEP-25 HS	0,05	0,09	0,16	0,22	0,32	0,44	0,62	0,88
VEP-25 LS	0,05	0,08	0,11	0,17	0,26	0,45	--	--
VEP-30 HS	0,05	0,08	0,11	0,16	0,22	0,3	0,41	0,6
VEP-30 LS	0,05	0,05	0,09	0,12	0,19	0,38	--	--

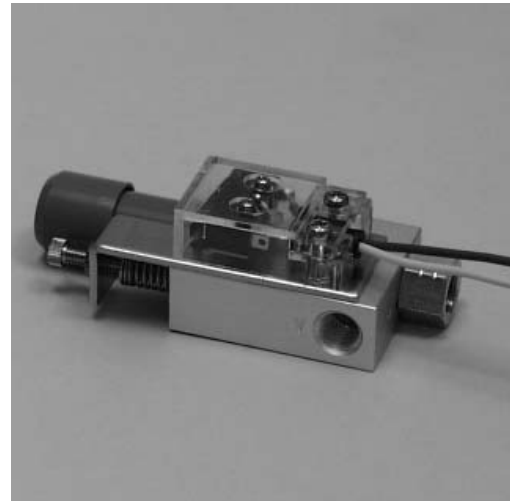
all indications with 5,5 bar operational pressure

Description

Single-stage ejector of small size and weight with integrated mechanical underpressure switch. The switching point of the underpressure switch can be adjusted by a screw from -0,2 bar to -0,5 bar. The ejector works according to the venturi principle and is especially suitable for material handling. The space-saving build allows mounting in constricted places. The ejector does not develop any warmth and has no movable parts.



Switching diagram

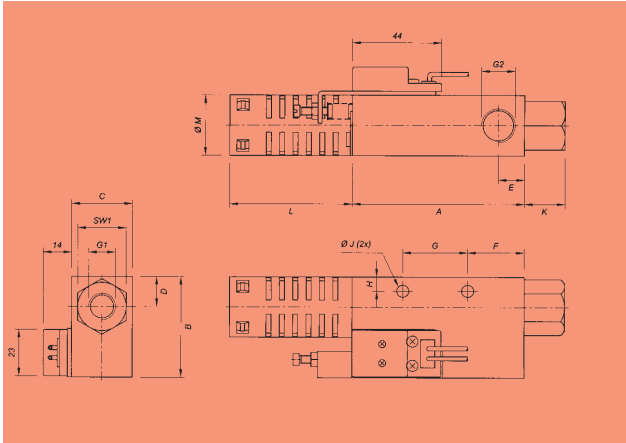


Ejector with mechanical underpressure switch

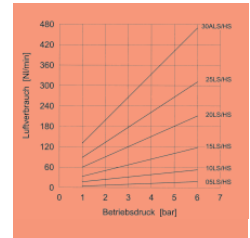
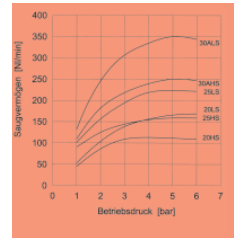
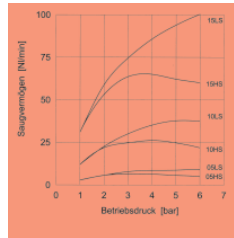
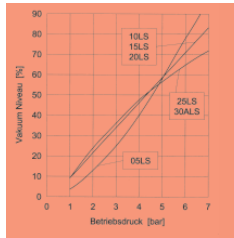
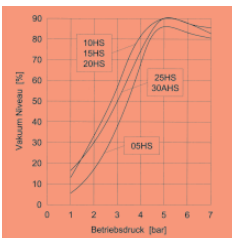
General Data	
Type	Vacuum ejector with underpressure switch
Medium	dry, oil-free air
Operational pressure (bar)	1 to 8
Temperature range (°C)	0 to + 60
Material	anodized aluminium, brass
Adjustment range (bar)	- 0,2 to - 0,53
Repetitive accuracy (mbar)	± 50
Hysteresis (mbar)	40 to 133

Article numbers		
Type	Vacuum ejector	Replacement silencer
VEP-05 HS-VSM	1.44.1.0010	2.44.1.0001
VEP-05 LS-VSM	1.44.1.0013	2.44.1.0001
VEP-10 HS-VSM	1.44.1.0016	2.44.1.0001
VEP-10 LS-VSM	1.44.1.0019	2.44.1.0001
VEP-15 HS-VSM	1.44.1.0022	2.44.1.0003
VEP-15 LS-VSM	1.44.1.0025	2.44.1.0003
VEP-20 HS-VSM	1.44.1.0028	2.44.1.0004
VEP-20 LS-VSM	1.44.1.0031	2.44.1.0004

Technical Data					
Type	Nozzle Ø (mm)	max. vacuum (%)	Volume stream (l/ min)	Air consumption (l/ min)	Weight (kg)
VEP-05 HS-VSM	0,5	86	6	13	0,12
VEP-05 LS-VSM	0,5	56	9	13	0,12
VEP-10 HS-VSM	1,0	82	27	44	0,12
VEP-10 LS-VSM	1,0	57	36	44	0,12
VEP-15 HS-VSM	1,5	79	63	100	0,19
VEP-15 LS-VSM	1,5	60	95	100	0,19
VEP-20 HS-VSM	2,0	86	110	180	0,46
VEP-20 LS-VSM	2,0	64	165	180	0,46



Ejector with mechanical underpressure switch



Dimensions

Type	A	B	C	D	E	F	G	H	J	K	L	M	G1	G2	SW1
VEP-05 HS/LS-VSM	45	33	16	10	8	14	20	4,5	4,2	10	37	18,5	G 1/8"	G 1/8"	14
VEP-10 HS/LS-VSM	45	33	16	10	8	14	20	4,5	4,2	10	37	18,5	G 1/8"	G 1/8"	14
VEP-15 HS/LS-VSM	63	35	20	11	10	20	25	5	4,5	15	46,5	20	G 1/4"	G 1/4"	17
VEP-20 HS/LS-VSM	85	50	30	15	13	28	32	7	6	20	60,5	30	G 1/4"	G 3/8"	24

Evacuation time for evacuating a volume of 1 litre

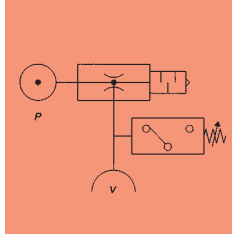
	10 % (s)	20 % (s)	30 % (s)	40 % (s)	50 % (s)	60 % (s)	70 % (s)	80 % (s)
VEP-05 HS-VSM	1,12	2,36	3,74	5,52	7,82	11,02	15,2	24,73
VEP-05 LS-VSM	0,61	1,31	2,33	3,75	7,07	--	--	--
VEP-10 HS-VSM	0,25	0,51	0,89	1,33	1,87	2,5	3,61	5,84
VEP-10 LS-VSM	0,17	0,34	0,6	0,94	1,46	2,31	--	--
VEP-15 HS-VSM	0,13	0,24	0,4	0,6	0,89	1,22	1,79	3,32
VEP-15 LS-VSM	0,09	0,16	0,27	0,45	0,76	1,97	--	--
VEP-20 HS-VSM	0,08	0,13	0,22	0,34	0,51	0,7	1,01	1,46

all indications with 5,5 bar operational pressure

Description

Single-stage ejector of small size and weight with integrated electronic underpressure switch. The switching point is adjustable by a potentiometer. The underpressure switch is connected to the ejector and what makes it stand out is the precise switching accuracy and its short response times.

The space-saving design and the low weight makes the ejector especially suitable for applications with high accelerations and restricted space conditions (robot technology, pick&place applications).



Switching diagram



Ejector with electronic underpressure switch

General Data

Type	Vacuum ejector with underpressure switch
Medium	dry, oil-free air
Operational pressure (bar)	1 to 8
Temperature range (°C)	0 to + 60
Material	anodized aluminium, brass
Adjustment range (bar)	-1 to 0
Repetitive accuracy	± 0,2 % F.S.
Hysteresis (mbar)	2 % F.S.

Article numbers

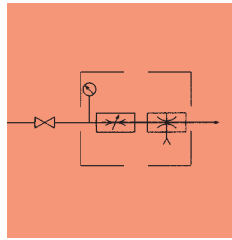
Type	Vacuum ejector	Underpressure switch	Replacement silencer
VEP-05HS-VSEM	1.44.1.0009	1.52.3.0016	2.44.1.0001
VEP-05LS-VSEM	1.44.1.0012	1.52.3.0016	2.44.1.0001
VEP-10HS-VSEM	1.44.1.0015	1.52.3.0016	2.44.1.0001
VEP-10LS-VSEM	1.44.1.0018	1.52.3.0016	2.44.1.0001
VEP-15HS-VSEM	1.44.1.0021	1.52.3.0016	2.44.1.0003
VEP-15LS-VSEM	1.44.1.0024	1.52.3.0016	2.44.1.0003
VEP-20HS-VSEM	1.44.1.0027	1.52.3.0016	2.44.1.0004
VEP-20LS-VSEM	1.44.1.0030	1.52.3.0016	2.44.1.0004

Technical Data

Type	Nozzle Ø (mm)	max. vacuum (%)	Volume stream (l/ min)	Air consumption (l/ min)	Weight (kg)
VEP-05HS-VSEM	0,5	86	6	13	0,12
VEP-05LS-VSEM	0,5	56	9	13	0,12
VEP-10HS-VSEM	1,0	82	27	44	0,12
VEP-10LS-VSEM	1,0	57	36	44	0,12
VEP-15HS-VSEM	1,5	79	63	100	0,19
VEP-15LS-VSEM	1,5	60	95	100	0,19
VEP-20HS-VSEM	2,0	86	110	180	0,46
VEP-20LS-VSEM	2,0	64	165	180	0,46

Description

Single-stage ejector complete with housing with steplessly adjustable pressure reducer, vacuum gauge, stopcock and hose nipples. The ejector works according to the venturi principle. In space-saving design suitable for restricted places. The ejector develops no warmth and has no movable parts.



Switching diagram



VIP-8 SP

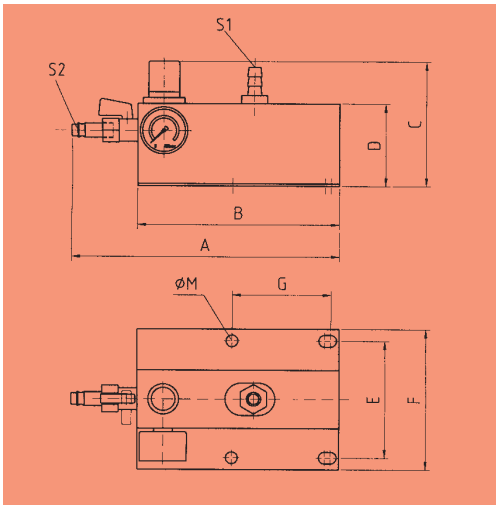
General Data	
Type	VIP 8 SP
Medium	dry, oil-free air
Operational pressure(bar)	1 to 7
Temperature range (°C)	0 to 60

Article numbers	
Type	VIP 8
VIP-8SP-5,0CBM	1.44.1.0036

5
Vacuum generators

Technical Data					
Type	Nozzle Ø (mm)	max. vacuum (%)	Volume stream (l/ min)	Air consumption max. (l/ min)	Weight (kg)
VIP 8 SP	1,2	85	0 - 80	65	1,1

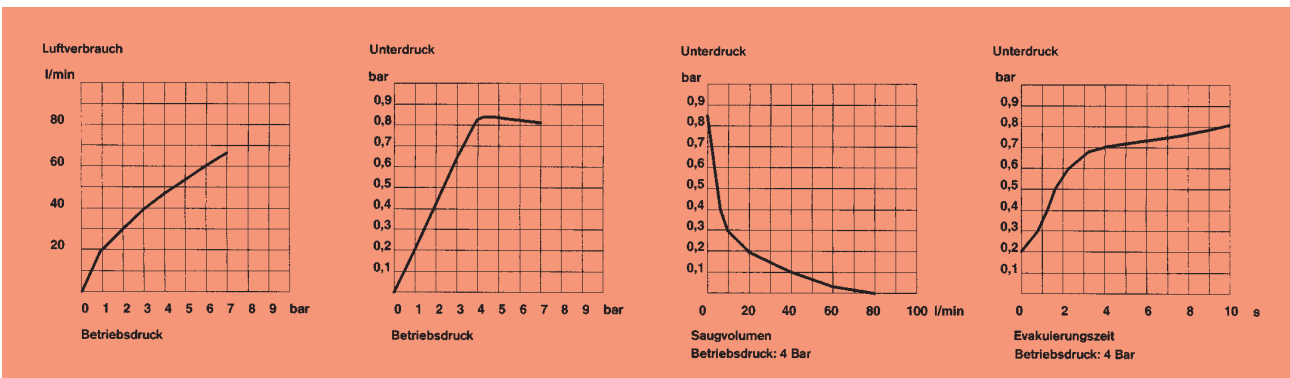
Evacuation time for evacuating a volume of 1 litre								
	10 % (s)	20 % (s)	30 % (s)	40 % (s)	50 % (s)	60 % (s)	70 % (s)	80 % (s)
VIP 8 SP	0,12	0,22	0,36	0,53	0,76	1,02	1,47	2,13



1/ S1: Vacuum connection
2/ S2: Compressed air connection

VIP 8 SP

Dimensions										
Type	A	B	C	D	E	F	G	M	S1 LW	S2 LW
VIP 8 SP	226	170	106	70	100	120	83	10	10	10



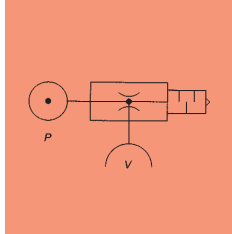
Description

Multistage ejector in small size and low weight inside a stable aluminium housing. Optional available with silencer and control vacuum gauge.

Due to the chamber and the nozzle configuration in several ejector steps this type of ejector has a higher volume stream regarding to the same air usage than single stage ejectors.

Maintenance free and wear resistant operation, no warmth development, and the free choice of any installation position are additional advantages of this ejector.

Especially suitable for porous materials or transport goods, which require a big volume stream or a short cycle- and evacuation time.



Switching diagram
V Vacuum connection
P Compressed air connection



Multi-stage ejectors VEM

General Data

Type	
Medium	dry, oil-free air
Operational pressure (bar)	4 to 6
Temperature range (°C)	0 to 100
Material	Coated
	aluminium, neoprene,
	brass, stainless steel

Article numbers

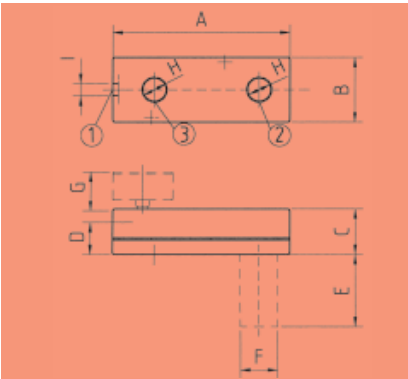
Type	Multi-stage ejector	Silencer	Control vacuum gauge
VEM-4	1.44.2.0004	2.44.2.0001	1.52.5.0008
VEM-8	1.44.2.0006	2.44.2.0001	1.52.5.0008
VEM-16	1.44.2.0002	2.44.2.0002	1.52.5.0008
VEM-32	1.44.2.0003	2.44.2.0002	1.52.5.0008
VEM-64	1.44.2.0005	2 x 2.44.2.0002	1.52.5.0008
VEM-128	1.44.2.0001	3 x 2.44.2.0002	1.52.5.0008

Technical Data

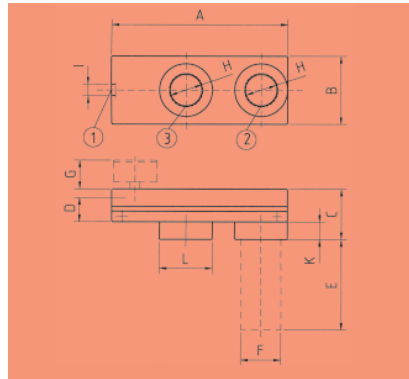
Type	max. vacuum (%)	Volume stream (l/ min)	Air consumption (l/ min)	Weight (kg)	Sound level dB (A) ¹⁾
VEM-4	90	300	68 - 95	0,62	60 - 65
VEM-8	90	500	136 - 190	0,65	65
VEM-16	90	1050	250 - 350	2,5	75
VEM-32	90	2100	700	2,8	72
VEM-64	90	4200	1400	7,5	72
VEM-128	90	9600	2880	9,5	72

^{*)} all indications with 4 to 6 bar operational pressure

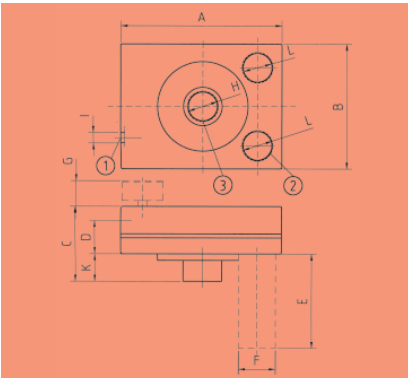
¹⁾ with silencer



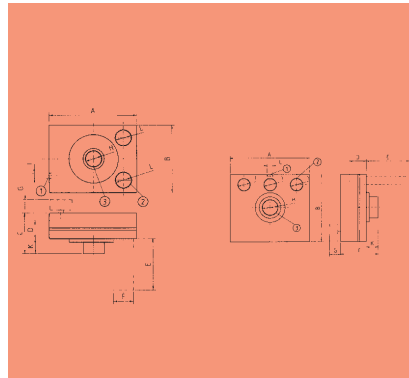
VEM 4 and VEM 8



VEM 16 and VEM 32



VEM 64



VEM 128













- 1 Compressed air connection
- 2 Ventilation
- 3 Vacuum connection

Dimensions											
Type	A	B	C	D	E	F	G	H	I	K	L
VEM 4	182	67	47	33	75	38	40	G 3/4"	G 1/4"	--	--
VEM 8	182	67	47	33	75	38	40	G 3/4"	G 1/4"	--	--
VEM 16	250	97	72	34,5	130	57	41	G 1 1/2"	G 3/8"	25	75
VEM 32	250	97	90	34,5	130	57	41	G 1 1/2"	G 3/8"	25	75
VEM 64	250	195	117	52	148	57	40	G 2"	G 3/8"	43	G 1 1/2"
VEM 128	295	250	138	63	160	57	42	G 2"	G 1 1/2"	43	G 1 1/2"

Evacuation time for evacuating a volume of 1 litre *)									
	10 %	20 %	30 %	40 %	50 %	60 %	70 %	80 %	
VEM-4	0,2	0,47	0,1	0,245	0,45	0,68	1,15	1,9	
VEM-8	0,01	0,024	0,05	0,123	0,23	0,34	0,58	0,95	
VEM-16	0,006	0,02	0,04	0,08	0,13	0,2	0,35	0,52	
VEM-32	0,003	0,005	0,01	0,03	0,05	0,08	0,13	0,23	
VEM-64 (ms)	0,001	0,0025	0,006	0,015	0,025	0,04	0,068	0,12	
VEM-128 (ms)	0,001	0,0015	0,003	0,008	0,014	0,02	0,035	0,06	

*) all indications with 6 bar operational pressure

6 CONTROL VALVES

	<i>3/2-way solenoid valve EMV</i>	6.2
	<i>3/2-way impulse solenoid valve IMV</i>	6.4
	<i>3/2-way reversing valve UV</i>	6.6
	<i>3/2-way hand slide valve HSV</i>	6.8
	<i>2/2-way ball valve KV</i>	6.10
	<i>3/2-way ball valve KV</i>	6.12
	<i>Non-return valve RV</i>	6.14
	<i>Flow valve SV</i>	6.16
	<i>Flow valve SV(E)</i>	6.18
	<i>Touch valve TV</i>	6.20
	<i>Vacuum regulating valve VRV</i>	6.22
	<i>Foot interruptor FUB</i>	6.24

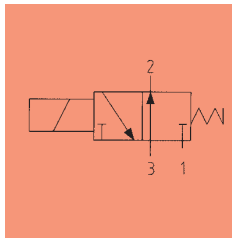
Description

Robust 3/2-way valve, directly controlled by spring resetting.

Solenoid valves are used where quick switching from suction to ventilation is required. The valve can additionally be admissioned with compressed air in order to accelerate the ventilation process (max. 1 bar overpressure - on connection 1). When without current, the valves are open (NO). This guarantees that the vacuum circuit is not ventilated in case of a power failure, and that engaged goods do not fall off at once. All valves can be completely delivered (with ventilation filter and hose nipples). Additionally a fixing yoke is included in EMV-3/2-R1/4.



Typee EMV-3/2-R1/4



Switching diagram



Typee EMV-3/2-R 1/2 to EMV-3/2-R1

Article numbers

Type	Valve complete 24 V (DC)	Valve complete 230 V (AC)	Valve 24 V (DC)	Valve 230 V (AC)	Replacement ventilation filter
EMV-3/2-R1/4	1.51.2.0051	1.51.2.0050	1.51.2.0053	1.51.2.0052	1.53.1.0004
EMV-3/2-R1/2	1.51.2.0015	1.51.2.0013	1.51.2.0016	1.51.2.0014	1.53.1.0003
EMV-3/2-R3/4	1.51.2.0019	1.51.2.0017	1.51.2.0020	1.51.2.0018	1.51.1.0008
EMV-3/2-R1	1.51.2.0023	1.51.2.0021	1.51.2.0024	1.51.2.0022	1.53.1.0009

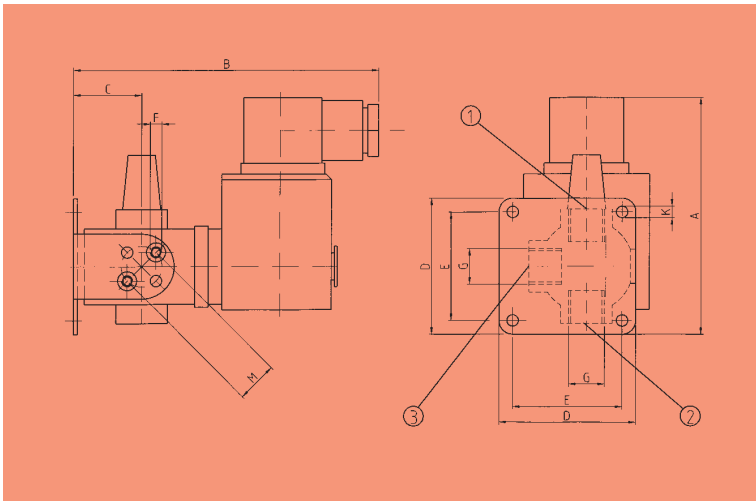
Technical Data

	EMV-3/2-R1/4	EMV-3/2-R1/2	EMV-3/2-R3/4	EMV-3/2-R1
Function	NO	NO	NO	NO
Mounting position	discretionary	discretionary	discretionary	discretionary
vacuum	max. 98 %	max 98 %	max. 98 %	max. 98 %
max. Pressure range (bar)	max. 1 bar	max. 1 bar	max. 1 bar	max. 1 bar
Nominal width	3,8	12	20	25
Flow (m ³ /h) ¹⁾	5	26	70	73
Switches (1/min)	60	300	70	70
Switching time open (ms)	30	40	160	160
Switching time close (ms)	30	25	100	100
Temperature range(°C)	+ 5 to + 80	+ 5 to + 80	+ 5 to + 80	+ 5 to + 80
Nominal voltage DC ²⁾	24 V	24 V	24 V	24 V
Nominal voltage AC ²⁾	230 V, 50 Hz	230 V, 50 Hz	230 V, 50 Hz	230 V, 50 Hz
Current consumption DC (A) ²⁾	0,41	0,76	1,7	1,7
Current consumption AC (A) ²⁾	0,04	0,16	0,16	0,16
Class of insulation	F	H	H	H
Protective system	IP 65	IP 65	IP 65	IP 65
Duty factor	100 %	100 %	100 %	100 %
electr. connection	Pg 11	Pg 9	Pg 9	Pg 9
Machine outlet	ISO 4400, Form P	DIN 43 650, Form A	DIN 43 650, Form A	DIN 43 650, Form A
Weight (kg)	0,52	1,0	5,6	5,4

1) Flow with $\Delta p = - 950 \text{ mbar}$

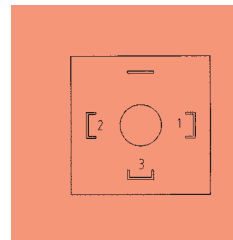
2) Special voltages on request

3/2-WAY-SOLENOID VALVE EMV

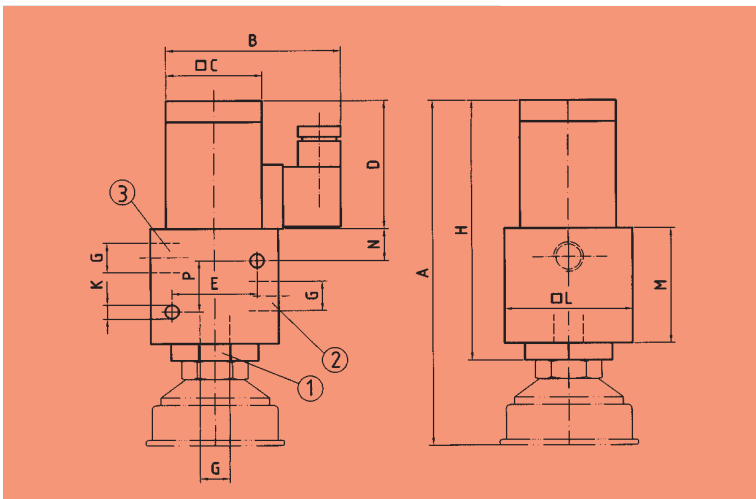


Solenoid valve EMV-3/2-R1/4

- 1 Ventilation filter
- 2 Suction plate
- 3 Vacuum pump



Connection DIN 43 650 with integrated LED and varistor



Solenoid valves EMV-3/2-R1/2 to EMV-3/2-R1

- 1 Ventilation filter
- 2 Suction plate
- 3 Vacuum pump

Advice:

Please mount a vacuum filter in front of the suction connection, to protect the valve from dirt particles. Please read chapter 8 "Filters and Accessories" for fitting vacuum filters!

Dimensions													
Type	A	B	C	D	E	F	G	H	K	L	M	N	P
EMV-3/2-R1/4	117	112	25	50	40	M 4	G 1/4"	---	4,3	---	15	---	---
EMV-3/2-R1/2	162	88,5	45	59,5	40	--	G 1/2"	121,5	6,5	60	62	14	25
EMV-3/2-R3/4	257	130	80	80	80	--	G 3/4"	206	9	100	118	30	45
EMV-3/2-R1	257	130	80	80	80	--	G 1"	206	9	100	118	30	45

Description

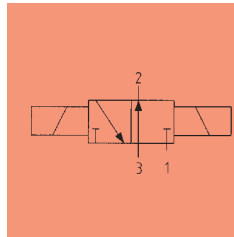
Robust 3/2-way valve, directly controlled with a permanent magnet.

Solenoid valves are used where quick switching from suction to ventilation is required. The valve can additionally be admissioned with compressed air in order to accelerate the ventilation process (max. 1 bar overpressure - on connection 1). Impulse magnetic valves are mainly used in bigger vacuum circuits, in which single suction plates have to be turned on and off. In case of a power failure the current switching condition remains, there is no change in switching.

All valves can be completely delivered (with ventilation filter and hose nipples).



Type IMV-R1/2



Switching diagram



Type IMV-3/2-R 3/4 to IMV-3/2-R1

Advice:

We recommend to mount in a vacuum filter in front of the suction connection, to keep dirt particles away from the valve. Please read chapter 8 "Filters and Accessories" for fitting vacuum filters!

Article numbers

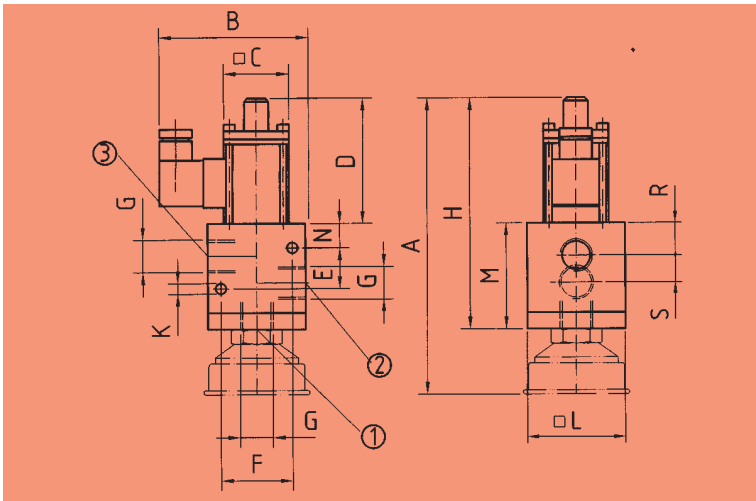
Type	Valve complete 24 V (DC)	Valve 24 V (DC)	Replacement ventilation filter
IMV-3/2-R1/2	1.51.2.0048	1.51.2.0047	1.53.1.0003
IMV-3/2-R3/4	1.51.2.0035	1.51.2.0036	1.53.1.0008
IMV-3/2-R1	1.51.2.0033	1.51.2.0034	1.53.1.0009

Valve complete, incl. hose nipples and sealing rings

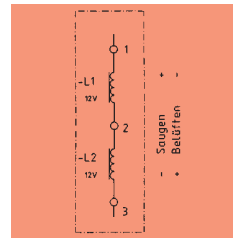
Technical Data	IMV-3/2-R1/2	IMV-3/2-3/4	IMV-3/2-R1
Function	NC	NC	NC
Mounting position	discretionary	discretionary	discretionary
Pressure range vacuum	max 98 %	max. 98 %	max. 98 %
max. pressure range (bar)	max. 1 bar	max. 1 bar	max. 1 bar
Nominal width	10	20	25
Flow (m ³ /h) ¹⁾	21	74	81
Switches (1/min)	30	20	20
Switching time open (ms)	20	45	45
Switching time close (ms)	20	45	45
Temperature range(°C)	+ 5 to + 60	+ 5 to + 60	+ 5 to + 60
Nominal voltage DC (V)	24	24	24
Current consumption DC (A)	1,2	4,5	4,5
Class of insulation	E	E	E
Protective system	IP 43	IP 43	IP 43
Duty factor	40 %	40 %	40 %
electr. connection	Pg 9	Pg 11	Pg 11
Machine outlet	DIN 43 650, Form A	terminal box	terminal box
Weight (kg)	1,1	6,5	6,5

1) Flow with Δp = - 950 mbar

3/2-WAY-IMPULSE SOLENOID VALVE IMV



- 1 Ventilation filter
- 2 Suction plate
- 3 Vacuum pump



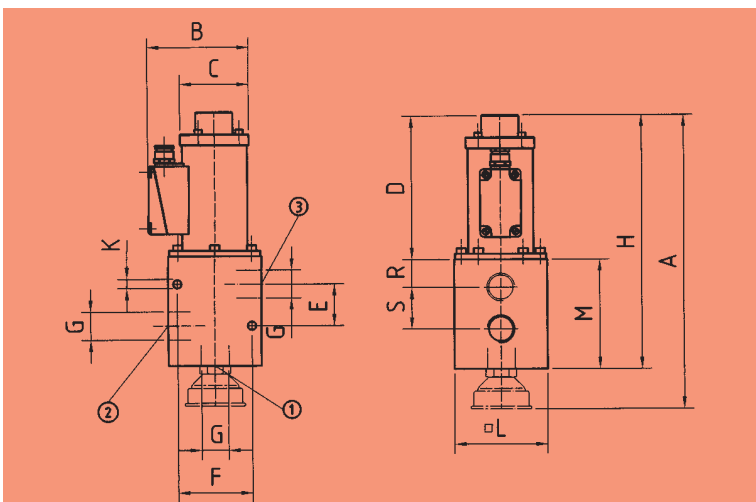
Connection DIN 43 650

- L1 Coil 1
- L2 Coil 2

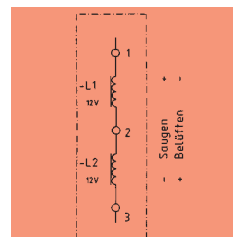
Control

- 1 + Suction
- 2 -
- 3 + Release

Impulse solenoid valve type 1/2"



- 1 Ventilation filter
- 2 Suction plate
- 3 Vacuum pump



Connection clipboard

- L1 Coil 1
- L2 Coil 2

Control

- | | Suction | Release |
|---|------------|---------|
| 1 | + | - |
| 3 | - | + |
| 2 | not in use | |

Polarized valve control!

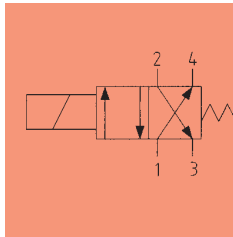
Impulsmagnetvalve Type 3/4" to 1"

6
Control valves

Dimensions														
Type	A	B	C	D	E	F	G	H	K	L	M	N	R	S
IMV3/2-R1/2	181	52	40	77	25	44	R 1/2"	142	5	60	65	15	20	16,5
IMV3/2-R3/4	315	106	40	155	43	80	R 3/4"	273	8,5	100	118	--	41	43
IMV3/2-R1	315	106	40	155	43	80	R 1"	273	8,5	100	118	--	41	43

Description

Reversing solenoid valve for vacuum blower. This valve is suitable for high volume streams as happen when using a blower. The valve makes it possible to switch from suction to ventilate without the necessity to change the blower's direction of rotation. This valve is not able to blow off.



Switching diagram



Reversing valve UV 4.40

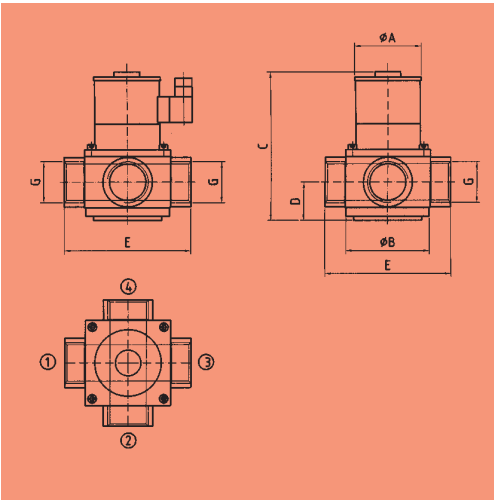
Article numbers

Type	Reversing valve
UV-4.40-24V	1.51.2.0039

Technical Data

	UV-4.40
Switchings (1/min)	120
Switching time open (ms) ¹⁾	20 - 50
Switching time close (ms) ¹⁾	20 - 50
Temperature (°C)	max. 70
Surrounding temperature (°C)	max. 40
Nominal voltage DC (V)	24
Duty factor	100 %
Current consumption DC (A)	1,6
Weight (kg)	4

1) Switching time depends on load applied



- 1 Tube (suction plate)
- 2 Pressure side
- 3 Outlet / Silencer
- 4 Suction side (blower)

Reversing valve UV 4.40

Dimensions						
Type	A	B	C	D	E	G
UV 4.40	78	98	174	45	148	G 1 1/2"

Description

Hand slide valve in 3/2-way version with two slide positions ("Suspend" and "Release").

Suitable for easy and safe vacuum controlling for vacuum load lifting devices and suction devices of any kind.

Robust suspension made of die-cast steel are available for mounting the manual slide valves.



Suspension for hand slide valve

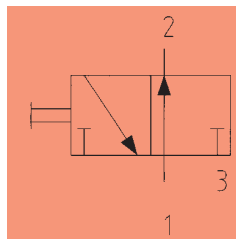


HSV-SK with safety catch



Hand slide valve HSV

- 1 Vacuum generator
- 2 Suction plate
- 3 Ventilation



Switching diagram

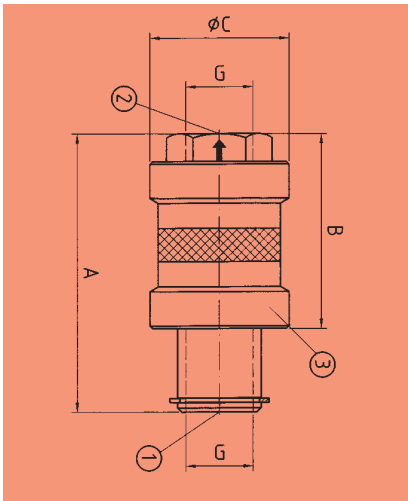
Article numbers

Type	Hand slide valve	suitable suspension
HSV-3/2-R1/4i	1.51.1.0004	2.51.1.0007
HSV-3/2-R3/8i	1.51.1.0007	2.51.1.0009
HSV-3/2-R1/2i	1.51.1.0002	2.51.1.0006
HSV-3/2-R1/2i-SK	1.51.1.0024	2.51.1.0006
HSV-3/2-R3/4i	1.51.1.0005	2.51.1.0008
HSV-3/2-R3/4i-SK	1.51.1.0025	2.51.1.0008

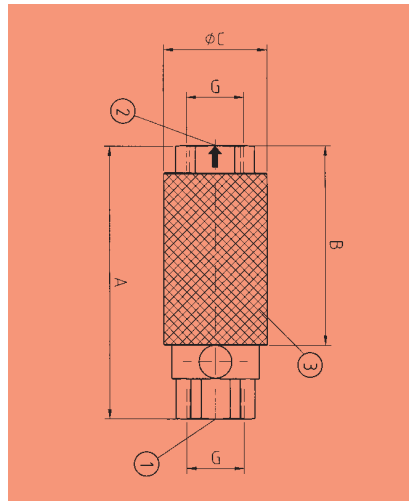
Technical Data

Type	Nominal width	Flow ¹⁾ (m ³ /h)	Weight (g)	Weight suspens. (g)
HSV-3/2-R1/4i	9	12	96	50
HSV-3/2-R3/8i	13	21	156	66
HSV-3/2-R1/2i	19	33	227	75
HSV-3/2-R1/2i-SK	16	29	251	75
HSV-3/2-R3/4i	26	59	368	118
HSV-3/2-R3/4i-SK	23	53	394	118

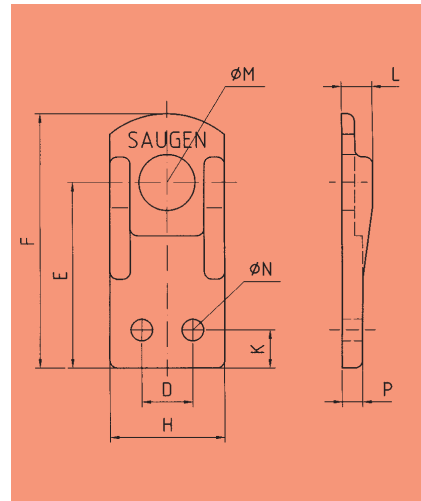
1) Flow with $\Delta p = - 950 \text{ mbar}$



3/2-way hand slide valve



Hand slide valve with safety catch



Suspensions for 3/2-way hand slide valve

Dimensions

Type	A	B	C	D	E	F	G	H	K	L	M	N	P
HSV-3/2-R1/4i	58	43	30	19	42	80	R 1/4"	35	15	10	14	8,5	8
HSV-3/2-R3/8i	70	52	35	20	60	100	R 3/8"	40	15	12	22	8,5	8
HSV-3/2-R1/2i	80	59	40	20	52	100	R 1/2"	45	15	12	22	8,5	8
HSV-3/2-R1/2i-SK	100	73	38	20	52	100	R 1/2"	45	15	12	22	8,5	8
HSV-3/2-R3/4i	100	70	50	35	62	120	R 3/4"	55	15	14	27	8,5	8
HSV-3/2-R3/4i-SK	125	85	52	35	62	120	R 3/4"	55	15	14	27	8,5	8

Description

Manually used (with hand lever) stop valve in 2/2-way version.

Suitable for turning on and off single suction cups and suction plates in vacuum circuits. The use is effectuated through a hand lever.

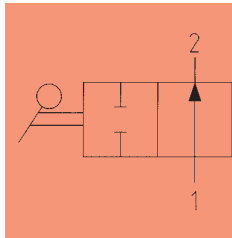
Type 1/4" to 1/2" with inner- / outer thread and leaf handle.

Type 3/4" and 1" with inner thread on both sides and hand lever.

1 Vacuum generator
 2 Suction plate



Type 1/4" and 1/2"



Switching diagram



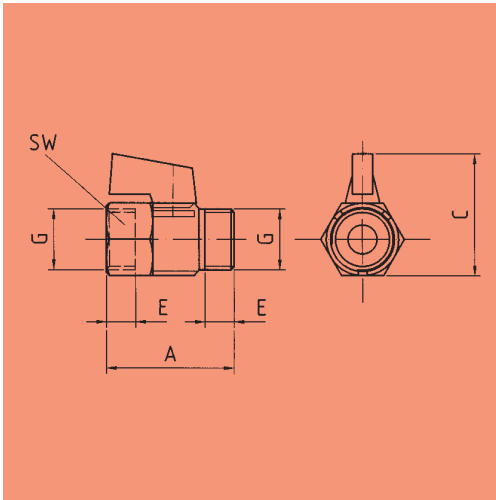
Type 3/4" and 1"

Article numbers

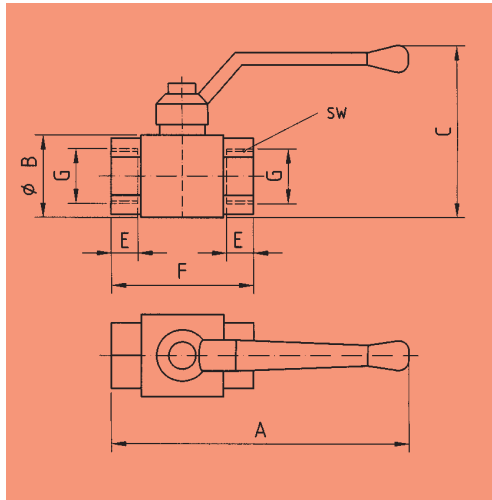
Type	2/2-way ball valve
KV-2/2-R1/4	1.51.1.0011
KV-2/2-R3/8	1.51.1.0008
KV-2/2-R1/2	1.51.1.0009
KV-2/2-R3/4	1.51.1.0014
KV-2/2-R1	1.51.1.0012

Technical Data			
Type	Nominal width	Flow ¹⁾ (m ³ /h)	Weight (g)
KV-2/2-R1/4	12	25	67
KV-2/2-R3/8	14	26	67
KV-2/2-R1/2	19	40	94
KV-2/2-R3/4	24	80	341
KV-2/2-R1	30	88	600

1) Flow with $\Delta p = - 950 \text{ mbar}$



2/2-way ball valves KV2/2-R1/4 to KV2/2-R1/2



2/2-way ball valves KV2/2-R3/4 to KV2/2-R1

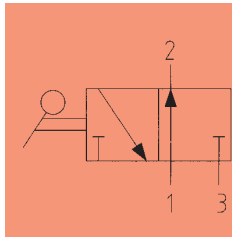
Dimensions							
Type	A	B	C	E	F	G	SW
KV-2/2-R1/4	39	--	37	8	--	R 1/4"	21
KV-2/2-R3/8	41	--	37	8	--	R 3/8"	21
KV-2/2-R1/2	45	--	42	10	--	R 1/2"	25
KV-2/2-R3/4	120	38	67	18	72	R 3/4"	32
KV-2/2-R1	136	48	90	21	85	R 1"	40

Description

Switch valve in 3/2-way version for manual use (with hand lever).

Suitable for turning on and off individual suction cups / plates in vacuum circuits. The operation is effectuated with a hand lever. The suction cup/plate can be ventilated through connection 3.

We recommend the mounting of a ventilation filter (please read chapter 8 "Filters and Accessories").



Switching diagram

- 1 Vacuum generator
- 2 Suction plate
- 3 Ventilation



3/2-way ball valve

Article numbers

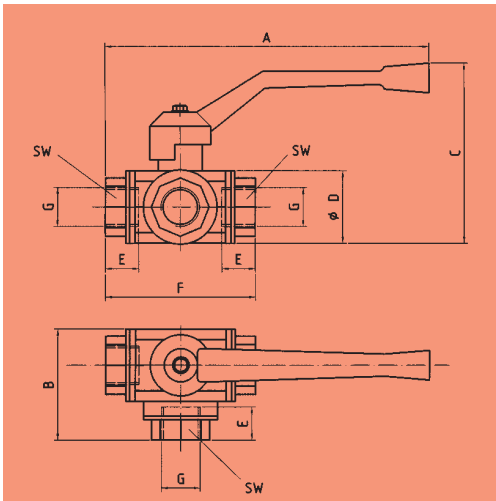
Type	3/2-way ball valve	suitable ventilation filter
KV3/2-R1/2	1.51.1.0018	1.53.1.0003
KV3/2-R3/4	1.51.1.0021	1.53.1.0008
KV3/2-R1	1.51.1.0016	1.53.1.0009

Technical Data

Type	Nominal width	Flow ¹⁾ (m ³ /h)	Weight (kg)
KV3/2-R1/2	19	33	0,75
KV3/2-R3/4	24	58	1,25
KV3/2-R1	30	94	1,9

1) Flow with $\Delta p = - 950 \text{ mbar}$

3/2-WAY BALL VALVE KV



3/2-way ball valve

Dimensions								
Type	A	B	C	D	E	F	G	SW
KV-3/2-R1/2	174	63	100	39	14	81	G 1/2"	29
KV-3/2-R3/4	216	75	120	47	14	92	G 3/4"	34
KV-3/2-R1	258	86	133	54	17	107	G 1"	41

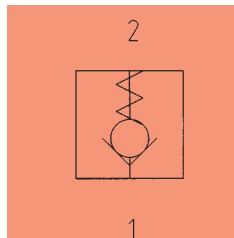
Description

Spring-loaded non-return valve in short version outer thread on both sides (type 1/4") or inner / outer thread (type 1/2"). Suitable for mounting between vacuum generator and vacuum tank or in distributor lines. When turning off the vacuum generator or in case of power failure the valve closes and prevents ventilation of the vacuum tank. Absolutely necessary for vacuum generators with vacuum-controlled motor switching units! Discretionary mounting possible!

Housing: Brass
 Sealing: EPDM
 Spring: Stainless steel



Rückschlagvalve RSV-K



Switching diagram



Non-return valve RSV

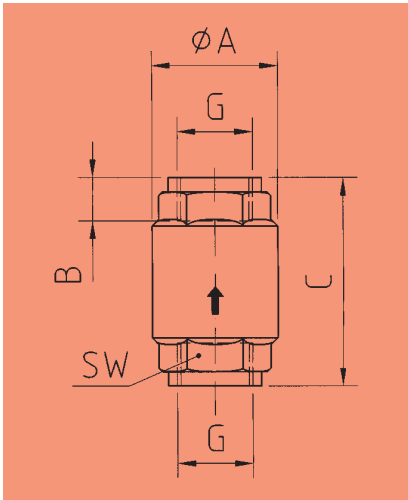
- 1 Tank
- 2 Vacuum generator

Article numbers

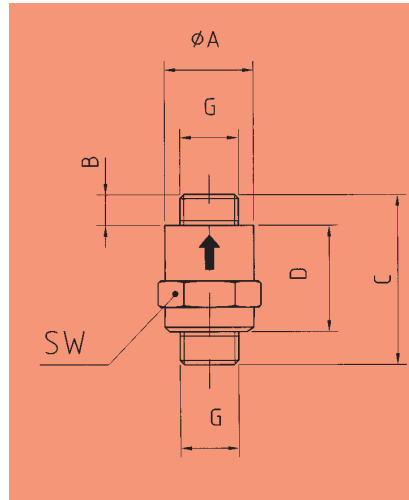
Type	
RSV-K-R1/4	1.51.4.0002
RSV-R1/4	1.51.4.0004
RSV-R3/8	1.51.4.0008
RSV-K-R1/2	1.51.4.0001
RSV-R1/2	1.51.4.0003
RSV-R3/4	1.51.4.0007
RSV-R1	1.51.4.0006

Technical Data	SV-K-R1/4	RSV-R1/4	RSV-R3/8	RSV-K-R1/2	RSV-R1/2	RSV-R3/4	RSV-R1
	Pressure range vacuum	max. 98 %	98%	98%	max 98 %	98%	98%
max. pressure range (bar)	max. 25	16	25	max. 25	25	25	25
Opening pressure (bar)	0,02	0,1	0,02	0,02	0,02	0,02	0,02
Temperature range (°C)	-10 / 100	-10 / 110	-15 / 110	-10 / 100	-15 / 110	-15 / 110	-15 / 110
Nominal width	8	8	8	12	12	16	22
Flow (m ³ /s) ¹⁾	9	14	24	32	41	52	85
Weight (kg)	0,042	0,1	0,177	0,058	0,193	0,284	0,414

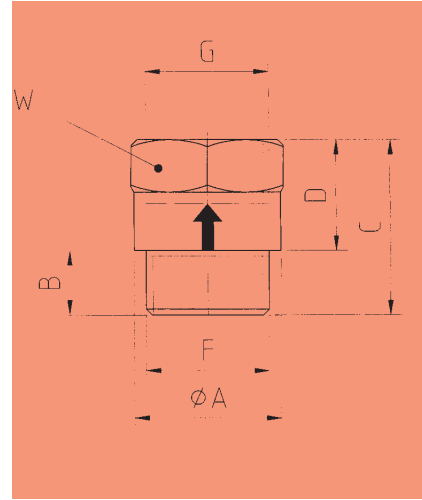
1) Flow with Δp = - 950 mbar



Non-return valves RSV-R1/4 to RSV-R1, long design



RSV-K-R1/4, short design



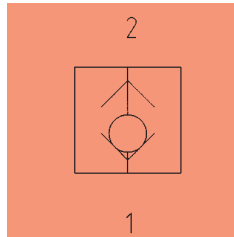
RSV-K-R1/2, short design

Dimensions

Type	A	B	C	D	F	G	SW
RSV-K-R1/4	20	7	38	24	--	G 1/4"	20
RSV-R1/4	22	12	45	---	---	R 1/4"	22
RSV-R3/8	34,5	10	54	---	---	R 3/8"	23
RSV-K-R1/2	25	11	30	19	G 1/2"	G 1/2"	26
RSV-R1/2	34,5	10	57	---	---	R 1/2"	27
RSV-R3/4	41,5	12	64	---	---	R 3/4"	33
RSV-R1	48	14,5	75	---	---	R 1"	40

Description

Robust flow valves made of steel with a low height, ideal for mounting on suction heads and suction plates with central vacuum supply. These flow valves are only intended to be fitted in a vertical position. Unused suction heads / suction plates will be automatically closed via the flow valves, thus ensuring that the vacuum is built up and that the vacuum system is securely sealed off.



Switching diagram

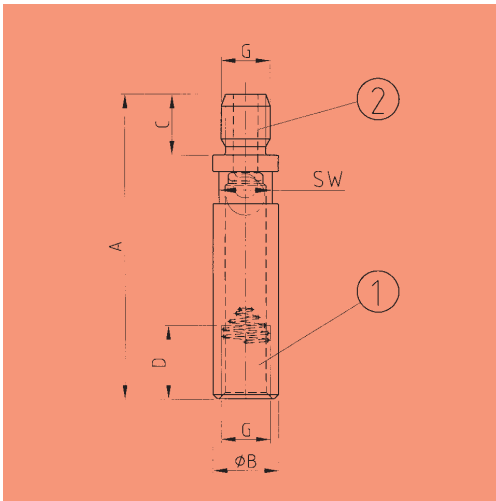
- 1 Suction plate
- 2 Vacuum generator



Flow valves SV-M12 - SV M16

Article numbers					
Conn. M12	Part No:	Conn. R1/4"	Part no:	Conn. M16	Part no:
SV-M12-K6	1.51.6.0002	SV-R1/4-K6	1.51.6.0036	SV-M16-K8	1.51.6.0010
SV-M12-K7	1.51.6.0003	SV-R1/4-K7	1.51.6.0037	SV-M16-K9	1.51.6.0011
SV-M12-K8	1.51.6.0004	SV-R1/4-K8	1.51.6.0038	SV-M16-K10	1.51.6.0006
SV-M12-K9	1.51.6.0005	SV-R1/4-K9	1.51.6.0039	SV-M16-K11	1.51.6.0007
				SV-M16-K12	1.51.6.0008
				SV-M16-K13	1.51.6.0009

Technical Data						
Type	Weight (kg)	Suction required for closing (m ³ /h)	Throughflow during ventilation (m ³ /h)	Installation position	Max. Tensile load (N)	Max. Bending mom. (Nm)
SV-M12-K6	0,05	6	10	vertical	2.000	8,5
SV-M12-K7	0,05	3,5	10	vertical	2.000	8,5
SV-M12-K8	0,05	2,5	10	vertical	2.000	8,5
SV-M12-K9	0,05	1	10	vertical	2.000	8,5
SV-R1/4-K6	0,05	8,5	12,5	vertical	3.000	10
SV-R1/4-K7	0,05	8	12	vertical	3.000	10
SV-R1/4-K8	0,05	7	11	vertical	3.000	10
SV-R1/4-K9	0,05	4,5	10	vertical	3.000	10
SV-M16-K8	0,1	20	22	vertical	5.000	20
SV-M16-K9	0,1	18	22	vertical	5.000	20
SV-M16-K10	0,1	15	22	vertical	5.000	20
SV-M16-K11	0,1	9,5	22	vertical	5.000	20
SV-M16-K12	0,1	6	22	vertical	5.000	20
SV-M16-K13	0,1	2,5	22	vertical	5.000	20



Flow valves SV M12, SV R1/4 and SV M 16

How flow valves works

A ball closes the suction line if the volume stream becomes too large.

When engaging a load the volume stream is too small to enable the ball to get into closing position.

If the suction cup is not in use and false air is sucked in the volume stream becomes so large inside the suction line that the ball is drawn against the sealing and the line is closed. False air no longer enters the suction circuit and the vacuum can build up.

Dimensions						
Type	A	B	C	D	G	SW
SV-M12-K6	75	16	15	18	M 12	13
SV-M12-K7	75	16	15	18	M 12	13
SV-M12-K8	75	16	15	18	M 12	13
SV-M12-K9	75	16	15	18	M 12	13
SV-R1/4-K6	75	16	15	18	R 1/4"	13
SV-R1/4-K7	75	16	15	18	R 1/4"	13
SV-R1/4-K8	75	16	15	18	R 1/4"	13
SV-R1/4-K9	75	16	15	18	R 1/4"	13
SV-M16-K8	78	20	18	22	M 16	17
SV-M16-K9	78	20	18	22	M 16	17
SV-M16-K10	78	20	18	22	M 16	17
SV-M16-K11	78	20	18	22	M 16	17
SV-M16-K12	78	20	18	22	M 16	17
SV-M16-K13	78	20	18	22	M 16	17

Note:

We definitely recommend suction tests before deciding which flow valves to use, as the flow conditions and therefore also the existing pressure conditions at the suction heads and/or suction plates change in accordance with the vacuum distribution system!

Description

Flow valves in steel- or brass version.

Flow valves are used to automatically turn off individual suction plates, when goods with different sizes have to be transported while the order of the suction cups / plates has to remain the same. Suction cups / plates that are not used, are automatically closed through the flow valves and guarantee a safe creation of the vacuum.

A red ball in the monitoring area of the flow valve SV-R1/2-VW indicates whether the valve is open or closed.

Especially suitable for optical control of individual suction plates in vacuum load lifting processes. The user can see at once, which suction plates are in use.



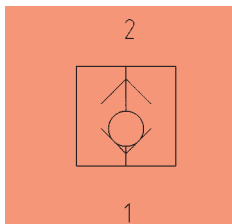
Flow valve with Viewing Window



Flow valves SV-R1/2 - R3/4



Flow valve SVE-R3/4 with adjustable features



- 1 Suction cup
- 2 Vacuum generator

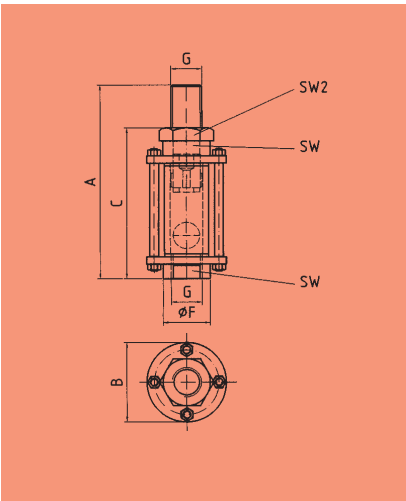
Switching symbol flow valves

Article numbers

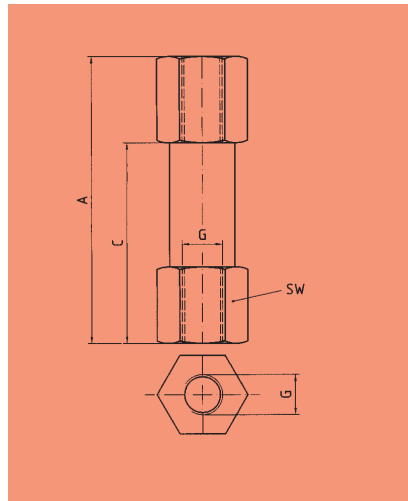
Type	Part No:
SV-R1/2-VW	1.51.6.0018
SV-R1/2	1.51.6.0019
SV-R3/4	1.51.6.0040
SVE-R3/4	1.51.6.0001

Technical Data				
Type	Weight (kg)	Nominal width	Flow ¹⁾	Mounting position
			dur. ventilation (m ³ /h)	
SV-R1/2-VW	0,52	15	9,3	senkrecht
SV-R1/2	0,93	18	42	senkrecht
SV-R3/4	0,86	24	54	senkrecht
SVE-R3/4	0,25	16	26	beliebig

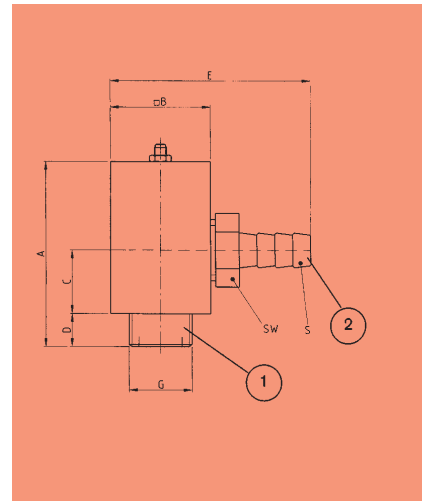
1) Flow with $\Delta p = - 950 \text{ mbar}$



SV-1/2-VW



SV-1/2 and SV-3/4



SVE-3/4

Dimensions

Type	A	B	C	D	E	F	G	SW (S)	SW 2
SV-R1/2-VW	150	--	103	--	--	32	R 1/2"	27	32
SV-R1/2	150	--	105	--	--	--	R 1/2"	41	--
SV-R3/4	150	--	105	--	--	--	R 3/4"	41	--
SVE-R3/4	78	40	27	12	84	--	R 3/4"	1/2"	27

Advice:

To determine the right valve size try-outs are recommended.

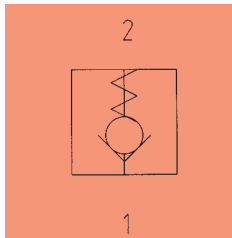
Description

Tastvalvee in verzinkter Stahlausführung zum Einschrauben in Saugplatten mit zentralem Vakuumanschluß. Die Tastvalvee öffnen beim Aufsetzen der Saugplatte auf ein Werkstück automatisch und sorgen für den Aufbau des Vakuums an den aufliegenden Saugplatten. Durch einen voreilenden Taster, der durch Federrückstellung das Valve geschlossen hält, wird das Valve angesteuert.

Das Tastvalve TV 11/4 besitzt eine sehr großen Durchsatz und eignet sich für Anwedungen bei denen Vakuumgebläse zum Einsatz kommen.



TV-R 11/4 für Gebläse



Schaltsymbol Tastvalve



Tastvalve TV-M12 to TV-M16

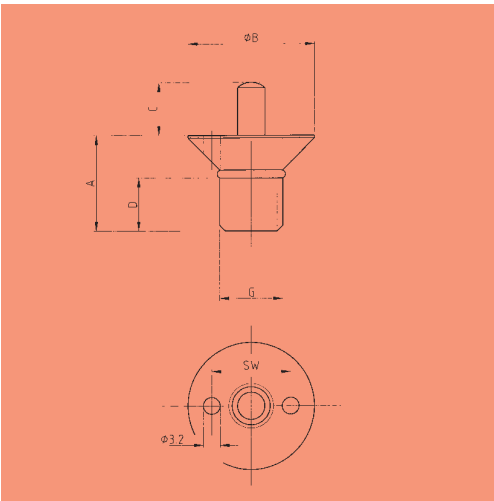
- 1 Saugplatte
- 2 Saugplattenaufnahme

Article numbers

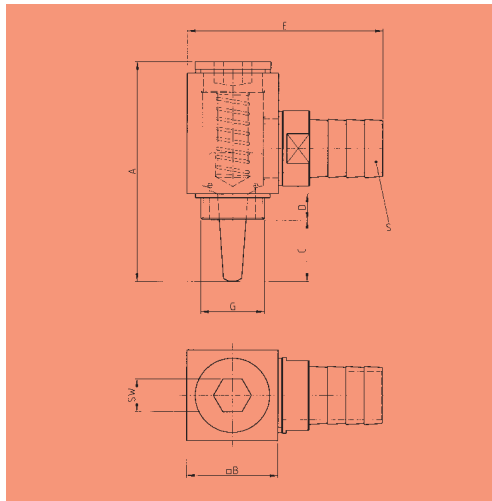
Art.-Nr:	
TV-M12	1.51.5.0002
TV-M16	1.51.5.0003
TV-R11/4"	1.51.5.0005

Technical Data

Type	Weight (kg)	max. Eigenhub (AW) Saugplatte	Durchfluß m ³ /h beim Belüften	Einbaulage
TV-M12	0,02	8	max. 12	beliebig
TV-M16	0,05	13	max. 18	beliebig
TV-R11/4"	0,85	35	max. 67	beliebig



Touch valves TV-M12-SAS and TV-M16-SAS



Touch valve TV-M16-SAK

Dimensions								
Type	A	B	C	D	E	G	S	SW
TV -M12	18	24	10		---	M 12	---	15
TV-M16	37,5	30	12,5	17,5	---	M 16	---	15
TV-R11/4"	146	60	41	17	131	R 11/4"	38	22

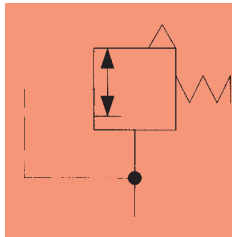
Advice:

When using touch valves please pay attention that the suction plates in use fully cover the work piece as otherwise leakages inside the vacuum system occur.

Description

Robust regulating valve in brass version with adjusting screw.

With these vacuum-regulating valves you can, independent from the used vacuum generators, adjust the needed vacuum in the vacuum circuit. Because of the stepless adjusting possibilities a very exact and easy adjusting of the required vacuum is possible. For the optical vacuum-control we recommend vacuum gauges or digital underpressure switches.



Switching diagram



Vacuum regulating valves VRV-R1/2 and VRV-R3/4

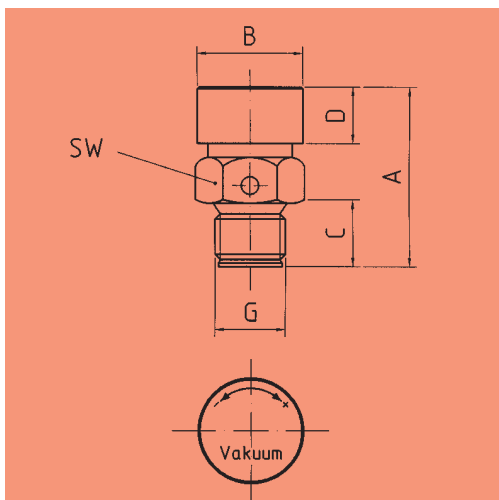
Article numbers

Type	Vacuum regul. valve
VRV-R1/2	1.51.7.0001
VRV-R3/4	1.51.7.0002

Technical Data

	VRV-R1/2	VRV-R3/4
Vacuum range (% Vac.)	0 to 98%	0 to 98%
Precision (% Vac.)	+/- 2,5%	+/- 2,5%
Temperature range(°C)	10 to 50	10 to 50
Nominal width	18	24
max. flow (m ³ /h) ¹⁾	8	18
Weight (kg)	0,125	0,21

1) Flow with Δp = - 950 mbar



Vacuum regulating valves VRV-R1/2 and VRV-R3/4

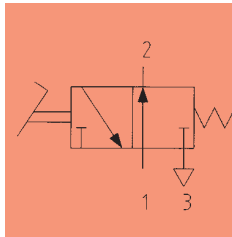
Dimensions						
Type	A	B	C	D	G	SW
VRV-R1/2	51	30	18	16	R 1/2"	27
VRV-R3/4	54	40	18,5	15	R 3/4"	32

Description

Foot interruptor in 3/2-way version with spring reset.

Suitable for suction devices and work stands, in which the vacuum has to be controlled by foot. Due to safety reasons and to prevent unwanted use, the foot interruptor is furnished with a steel hood. The starting position of the valve is open and when used ventilates the vacuum circuit.

FUB-R1/4: In the starting position the valve is open and ventilates when operated



Switching diagram



Foot interruptor with safety hood viewed from the front

Article numbers

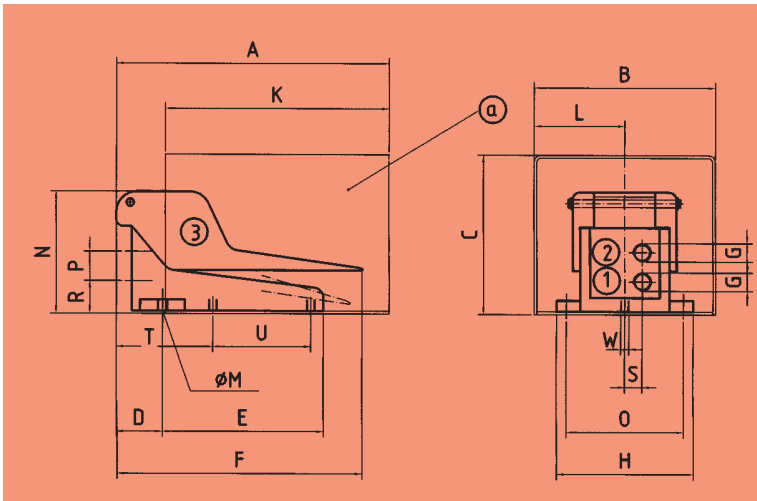
Type

FUB-R1/4	1.51.1.0001
----------	-------------

Technical Data

	FUB-R1/4
Pressure range (bar)	-1 to 10
Temperature range (°C)	- 10 to + 60
Nominal width	7
Flow (m³/h) ¹⁾	6
Weight (kg)	1,23

1) Flow with $\Delta p = - 950 \text{ mbar}$



- a Safety hood
- 1 Vacuum generator
- 2 Suction plate
- 3 Ventilation

3/2-way foot interruptor FUB-R1/4 with safety hood

Dimensions																				
Type	A	B	C	D	E	F	G	H	K	L	M	N	O	P	R	S	T	U	W	X
FUB-R1/4	195	130	114	33	106	176	R 1/4"	98	160	65	6,5	85,5	84	21	23,5	12,5	69	70	M 6	74,4

7

VACUUM SUPERVISION

	<i>Vacuum switch electronic VSE</i>	7.4
	<i>Vacuum switch digital VSD 1/8</i>	7.6
	<i>Vacuum switch digital VSD 1/4</i>	7.8
	<i>Vacuum switch electronic Mini VSEM</i>	7.10
	<i>Vacuum switch mechanical VSM</i>	7.12
	<i>Vacuum switch pneumatical VSP</i>	7.14
	<i>Pressure switch electronic DSE</i>	7.16
	<i>Pressure switch digital DSD</i>	7.18
	<i>Outlet cable</i>	7.20
	<i>Vacuum gauge VM</i>	7.22
	<i>Electric warning unit EW</i>	7.24

Description

Vacuum switches are used to supervise and control vacuum circuits. While vacuum gauges only display the existing operational vacuum can vacuum switched be used both for supervision and control of:

- several vacuum circuits
- vacuum-dependant motor control of vacuum pumps
- Control of warning and supervision units, etc.

Vacuum switches have various functions:

Function and performance of vacuum and pressure switches				
Criteria:	mechanical	electronical	digital	pneumatical
Mounting position:	discretionary	discretionary	discretionary	discretionary
Measuring medium:	Air, oil, petrol	non-aggressive gases, oil-free, dry air		
Measurement ranges: bar	- 1 to 1	-1 to 10	-1 to 10	- 0,75 to 0,35
Display:	---	---	digital	---
Overpressure safety: bar	10	up to 16	up to 16	2
Switching:	NO, NC	PNP, NPN	PNP, NPN	NO, NC
Switching exits:	analogous	analogous, digital	analogous, digital	pneumatical
Condition display:	via connection plug	via diode	via diode	---
Reaction time:	< 20 ms	< 5 ms	< 5 ms	< 35 ms
Switching times: 1/min	200	200	200	30
Hysteresis:	5 - 20 %	2%, adjustable	2%, adjustable	10 %
Repetitive accuracy:	+/- 5 %	+/- 1 %	+/- 1 %	+/- 3 %
Voltage: V	250	18 - 32	18 -32	---
Power: A	5	< 0,05	< 0,05	---
Temperature ranges: °C	-20 to +100	- 10 to + 60	- 10 to + 60	0 to 80
Safety classes:	IP 55	IP 65	IP 65	---
Performances:	Mechanical	Piezo-Quarz-	Piezo-Quarz	Mechanical
	membrane with	technology with	technology with	membrane with
	adjustable	adjustable	programmable	adjustable
	switching point	switching point	switching points	switching point

VS(E) - 1/4 - 3PNP - M8

Cable connection:

- AK Connection wire connected
- PS Connection for pneumatic cable
- M8 Connection thread M8 for separate cable
- SK separate cable for direct connection to plug

Switching exit:

- A Analogous switching exit
- PNP Switching condition against +
- NPN Switching condition against -
- NO normal open
- NC normal closed
- ... % Switching point chaltpunkt in %-Vakuum (z.B. 60%)

Vacuum connection:

- AF Connection flange
- AS Connection pipe
- 1/8 A Connection thread R 1/8", outside thread
- 1/8 I Connection thread R 1/8", inside thread
- 1/4 A Connection thread R 1/4", outside thread
- 1/4 I Connection thread R 1/4", inside thread

Design, function:

- M mechanical
- P pneumatical
- E electronical
- D digital
- ...M Miniature design
- ...K Kutoche design

Switch type:

- VS Vacuum switch
- DS Pressure switch

Pressure area (bar)

- 1 to 1
- 0 to 10

Description

Accurate and robust electronical vacuum switch with Piezo-Quarz-technology.
 Elektronical vacuum switches are used to control vacuum switching circuits. The stepless adjustment possibilities of switching point and hysteresis by potentiometer allow to set very exact ratings to optimize cycle times.
 The vacuum switches are delivered with all required accessories (ventilation nipple, screws and o-rings). The flange design enclues fixing brackets with screws.



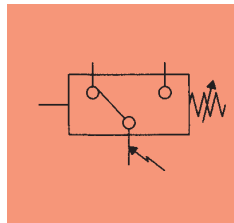
VSE-AF4PNP-M8



Fixing set



Vacuum switch, electronical VSE-R1/8-4PNP-M8



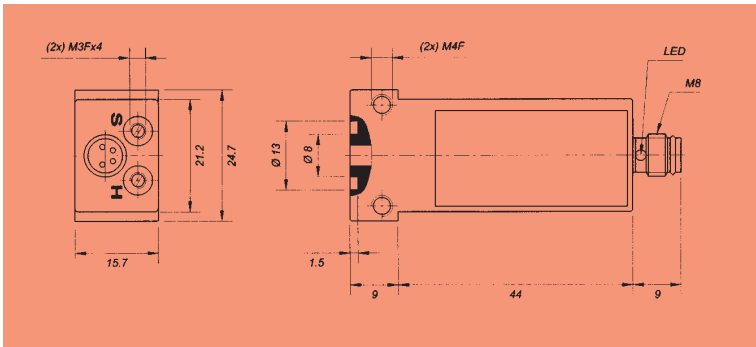
Switching symbol

Article numbers

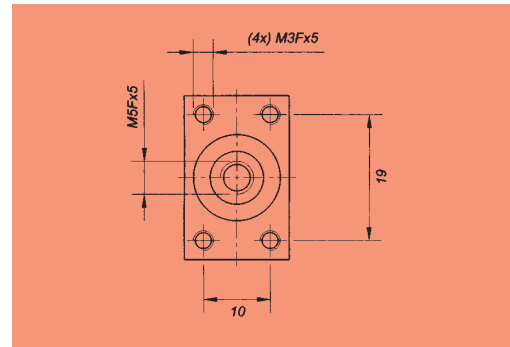
Type	Part No:
VSE-AF-4PNP-M8	1.52.3.0010
VSE-AF-4NPN-M8	1.52.3.0009
VSE-1/8-4PNP-M8	1.52.3.0012
VSE-1/8-4NPN-M8	1.52.3.0011

Technical Data

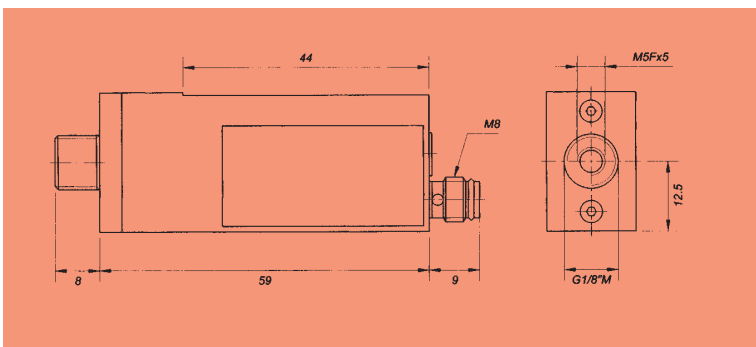
Type	VSE-AF-...	VSE-1/8-...
Mounting position	discretionary	discretionary
Measuring medium:	dry, oilfree air, non-aggressive gasses	dry, oilfree air, non- aggressive gasses
Measuring range	- 1 to 0 bar	- 1 to 0 bar
Overpressure safety	5 bar	5 bar
Voltage	10,8 to 30 (V) DC	10,8 to 30 (V) DC
Allowed peak stress	400 VP, 1µs	400 VP, 1µs
Own power consumption	< 20 mA	< 20 mA
Switching exit	normal open (N.O.) max. 125mA, 30V	normal open (N.O.) max. 125mA, 30V
Switching	PNP / NPN	PNP / NPN
Analogous exit	1 to 5V DC +/-0,04	1 to 5V DC +/-0,04
Electrical connection	4-pin M 8 plug connection	4-pin M 8 plug connection
Display	LED in plug connection	LED in plug connection
Reaction time	< 5 ms	< 5 ms
Repetitive accuracy	± 1 %	± 1 %
Hysteresis H	3 to 20% at -0,3 to -1bar	3 to 20% at -0,3 to -1bar
Allowed humidity	35 to 85 % RH	35 to 85 % RH
Safety type	IP 65 (w/o ventilation IP 40)	IP 65 (w/o ventilation IP40)
Temperature range°C	0 to + 50 °C	0 to + 50 °C
Weight	43 g	30 g



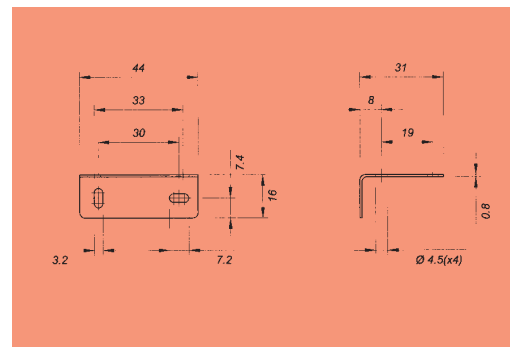
Vacuum switches with flange connection AF



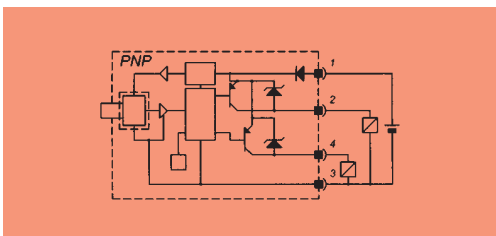
Connection dimensions vakuu switch AF



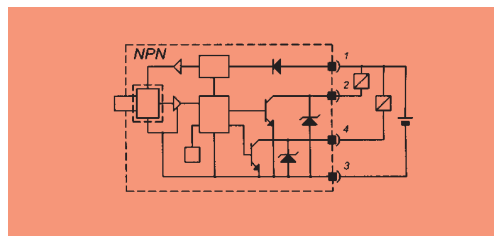
Vacuum switch with connection thread R1/8"



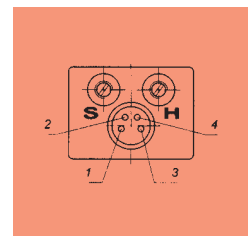
Fixing bracket for underpressure switch flange design (AF)



Switching diagram PNP, 4-PIN



Switching diagram NPN, 4-PIN



Plug connection 4 pin

Overview of fitting cable connections

Type	Connection	Exit	Pins	Length	Material	Part-No
AK-M8-4P-2M PVC	plug	straight	4	2 m	PVC	1.52.4.0001
AK-M8-4P-5M-PUR	plug	straight	4	5 m	PUR	1.52.4.0003
AK-M8-4P-5M-PUR-90	plug	90°	4	5 m	PUR	1.52.4.0004

Plug connection 4 pin

(EN 50044)

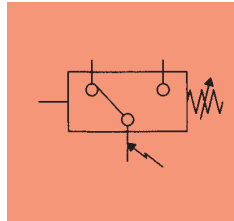
- 1 V+ (brown)
- 2 Analogous exit (white)
- 3 V- (blue)
- 4 Switching exit (black)

Description

Elektronic vacuum switch with Piezo-Quarz-technology and digital display.
 The digital vacuum switches show an extremely high accuracy and a variety of adjustment possibilities. Two independently working switching exits with differing hystereses can be programmed. The set rates can be secured by code against accidental re-adjustment; all parameters can be set independent of the system pressure. The vacuum switches are especially suitable in robot, packing and automation technology.



Type VSDK-4PNP-R1/8



Switching symbol



Type VSD-1/4-4PNP-M8

Article numbers

Type	Vacuum switch	Fixing frame
VSD-1/8-4PNP-M8	1.52.3.0003	
VSD-1/8-4NPN-M8	1.52.3.0002	
VSDK-1/8-4PNP-M8	1.52.3.0007	2.52.3.0001
VSDK1/8-4NPN-M8	1.52.3.0006	2.52.3.0001

Delivery includes:

- 1 ventilation nipple M 3 for hose $d_j = 3$
- 1 o-ring for ventilation nipple M 3

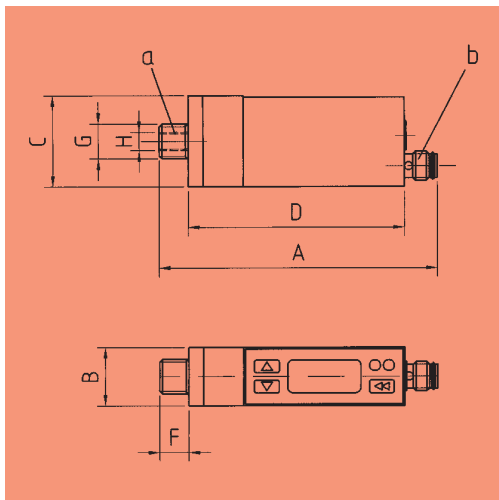
only on UDSD-1-0-K:

- 1 closing plug G 1/8"
- 1 fixing bracket horizontal
- 1 fixing bracket vertical

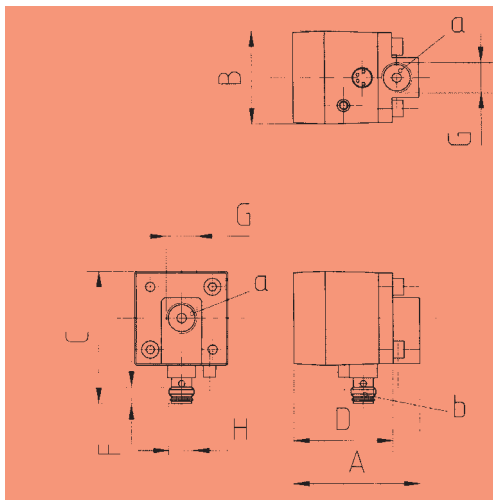
Technical Data

Type	VSD-.../VSDK-...
Mounting position	discretionary
Measuring medium	dry, oilfree air, nicht aggressive Gase
Measuring range	- 1 to 0 bar
Overpressure safety:	5 bar
Voltage	10,8 to 30 V (DC)
Power consumption	< 55 mA
Switching exit	2 x adjustable to either N.O. or N.C. max. 125mA, 30V with current limit
Mode:	either hysteresis or comparator
Programming	peak and basic setting
Settings	display option, parameter, locking
Switching	PNP / NPN
Electrical Connection	4-pin M 8 plug connection or integrated cable
Reaction time	< 5 ms
Repetitive accuracy	± 1 %
Allowed humidity	35 to 85 % RH
Safety type	IP 65 (w/o ventilation hose IP 40)
Temperature range °C	0 to + 50 °C
Weight	35 g

VACUUM SWITCH DIGITAL VSD-1/8



Vacuum switch VSD-R1/8...

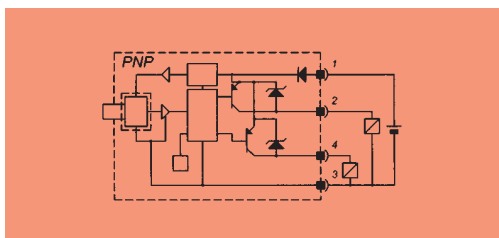


Vacuum switch VSDK...

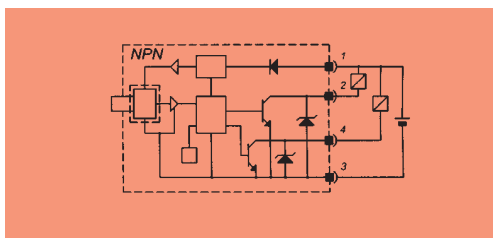
a Vacuum connection
 b Voltage connection

Dimensions

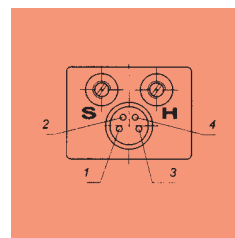
Type	A	B	C	D	E	F	G	H
VSD-1/8...	76	16	25	59	---	8	G 1/8"	M 5
VSDK...	40	30	42,2	31,5	6,7	5	G 1/8"	M 8



Switching diagram PNP, 4-PIN



Switching diagram NPN, 4-PIN



Plug connection 4 pin

7
 Vacuum supervision

Overview of fitting cable connections

Type	Connection	Exit	Pins	Length	Material	Part No.
AK-M8-4P-2M-PVC	plug	straight	4	2 m	PVC	1.52.4.0001
AK-M8-4P-5M-PUR	plug	straight	4	5 m	PUR	1.52.4.0003
AK-M8-4P-5M-PUR-90	plug	90°	4	5 m	PUR	1.52.4.0004

Plug connection 4 pin (EN 50044)

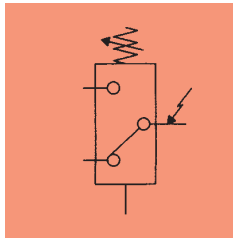
- 1 V+ (brown)
- 2 Analogous exit (white)
- 3 V- (blue)
- 4 Switching exit (black)

Description

Elektronical vacuum switch with Piezo-Quarz technology and digital display. The digital vacuum switches show an extremely high accuracy and a variety of adjustment possibilities. Two independently working switching exits with differing hystereses can be programmed. The set rates can be secured by code against accidental re-adjustment; all parameters can be set independent of the system pressure. The vacuum switches are especially suitable for vacuum load lifting devices with several, independently working vacuum circuits.



VSD-1/4 w/o connection cable



Switching symbol



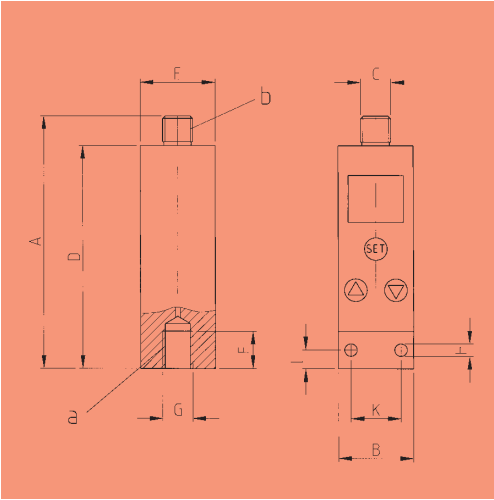
VSD-1/4 with connection cable

Article numbers

Type	without connection cable	with connection cable	conn. cable 90°
VSD-1/4-4PNP	1.52.3.0019	1.52.3.0018	1.52.4.0008

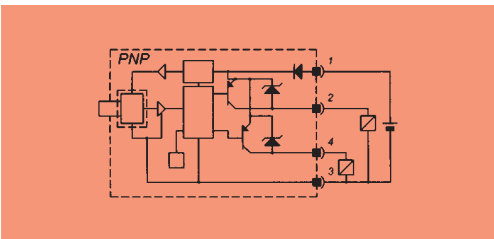
Technical Data

Type	VSD-1/4-3PNP-M8
Mounting position	discretionary
Measuring medium	dry, oilfree air, non-aggressive gasses
Measuring range	-1 to + 1 bar
Overpressure safety:	10 bar
Voltage	10 to 32 V (DC)
Power consumption	< 50 mA allowed power
Switching exit	1 x adjustable N.O. or N.C. max. 1A, 24V
Mode	hysteresis mode
Programming	peak and basic setting
Settings	display option,, locking
Switching	PNP
Elektric connection	3-pin + PE (DIN 43650)
Reaction time	< 5 ms
Repetitive accuracy	± 0,2 %
Allowed humidity	---
Safety type	IP 65
Temperature range °C	-10 to + 60 °C
Weight	160 g

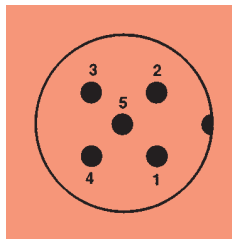


Vacuum switch VSD-1/4

Dimensions										
Type	A	B	C	D	E	F	G	H	K	L
VSD-1/4	102	30	M12x1,5	90	30	15	G 1/4"	5	20	7,5



Switching diagram VS-D-1/4-...



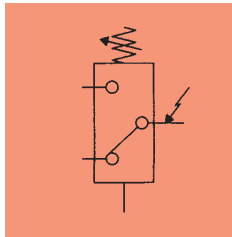
Connection M 12x1

Pinbelegung

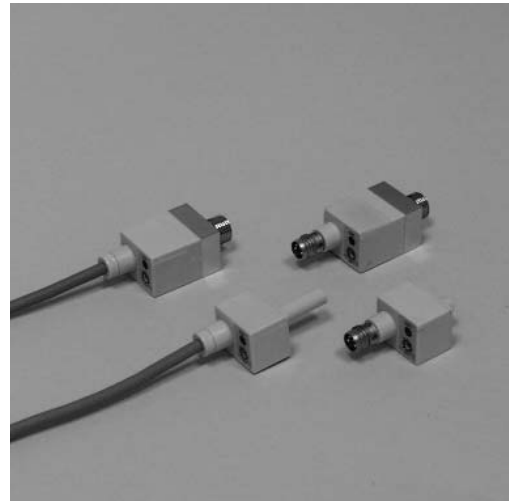
- 1 brown, V +
- 2 white, exit 2, analogous
- 3 blue, V -
- 4 black, exit 1, PNP
- 5 not in use

Description

Electronical vacuum switch in miniature design. This vacuum switch is suitable for all control tasks in vacuum switching circuits that require a high precision and short switching circuits. The very compact design of these switches are particularly suitable for pick & place applications, automation and robot technologies and single supervision of suction cups and plates. The switches own two digital exits (N.C. and N.O.), an LED display for the switching condition and a potentiometer to adjust the switching point. The switches are available with flange plate (M8) or with connection nozzle (AS 6 mm) and can be obtained with fast or screwable connection cable (see cable connections).



Switching symbol VSEM...



Underpressure switch VSEM...

Abbreviations:

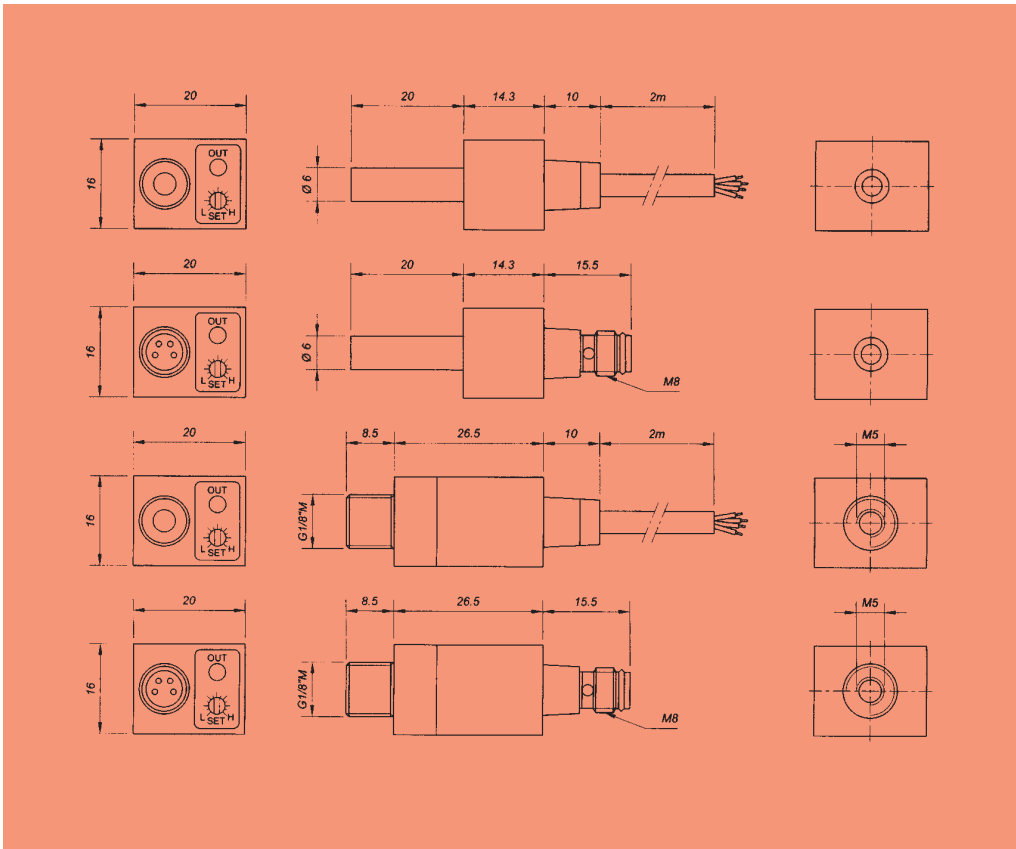
- 1/8 Thread R 1/8
- AS Connection nozzle 6 mm
- M8 separate connection cable with thread M8
- AK mounted connection cable, length 2 m

Article numbers

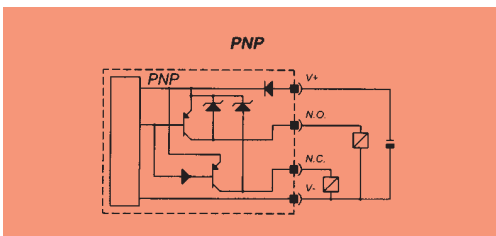
Type:	Part No:
VSEM-1/8-4PNP-M8	1.52.3.0014
VSEM-1/8-4PNP-AK	1.52.3.0013
VSEM-AS-4PNP-M8	1.52.3.0016
VSEM-AS-4PNP-AK	1.52.3.0015

Technical Data

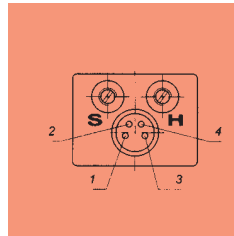
Features	VSEM-...-...-...
Mounting position	discretionary
Measuring medium	dry, oilfree air, non-aggressive gasses
Connection:	connection nozzle ϕ 6 mm or thread R 1/8"
Measuring range	-1 to 0 bar
Overpressure safety	5 bar
Operational voltage	10,8 ... 30 V DC conn. reversal-proof
Power consumption	< 20 mA
Allowed peaks	400 VP, 0,5 μ s
Switching exit	2 exits (N.O. and N.C.), max: 125 mA, 30V adjustment by potentiometer (2/3 turnings)
Switching	PNP
Elektrical connection	4-pin M8 plug connection or cable 2 m (long)
Reaction time	1 ms
Repetitive accuracy	+/- 0,2 % F.S.
Hystereses setting	2 % F.S.
Allowed humidity	35 to 85 % RH
Safety type	IP 40
Temperature range	0 to + 50 °C
Storage temperature:	- 10°C to + 50°C
Vibration resistance	10 to 55 Hz, 0,75 mm XYZ, 2 hours
Shock resistance	100 G XYZ
Weight	7 g (connection nozzle AS) or 77 g (thread R 1/8)



Vacuum switch VSEM..... with connection nozzle and thread R 1/8"



Switching diagram PNP



Plug connection 4 pin

**Plug connection 4 pin
 (EN 50044)**

- 1 V+ (brown)
- 2 Switching exit N.C. (white)
- 3 V- (blue)
- 4 Switching exit N.O. (black)

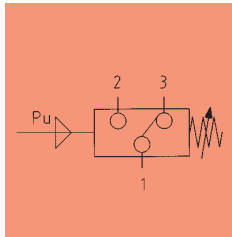
Overview of fitting cable connections						
Type	Connection	Exit	Pins	Length	Material	Part No
AK-M8-4P-2M PVC	plug	straight	4	2 m	PVC	1.52.4.0001
AK-M8-4P-5M-PUR	plug	straight	4	5 m	PUR	1.52.4.0003
AK-M8-4P-5M-PUR-90	plug	90°	4	5 m	PUR	1.52.4.0004

Description

Robuster, mechanischer Vakuumschalter mit fester Rückschaltdifferenz.

Mechanische Unterdruckmessung über eine Membran mit einstellbarem Schalterpunkt für Ventilansteuerungen. Diese Unterdruckschalter eignen sich besonders für einfache Handhabungsaufgaben, bei denen die Grundfunktion „Betriebsvakuum erreicht oder nicht“ im Vordergrund stehen.

Lieferbar mit fest eingestellten Schalterpunkten von 60 % und 80 % und einer festen Hysterese von ca. 5% und 20% für einfache vakuumabhängige Motorswitchingen bei 230V



Schaltsymbol VSM



Mechanischer Unterdruckschalter VSM

Article numbers

Type

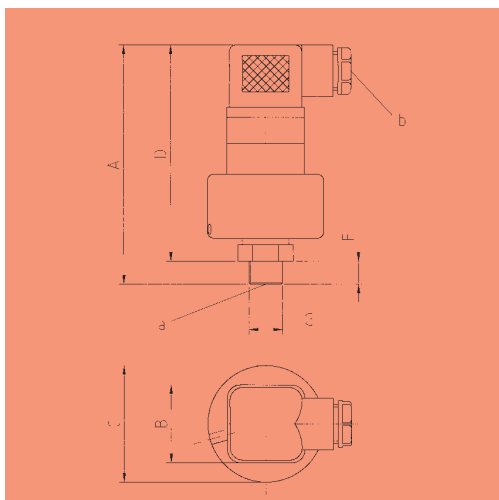
VSM-1/4-0,6-SK-5%	1.52.1.0001
VSM-1/4-0,6-SK-20%	1.52.1.0006
VSM-1/4-0,8-SK-5%	1.52.1.0002

5 % Hysteresis set

20 % Hysteresis set

Technical Data

Type	VSM-1/4-0,6-SK	VSM-1/4-0,8-SK
Mounting position	vertical	vertical
Adjustment area (bar)	-0,95 to 1	-0,95 to 1
Switching point	60 %	80 %
Overpressure safety (bar)	10	10
Media resistance	Air, oil, petrol	Air, oil, petrol
Reproduction accuracy	± 5 %	± 5 %
Return difference (bar)	0,02 to 0,05	0,02 to 0,05
Switching (1/ min)	200	200
Electrical connection	Pg 9	Pg 9
Outlet	DIN 43650	DIN 43650
Voltage max. (V)	250	250
Strom max. (A)	5	5
Safety type	IP 55	IP 55
Temperature range (°C)	- 20 to + 100	- 20 to + 100
Weight (kg)	0,29	0,29



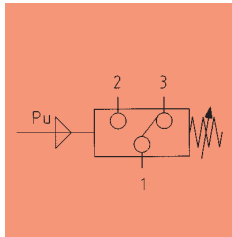
Vacuum switch VSM-1/4

Dimensions						
Type	A	B	C	D	F	G
VSM-1/4	93	27	45	84	9	R 1/4"

Description

Strictly pneumatical vacuum switch without electrical connections. Vacuum measuring by a membrane. The vacuum switch is available as NO and NC.

Due to its minimum dimensions and weight the vacuum switch is especially suitable for supervision of the vacuum directly in the vacuum circuit. Also suitable for applications run with compressed air without electrical connection.



Switching symbol VSP



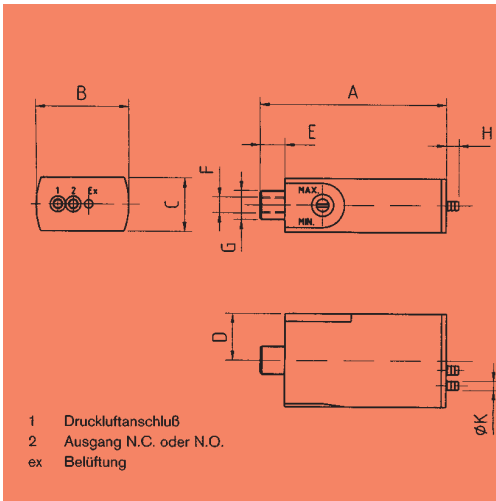
Pneumatic vacuum switch VSP-1/8

Article numbers

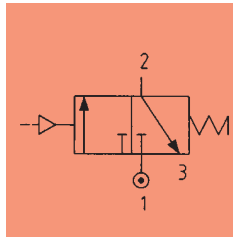
Type	
VSP-1/8-NO	1.52.2.0002
VSP-1/8-NC	1.52.2.0001

Technical Data

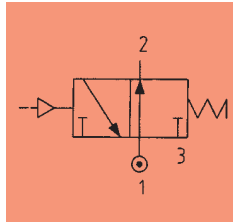
Type	VSP-1/8-NO	VSP-1/8-NC
Mounting position	discretionary	discretionary
Measuring medium	dry, oilfree air, non-aggressive gasses	dry, oilfree air, non-aggressive gasses
Einsatzbereich (bar)	2 to 6	2 to 6
Einstellbereich (mbar)	-350 to -850	-350 to -850
Overpressure safety (bar)	2	2
Design	N.O.	N.C.
Mode	Hysterese	Hysterese
Hysteresis (mbar)	80 to 100	80 to 100
Cycles (1/ min)	30	30
Repetitive accuracy (%)	3	3
Temperature range (°C)	0 to + 80	0 to + 80
Weight (g)	32	32
Max. flow (l/ min)	130	70



Vacuum switch VSP-1/8



Switching diagram VS-P-NC



Switching diagram VS-P-NO

- 1 Compressed air entrance
- 2 Compressed air exit
- 3 Ventilation

Dimensions									
Type	A	B	C	D	E	F	G	H	K
VSP-1/8-...	59,6	30	17	15	8	M 5	G 1/8"	4	3

Exact and robust electronical pressure switch with Piezo-Quarz technology.

Electronical pressure switches are used to control and regulate pressure circuits. The stage-less adjustment possibility of switching point and hysteresis via potentiometer allow to set very exact values, thus optimizing cycle times.

The pressure switches are supplied with all necessary accessories (ventilation nipple, screws, o-rings). The flange design includes a fixing bracket with screws.



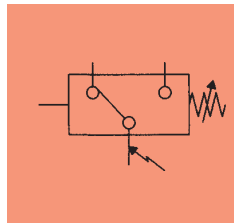
VSE-AF4PNP-M8



fixing set



Vacuum switch, electronical VSE-R1/8-4PNP-M8



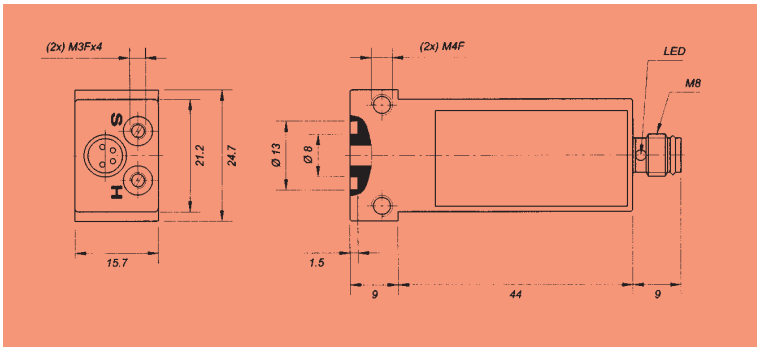
Switching diagram

Article numbers

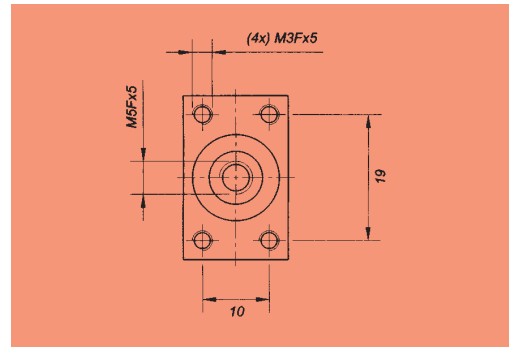
Type	Part-No:
DSE-AF-4PNP-M8	1.52.3.0020
DSE-AF-4NPN-M8	1.52.3.0021
DSE-1/8-4PNP-M8	1.52.3.0022
DSE-1/8-4NPN-M8	1.52.3.0023

Technical Data

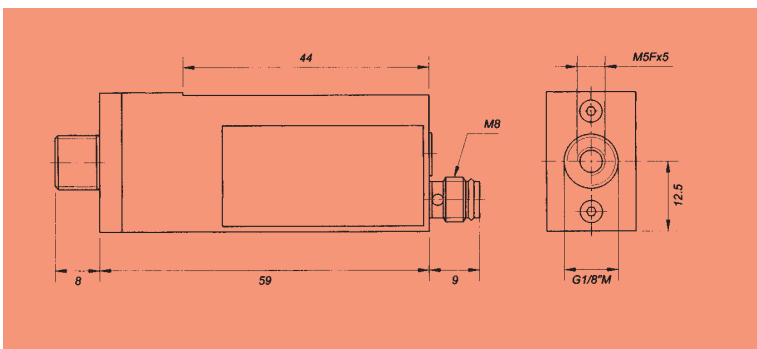
Type	VSE-AF-...	VSE-1/8-...
Mounting position	discretionary	discretionary
Measuring medium	dry, oilfree air, non-aggressive gases	dry, oilfree air, non-aggressive gases
Measuring range	0 to 10 bar	0 to 10 bar
Overpressure safety	15 bar	15 bar
Voltage	10,8 to 30 (V) DC	10,8 to 30 (V) DC
zul. Spannungsspitze	400 VP, 1µs	400 VP, 1µs
Power consumption	< 20 mA	< 20 mA
Switching exit	Ruhestellung offen (N.O.) max. 125mA, 30V	Ruhestellung offen (N.O.) max. 125mA, 30V
Switching	PNP / NPN	PNP / NPN
Analogausgang	1 to 5V DC +/-0,04	1 to 5V DC +/-0,04
Elektrischer Connection	4-pin M 8 SteckConnection	4-pin M 8 SteckConnection
Zustandsanzeige	LED im SteckConnection	LED im SteckConnection
Reaction time	< 5 ms	< 5 ms
Repetitive accuracy	± 1 %	± 1 %
Hystereseeinstellung H	3 to 20% bei -0,3 to -1bar	3 to 20% bei -0,3 to -1bar
Allowed humidity	35 to 85 % RH	35 to 85 % RH
Safety type	IP 65 (ohne Entlüftungsschl. IP 40)	IP 65 (ohne Entlüftungsschl. IP40)
Temperature range °C	0 to + 50 °C	0 to + 50 °C
Weight	43 g	30 g



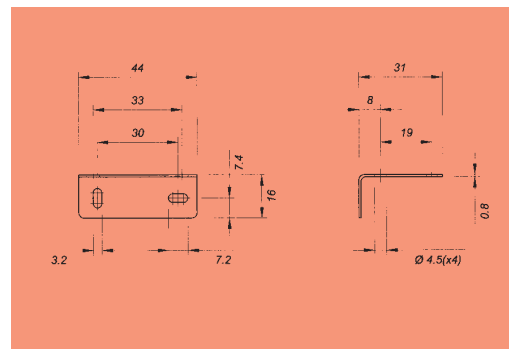
Vacuum switch with flange connection AF



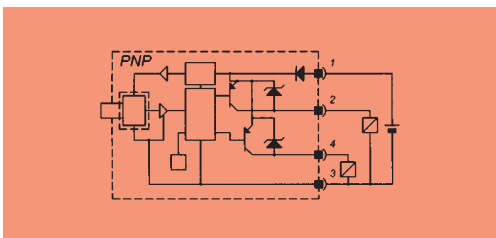
Connection dimensions vacuum switch AF



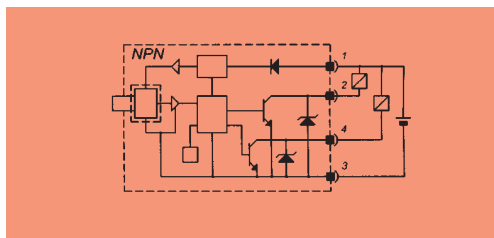
Vacuum switch with thread R1/8"



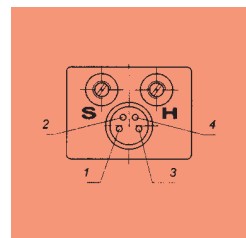
Fixing bracket for underpressure switch, flange design (AF)



Switching diagram PNP, 4-pin



Switching diagram NPN, 4-pin



Plug connection 4 pin

Overview of fitting cable connections

Type	Connection	Exit	Pins	Length	Material	Part No
AK-M8-4P-2M PVC	plug	straight	4	2 m	PVC	1.52.4.0001
AK-M8-4P-5M-PUR	plug	straight	4	5 m	PUR	1.52.4.0003
AK-M8-4P-5M-PUR-90	plug	90°	4	5 m	PUR	1.52.4.0004

Plug connection 4 pin

(EN 50044)

- 1 V+ (brown)
- 2 Analogous exit (white)
- 3 V- (blue)
- 4 Switching exit (black)

Description

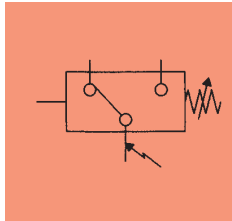
Elektronischer Druckschalter mit Piezo-Quarz-Technik und digitaler Anzeige.

Die digitalen Druckschalter zeichnen sich durch ihre extrem hohe Genauigkeit und die Vielfalt an Einstellmöglichkeiten aus. Es können zwei unabhängig voneinander arbeitende Schaltausgänge mit unterschiedlichen Hysteresen verarbeitet werden. Die eingestellten Werte lassen sich gegen unbeabsichtigtes Verstellen mit Code sichern; die Einstellung aller Parameter kann unabhängig vom anliegenden Systemdruck vorgenommen werden.

Die Druckschalter eignen sich besonders zum Einsatz in der Roboter-, Verpackungs- und Automatisierungstechnik.



Type DSDK-4PNP-R1/8



Schaltsymbol Druckschalter



Type DSD-1/4-4PNP-M8

Article numbers

Type	Vakuumschalter	Befestigungs- rahmen
DSD-1/8-4PNP-M8	1.52.3.0024	
DSD-1/8-4NPN-M8	1.52.3.0025	
DSDK-1/8-4PNP-M8	1.52.3.0026	2.52.3.0001
DSDK1/8-4NPN-M8	1.52.3.0027	2.52.3.0001

Im Lieferumfang enthalten sind:

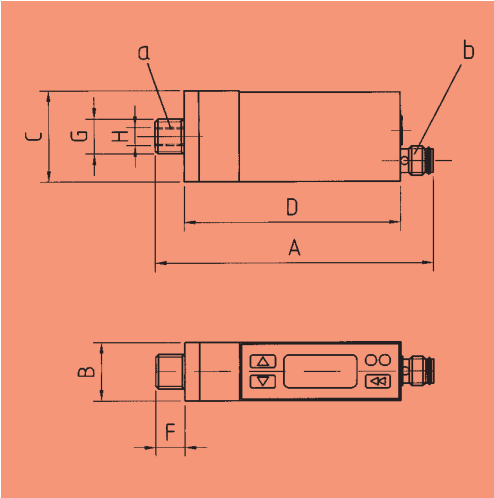
- 1 Entlüftungsnippel M 3 für Schlauch $d_j = 3$
- 1 O-Ring für Entlüftungsnippel M 3

nur bei UDSD-1-0-K:

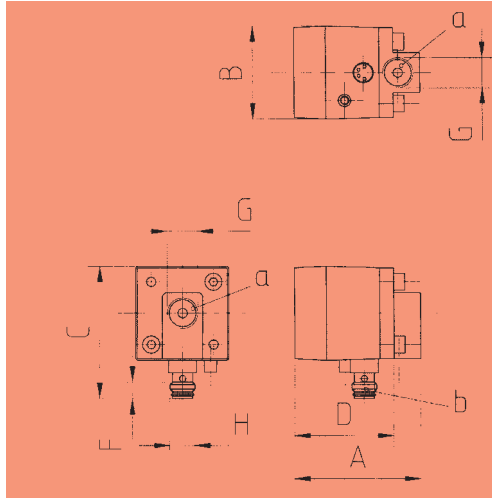
- 1 Verschlußstopfen G 1/8"
- 1 Befestigungswinkel horizontal
- 1 Befestigungswinkel vertikal

Technical Data

Type	DSD-.../DSDK-...
Mounting position	discretionary
Measuring medium	dry, oilfree air, nicht aggressive Gase
Measuring range	0 to 10 bar
overpressure safety:	15 bar
Voltage	10,8 to 30 V (DC)
Power consumption	< 55 mA
Switching exit	2 x wahlweise einstellbar N.O. oder N.C. max. 125mA, 30V mit Strombegrenzung
Mode:	wählbar: Hysterese oder Komparator
Programming	Spitzen- und Grundwert
Settings	Anzeigeoption, Parameter, Verriegelung
Switching	PNP / NPN
Elektrischer Connection	4-pin M 8 SteckConnection bzw. integriertes Kabel
Reaction time	< 5 ms
Repetitive accuracy	± 1 %
Settings	35 to 85 % RH
Safety type	IP 65 (ohne Entlüftungsschlauch IP 40)
Temperature range °C	0 to + 50 °C
Weight	35 g



Pressure switch DSD-R1/8-...

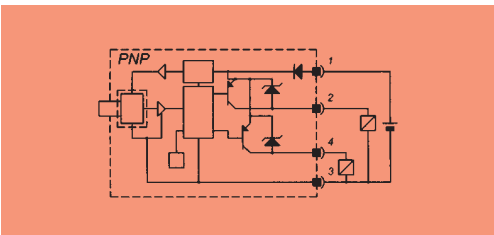


Pressure switch DSDK-...

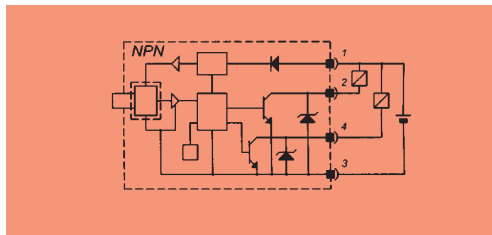
a Connection Vakuum
 b Connection Voltage

Dimensions

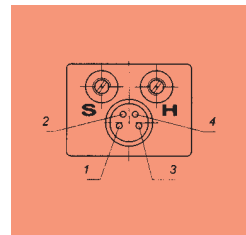
Type	A	B	C	D	E	F	G	H
DSD-1/8-...	76	16	25	59	---	8	G 1/8"	M 5
DSDK-...	40	30	42,2	31,5	6,7	5	G 1/8"	M 8



Schaltplan PNP, 4-PIN Belegung



Schaltplan NPN, 4-PIN Belegung



SteckConnection 4 pin

Übersicht für passende Kabelanschlüsse

Type	Connection	Exit	Pins	Length	Material	Art.-Nr
AK-M8-4P-2M PVC	steckbar	gerade	4	2 m	PVC	1.52.4.0001
AK-M8-4P-5M-PUR	steckbar	gerade	4	5 m	PUR	1.52.4.0003
AK-M8-4P-5M-PUR-90	steckbar	90°	4	5 m	PUR	1.52.4.0004

SteckConnection 4 pin
 (EN 50044)

- 1 V+ (braun)
- 2 Analogausgang (weiß)
- 3 V- (blau)
- 4 Switching exit (schwarz)

Description

Sehr elastische und beanspruchbare Connection-kabel mit verschraubbarer Steckconnection für elektronische Unterdruckschalter.

Die Connectionkabel werden am Unterdruckschalter festgeschraubt (Gewinde M 8). Sie sind in unterschiedlichen Lengthn mit geradem Exit oder 90°-WinkelExit, in 3- oder 4-Pin Ausführung lieferbar.

Bei sehr hoher Beanspruchung empfehlen wir, Kabel im Material PUR zu verwenden!



Article numbers

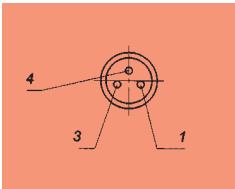
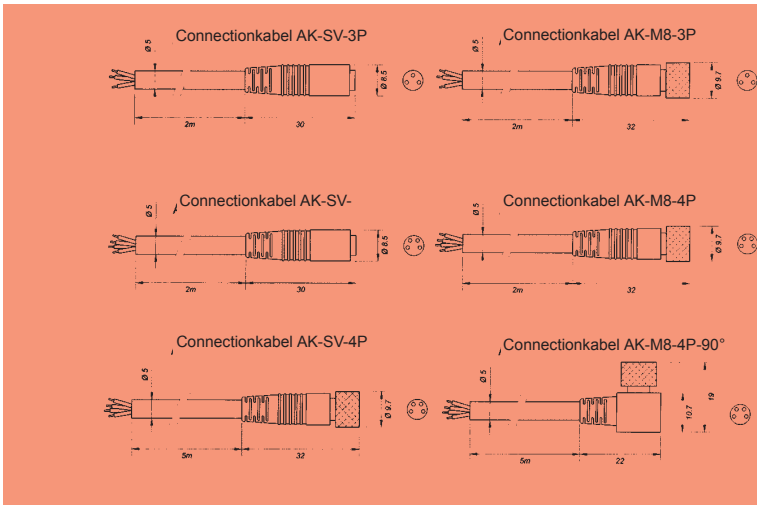
Type	Connectionkabel
AK-M8-3P-2M-PVC	1.52.4.0001
AK-M8-3P-2M-SV	1.52.4.0005
AK-M8-4P-2M-PVC	1.52.4.0002
AK-SV-4P-2M-PVC	1.52.4.0006
AK-M8-4P-5M-PUR	1.52.4.0003
AK-M8-4P-5M-PUR-90°	1.52.4.0004

Elektrische Daten

Type	AK-M8/SV-...
Leitungsquerschnitt	0,25mm ²
Material Federkontakt	CuSn
Temperature range	-25 to +85°C
Strombelastbarkeit	4 A
Betriebsvoltage	60 V (AC) / 75V (DC)
Safety type	IP 65

Technical Data

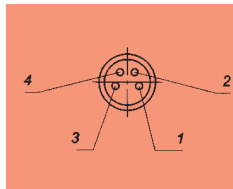
Type	Connection	Exit	Pins	Length	Material
AK-M8-3P-2M-PVC	M 8	gerade	3	2 m	PVC
AK-SV-3P-2M-PVC	steckbar	gerade	3	2 m	PVC
AK-M8-4P-2M-PVC	M 8	gerade	4	2 m	PVC
AK-SV-4P-2M-PVC	steckbar	gerade	4	2 m	PVC
AK-M8-4P-5M-PUR	M 8	gerade	4	5 m	PUR
AK-M8-4P-5M-90°-PUR	M 8	90°	4	5 m	PUR



Kontaktbelegung

3-Pin

- 1 braun
- 3 blau
- 4 schwarz



Kontaktbelegung

4-Pin

- 1 braun
- 2 weiß
- 3 blau
- 4 schwarz

Description

Vakuummeter (Kontrollmanometer) in robuster Ausführung mit Rot-/ Grün-Bereich. Geeignet zur optischen Kontrolle des Vakuums in Ansaugeräten und Anlagen aller Art. Der Grünbereich signalisiert Betriebsbereitschaft. Vakuummeter sind in verschiedenen Durchmessern, mit unterschiedlichen Anschlüssen und Measuring rangeen erhältlich.



Vakuummeter mit Connection hin-



VM-100-R1/2U-MB0-250



Vakuummeter mit unterschiedlichen Anschlüssen und Measuring ran-

Hinweis:

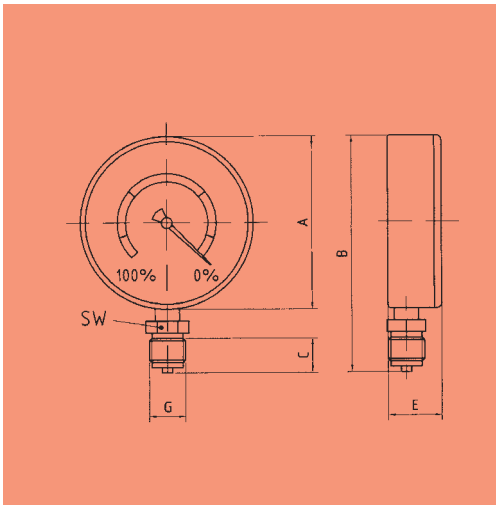
Laut UVV 18 müssen VacuumLastaufnahmemittel mit einer Druckmeßeinrichtung ausgerüstet sein, die den Arbeits- und den Gefahrenbereich deutlich erkennbar signalisiert.

Article numbers

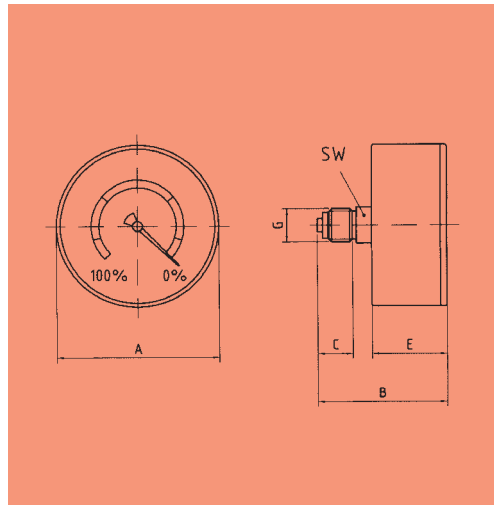
Type	Vakuummeter
VM-63-R1/4U-RG60	1.52.5.0010
VM-63-R1/4H-RG60	1.52.5.0008
VM-63-R1/4U-RG80	1.52.5.0011
VM-63-R1/4H-RG80	1.52.5.0009
VM-100-R1/2U-RG60	1.52.5.0005
VM-100-R1/2H-RG60	1.52.5.0001
VM-100-R1/2U-RG80	1.52.5.0006
VM-100-R1/2H-RG80	1.52.5.0002
VM-100-R1/2U-MB0-250	1.52.5.0004

Technical Data

Type	Connection	Measuring range		Weight (kg)
		(Vakuum %)	Grünbereich (Vakuum %)	
VM-63-R1/4U-RG60	unten	0 - 100%	ab 60%	0,134
VM-63-R1/4H-RG60	hinten	0 - 100%	ab 60%	0,136
VM-63-R1/4U-RG80	unten	0 - 100%	ab 80%	0,136
VM-63-R1/4H-RG80	hinten	0 - 100%	ab 80%	0,137
VM-100-R1/2U-RG60	unten	0 - 100%	ab 60%	0,353
VM-100-R1/2H-RG60	hinten	0 - 100%	ab 60%	0,249
VM-100-R1/2U-RG80	unten	0 - 100%	ab 80%	0,364
VM-100-R1/2H-RG80	hinten	0 - 100%	ab 80%	0,25
VM-100-R1/2U-MB0-250	unten	0 - 25%	ab 10%	0,545



Vakuummeter Connection unten



Vakuummeter Connection hinten

Dimensions						
Type	A	B	C	G	E	SW
VM-63-R1/4U-RG60/80	63	86	12	G 1/4"	28	14
VM-63-R1/4H-RG60/80	63	49	12	G 1/4"	30	14
VM-100-R1/2U-RG60/80	100	137	20	G 1/2"	31	22
VM-100-R1/4H-RG60/80	100	51	12	G 1/4"	32	14
VM-100-R1/2U-MB0-250	100	142	19	G 1/2"	49	22

Description

Elektronische Warneinrichtung im Blechgehäuse, zum nachträglichen Einbau (komplett verdrahtet und Connectionfertig).

Geeignet zum nachträglichen Einbau in VacuumLastaufnahmemittel. Durch die akustische Warneinrichtung (EW-0) werden die Sicherheitsvorschriften eingehalten. Bei größeren Lastaufnahmemitteln oder beim Betrieb in sehr lauter Umgebung empfehlen wir die Warneinrichtung EW-III, die zusätzlich mit Dioden oder Leuchten ausgestattet ist.

Zudem sind sämtliche Warneinrichtung mit einer Stromausfallmeldung ausgerüstet, die einen Stromausfall akustisch melden.(100 dB(A))

Lieferumfang mit mechanischen Unterdruckschalter VS-M-1/4 voreingestellt auf 60% oder 80% Schaltpunkt



Warneinrichtung EW-0



Elektronische Warneinrichtung EW-III-L, mit optischem und akustischem Signal sowie Stromausfallmeldung.

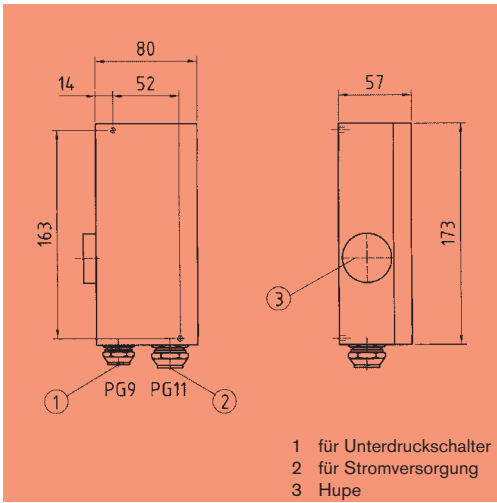
Article numbers

Type	HSV	HSV	EMV
	230V, 50Hz	400V, 50Hz	400V, 50 Hz
EW-O	6.34.1.0002	6.34.1.0003	---
EW-III-L	---	6.34.1.0016	6.34.1.0012

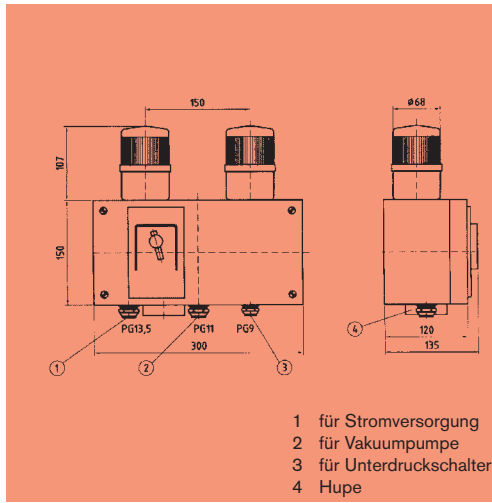
HSV für Vakuumsteuerung über Handschiebeventil
 EMV für Vakuumsteuerung über Elektromagnetventil

Technical Data

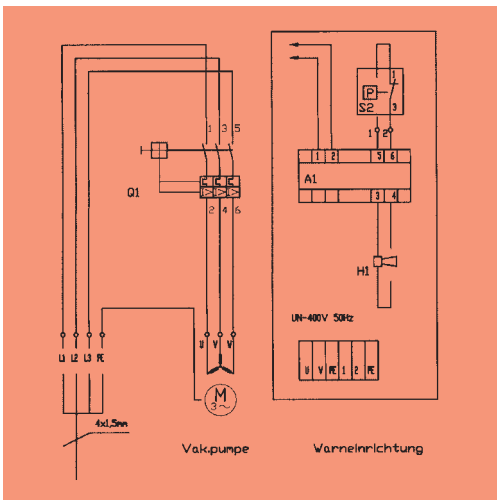
Type	Warnsignal	Stromausfall- meldung	Stromaufnahme (W)
EW-O	akustisch	ja	2
EW-III-L	akustisch und optisch über Lampen	ja	4



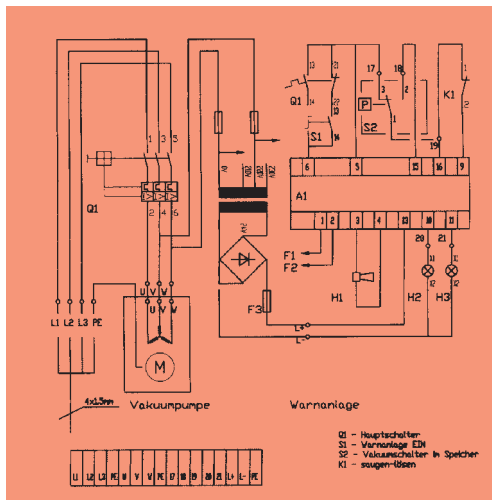
Warneinrichtung EW-O



Warneinrichtung EW-III-L













Schaltplan Warneinrichtung EW-O



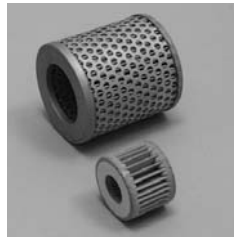
Schaltplan Warneinrichtung EW-III-L

8 FILTERS AND ACCESSORIES

	<i>Vacuum filter VF</i>	8.2
	<i>Ventilation filter BF</i>	8.4
	<i>Hose nipples SN</i>	8.6
	<i>Screw-on connections EV</i>	8.8
	<i>Vacuum hose line VS</i>	8.10
	<i>Sealing rings DR</i>	8.13
	<i>Vacuum distributors VTB</i>	8.14
	<i>Revolving vacuum feeders DVZ</i>	8.16
	<i>Quick-change coupling SWK</i>	8.18
	<i>Water separator WA</i>	8.20

Description

Vacuum filters with exchangeable micro-filter cartridges. The vacuum filters are mounted in on the suction side in front of vacuum pumps, valves and other switching devices. The extremely high degree of elimination (almost 100 %) makes them especially suitable in dusty areas.



Filterpatronen



Vacuum filter VF-1/2



Vacuum filter VF-3/4 to VF-1 1/4 B (with housin g)

Mounting Advice:

Never mount the filter with the clean air nozzle (exit to the pump) to the bottom, because then dirt particles can fall into the distributor line, when exchanging the filter cartridge!

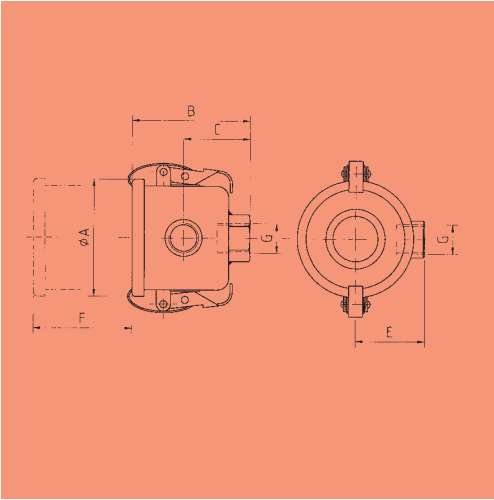
Article numbers

Type	Filter	Filter cartridge
VF-1/2	1.53.2.0002	2.53.2.0009
VF-3/4	1.53.2.0016	2.53.2.0014
VF-1 1/4A	1.53.2.0003	2.53.2.0005
VF-11/4B	1.53.2.0004	2.53.2.0004
VF-21/2	1.53.2.0005	2.53.2.0006

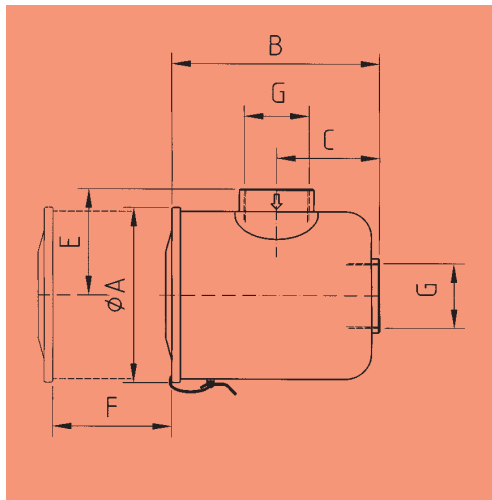
Technical Data

Type	Gewicht (kg)	Durchfluß (m ³ /h)	passender Schlauchnippel
VF-1/2	0,72	12	SN-R1/2-1/2
VF-3/4	0,59	42	SN-R3/4-3/4
VF-11/4A	1,06	96	SN-R1 1/4-38
VF-11/4B	1,25	108	SN-R1 1/4-38
VF-21/2	1,88	360	--

Flow with p = 10 mbar and clean filter cartridge



Vacuum filter 3/4" in mounting position - clean air nozzle on the top



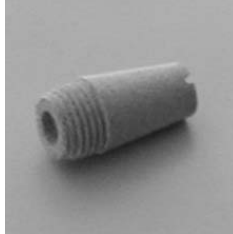
Vacuum filter 1/2"

Dimensions						
Type	A (mm)	B (mm)	C (mm)	E (mm)	F (mm)	G
VF-1/2"	82,5	82,5	46,5	49	70	G 1/2"
VF-3/4"	97	89,5	45	59	70	G 3/4"
VF-1 1/4" A	136	116	68	81	75	G 1 1/4"
VF-1 1/4" B	172	170	108	98	130	G 1 1/4"
VF-2 1/2"	194	247	119	123	215	G 2 1/2"

Description

Robust ventilation filter with stable sheet metalhousing.

Suitable for mounting on valves, to prevent dirt particles from getting into the vacuum circuit when ventilating. Recommended especially when using magnetic valves, because in this case, high velocities of flow emerge during ventilation.



Ventilation filter BF-R1/4



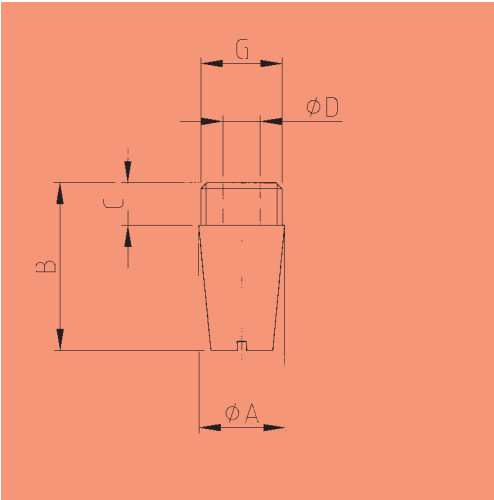
Ventilation filters BF-R1/2 to BF-R1 1/2

Maintenance: When cleaning, use compressed air to blow the ventilation filter against the suction direction.

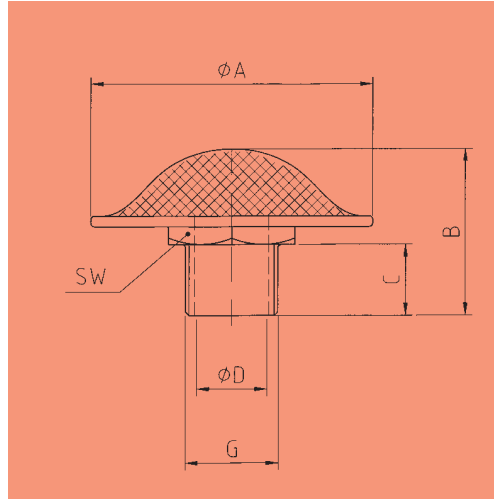
Article numbers	
Type	Ventilation filter
BF-R1/4	1.53.1.0004
BF-R1/2	1.53.1.0003
BF-R3/4	1.53.1.0008
BF-R1	1.53.1.0009
BF-R1 1/2	1.53.1.0010

Technical Data		
Type	Weight (kg)	Flow ¹⁾ (m ³ /h)
BF-R1/4	0,02	45
BF-R1/2	0,1	70
BF-R3/4	0,12	70
BF-R1	0,16	86
BF-R1 1/2	0,33	100

1) Flow with Δp = -950 mbar



Ventilation filter BF-R1/4



Ventilation filters BF-R1/2 to BF-R1

Dimensions						
Type	A	B	C	D	G	SW
BF-R1/4	14	27	8	6	R 1/4"	---
BF-R1/2	80	45	11	16	R 1/2"	27
BF-R3/4	80	47	20	21	R 3/4"	36
BF-R1	80	47	20	27	R 1"	46

Description

Hose nipples for connecting vacuum components by means of a vacuum hose. The hose nipples are made of galvanized steel and available with different hose connections and threads. It is a must to use sealing band and sealing rings when mounting, in order to prevent unnecessary leakages. We recommend to use hose clips to secure the hose connections.

Standard scope of supply:
 Hose nipple with sealing ring.



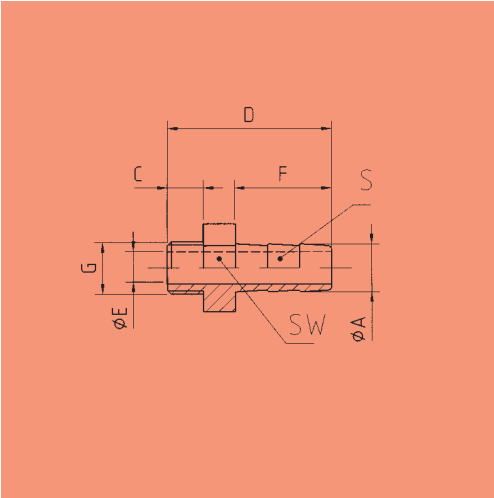
Hose nipples with different connections and widths

Article numbers

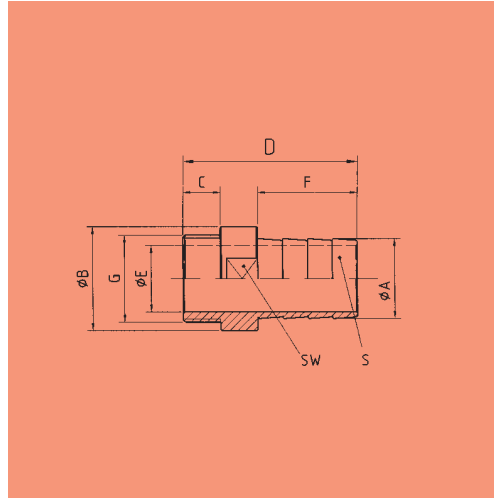
Type	Hose nipple
SN-R 1/8-6	1.54.1.0011
SN-R 1/4-6	1.54.1.0008
SN-R 1/4-10	1.54.1.0007
SN-R 1/4-1/2	1.54.1.0006
SN-R 3/8-10	1.54.1.0017
SN-R 3/8-1/2	1.54.1.0016
SN-R 1/2-1/2	1.54.1.0005
SN-R 3/4-1/2	1.54.1.0003
SN-R 3/4-3/4	1.54.1.0015
SN-R 1-1	1.54.1.0012
SN-R 1 1/4-38	1.54.1.0014
SN-R1 1/2-38	1.54.1.0013

Technical Data

Type	Weight (kg)	Inside dia. hose
SN-R 1/8-6	0,012	6
SN-R 1/4-6	0,018	6
SN-R 1/4-10	0,03	10
SN-R 1/4-1/2	0,038	1/2"
SN-R 3/8-10	0,042	10
SN-R 3/8-1/2	0,048	1/2"
SN-R 1/2-1/2	0,07	1/2"
SN-R 3/4-1/2	0,123	1/2"
SN-R 3/4-3/4	0,107	3/4"
SN-R 1-1	0,212	1"
SN-R 1 1/4-38	0,385	38
SN-R1 1/2-38	0,452	38



Hose nipples SN-R1/8 to SN-R3/4



Hose nipples SN-R1 and bigger

Dimensions									
Type	A	B	C	D	E	F	G	S	SW
SN-R 1/8-6	9	---	9	34	6	20	R 1/8"	6	14
SN-R 1/4-6	9	--	9	34	6	20	R 1/4"	6	17
SN-R 1/4-10	12	--	9	41	8	24	R 1/4"	10	19
SN-R 1/4-1/2	15	--	9	41	8	24	R 1/4"	1/2"	19
SN-R 3/8-10	12	--	9	41	8	24	R 3/8"	10	22
SN-R 3/8-1/2	15	--	9	41	11	24	R 3/8"	1/2"	22
SN-R 1/2-1/2	15	--	10	50	11	30	R 1/2"	1/2"	27
SN-R 3/4-1/2	15	--	12	54	11	30	R 3/4"	1/2"	32
SN-R 3/4-3/4	21	--	12	64	17	40	R 3/4"	3/4"	32
SN-R 1-1	26,5	42	16	79	22	48	R 1"	1"	36
SN-R 1 1/4-38	38,5	50	18	84	32	48	R1 1/4"	38	46
SN-R 1 1/2-38	38,5	55	18	84	32	48	R1 1/2"	38	50

Description

Special fittings for vacuum hose lines of PE material without wire lining.

Straight fitting (EVG) with cylindrical thread and high-quality seal.

Elbow fitting (EVW) with conical thread.

T fitting (EVT) with conical thread.

Elbow fitting (EVWD) turnable with cylindrical thread and high-quality seal.



Elbow fitting EVW



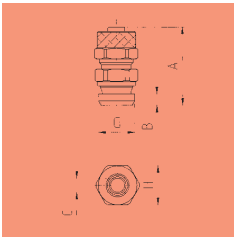
T-fitting EVT



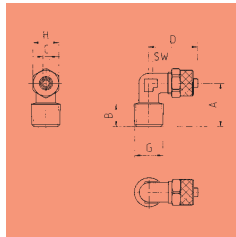
Fittings

Article numbers	
Type	Fitting
EVG-6/4-R1/4	6.29.2.0015
EVG-8/6-R1/4	6.29.2.0016
EVG-10/8-R1/2	6.29.2.0013
EVG-12/10-R1/2	6.29.2.0014
EVW-6/4-R1/4	6.29.2.0026
EVW-8/6-R1/4	6.29.2.0028
EVW-8/6-R1/2	6.29.2.0027
EVW-10/8-R1/2	6.29.2.0024
EVW-12/10-R1/2	6.29.2.0025
EVT-6/4-R1/4	6.29.2.0019
EVT-8/6-R1/4	6.29.2.0020
EVT-10/8-R1/2	6.29.2.0017
EVT-12/10-R1/2	6.29.2.0018
EVWD-6/4-R1/4	6.29.2.0022
EVWD-8/6-R1/4	6.29.2.0023
EVWD-10/8-R1/4	6.29.2.0021

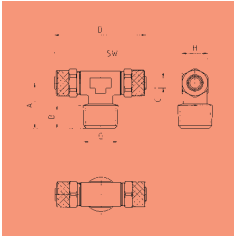
Technical Data			
Type	Thread	Exits (I.D.)	Weight (g)
EVG-6/4-R1/4	R 1/4"	4	23
EVG-8/6-R1/4	R 1/4"	6	26
EVG-10/8-R1/2	R 1/2"	8	50
EVG-12/10-R1/2	R 1/2"	10	55
EVW-6/4-R1/4	R 1/4"	4	22
EVW-8/6-R1/4	R 1/4"	6	23
EVW-8/6-R1/2	R 1/2"	6	53
EVW-10/8-R1/2	R 1/2"	8	58
EVW-12/10-R1/2	R 1/2"	10	63
EVT-6/4-R1/4	R 1/4"	4	32
EVT-8/6-R1/4	R 1/4"	6	35
EVT-10/8-R1/2	R 1/2"	8	83
EVT-12/10-R1/2	R 1/2"	10	95
EVWD-6/4-R1/4	R 1/4"	4	29
EVWD-8/6-R1/4	R 1/4"	6	31
EVWD-10/8-R1/4	R 1/4"	8	41



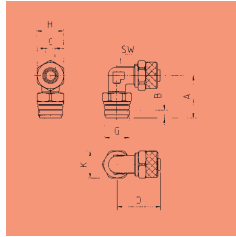
Fitting EVG



Fitting EVW



Fitting EVT



Fitting EVWD

Dimensions

Type	A	B	C	D	G	H	SW	K
EVG-6/4-R1/4	20,5	4,1	3	--	R 1/4"	12	--	--
EVG-8/6-R1/4	20,5	4,1	5	--	R 1/4"	14	--	--
EVG-10/8-R1/2	23,5	5	6,5	--	R 1/2"	16	--	--
EVG-12/10-R1/2	23,5	5	8,5	--	R 1/2"	19	--	--
EVW-6/4-R1/4	20,5	11	3	22,5	R 1/4"	12	10	--
EVW-8/6-R1/4	20,5	11	5	22,5	R 1/4"	14	10	--
EVW-8/6-R1/2	28	14	5	26,5	R 1/2"	14	17	--
EVW-10/8-R1/2	28	14	6,5	28,5	R 1/2"	17	16	--
EVW-12/10-R1/2	28	14	8,5	30,5	R 1/2"	19	17	--
EVT-6/4-R1/4	20,5	11	3	45	R 1/4"	12	10	--
EVT-8/6-R1/4	20,5	11	5	45	R 1/4"	14	10	--
EVT-10/8-R1/2	28	14	6,5	57	R 1/2"	16	17	--
EVT-12/10-R1/2	28	14	8,5	61	R 1/2"	17	19	--
EVWD-6/4-R1/4	22,5	4,1	3	22,5	R 1/4"	10	12	17
EVWD-8/6-R1/4	22,5	4,1	5	22,5	R 1/4"	10	14	17
EVWD-10/8-R1/4	24,5	4,1	6,5	25	R 1/4"	12	16	17

Description

Special hoses (sometimes with wire lining), which guarantee a safe connection with all vacuum parts. The wire lining prevents a contraction of the hoses, even with enormous under-pressures.

We generally recommend to use hose clips for securing the vacuum hoses to hose nipples.



Pneumatic hose for vacuum



Black with wire support



Transparent with wire support

1 PVC with wire lining transparent:

Temperature range: $-5^{\circ}\text{C} \div +65^{\circ}\text{C}$

Highly flexible hose, even, non-abrasive

2 rubber with wire lining black:

Temperature range: $-40^{\circ}\text{C} \div +100^{\circ}\text{C}$

Elastomere-hose with inner textile- and steel wire and fabric-patterned, even lining.

3 PE blue:

Temperature range $-10^{\circ}\text{C} \div +40^{\circ}\text{C}$

4 NK red:

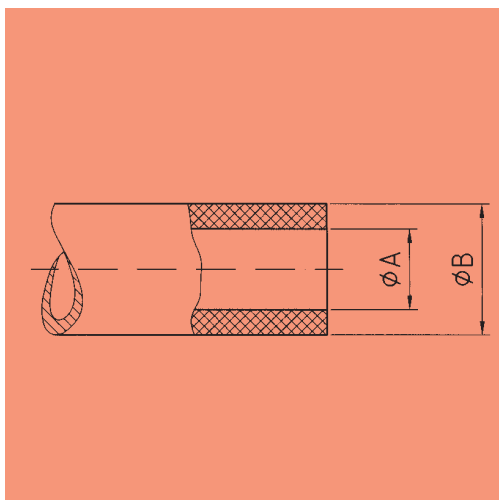
Natural rubber

Article numbers

Type	Vacuum hose by the meter	Vacuum hose by pre-packed units
VS-6-R	1.54.1.0040	1.54.1.0041
VS-10-T	1.54.1.0023	1.54.1.0026
VS-1/2-S	1.54.1.0018	1.54.1.0019
VS-1/2-T	1.54.1.0020	1.54.1.0021
VS-3/4-S	1.54.1.0031	1.54.1.0032
VS-3/4-T	1.54.1.0033	1.54.1.0034
VS-1-S	1.54.1.0027	1.54.1.0028
VS-1-T	1.54.1.0029	1.54.1.0030
VS-38-T	1.54.1.0035	1.54.1.0036
VS-4-B	1.54.1.0037	---
VS-6-B	1.54.1.0039	---
VS-8-B	1.54.1.0042	---
VS-10-B	1.54.1.0022	---

Technical Data

Type	Bending radius (mm)	Material	Weight (kg/ m)	Unit (m)	Volume (l/m)
VS-6-R	23	4	0,2	25	0,028
VS-10-T	20	1	0,16	30	0,079
VS-1/2-S	56	2	0,34	25	0,154
VS-1/2-T	30	1	0,35	30	0,154
VS-3/4-S	80	2	0,43	25	0,314
VS-3/4-T	50	1	0,38	30	0,314
VS-1-S	100	2	0,74	25	0,491
VS-1-T	60	1	0,51	30	0,491
VS-38-T	90	1	0,95	30	1,134
VS-4-B	30	3	0,014	--	0,013
VS-6-B	40	3	0,02	--	0,028
VS-8-B	60	3	0,026	--	0,05
VS-10-B	85	3	0,32	--	0,079



Vacuum hose

Dimensions		
Type	A	B
VS-6-R	6	14
VS-10-T	10	16
VS-1/2-S	14	21,5
VS-1/2-T	14	20
VS-3/4-S	20	28
VS-3/4-T	20	26,5
VS-1-S	25	33
VS-1-T	25	34
VS-38-T	38	50
VS-4-B	4	6
VS-6-B	6	8
VS-8-B	8	10
VS-10-B	10	12

Description

For securing vacuum hoses on hose nipples. The hose clips seal vacuum hoses on hose nipples and prevent the suction of leakage air. They also secure the vacuum hose against unintentional pulling off.

Advice
 According to the german UVV* 18 hose connections on load lifting devices have to be secured against unintentional pulling off.

* UVV = Accident Prevention Regulations

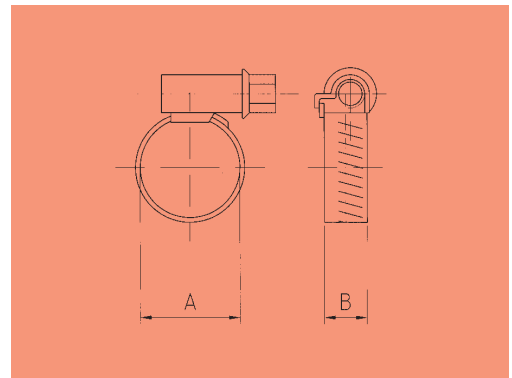


Hose clips for securing hose connections

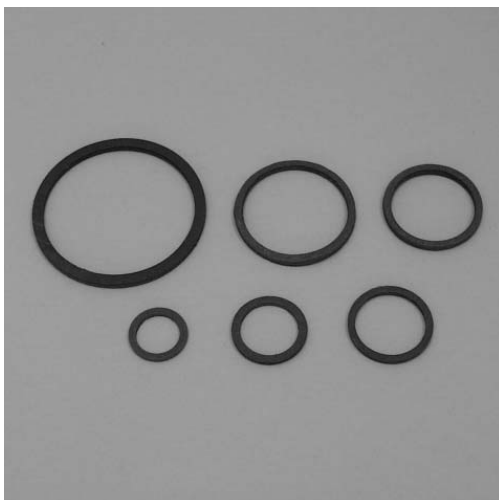
Technical Data	
Type	Weight (g)
SK-6	11
SK-10	13
SK-1/2	14
SK-3/4	14,5
SK-1	17
SK-38	18

Article numbers	
Type	Hose clip
SK-6	6.21.3.0006
SK-10	6.21.3.0003
SK-1/2	6.21.3.0002
SK-3/4	6.21.3.0004
SK-1	6.21.3.0001
SK-38	6.21.3.0005

Dimensions		
Type	A (Clamping area)	B
SK-6	8 ÷ 16	9
SK-10	12 ÷ 22	9
SK-1/2	14 ÷ 30	9
SK-3/4	20 ÷ 35	9
SK-1	26 ÷ 40	9
SK-38	38 ÷ 53	13



Hose clip SK



Sealing rings in vulcan-fibre-version

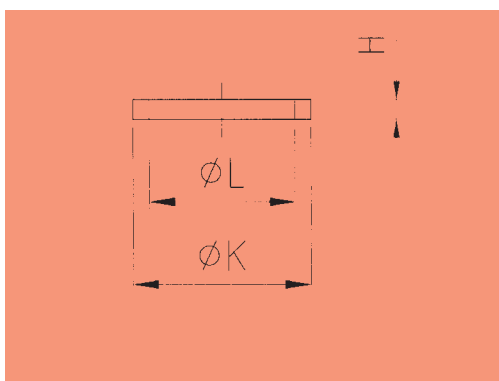
Description

Sealing rings are used to seal screwable mounting parts with inner vacuum feeders, as between bolts and hose nipples or between suction plate and bolts.

Material: vulcan-fibre

Article numbers

Type	Sealing ring
DR-M5	6.29.2.0002
DR-R1/8	6.29.2.0006
DR-R1/4	6.29.2.0005
DR-R3/8	6.29.2.0010
DR-R1/2	6.29.2.0004
DR-R3/4	6.29.2.0009
DR-R1	6.29.2.0003
DR-R1 1/4	6.29.2.0008
DR-R1 1/2	6.29.2.0007



Sealing rings

Dimensions

Type	H	K	L
DR-M5	1	8	5,2
DR-R1/8	1,5	16	10
DR-R1/4	2	18	13
DR-R3/8	2	23	17
DR-R1/2	2	26	21
DR-R3/4	2,5	32	26,5
DR-R1	2,5	39	33
DR-R1 1/4	2,5	49	42
DR-R1 1/2	2,5	55	48

Description

Distributors are used for distributing the vacuum from one central unit to various suction places. A 2/2-way ball valve is mounted on every vacuum exit for switching on and off. In addition to that a 3/2-way manual slide valve can be mounted in at the vacuum entrance S 1, in order to control the entire distributor.

Manual slide valve see chapter 7:
 Control valves, measuring units.



VTB-4



VTB-8

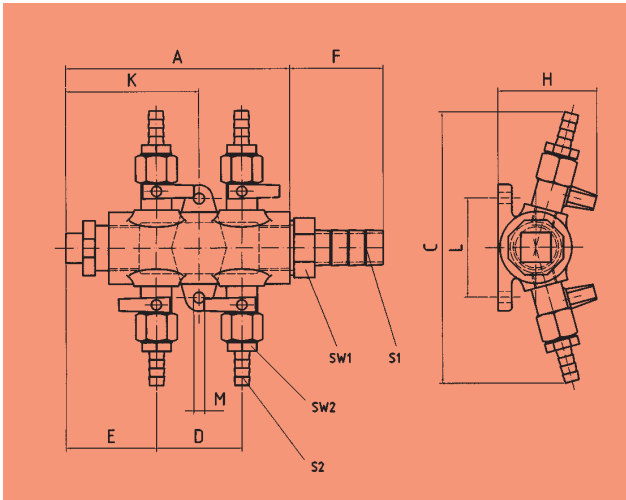


VTB-12

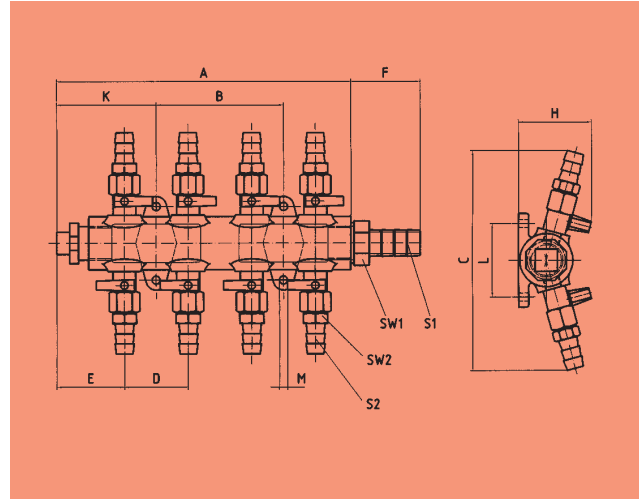
Article numbers	
Type	Distributor
VTB-4-EIN-R1/2-AUS-6mm	1.54.2.0028
VTB-4-EIN-R1/2-AUS-10mm	1.54.2.0027
VTB-4-EIN-R3/4-AUS-6mm	1.54.2.0030
VTB-4-EIN-R3/4-AUS-10mm	1.54.2.0029
VTB-8-EIN-R1/2-AUS-6mm	1.54.2.0034
VTB-8-EIN-R1/2-AUS-10mm	1.54.2.0033
VTB-8-EIN-R3/4-AUS-6mm	1.54.2.0037
VTB-8-EIN-R3/4-AUS-10mm	1.54.2.0036
VTB-12-EIN-R1/2-AUS-6mm	1.54.2.0023
VTB-12-EIN-R1/2-AUS-10mm	1.54.2.0022
VTB-12-EIN-R3/4-AUS-6mm	1.54.2.0025
VTB-12-EIN-R3/4-AUS-10mm	1.54.2.0024

Technical Data			
Type	Connection	Exits Inside dia	Weight (kg)
VTB-4-EIN-R1/2-AUS-6mm	1/2"	6	0,87
VTB-4-EIN-R1/2-AUS-10mm	1/2"	10	0,92
VTB-4-EIN-R3/4-AUS-6mm	3/4"	6	0,9
VTB-4-EIN-R3/4-AUS-10mm	3/4"	10	0,95
VTB-8-EIN-R1/2-AUS-6mm	1/2"	6	1,42
VTB-8-EIN-R1/2-AUS-10mm	1/2"	10	1,57
VTB-8-EIN-R3/4-AUS-6mm	3/4"	6	1,45
VTB-8-EIN-R3/4-AUS-10mm	3/4"	10	1,6
VTB-12-EIN-R1/2-AUS-6mm	1/2"	6	1,97
VTB-12-EIN-R1/2-AUS-10mm	1/2"	10	2,17
VTB-12-EIN-R3/4-AUS-6mm	3/4"	6	2,0
VTB-12-EIN-R3/4-AUS-10mm	3/4"	10	2,2

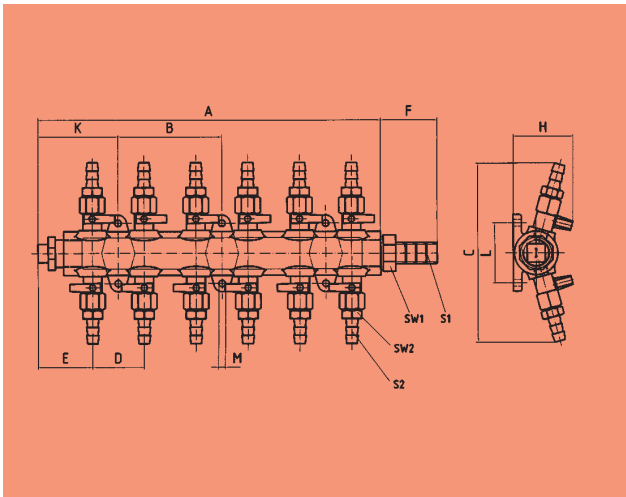
Dimensions							
Type	A	B	C	D	E	F	H
VTB-4-EIN-R1/2-AUS-6mm	131	--	158	50	53	44	57
VTB-4-EIN-R1/2-AUS-10mm	131	--	168	50	53	44	57
VTB-4-EIN-R3/4-AUS-6mm	131	--	158	50	53	55	57
VTB-4-EIN-R3/4-AUS-10mm	131	--	168	50	53	55	57
VTB-8-EIN-R1/2-AUS-6mm	231	100	158	50	53	44	57
VTB-8-EIN-R1/2-AUS-10mm	231	100	168	50	53	44	57
VTB-8-EIN-R3/4-AUS-6mm	231	100	158	50	53	55	57
VTB-8-EIN-R3/4-AUS-10mm	231	100	168	50	53	55	57
VTB-12-EIN-R1/2-AUS-6mm	331	100	158	50	53	44	57
VTB-12-EIN-R1/2-AUS-10mm	331	100	168	50	53	44	57
VTB-12-EIN-R3/4-AUS-6mm	331	100	158	50	53	55	57
VTB-12-EIN-R3/4-AUS-10mm	331	100	158	50	53	55	57



Vacuum distributors VTB-4



Vacuum distributors VTB-8



Vacuum distributors VTB-12

Dimensions							
Type	K	L	M	SW 1	S 1 LW	SW 2	S 2 LW
VTB-4-EIN-R1/2-AUS-6mm	78	58	6,4	32	1/2"	17	6
VTB-4-EIN-R1/2-AUS-10mm	78	58	6,4	32	1/2"	19	10
VTB-4-EIN-R3/4-AUS-6mm	78	58	6,4	32	3/4"	17	6
VTB-4-EIN-R3/4-AUS-10mm	78	58	6,4	32	3/4"	19	10
VTB-8-EIN-R1/2-AUS-6mm	78	58	6,4	32	1/2"	17	6
VTB-8-EIN-R1/2-AUS-10mm	78	58	6,4	32	1/2"	19	10
VTB-8-EIN-R3/4-AUS-6mm	78	58	6,4	32	3/4"	17	6
VTB-8-EIN-R3/4-AUS-10mm	78	58	6,4	32	3/4"	19	10
VTB-12-EIN-R1/2-AUS-6mm	78	58	6,4	32	1/2"	17	6
VTB-12-EIN-R1/2-AUS-10mm	78	58	6,4	32	1/2"	19	10
VTB-12-EIN-R3/4-AUS-6mm	78	58	6,4	32	3/4"	17	6
VTB-12-EIN-R3/4-AUS-10mm	78	58	6,4	32	3/4"	19	10

Description

Very robust vacuum feeder for rotation elements in aluminium design.

Depending on the design the vacuum feeders are set for low or high speeds. By using special o-ring seals and bearing drenched in oil they are absolutely leakage-free and can be mounted in any position. When mounting please take care that the flow air is filtered (see vacuum filters).



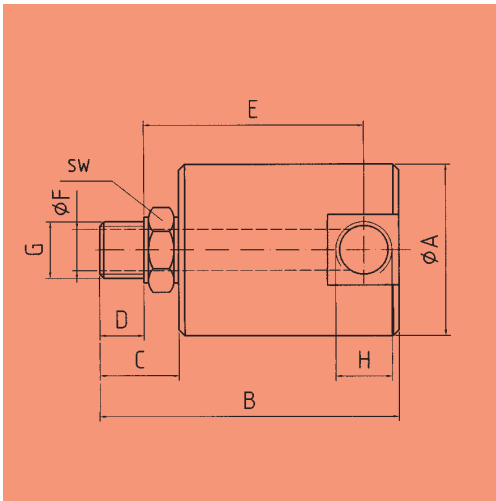
DVZ-R1/4-250U/m

Article numbers

Type	Revolving vacuum feeders
DVZ-R1/4-250U/MIN	1.54.2.0005
DVZ-R1/2-250U/MIN	1.54.2.0001
DVZ-R1/4-3500U/MIN	1.54.2.0006
DVZ-R1/2-3500U/MIN	1.54.2.0003
DVZ-R3/4-3500U/MIN	1.54.2.0009
DVZ-R1-3000U/MIN	1.54.2.0007

Technical Data

Type	Speed (1/ min)	Max. vacuum %	Weight (kg)	Temperature range (°C)
DVZ-R1/4-250U/MIN	250	93	0,3	5 - 120
DVZ-R1/2-250U/MIN	250	93	1,2	5 - 120
DVZ-R1/4-3500U/MIN	3500	93	0,4	5 - 120
DVZ-R1/2-3500U/MIN	3500	93	0,7	5 - 120
DVZ-R3/4-3500U/MIN	3500	93	1,6	5 - 120
DVZ-R1-3000U/MIN	3000	93	2,1	5 - 120



DVZ-R1/4-250U/min to DVZ-R1-3000U/min

Dimensions									
Type	A	B	C	D	E	F	G	H	SW
DVZ-R1/4-250U/MIN	38	83,3	28,5	16	40	8	G 3/8"	G 1/4"	22
DVZ-R1/2-250U/MIN	70	116	38	19	59	16	G 3/4"	G 1/2"	36
DVZ-R1/4-3500U/MIN	41,2	81	29	11,5	60	6,4	G 1/4"	G 1/4"	22
DVZ-R1/2-3500U/MIN	57,1	113	34	17,5	78	12,7	G 1/2"	G 1/2"	30
DVZ-R3/4-3500U/MIN	73	128	34	17	94	17,5	G 3/4"	G 3/4"	36
DVZ-R1-3000U/MIN	82,6	150	42	22	108	22,2	G 1"	G 1"	36

Description

Quick-change couplings are employed wherever suction circuits or suction plates need to be exchanged. The quick-change couplings are made of brass and completely leakage-free. They can be easily fit together. To separate them, simply pull the outer ring downwards and remove the plug coupling. The quick-change couplings lock on both sides and are also suitable for compressed air and liquids.



Quick-change couplings SWK-1/2 H and SWK-1/2 S

Article numbers

Type	Complete set (K)	Socket (F)	Plug (S)
SWK-1/4-	1.54.2.0050	1.54.2.0046	1.54.2.0042
SWK-1/2-	1.54.2.0051	1.54.2.0047	1.54.2.0043
SWK-3/4-	1.54.2.0052	1.54.2.0048	1.54.2.0044
SWK-1-	1.54.2.0053	1.54.2.0049	1.54.2.0045

Quick-change coupling SWK...-K

Complete set consisting of hat and plug coupling

Quick-change coupling SWK...-F

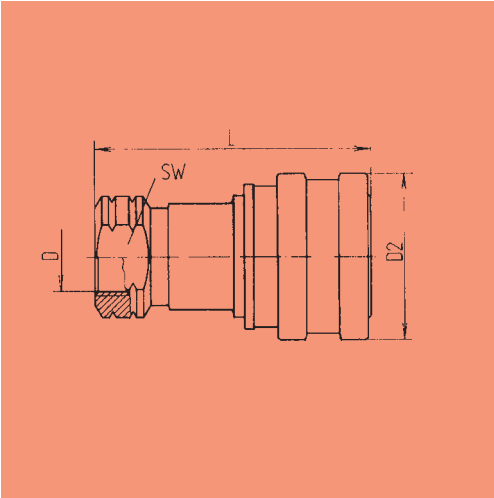
Coupling socket

Quick-change coupling SWK...-S

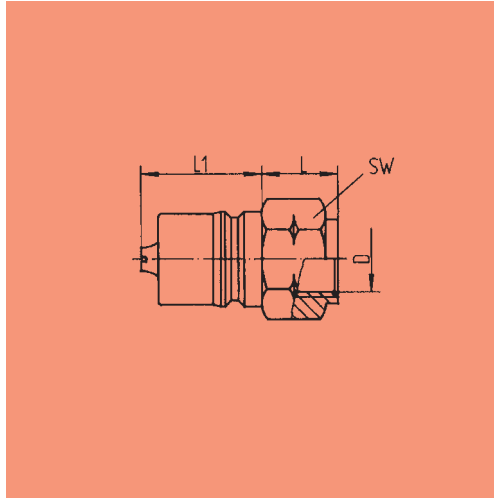
Coupling plug

Technical Data

Type	Thread	Design	Weight (kg)
SWK-1/4-F	R 1/4"	Brass	0,2
SWK-1/4-S	R 1/4"	Brass	0,1
SWK-1/2-F	R 1/2"	Brass	0,4
SWK-1/2-S	R 1/2"	Brass	0,2
SWK-3/4-F	R 3/4"	Brass	0,9
SWK-3/4-S	R 3/4"	Brass	0,5
SWK-1-F	R 1"	Brass	1,4
SWK-1-S	R 1"	Brass	0,8



Quick-change coupling SWK 1/4" to 1" - H (hat coupling)



Quick-change coupling SWK 1/4" to 1" - S (plug coupling)

Article numbers					
	D	D2	L	L1	SW
SWK-1/4-F	R 1/4"	30	58	---	19
SKK-1/4-S	R 1/4"	---	14	25	19
SWK-1/2-F	R 1/2"	48	75	---	29
SKK-1/2-S	R 1/2"	---	19	32	29
SWK-3/4-F	R 3/4"	56	89	---	34
SWK-3/4-S	R 3/4"	---	17	42	34
SKK-1-F	R 1"	66	105	---	41
SKK-1-S	R 1"	---	24	47	42

Description

Liquid-separator with manual drain and monitoring window for visual control.

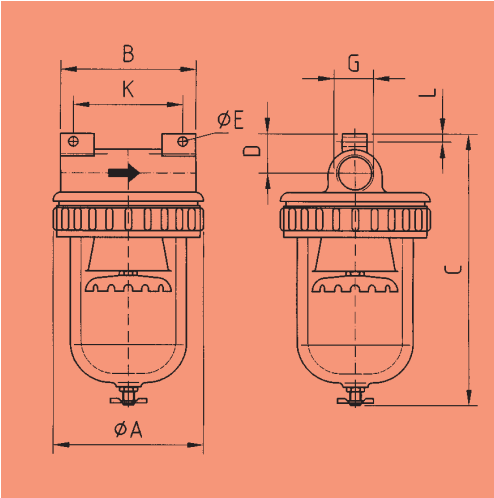
By means of a two-staged cleaning (draining of hard components and liquids) these separators are mainly used in fields of handling, in which the transported good is wet or moist (as outside, working with stones and woods). An additional filter with a pore-width of 50 - 75 µm guarantees the draining of the smallest hard components. When mounting, note the direction of flow (marked with an arrow)!



Water separators WA-R1/2 to WA-R1

Article numbers	
Type	Water separator
WA-R1/2	1.53.4.0001
WA-R3/4	1.53.4.0002
WA-R1	1.53.4.0006

Technical Data				
Type	Mounting pos.	Working temp. (°C)	Cont. capacity (ml)	Pressure (bar)
WA-R1/2	vertical	0 ÷ 50	80	- 1 to 16
WA-R3/4	vertical	0 ÷ 50	260	- 1 to 16
WA-R1	vertical	0 ÷ 50	260	- 1 to 16



Water separators WA-R1/2 to WA-R1

Dimensions								
Type	A	B	C	D	E	G	K	L
WA-R1/2	87	80	196	24	6	G 1/2"	50	6
WA-R3/4	87	90	213	38	6	G 3/4"	97	6
WA-R1	87	90	213	38	6	G 1"	97	6