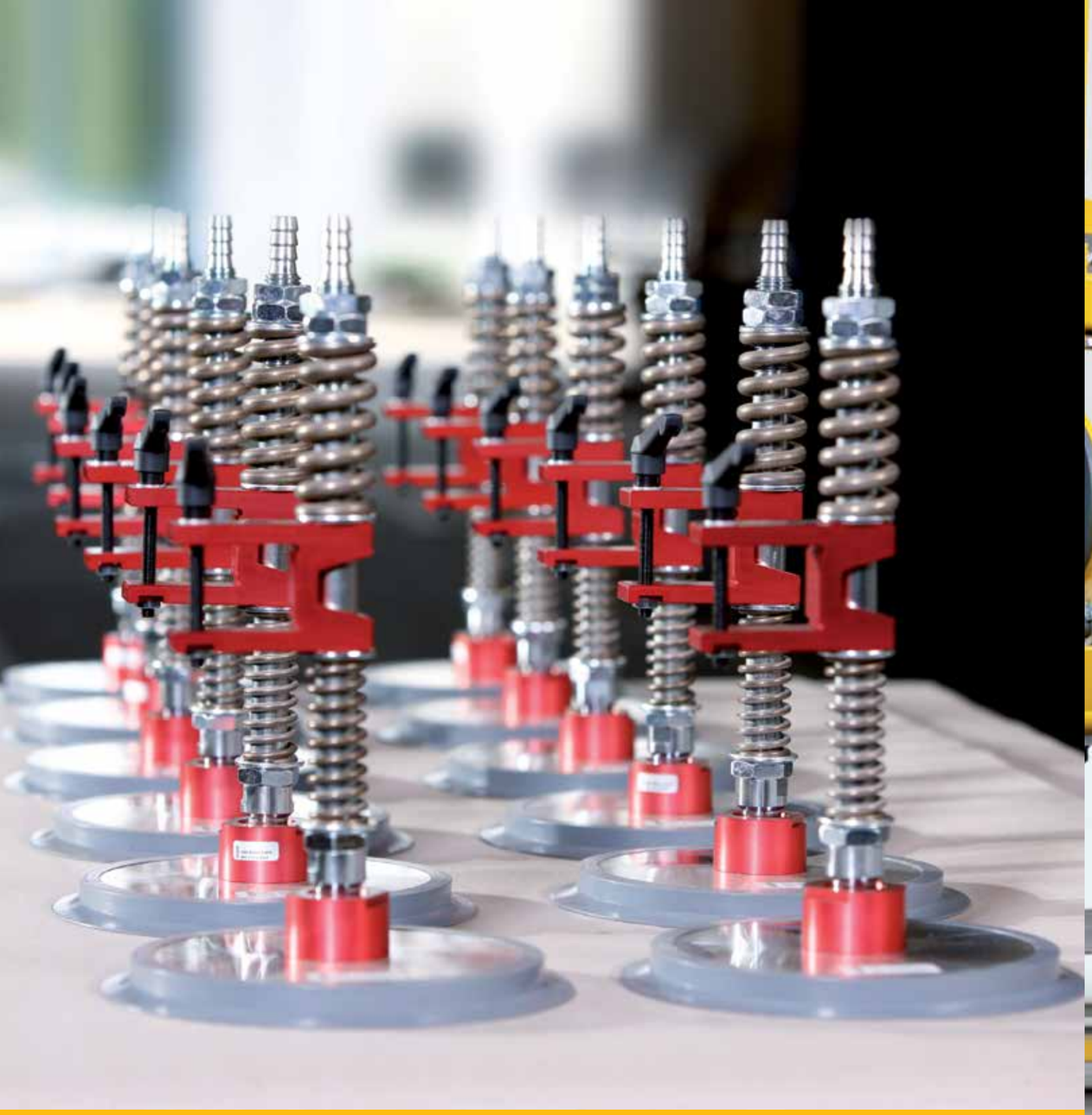

Vacuum-Components

Complete Catalog

FEZER – simply move more.

A third generation family business FEZER belongs to the leading companies for vacuum handling with a worldwide outstanding reputation.

We keep in close contact with our customers to simplify and increase the safety of their production processes with innovative and economical solutions.

To ensure this we have a team of highly motivated, competent and totally reliable employees.

Our high grade of customer support is guaranteed with quality management as per DIN ISO 9001. Thus we can permanently analyse business processes and perfectly adjust them to the ever increasing requirements.

Decide in favour for us for

- simple handling
- efficient, economical production processes and
- highest operational safety

true to our motto: simply move more.

Georg Komposch
Managing Director
Albert Fezer Maschinenfabrik GmbH

Michael Beisswenger
Shareholder and Chairman
Fezer Vacuum Products Ltd., Shanghai

FEZER
Simply move more.

FEZER – powerful and convincing

The name FEZER stands for the interaction of efficient high-quality products with extraordinary services and competent, cooperative advisory service.

Our products are designed for the multiple needs and requests of our customers.

With our know-how of many years we design technical masterstrokes that set standards.

We set the highest priority to operational safey, ergonomic handling and simplicity of the systems.

1925 Albert Fezer and Gottlieb Stoll together foand the company FESTO

1933 Albert Fezer leaves FESTO and foands Albert Fezer Maschinenfabrik

1935 First exhibition appearances make the company known to a wide clientele

1945 The wood handling field is expanded by cutting and trimming saws

1951 Federal minister Ludwig Erhard visits our booth on the Hannover Exhibition

1952 New building and relocation of the company to today's site in Esslingen-Zell

FEZER
Simply move more.

FEZER – innovative and competent

The highly motivated and competent FEZER employees have decades-long experiences in dimensioning and designing functional vacuum systems.

Constant internal training increases and optimizes this knowledge.

This helps to guarantee our customers a simple, efficient and economical system dimensioning based on state of the art technology.

1957 Looking for solutions to fixate wooden plates leads to entering the vacuum technology

1958 Founder Albert Fezer honours the 25th company anniversary

1962 Expansion of the vacuum technology by working stand which are part of the Fezer range up to this date

1965 Production start for the first vacuum lifters with vacuum pump and safety tank

1975 The wood working field is expanded by machines to handle roof beams

1976 Fezer builds the first large vacuum lifters with a capacity of several tons

FEZER
Simply move more.

FEZER – focussed on your requirements

Whether it is about advice, delivery or service support – FEZER helps you always quickly and reliably.

We support you with the installation and setting into operation on site and by regular maintenance ensure a high level of operational safety and availability of the installed systems

1983 Managing director Hans Feder congratulates the proprietress Elisabeth Fezer to the 50th company anniversary

1987 The vacuum lifter VacuBoy is awarded the Bavarian State's Award for outstanding accomplishments

1988 Building of a fully automatic inspection line for aluminium sheets for our customer Hoogovens

1991 Introduction of the first coil lifters for the transport of split strip rings

1996 Georg Komposch, grandson of the founder, joins the company

2001 Presentation of the new tube lifter VacuPowerlift with its modular system

The FEZER Company

Worldwide a strong Partner

FEZER
Simply move more.

FEZER – everywhere and always available

We have a wide sales structure to ensure that we are always available for our customers.

In Germany our field sales force covers the whole country so that they are always available to visit you personally.

Outside of Germany FEZER owns a daughter company in China and has long-term parterns in more than 40 countries.

Germany

Albert Fezer Maschinenfabrik GmbH
Hauptstrasse 37-39, 73730 Esslingen/Zell

Phone: +49 711 36009 0
Fax: +49 711 36009 40
E-Mail: fezer@fezer.de

China

Fezer Vacuum Products (Shanghai) Co., Ltd.
Unit 309, Building 1, Lane 285 Tian Gong Road,
Jinshan Industrial Zone, Shanghai, PRC

Phone: +49 711 36009 0
Fax: +49 711 36009 40
E-Mail: info@fezer.com

2004 Fezer presents their own aluminum track system for column slewing jibs and suspension track systems

2006 Expansion of the international sales structure by new partners in Eastern Europe and Asia

2008 FEZER invites their staff to a sea cruise on the Neckar for the 75th anniversary

2009 A large order from Russia deals FEZER a full house

2010 Presentation of the compact tube lifter VacuQuicklift with patented quick-release system for fast and simple release of loads

2012 Foundation of the 100% daughter Fezer Vacuum Products Ltd. in Shanghai, China

FEZER
Simply move more.

Vacuum Components and System Technology

With FEZER vacuum components you have almost everything under control. The huge range of various suction pads offers for almost any automatic process a suitable solution. Whether you have to move metal sheets, wooden plates, formed parts or solar wafers: with FEZER you work in an economical process-safe way.

Creative and competent salespeople are happy to advise you at any time and know the answer to your individual questions.

Ideal for many applications are also our complete solutions. You will receive a completely installed, designed and ready-for-connection suction spider to flange onto a robot or linear axes.

- **Suction Pads**
- **Connection Elements**
- **Vacuum Generators**
- **Valve Technology**
- **Vacuum Supervision**
- **Filter Elements**
- **Connection Elements**
- **System Technology**


1


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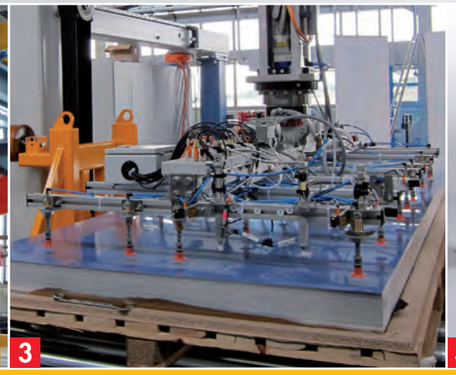
3


4

Vacuum components in Action

1 Suction spider in flat design on linear robot

2 Vacuum components for a concrete turning-frame

3 Suction spider with separation function for printing plates

4 simple suction spider designed with vacuum components

FEZER
Simply move more.

Vacuum Tube Lifter

Our vacuum tube lifters offer the best of two worlds: they not only use the vacuum to engage loads, but also to lift them and can thus dispense with additional lifting aids like chain hoists or rope balancers.

Fezer tube lifters work very dynamical and reach lifting speeds of up to 60m/min.

- **VacuQuicklift**
  This tube lifter for loads up to 35 kg allows and extremely quick handling of loads by the unique quick-release-system.

- **VacuPowerlift**
  VacuPowerlift is universally usable for cardboard boxes, wooden plates, drums, metal sheets, formed parts and many more.


1


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Vacuum Tube Lifters in Action

1 VacuPowerlift for the handling of raw chipboards

2 VacuQicklift for the handling of cardboard boxes

3 VacuQuicklft for palettising of boxed beverages

4 VacuPowerlift for handling solar panels

FEZER
Simply move more.

Vacuum Handling Technology

Vacuum lifters by FEZER belong to the most used products for handling all kinds of workpieces.

No matter whether it is about the loading of drums, the transport of steel sheets or the handling of coils and split strips: FEZER offers you a vast range of vacuum lifters for almost any application.

All lifters are in accordance with the CE regulations and convince by their robust construction, their high functionality combined with simple and ergonomic operation and the unique FEZER safety concept with patented main switch supervision.

- **VacuBoy**
  universal lifter up to 2.000 kg
- **VacuGiant**
  heavy-duty lifter for loads of up to 40.000 kg
- **VacuCoil**
  special lifter for coils and split strips
- **VacuWood**
  lifter for planks and gluelam beams
- **VacuPoro**
  universal lifter for porous workpieces

Vacuum Lifters in Action

1 VacuGiant for the transport of aluminum sheets

2 VacuCoil for feeding a punching machine

3 VacuBoy for feeding a laser cutting machine

4 VacuPoro for handling prefabricated house elements

FEZER
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Cranes and Manipulators

With our self-designed aluminum track system we offer you a complete solution for individual requirements.

Ideally coordinated components guarantee a smoothly running system for loads of up to 500 kg.

In connection with the easily rotatable consoles wall and slewing jibs with jib lenths of up to 6 metres can be manufactured.

There is a variety of suspensions and connection elements available for the suspension track systems. Thus areas of up to 50 m length and 8 m width can be covered.

With the splendid, rigid lift system Liftfix suspension track systems can pick up and set down loads precisely.
Additionally available for our systems are endlessly turning functions and electric drives for all travels.

- **Wall Slewing Jibs**
  capacity up to 500 kg, jib lengths up to 6.000 mm
- **Column Slewing Jibs**
  capacity up to 500 kg, jib lengths up to 6.000 mm
- **Suspension Track Systems**
  capacity up to 500 kg, individual area adjustment
- **Liftfix**
  rigid, telescopic lifting system up to 500 kg

Cranes and Manipulators in Action

1 Suspension track system for loading a laser cutting machine

2 Suspension track system with Liftfix for precise positioning

3 Wall slewing jib for loading a nipple machine

4 Column slewing jib for handling of synthetic plates

Working Stands

Vacuum working stands by FEZER offer many advantages.

We are, for instance, the ideal partner, when it comes to the manual treatment of small parts or component assembly and the swivel and turning feature guarantees an easy all-around treatment of engaged workpieces.

On complicated operation processes the working stands can be equipped with electrical drives and thus contribute to an efficient and safe process run.

- **VacuStand I**
  one-foot design with turning and swivel modules
- **VacuStand II**
  in two-foot design with swivel feature
- **VacuStand 180E**
  with electrical swivel drive
- **VacuStandMobil**
  with electrical lifting column and separate adaptors


1


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Working Stands in Action

1 VacuStand as holding device for grinding die-cast parts

2 VacuStandMobil with height adjustment for metal fixation

3 VacuStandMobil on battery power for the installation of mud wings

4 Vacuum turning device as installation aid for trailer roofs

Learn more at www.fezer.de
Just go online and visit our new website to receive further information on our products, applications and solutions.

At www.fezer.de you can find:

- Current News
- Exhibition Dates
- Detailed Product Information
- STEP files to Download
- Worldwide Contacts

We are looking forward to your visit!

Vacuum Components

Contents

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Basics

Basics of Vacuum Technology

Summary

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1. Basics
2. Suction Pads
3. Mounting Elements
4. Vacuum Generators
5. Valve Technology
6. Vacuum Supervision
7. Filter Elements
8. Connection Elements
9. System Technology

Vacuum Technology

Pressure and Conversion Tables

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Vacuum – An idea breaks through
The term „vacuum“ has been known for ages since Otto von Guerike carried out his famous test in 1654 with the Magdeburg Half Balls.

With the ever faster development in automation vacuum technology found its place in the industry only in the past 30 years. Today vacuum technology has established itself and is being used in many different areas. Whether heavy loads have to be transported safely and gently or chassis parts moved quickly - vacuum technology offers many possibilities and works absolutely safely and efficiently.

Vacuum – An idea breaks through
As per DIN 28400 vacuum is the condition of a gas whose pressure is less than the atmosphere. In the area of rough vacuum the underpressure is mostly stated in per cent or bar.

The conversion tables on the right show an overview of commonly used units and their conversion relations.

Vacuum and Altitudes
When dimensioning vacuum generators please consider in what altitude it is being used. The air pressure decreases ca. 12,5 mbar per 100m altitude. This means that a generator that achieves a pressure difference of 800mbar at an altitude of 200m, achieves only a pressure difference of ca. 660mbar at an altitude of 1500m.

Vacuum Technology

Pressure and Conversion Tables

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Conversion tables Vacuum/Pressure Units

Measurand		bar	mbar	kPa	at	Torr	m WS	psi	inch Hg
1 bar	(105 N/m2) =	1	1000	100	1,019	750,2	10,19	14,51	29,53
1 mbar	(102 N/m2) =	0,001	1	0,1	0,001019	0,7502	0,01019	0,01451	0,02953
1 kPa	(103 N/m2) =	0,01	10	1	0,01019	7,502	0,1019	0,1451	0,2953
1 at	(104 kp/m2) =	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 H2O) =	0,09807	98,07	9,807	0,01	73,57	1	1,423	2,896
1 psi	(lb/in2) =	0,06893	68,93	6,893	0,07029	51,71	0,7029	1	2,035
1 ich Hg	(in Hg) =	0,03387	33,87	3,387	0,03453	25,41	0,3453	0,4913	1

Pressure Conversion Table

Vacuum (%)	Press. abs. (mbar)	Atmospheric Pressure Difference at Normal Atmosphere as per 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

Air pressure p in dependance to Height h

Normal Atmosphere Height h (m)	Air Pressure p (mbar)
0	1013,2
200	989,5
400	966,1
600	943,2
800	920,8
1000	898,7
1200	877,2
1400	856,1
1600	835,3
1800	814,9
2000	795,0

Vacuum Technology

Vacuum Switching Circuits

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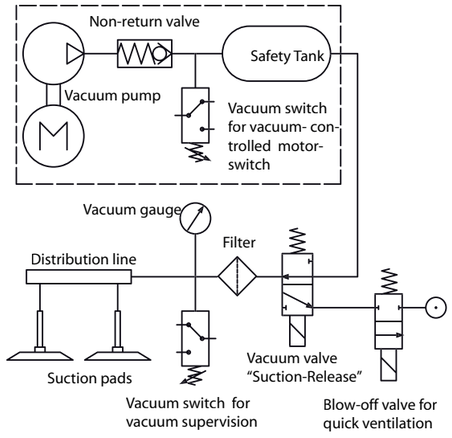
Vacuum Technology in Practice
Generally when choosing a vacuum system one should consider that higher underpressures lead to higher energy costs. In vacuum technology underpressures of 60-80% are the usual.

On porous workpieces, or on workpieces where no optimal sealing is possible, the operational vacuum may only achieve 20-30%. Here the vacuum is achieved with a blower.



Vacuum circuit with Vacuum Pump
Used when handling dense transport goods. The vacuum is generated by an electrical pump. The pump evacuates the safety tank, which is protected against the pump by a non-return valve. A vacuum switch supervises the vacuum in the safety tank.

A valve controls the function „suction-release“ which allows to engage or release loads. Additionally, the vacuum pump can automatically switch on and off dependant on the vacuum level (Eco-Module).

Vacuum Technology

Vacuum Switching Circuits

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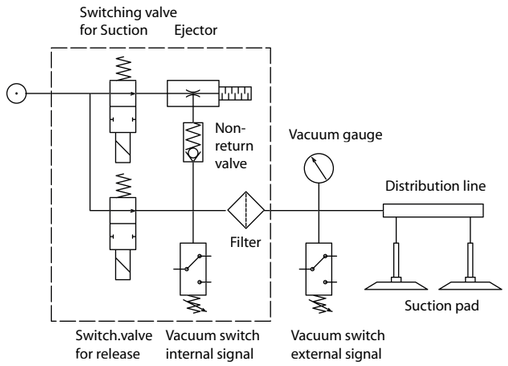
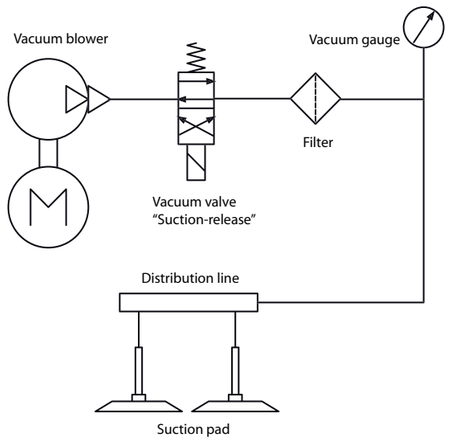


Vacuum circuit with Ejector
Ejectors generate the underpressure via pressurized air. The suction pads can be connected straight to the ejector. When the pressurized air is activated the load is engaged.

On complicated arrangements additional valves can be added to control single suction pads or suction circuits. There are ejectors with many additional functions like air itung eingebaut werden. Zudem gibt es die Ejectors mit einer Vielzahl an Zusatzfunktionen, wie Luftsparautomatik, integrierten Vacuumschalter oder Abblas-impuls.



Vacuum circuit with blower
Blower are mainly used when handling porous workpieces like MDF- or chip plates. The vacuum is generated by a blower. A valve controls the function „suction-release“.
Due to the high flow rate of blowers a safety tank does not make sense. On manual lifters the blower is equipped with a fly-wheel where the loads do not fall straight off in case of a power failure.

Vacuum Technology

Symbols and Designations

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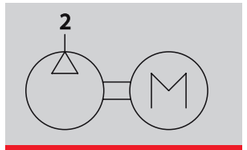
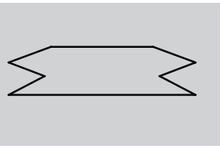
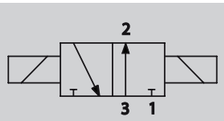
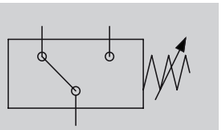


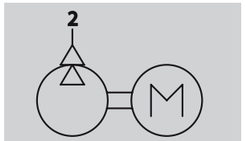
Vacuum pump


Bellows suction pad

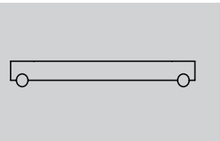


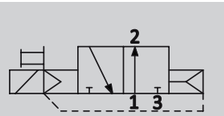
3/2-ways impulse valve


Vacuum switch mechan.

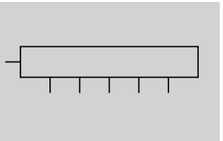


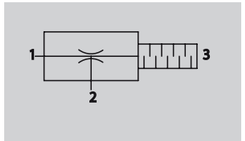
Vacuum blower


Suction pad froth rubber

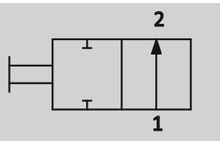


3/2 ways valve pre-set

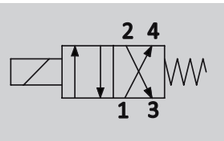

Distribution line



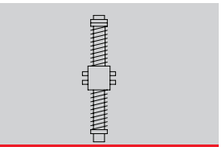
Ejector

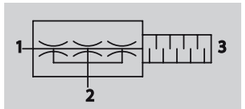


2/2 ways ball valve

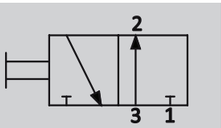


4/2 ways solenoid valve

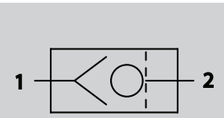

Spring bolt



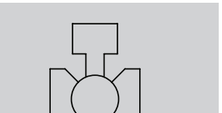
Multi stage ejector



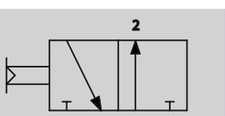
3/2 ways ball valve



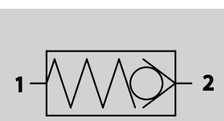
Flow valve


Suction plate retainer

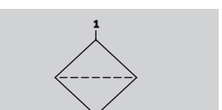

Flat suction cups



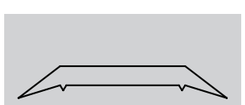
3/2 ways handslide valve

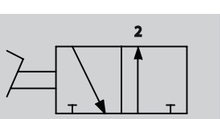


Non-return valves

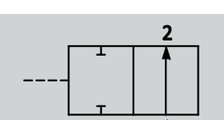


Filters


Flat cups w/ add. sealing

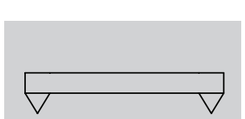


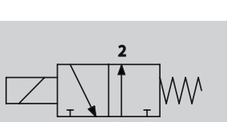
3/2 ways foot interruptor



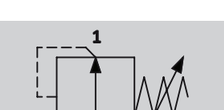
Touch valve

Safety tanks


Flat cups w/ pointed sealing



3/2 ways solenoid valve



Vacuum regulation valve


Vacuum gauge

Vacuum Technology

Definitions

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Abbreviations and Definitions

EH	Self stroke of the suction pad. Describes the stroke between the engaged and non engaged condition of the suction pad.
AR	Suction radius. States for which minimum work piece radius a suction pad can be used.
V (l)	Own volume of the vacuum components. Serves to decide the volume to be evacuated.
V_R (L)	Rest volume (secondary volume). Total volume of all vacuum components in the distribution system from vacuum valve onwards. Serves to decide on valve sizes and tank volume.
V_S (l)	Tank volume (primary volume). The tank volume is the volume between pump and valve. The larger the volume the shorter the suction times.
$\dot{V}$ (m^3/h)	Flow rate is indictated on all pumps, control valves and filter elements. Serves to define the evacuation times. Measured from -0,95 to 0 bar.
F_H,F_V (N)	horizontal and vertical carrying capacity. Depending on the application one distinguishes between these two capacities: Horizontal Capacity F_H: Load is in horizontal position Vertical Capacity F_V: Load is in vertical position (on swivel and turning-over motions). To calculate the vertical capacities the friction coefficients are important.
Ü	max. overhang when tranporting sheet material
n	Quantity of required suction cups required for the safe transport of materials.

Units and Conversion factors

V	1000 ml = 1 l = 1 dm^3= 0,001 m^3	
$\dot{V}$	1 m^3/h = 0,278 l/s = 16,667 l/min 1 l/min = 0,017 l/s = 0,06 m^3/h 1 l/s = 0,02 l/min = 3,6 m^3/h	
p	1 bar = 1000 mbar	
t	1 min = 60 s = 0,0167 h	
F	10 N = 1,02 kg 1 kg = 9,81 N	
F	= 0,1 x p x A	p (bar) A (mm^2)
	= 0,001 x p x A	p (%-Vak.) A (mm^2)
A	1 cm^2 = 100 mm^2 = 0,0001 m^2	
Δ p - 1 bar	= Δ p -1000 mbar = 100 % Vacuum	

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Layout of Vacuum components

Sealing types of Suction pads

Sealing types of suction pads
When choosing suction pads many ideas have to be considered before the best vacuum suction plate can be decided on. Of main importance is the sealing of the space between vacuum pad and workpiece. The better the sealing the more energy can be saved when generating the vacuum. There are various designs available, all of which have their special applications.

Flat sealing single

- smooth and even surfaces

Flat sealing with sealing ring

- slightly rough or scaled surfaces

Bellows sealing

- smooth and curved surfaces

Sponge rubber sealing

- very rough surfaces

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Layout of Vacuum components

Sealing types of Suction pads

Pointed sealing

- structured surfaces

Special sealings

- special applications

The following table offers an overview of common surfaces and the suitable sealing type.

Suction pads for diverse surface conditions

Sealing type	smooth	rough	structured	moist, oily	flexible	wavy
Flat sealing	+++	+	-	+	+	++
Flat cup with sealing ring	+++	+	-	+++	+	++
Bellows sealing	+++	+	-	+	+++	+++
Sponge rubber sealing	+++	+	++	+	+++	++
Pointed sealing	+++	+	+++	+	++	++
Special sealing	++	++	-	+	+++	++

not suitable	-
limited suitability	+
good suitablility	++
very good suitability	+++

Layout of Vacuum components

Quantity and Holding Forces of Suction Pads

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Quantity of Suction pads
The inherent stability of the materials determines the quantity of the suction pads. E.g., a 30mm thick steel sheet can be transported with less suction pads than a 1mm thick one.

To determine exactly the required quantity the max. overhang on minimum material thickness is put into relation to the max. length and width. Afterwards the holding forces of the suction pads can be easily determined.

max. possible overhang "O" on various materials (mm):

Material thickness	O on steel	O on alu	O on wood
< 0,5 mm	300	250	200
< 1,0 mm	400	300	300
< 2,0 mm	500	400	400
< 4,0 mm	750	600	600
< 8,0 mm	1.000	800	800
> 12,0 mm	1.500	1.250	1.250

The quantity of cups is determined thus:

Quantity main direction:	$n_L = \frac{L}{2 \times O}$
Quantity cross direction:	$n_W = \frac{B}{2 \times O}$
Gesamtanzahl:	$n_T = n_L \times n_W$

L Workpiece length
B Workpiece width
n_L Q'ty of cups main direction
n_B Q'ty of cups cross direction
n_G Total q'ty of cups
O max. possible overhang (see table)

The correct holding forces depend on the following factors:
If the quantity of suction pads has been determined their holding forces must be calculated. The holding forces depend on various factors of influence.

- Type of handling (horizontal or vertical)
- Occuring shearing acceleration forces (especially on automated and robot processes)
- Friction factor between workpiece and suction pad
- specified safety factors

Layout of Vacuum components

Quantity and Holding Forces of Suction Pads

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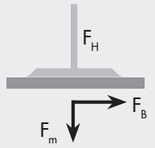
Horizontal Handling



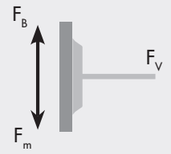
$F_H = (F_m + F_B) \times S = (m \times g + \frac{m}{\mu} \times a) \times S$

$F_H = m \times (g + \frac{a}{\mu}) \times S$

On low cross acceleration the following simplified formula applies :

$F_H = m \times g \times S$

Vertical Handling



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

$F_H = \frac{m}{\mu} \times (g + a) \times S$

On low vertical acceleration following simplified formula applies:

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

F_H total holding force (N) on horizontal handling
F_V total holding force (N) on vertical handling
F_m Mass force (N) of the workpiece
F_B occuring max. acceleration forces (N)
m weight of workpiece (kg)
g = 9,81 m/s2
a cross acceleration in (m/s2
μ friction factor against workpiece (see table) or as per tests
S safety factor S=2, as per DIN EN 13155

Friction forces of some surface conditions

Surface	Friction coefficient
rough to structured	0,6 - 0,7
smooth and dry	0,5
moist to wet	0,3 - 0,4
oily	0,1 - 0,2

Resulting holding force erende F_S per pad

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

F_S holding force per pad
F_H total holding force (N) on horizontal handling
F_V total holding force (N) on vertical handling
n_G total number of suction pads

Layout of Vacuum components

Material Overview

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The right makterial makes the difference
Important for the lifespan of a suction pad and the safety of the vacuum system is not only the right dimensioning but also the correct material. High temperatures, usage in the food industry or in connection with oils, acids or lyes demand special materials.

Depending on demand and usage you can easily choose the correct material from the below table:

Overview of different materials

	Perbunane (NBR)	Silicone (SI)	Neoprene (CR)	Vulkollane (VU)
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
Tensile extension (%)	ca. 500	ca. 500	ca. +50	ca. +50
Temperature resistance long-term (°C)	-10 ... +80	-20 ... +200	-10 ... +100	-30 ... +80
Temperature resistance short-term (°C)	-20 ... +120	-50 ... +230	-20 ... +130	0 ... +100
Color	black/grey	transparent/red	white/black	brown
Shore strength (A)	30 ... 80	30 ... 80	50	60 ... 90

not suitable	-
limited suitability	+
good suitability	++
very good suitability	+++

Layout of Vacuum components

Material Overview

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Norserex (NRS)	Polyurethane (PU)	Vitone (VI)	Natural rubber (NK)	Sponge rubber (M)	Froth rubber (Z)
++	+++	++	+	+	+
+	+++	+++	++	++	++
++	++	+++	+	+	+
-	+++	+++	+	+	+
-	+	+++	+	+	+
-	+	++	+	+	+
++	+	+	+++	++	+++
-	-	-	-	-	
+	+	+++	-	+++	++
+	+++	++	++	++	++
ca. 8	ca. 35	ca. 17	ca. 28	ca. 20	ca. 20
ca. 550	ca. 600	ca. 300	ca. 600	-	-
-10 ... +70	-30 ... +100	-10 ... +250	-20 ... +80	-10 ... +60	-10 ... +60
-10 ... +75	0 ... +120	-10 ... +320	-30 ... +100	-10 ... +90	-10 ... +90
grey	blue/grey	black	light brown	black/grey	red
20 ... 30	50 ... 60	60 ... 80	30 ... 60	30	30

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Layout of Vacuum components

Mounting of Suction Pads

Installation of suction pads
Often underrated and frequently the reason for inadequate functionality: an unsuitable suction plate installation. Important for the installation of suction pads is their assembly. On the one hand the load has to be engaged in a gentle and safe way, on the other hand an even distribution of the load must be guaranteed.

FEZER offer you not only a large range of suction pads but also suitable assemblies which are inter-exchangeable so that they can be used for all applications.

Overview of possible assemblies of suction pads

	Rigid connection	Articulated connection	Swinging connection	Uncushioned	Cushioned
					
	Simple and inexpensive solution, especially on inherent loads	Recommended on soft or slightly uneven parts. This connection allows an excellent adjustment to uneven surfaces.	Use for relatively long and narrow parts. This connection allows an excellent adjustment to the bending of the parts.	This assembly is being used for inherent loads or with a small number of pads. This assembly is inexpensive and in lots of cases absolutely sufficient.	The cushioning guarantees both setting down gently on materials and an excellent load distribution on transport. Especially recommendable on limp and wavy parts.
Small parts	+++	++	-	+++	+
Inherently stable loads	+++	++	+	+++	++
Formed, stable loads	++	+++	+	+++	+++
Limp parts	-	+++	+++	-	+++
Wavy parts	-	+++	+	-	+++
Sensitive surfaces	+	+++	-	-	+++
High acceleration	+++	+++	+	+++	+++
Height compensation	-	-	-	-	+++

not suitable	-
limited suitability	+
good suitability	++
very good s'bility	+++

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Layout of Vacuum components

Overview of Vacuum Generators

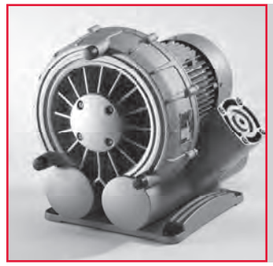
General Information
The basis of any vacuum system is the vacuum generation. There are many different vacuum generators available with their individual characteristics and advantages. To choose from are the following vacuum generators:

Vacuum pumps

- oilless pumps
- oil-lubricated pumps

Ejectors

- Inline-Ejectors
- Basic ejectors
- Compakt ejectors
- Multistage ejectors



Vacuum blowers

- with direct drive
- with belt drive
- with flywheel

Layout of Vacuum components

Overview of Vacuum Generators

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Which vacuum generator is the right one depends on several factors:

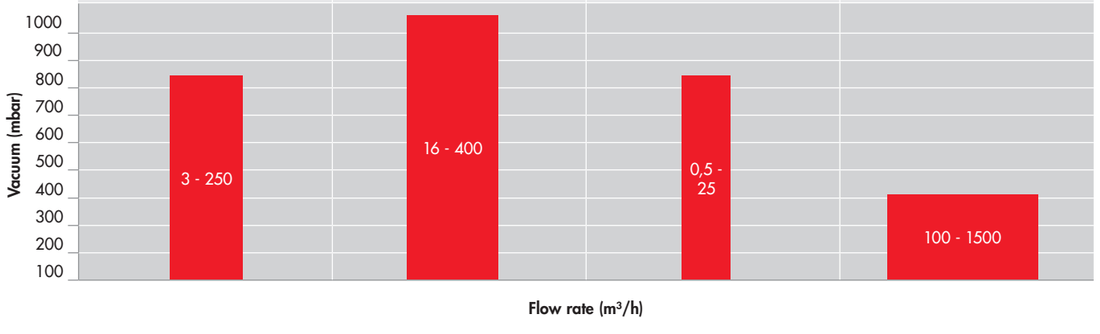
- Which way of creating the vacuum is preferred: electrical or pneumatic?
- How dense is the sealing against the workpiece's surface?
- Is the workpiece dense or porous?
- Which suction times are required?
- Do any specific requirements (ex-proof, noise reduction) have to be met?
- Which installation dimensions and positions must be considered?

Vacuum generators in comparison

	Trockenläufer	Ölläufer	Ejectors	Gebläse
Max. vacuum	high	very high	high	low
Max. flow rate	high	high	low	very high
Installation position	arbitrary	waagerecht	arbitrary	arbitrary
Own weight	high	very high	low	very high
Evacuation times	high	high	low	very high
Quiet running	good	good	good	small
Maintenance frequency	medium	high	small	small
Economy	good	very good	small	good

Vacuum generators and their applications

Oilless	Oil-lubricated	Ejectors	Blowers
■ Manual lifters ■ General clamping technique ■ Wood industry ■ Small volumes	■ Manual lifters ■ General clamping technique ■ Automatiion ■ Packing industry	■ Automation ■ Automotive ■ Robots ■ Clamping technique	■ Porous workpieces ■ (Chip, MDF-boards) ■ Short evacuation times ■ Large volumes



Layout of Vacuum components

Overview of Vacuum Generators

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Use of a vacuum safety tank
When dimensioning vacuum systems it is important to decide if a safety tank or a vacuum generator without tank can be used. Advantages with safety tanks are:

- Increases the operational safety, especially with a power failure
- shorter suction times
- smaller vacuum generator required (especially with few operating cycles) and thus energy- and cost-saving.
- High energy saving potential in connection with a vacuum-controlled motor switch (ECO-Module).

When using a vacuum safety tank it should be designed in a way that the total vacuum (primary and secondary volume) does not drop below a specified operational vacuum when the workpiece is being engaged. This guarantees that an adequate vacuum is available after every suction operation. The dimensioning of the pump size also depends on the cycle times.

Dimensioning of tank volume and pump size:

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

$$\dot{V} = 3{,}6 \times S \times \frac{V_S}{t}$$

V_S	(l)	Volume of the safety tank
V_R	(l)	Volume to be evacuated
S		Safety factor, recommended 2
t	(s)	Time between 2 operating cycles (t = 60s / cycle quantity)
$\dot{V}$	(m³/h)	Flow rate of vacuum pump

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Layout of Vacuum components

Vacuum Control

Dimensioning of control valves
To control the vacuum mainly 2/2- and 2/3-ways valves in manual or electrical design are being used.

- 2/2- ways valves to switch on and off individual suction pads for trans port goods with different sizes
- 3/2- ways valves for suction and release operations

Generally all the valves are divided into the following categories:

Electro pneumatic valves

- 5/2-ways valves
- Valve islands

Solenoid valves

- Solenoid valves
- Impulse valves

Manually-operated valves

- Ball valves
- Hand slide valves
- Reguation valves

Self-operated valves
- Flow valves
- Flow resistances
- Touch valves

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Layout of Vacuum components

Vacuum Control

Dimensioning table for vacuum valves:
After calculation of the rest volume (sum of distribution line, suction pad volume, filters, vacuum hoses, and other installed elements) the required flow diameter of the valve can be determined based on the required evacuation and ventilation time. This can be found out by using the following formula or just taken from the dimensioning table.

Required flow of the valves

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

V_R	(l)	Rest volume of the vacuum circuit
t	(s)	Eequired evacuation time
n		Quantity of valves
$\dot{V}$	(l/s)	Required valve flow

Required valve flow subject to rest volume and the required ventilation times:

Rest volume	0,1 S		0,25 s		0,5 s		1,0 s		1,5 s		2,0 s	
(l)	(m³/h)	l/s	(m³/h)	l/s	(m³/h)	l/s	(m³/h)	l/s	(m³/h)	l/s	(m³/h)	l/s
0,5	18	5	7	2	3,5	1	2	0,5	1	0,3	0,5	0,1
1	36	10	14	4	7	2	4	1	2	0,5	1	0,3
2	72	20	29	8	14	4	7	2	5	1,4	4	1,1
3	108	30	43	12	22	6	11	3	7	2,0	5	1,4
4	144	40	58	16	29	8	14	4	10	2,8	7	2,0
5	180	50	72	20	36	10	18	5	12	3,3	9	2,5
6	216	60	86	24	43	12	22	6	14	3,9	11	3,1
7	252	70	101	28	50	14	25	7	17	4,7	13	3,6
8	288	80	115	32	58	16	29	8	19	5,3	14	233
9	324	90	130	36	65	18	32	9	22	6,1	16	4,4
10	360	100	144	40	72	20	36	10	24	6,7	18	5,0
15	540	150	216	60	108	30	54	15	36	10	27	7,5
20	720	200	288	80	144	40	72	20	48	13	36	10
30	1.080	300	432	120	216	60	108	30	72	20	54	15
40	1.440	400	576	160	288	80	144	40	96	27	72	20
50	1.800	500	720	200	360	100	180	50	120	33	90	25

Example:

The rest volume of the vacuum circuit was calculated and amounts to 4,8 litres. The required suction time must not exceed 0,5 seconds. Based on the above table this results in:

Rest volume as per table: 5 l
required flow: 36 m³/h, resp. 10 l/s

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Layout of Vacuum components

Vacuum Supervision

Dimensioning of vacuum instruments
To ascertain that there is always a sufficient operational vacuum each vacuum systems uses vacuum switches and vacuum gauges. While the vacuum gauges are only used for visual supervision vacuum switches can both be used for supervision and regulation instruments.

On dense parts with few cycles the vacuum switch can also be employed for the vacuum-controlled running of the pump which conserves parts and reduces operation costs.

There a mechanical and electronical vacuum switches with different functions.

mechanical vacuum switch
- simple structure
- Measuring by membrane with spring
- sturdy design

electronical vacuum switch
- Measuring by PiezoQuarz technology
- precise and exact measuring
- several switching exits possible

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Layout of Vacuum components

Vacuum Supervision

Mechanical vacuum switches
are mainly used for vacuum handling applications where the emphasis is on reliability, longevity and sturdiness. The mechanical vacuum switches have a fixed switching point and a hysteresis of 5 ... 20%.

Electronical vacuum switches
The electronical vacuum switches work according to the Piezo-Quarz principle and are mainly used where exact switching points, short cycles and high exactness of repetitions are relevant. Further advantages of the electronical vacuum switches are the very small sizes and the stepless and very exact settings.

The vacuum switches are available in several designs:
- with teach function
- with digital display
- with 1 or 2 digital exits
- with analogous exit

Overview Vacuum Switches

Criteria for selection		Vacuum switch mechanical	Vacuum switch electronical
Exactness		good	very good
Exactness of repet.		good	very good
Size/weight		gib	small
Longevity		high	high
Measure range	(mbar)	-5 ... -1.000	0 ... -1.000
Temperature range	(°C)	0 ... 60	0 ... 60
Safety class		IP 55	IP 65

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Layout of Vacuum components

Vacuum Distribution and Flow Resistances

Vacuum distribution
When designing vacuum ditribution systems please note the following points:

- Sufficient dimensioning of the hose diameters
- Keep the distribution line as short as possible
- Choose direct ways, no unnecessary angles and exits
- Secure hose connections with hose clamps

Flow resistance in vacuum lines
When designing distribution lines please take care that the flow resistance in the distribution system is kept at a miniumum. The following table shows the recommended hose diameters subject to the number of distribution exits:

Dimensioning of the hose diameters subject to number of exits

Exit hose Ø	Distribution exits 2	4	8	16	32	64	128
D	0,71 x D	0,50 x D	0,35 x D	0,25 x D	0,18 x D	0,125 x D	0,09 x D

Values of the hose diameters subject to number of exits

Hose feed Type	Inside -Ø D	Number of exits / recommended hose innerØ 2 0,71 x D	4 0,50 X D	8 0,35 x D	16 0,25 x D	32 0,18 x D	64 0,125 x D
VS-4	3	2,1	1,5	1,0	---	---	---
VS-6	4	2,8	2,0	1,4	1,0	---	---
VS-8	6	4,3	3,0	2,1	1,5	1,1	---
VS-10	7	5,0	3,5	2,5	1,8	1,3	---
VS-12	8,5	6,0	4,3	3,0	2,1	1,5	1,1
VS-16	10	7,1	5,0	3,5	2,5	1,8	1,1
VS-10-T	12	8,5	6,0	4,0	3,0	2,0	1,5
VS-1/2-T	14	10,0	7,0	5,0	3,5	2,5	2,0
VS-3/4-T	20	14,0	10,0	7,0	5,0	3,5	2,5
VS-1-T	25	18,0	12,5	9,0	6,5	4,5	3,0
VS-38-T	38	23,0	19,0	13,0	9,50	7,0	4,5
VS-32	32	23,0	16,0	11,0	8,0	6,0	4,0
VS- 38	38	27,0	19,0	13,0	9,5	7,0	5,0
VS- 40	40	28,0	20,0	14,0	10,0	7,0	5,0
VS- 45	45	32,0	22,5	16,0	11,0	8,0	6,0
VS- 50	50	35,5	25,0	17,5	12,5	9,0	6,0
VS- 60	60	43,0	30,0	21,0	15,0	11,0	7,5

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Layout of Vacuum components

Checklist for Dimensioning of Vacuum Components

Company:					
Contact:					
City:					
Phone: / Fax:					
e-mail:					

Work piece data:

	☐ Metal	☐ Wood	☐ Glass	☐ Plastic	☐ Cardboard
	Others:				
Dimensions (mm, kg)	Length min: ..... - max:			Width min: ..... - max:	
	Thickness min: ..... - max:			Weight min: ..... - max:	
Surface	☐ smooth	☐ rough	☐ structured	☐ dry	☐ wet, oily
Suction capacity	☐ dense	☐	☐ porous	☐ suction test required	
Anomalies	Temperature (C°):			Others:	
Handling operation	☐ Horizontal	☐ Vertical		☐ 90° Swivelling	☐ 180° Turning
	☐ Automat. operation	Cycle time (s):		max. accel.forces (m/s²)	
Vacuum generation	☐ Oilless	☐ Oil-lubricated		☐ Blower	☐ Pneumatic (Ejector)
	☐ 230/400V, 50 Hz	☐ 230V, 50 Hz		☐ 24V=	..... V, ... Hz
Valve control	☐ Manual	☐ Electrical		☐ 24V=	☐ 230V, 50 Hz
	Others:				
Vacuum supervision	☐ Optical (Gauge)	☐ Mechanical (VSM)		☐ Elektronical(VSE/D)	☐ Analogous (VSA)
Additional data	.....				

For a fast and quick dimensioning please fax us this filled-in check list or contact our Sales at:
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Suction Pads

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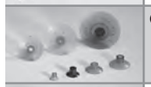
Suction Pads

Overview

Flat suction cup, round		Technical details		Application	Page
	G 10 - 60 soft	Dimensions Ø: Carrying capacity (N): Materials:	10 - 60 3,9 - 93 NBR, SI, CR	universal	2.5
	G 1,5 - 95 hard	Dimensions Ø: Carrying capacity (N): Materials:	10 - 60 3,9 - 93 NBR, SI, CR, PU, FKM	universal	2.7
	G 20 - 100 VU	Dimensions Ø: Carrying capacity (N): Materials:	20 - 100 19 - 300 VU	universal	2.9
	GR 75 - 115	Dimensions Ø: Carrying capacity (N): Materials:	75 - 115 170 - 380 NBR, SI	universal	2.11
	FSRL 110 - 290	Dimensions Ø: Carrying capacity (N): Materials:	110 - 290 50 - NBR, SI, PU, FKM	universal	2.13
	FSL 300 - 630	Dimensions Ø: Carrying capacity (N): Materials:	300 - 630 19 - 300 NBR, SI	universal	2.15

Flat suction plate, oval		Technical details		Application	Page
	FSL 20x60 - 80x370	Dimensions Ø: Carrying capacity (N): Materials:	20x60 - 80x370 50 - 570 NBR, SI	universal	2.17
	FSRL 100x200 - 350x600	Dimensions Ø: Carrying capacity (N): Materials:	100x200 - 350x600 750 - 7.350 NBR, SI	universal	2.19
	FSRL 100x200 - 350x600	Dimensions Ø: Carrying capacity (N): Materials:	450x850 18.750 NBR, SI	universal	2.21

Bellows suction cup, round		Technical details		Application	Page
	GF 30 - 115 soft	Dimensions Ø: Carrying capacity (N): Materials:	30 - 115 26 - 320 NBR, SI	universal	2.23
	GF 10 - 75 hard	Dimensions Ø: Carrying capacity (N): Materials:	10 - 75 1 - 197 NBR, SI, CR, PU, FKM	universal	2.25
	GF 20 - 85 VU	Dimensions Ø: Carrying capacity (N): Materials:	20 - 100 19 - 300 VU	universal	2.27
	GF 120 - 350	Dimensions Ø: Carrying capacity (N): Materials:	120 - 350 350 - 3230 NBR, SI	universal	2.29
	GFD 5 - 90	Dimensions Ø: Carrying capacity (N): Materials:	5 - 90 1 - 256 NBR, SI	universal	2.31
	GFD 20 - 85 VU	Dimensions Ø: Carrying capacity (N): Materials:	20 - 85 24 - 290 VU	universal	2.33

1. Basics
2. Suction Pads
3. Mounting Elements
4. Vacuum Generators
5. Valve Technology
6. Vacuum Supervision
7. Filter Elements
8. Connection Elements
9. System Technology

Suction pad

Overview

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Bellows suction plate, oval		Technical details		Application	Page
	GF 60x140 - 200x400	Dimensions Ø: Carrying capacity (N): Materials:	60x140 - 200x400 196 - 2345 NBR, SI	universal	2.35

Grip suction cup		Technical details		Application	Page
	GS 40 - 125	Dimensions Ø: Carrying capacity (N): Materials:	40 - 125 NBR, SI	Metal sheets oily, wet surfaces	2.37
	GS 30x60 - 70x140	Dimensions Ø: Carrying capacity (N): Materials:	30x60 - 70x140 NBR, SI	Metal sheets oily, wet surfaces	2.39
	GFS 40 - 125	Dimensions Ø: Carrying capacity (N): Materials:	40 - 125 NBR, SI	Metal sheets oily, wet surfaces	2.41
	GFS 30x60 - 70x140	Dimensions Ø: Carrying capacity (N): Materials:	30x60 - 70x140 NBR, SI	Metal sheets oily, wet surfaces	2.43

Bubble cap suction plate		Technical details		Application	Page
	GG 30 - 80	Dimensions Ø: Carrying capacity (N): Materials:	30 - 80 63 - 210 NBR, SI	curved surfaces	2.45
	GG 40x120 - 80x200	Dimensions Ø: Carrying capacity (N): Materials:	40x120 - 80x200 168 - 427 NBR, SI	curved surfaces	2.47

Soft suction cup		Technical details		Application	Page
	GP 20 - 140	Dimensions Ø: Carrying capacity (N): Materials:	10 - 60 3,9 - 93 NBR, SI, CR	Solar wafers, extremelyely thin materials	2.49

Foil suction cup		Technical details		Application	Page
	GO 20 - 140	Dimensions Ø: Carrying capacity (N): Materials:	10 - 60 3,9 - 93 NBR, SI, CR	Foils and packing	2.51

Structure suction plate		Technical details		Application	Page
	FSD 85 - 260	Dimensions Ø: Carrying capacity (N): Materials:	85 - 260 NOR, SI	Studded and checkered plates structured surfaces	2.53
	FSM 100 - 320	Dimensions Ø: Carrying capacity (N): Materials:	100 - 320 300 - 3580 M	Wood handling rough surfaces	2.55
	FSM 35x170 - 250x460	Dimensions Ø: Carrying capacity (N): Materials:	35x170 - 250x460 180 - 5420 M, Z	Wood handling rough surfaces	2.57
	FSGM 35x170 - 250x460	Dimensions Ø: Carrying capacity (N): Materials:	35x170 - 250x460 1130 - 5420 NBR, SI	gluelam beams rough surfaces	2.59

1. Basics
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Suction pad

Overview

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Separation suction plate		Technical details		Application	Page
	FSRLB 110 - 290	Dimensions Ø: Carrying capacity (N): Materials:	110 - 290 NBR, SI	Metal sheets Separation of sheets	2.61
	FSRLI 110 - 290	Dimensions Ø: Carrying capacity (N): Materials:	110 - 290 NBR, SI	Wood handling Separation of porous plates	2.63

Bar suction plate		Technical details		Application	Page
	FSLS 30x50 - 60x470	Dimensions Ø: Carrying capacity (N): Materials:	30x50 - 60x470 NBR, SI	Handling of bars and tubes	2.65
	FSLSE 120x300 - 200x750	Dimensions Ø: Carrying capacity (N): Materials:	120x300 ... 200x750 NBR		2.67

High temperature suction plate		Technical details		Application	Page
	FSHB 90 - 250	Dimensions Ø: Carrying capacity (N): Materials:	90 - 250 290 - 2080 VI	High tempereature applications	2.69

Rectangular suction plate		Technical details		Application	Page
	FSRL 30x100 - 30x300	Dimensions Ø: Carrying capacity (N): Materials:	30x100 - 30x300 3,9 - 93 NBR, SI	universal with protruding body	2.71
	EP 13x43 - 96x96	Dimensions Ø: Carrying capacity (N): Materials:	13x43 - 96x96 19 - 300 NBR	universal	2.73

Sealing profiles		Technical details		Application	Page
	RS 5 - PGR 20x25	Dimensions Ø: Materials:	5 - 15, 6x8 - 20x25 M, SI		2.75

Accessories for suction pads		Technical details		Application	Page
	Special glue			to glue on sealing profiles	2.77
	Textile cover	Dimensions Ø:	90 - 300	for sensitive surfaces	2.78

Flat suction cup, round

G10 - G60, soft design

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Description
Very elastic rubber cup with smooth pad (G) or burling pad (GN) and single lip. The suction pads are clipped on and can be easily removed when worn out. Please order connection nipples separately.

Application
- workpieces with flat and even surface
- workpieces with extremelyely sensitive surfaces

FS-G 10 ... FS-G 60, FS-GN38 ... FS-GN 47

Article numbers

Type	NBR-S	SI-T	CR-W	Connection nipple	
				M5-A	G1/4-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	1.31.1.0013	1.31.1.0014
FS-GN 38	1.01.1.0082	1.01.1.0083	1.01.1.0081	1.31.1.0013	1.31.1.0014
FS-G 47	1.01.1.0058	1.01.1.0059	1.01.1.0057	1.31.1.0013	1.31.1.0014
FS-GN 47	1.01.1.0085	1.01.1.0086	1.01.1.0084	1.31.1.0013	1.31.1.0014
FS-G 60	---	1.01.1.0072	1.01.1.0066	1.31.1.0006	1.31.1.0014

Technical details

Type	Holding force* (N)	Volume** (l)	Weight (kg)
FS-G 10	4	0,001	0,001
FS-G 20	13	0,001	0,001
FS-G 28	20	0,001	0,004
FS-G 38	46	0,002	0,004
FS-GN 38	45	0,002	0,004
FS-G 47	60	0,006	0,014
FS-GN 47	62	0,006	0,014
FS-G 60	93	0,014	0,016

** Specifications at 60 % vacuum w/o safety factor, on smooth, dry surfaces*
*** Volume with suction pad not engaged and unloaded*

Flat suction cup, round
G10 - G60, soft design
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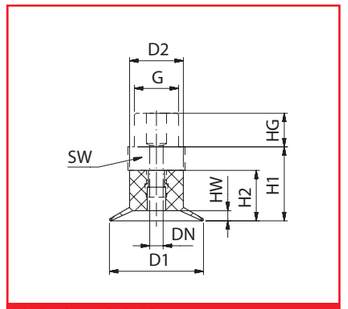
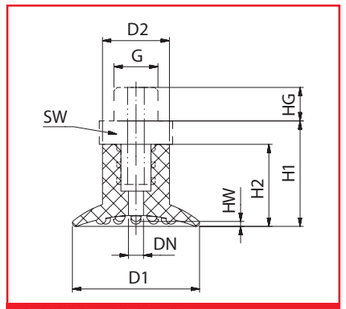


FS-G 10 ... FS-G 60



FS-GN 38 ... FS-GN 47

Dimensions

Type	D1	D2	DN	HW	H1	H2	HG	G	SW
FS-G 10	10	5	2,5	1,5	11	7,5	4,5	M5	8
FS-G 20	20	11,5	5,5	3	22	15	10	G1/4	17
FS-G 28	28	16	5,5	3	26	15	6	G1/4	17
FS-G 38	38	20	4,5	3,5	30,5	23,5	10	G1/4	19
FS-GN 38	38	20	4,5	4	30,5	23,5	10	G1/4	19
FS-G 47	47	20	4,5	5,5	33	26	10	G1/4	19
FS-GN 47	47	20	4,5	6	33	26	10	G1/4	19
FS-G 60	55	20	4	8	33	26	10	G1/4	19

Suitable connection elements

Type	Suction pad retainers		Holders			Suspension bolt
	SAS	SAK	Holding bracket	Bushing	Holding joint	
FS-G 10 ... FS-G28	SAS-M8x1-M5	---	HSW-M8x1-M5	HSB-M5-1/8	HSG-M8x1	FS ... -M8x1
FS-G 38 ... FS-G60	SAS-M12x1-1/4	---	HSW-M12x1-1/4	HSB-1/4-1/4	HSG-M12x1	FS ... -M12x1

Flat suction cup, round

G 2 - G 95 hard design

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Description
Very elastic rubber cup with smooth pad and single lip. The suction pads are clipped on the connection nipples and can be easily exchanged when worn out. Please order connection nipple separately.

Application
- workpieces with smooth and slightly rough surface
- many materials for various requirements
- low impring designs

FS-G 5...FS-G 95

Article numbers

Type	NBR-S	SI-T	CR-GR	PU-B	VI-S	Connection nipple	
						M5-A	G1/4-A
FS-G 5	1.01.1.0116	1.01.1.0118	1.01.1.0120	1.01.1.0121	1.01.1.0122	1.31.1.0002	---
FS-G 10	1.01.1.0004	1.01.1.0007	1.01.1.0001	1.01.1.0005	1.01.1.0134	1.31.1.0002	---
FS-G 15	1.01.1.0010	1.01.1.0013	1.01.1.0008	1.01.1.0011	1.01.1.0136	1.31.1.0002	---
FS-G 20	---	---	---	1.01.1.0019	1.01.1.0138	---	1.31.1.0005
FS-G 25	1.01.1.0140	1.01.1.0142	1.01.1.0144	1.01.1.0145	1.01.1.0146	---	1.31.1.0005
FS-G 30	1.01.1.0148	1.01.1.0149	1.01.1.0150	1.01.1.0046	1.01.1.0151	---	1.31.1.0005
FS-G 35	1.01.1.0153	1.01.1.0155	1.01.1.0157	1.01.1.0158	1.01.1.0159	---	1.31.1.0005
FS-G 40	1.01.1.0161	1.01.1.0162	1.01.1.0163	1.01.1.0055	1.01.1.0164	---	1.31.1.0005
FS-G 50	1.01.1.0166	1.01.1.0167	1.01.1.0168	1.01.1.0063	1.01.1.0169	---	1.31.1.0004
FS-G 60	1.01.1.0171	1.01.1.0172	1.01.1.0173	1.01.1.0070	1.01.1.0174	---	1.31.1.0006
FS-G 80	1.01.1.0176	1.01.1.0178	1.01.1.0180	1.01.1.0181	1.01.1.0182	---	1.31.1.0006
FS-G 95	1.01.1.0184	1.01.1.0186	1.01.1.0188	1.01.1.0189	1.01.1.0190	---	1.31.1.0006

Technical details

Type	Holding force* (N)	Volume** (l)	Weight (kg)
FS-G 5	0,6	0,001	0,001
FS-G 10	3,9	0,001	0,001
FS-G 15	6	0,001	0,005
FS-G 20	12,1	0,001	0,006
FS-G 25	23	0,001	0,007
FS-G 30	33	0,002	0,008
FS-G 35	46	0,004	0,010
FS-G 40	62	0,006	0,012
FS-G 50	78	0,008	0,025
FS-G 60	139	0,012	0,034
FS-G 80	275	0,025	0,048
FS-G 95	360	0,040	0,062

** Specifications at 60 % vacuum w/o safety factor, on smooth, dry surfaces*
*** Volume with suction pad not engaged and unloaded*

Flat suction cup, round
G 2 - G 95 hard design
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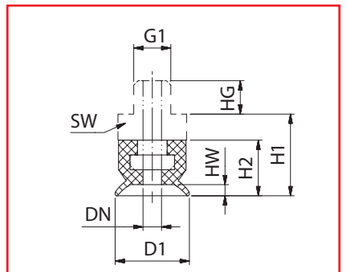
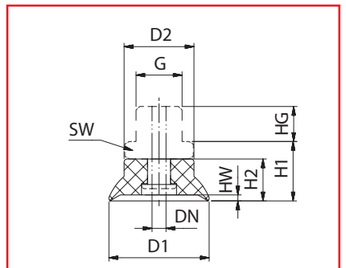
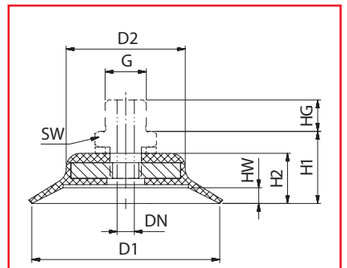


FS-G 5...FS-G 15



FS-G 20... FS-G 50



FS-G 60... FS-G 95

Dimensions

Type	D1	D2	DN	HW	H1	H2	HG	G	SW
FS-G 5	5	7,5	2,5	0,5	10	4	4,5	M5	8
FS-G 10	10	8,5	2,5	1,5	11,5	8	4,5	M5	8
FS-G 15	15	12	2,5	2	11,5	8	4,5	M5	8
FS-G 20	20	15	3	2	17,5	10	10	G1/4	17
FS-G 25	25	15	4	2	19	14	10	G1/4	17
FS-G 30	30	15	4	1,7	17	12	10	G1/4	17
FS-G 35	35	24	4	3	19	14	10	G1/4	17
FS-G 40	40	24	4	3,8	19	14	10	G1/4	17
FS-G 50	50	27	4	3,8	20	14	10	G1/4	17
FS-G 60	60	38	5,5	5	23	18	10	G1/4	17
FS-G 80	80	55	5,5	6	26	21	10	G1/4	17
FS-G 95	100	70	5,5	6	26	21	10	G1/4	17

Suitable connection elements

Type	Suction pad retainers		Holders			Suspension bolt
	SAS	SAK	Holding bracket	Bushing	Holding joint	
FS-G 5 ... FS-G 30	SAS-M8x1-M5	---	HSW-M8x1-M5	HSB-M5-1/8	HSG-M8x1	FS ... -M8x1
FS-G 35 ... FS-G 60	SAS-M12x1-1/4	---	HSW-M12x1-1/4	HSB-1/4-1/4	HSG-M12x1	FS ... -M12x1
FS-G 80 ... FS-G 95	SAS-M16x1,5-1/4	---	HSW-M16x1,5-1/4	HSB-1/4-1/4	HSG-M16x1,5	FS ... -M16x1,5

Flat suction cup, round

G 20 - G 100 Vulkollane

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Description

Very robust and extremelyely resistant flat suction cup made of vulkollane. Vulkollane has an up to 10-fold higher durabilty than other materials and is suitable for the highest strains. The cups are clipped on connection nipples and can be easily exchanged when worn out. Please order the connection nipples separately.

Application

- workpieces with smooth and flat surface
- highest strains, especially in multi-shift processes
- minimum abration and very good chemical resistance

FS-G 20 VU ... FS-G 100 VU

Article numbers

Type	VU-BR	Connection nipple	
		G1/8-A	G1/4-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

Technical details

Type	Holding force* (N)	Volume** (l)	Weight (kg)
FS-G 20 VU	16	0,001	0,008
FS-G 30 VU	45	0,003	0,012
FS-G 40 VU	68	0,006	0,014
FS-G 50 VU	82	0,009	0,025
FS-G 60 VU	128	0,016	0,034
FS-G 80 VU	225	0,063	0,085
FS-G 100 VU	300	0,180	0,120

** Specifications at 60 % vacuum w/o safety factor, on smooth, dry surfaces*
*** Volume with suction pad not engaged and unloaded*

Flat suction cup, round
G 20 - G 100 Vulkollane
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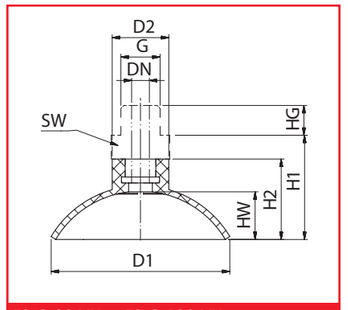

FS-G 20 VU ... FS-G 100 VU

Dimensions

Type	D1	D2	DN	HW	H1	H2	HG	G	SW
FS-G 20 VU	20	14	3	9	19	13	9,5	G1/8	14
FS-G 30 VU	30	19	3	14	23,5	17	9,5	G1/8	14
FS-G 40 VU	40	19	6	11	25	17	10	G1/4	17
FS-G 50 VU	50	19	6	16	30	22	10	G1/4	17
FS-G 60 VU	60	19	6	20	35	27	10	G1/4	17
FS-G 80 VU	80	24	6	19	34	26	10	G1/4	17
FS-G 100 VU	100	24	6	22	40	32	10	G1/4	17

Suitable connection elements

Type	Suction pad retainers		Holders			Suspension bolt
	SAS	SAK	Holding bracket	Bushing	Holding joint	
FS-G 20VU ... FS-G 30VU	SAS-M8x1-1/8	---	HSW-M8x1-1/8	HSB-1/8-1/8	HSG-M8x1	FS ... -M8x1
FS-G 40VU ... FS-G 60VU	SAS-M12x1-1/4	---	HSW-M12x1-1/4	HSB-1/4-1/4	HSG-M12x1	FS ... -M12x1
FS-G 80VU ... FS-G 100VU	SAS-M16x1,5-1/4	---	HSW-M16x1,5-1/4	HSB-1/4-1/4	HSG-M16x1,5	FS ... -M16x1,5

Flat suction cup, round

GR 75 - GR 115 with grooved pad

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Description
Very robust and resistant suction pad with grooved pad and vulcanized connection nipple. The grooved pad guarantees a wide support of the load and higher cross acceleration.

Application
- materials with smooth and even surface
- very thin materials
- applications with high cross acceleration
- imprint-free design in viton

FS-GR 75 ... FS-GR 115

Article numbers

Type	NBR-S	NBR-G	SI-T	VI-S
FS-GR 75	1.01.2.0006	1.01.2.0005	1.01.2.0007	1.01.2.0086
FS-GR 95	1.01.2.0010	1.01.2.0008	1.01.2.0011	1.01.2.0087
FS-GR 115	1.01.2.0003	1.01.2.0002	1.01.2.0004	1.01.2.0088

Technical details

Type	Holding force* (N)	Volume** (l)	Weight (kg)
FS-GR 75	170	0,03	0,06
FS-GR 95	270	0,04	0,09
FS-GR 115	380	0,06	0,13

** Specifications at 60 % vacuum w/o safety factor, on smooth, dry surfaces*
*** Volume with suction pad not engaged and unloaded*

Flat suction cup, round
GR 75 - GR 115 with grooved pad
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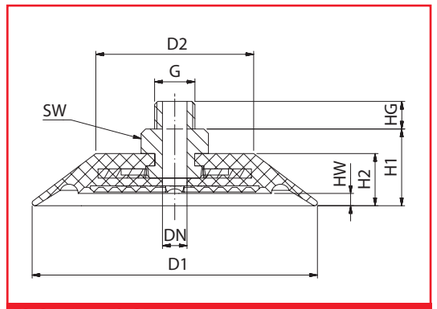

FS-GR 75 ... FS-GR 115

Dimensions

Type	D1	D2	DN	HW	H1	H2	HG	G	SW
FS-GR 75	73	31,5	8	4,5	17	35	9	G1/4	19
FS-GR 95	93	51,5	8	4,5	17	35	9	G1/4	19
FS-GR 115	113	70,5	8	5	17	35	9	G1/4	19

Suitable connection elements

Type	Suction pad retainer		Holders			Suspension bolt
	SAS	SAK	Holding bracket	Bushing	Holding joint	
FS-GR 75	SAS-M12x1-1/4	---	HSW-M12x1-1/4	HSB-1/4-1/4	HSG-M12x1	FS ... -M12x1
FS-GR 95 - FS-GR 115	SAS-M16x1,5-1/4	---	HSW-M16x1,5-1/4	HSB-1/4-1/4	HSG-M16x1,5	FS ... -M16x1,5

Flat suction plate, round

FSRL 120 - FSRL 600 with grooved pad

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Description

Robust and extremelyely resistant flat suction pad with grooved pad, long lips and additional inner sealing. The gasket is pulled over the body and can be easily exchanged when worn out. The suction pads are available with central (Z) or lateral (S) vacuum feed. Please order the connection screw
separately.

Application

- flat, sensitive workpieces
- smooth to slightly rough surfaces
- suitable for short suction resp. cycle times
- imprint-free design in viton

FSRL 120 ... FERL 600

Dimensions

Type	Suction pad			Replacement gasket			Connection screw	
	NBR-G	SI-T	VI-S	NBR-G	SI-T	VI-S	Type	Art.-Nr:
FSRL 120 Z	1.11.1.0248	1.11.1.0382	1.11.1.0530	2.11.2.0089	2.11.2.0102	2.11.2.0104	ASB-M16-20	1.31.2.0084
FSRL 120 S	1.11.1.0293	1.11.1.0384	1.11.1.0532	2.11.2.0114	2.11.2.0126	2.11.2.0174	AS-M16-22	1.31.2.0035
FSRL 170 Z	1.11.1.0250	1.11.1.0385	1.11.1.0526	2.11.2.0090	2.11.2.0119	2.11.2.0170	ASB-M16-20	1.31.2.0084
FSRL 170 S	1.11.1.0343	1.11.1.0356	1.11.1.0533	2.11.2.0127	2.11.2.0128	2.11.2.0175	AS-M16-22	1.31.2.0035
FSRL 230 Z	1.11.1.0251	1.11.1.0387	1.11.1.0525	2.11.2.0091	2.11.2.0120	2.11.2.0122	ASB-M16-20	1.31.2.0084
FSRL 230 S	1.11.1.0350	1.11.1.0388	1.11.1.0534	2.11.2.0130	2.11.2.0131	2.11.2.0176	AS-M16-22	1.31.2.0035
FSRL 290 Z	1.11.1.0271	1.11.1.0389	1.11.1.0531	2.11.2.0094	2.11.2.0121	2.11.2.0173	ASB-M16-20	1.31.2.0084
FSRL 290 S	1.11.1.0383	1.11.1.0390	1.11.1.0535	2.11.2.0132	2.11.2.0133	2.11.2.0177	AS-M16-22	1.31.2.0035
FSRL 340 S	1.11.1.0179	1.11.1.0142	1.11.1.0541		vulcanized		AS-M24x1,5-28	1.31.2.0069
FSRL 400 S	1.11.1.0180	1.11.1.0144	1.11.1.0542		vulcanized		AS-M24x1,5-28	1.31.2.0069
FSRL 500 S	1.11.1.0181	1.11.1.0146	1.11.1.0543		vulcanized		AS-M24x1,5-28	1.31.2.0069
FSRL 600 S	1.11.1.0182	1.11.1.0148	1.11.1.0544		vulcanized		AS-M24x1,5-28	1.31.2.0069

Z = central vacuum feed
S = lateral Vacuum feed

Technical details

Type	Holding force* (N)	Volume** (l)	Weight (kg)
FSRL 120 Z / S	550	0,06	0,33
FSRL 170 Z / S	1.150	0,12	0,55
FSRL 230 Z / S	2.100	0,20	1,00
FSRL 290 Z / S	3.040	0,78	1,95
FSRL 340 S	3.640	1,30	2,50
FSRL 400 S	4.000	2,60	6,00
FSRL 500 S	7.100	4,30	11,80
FSRL 600 S	9.500	6,80	18,40

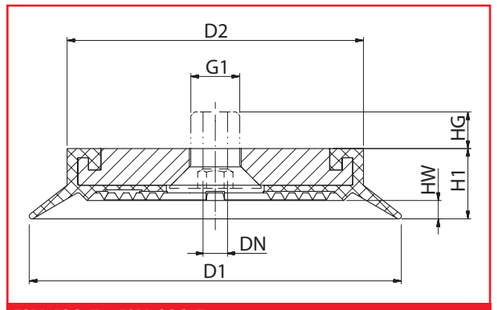
** Specifications at 60 % vacuum w/o safety factor, on smooth, dry surfaces*
*** Volume with suction pad not engaged and unloaded*

1. Basics
2. Suction Pads
3. Mounting Elements
4. Vacuum Generators
5. Valve Technology
6. Vacuum Supervision
7. Filter Elements
8. Connection Elements
9. System Technology

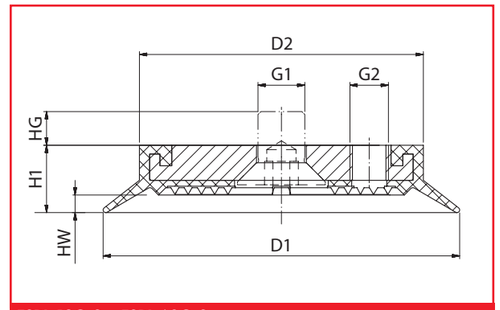
Flat suction plate, round

FSRL 120 - FSRL 600 with grooved pad

FEZER
Simply move more.



FSRL 12O-Z... FSRL 29O-Z



FSRL 12O-S... FSRL 60O-S

Dimensions

Type	D1	D2	DN	HW	H1	HG	G1	G2
FSRL 120 Z	120	97	8	6	23	8,5	M16	---
FSRL 120 S	120	97	---	6	23	8,5	M16	G1/4
FSRL 170 Z	170	147	8	6	23	8,5	M16	---
FSRL 170 S	170	147	---	6	23	8,5	M16	G1/4
FSRL 230 Z	220	197	8	6	23	13	M16	---
FSRL 230 S	220	197	---	6	23	13	M16	G1/2
FSRL 290 Z	290	267	8	6	23	13	M16	---
FSRL 290 S	290	267	---	6	23	13	M16	G1/2
FSRL 340 S	340	300	---	14	32	22	M20	G1/2
FSRL 400 S	400	300	---	17	46	22	M20	G1/2
FSRL 500 S	500	400	---	17	46	22	M24	G3/4
FSRL 600 S	600	500	---	17	46	22	M24	G3/4

Suitable connection elements

Type	Suction pad retainers		Suspension bolt
	SAS	SAK	
FSRL 120 ... FSRL 170	SAS-M16x1,5-M16	SAK-M16x1,5-M16	FS ... -M16x1,5
FSRL 230 ... FSRL 290	SAS-M20x1,5-M16	SAK-M20x1,5-M16	FS ... -M20x1,5
FSRL 340 ... FSRL 400	SAS-M20x1,5-M24x1,5	SAK-M20x1,5-M24x1,5	FS ... -M20x1,5*
FSRL 500 ... FSRL 600	SAS-M30x1,5-M24x1,5	SAK-M30x1,5-M24x1,5	FS ... -M30x1,5*

** Stössel ohne integrierte Vacuum feed*

Flat suction plate, round

FSL 300 - FSL 630

FEZER
Simply move more.

Description

Very robust and extremelyely resistant flat suction pad with long lip and additional inner sealings. The sealing is screwed onto the body and can be easily exchanged when worn out. The suction plates have a lateral vacuum feed.

Application

- large, heavy workpiece with scaled or slightly rough surface
- heavy-duty processes

FSL 300 ... FSL 630

Article numbers

Type	Suction pad		Replacement gasket		Connection screw	
	NBR-S	SI-T	NBR-S	SI-T	Type	Art.-Nr:
DP-FSL 300 S	1.11.1.0395	1.11.1.0396	1.13.1.0315	1.13.1.0316	AS-M24x1,5-30	1.31.2.0029
DP-FSL 360 S	1.11.1.0149	1.11.1.0150	1.13.1.0245	1.13.1.0031	AS-M24x1,5-30	1.31.2.0029
DP-FSL 400 S	1.11.1.0170	1.11.1.0171	1.13.1.0244	1.13.1.0034	AS-M24x1,5-30	1.31.2.0029
DP-FSL 450 S	1.11.1.0151	1.11.1.0152	1.13.1.0243	1.13.1.0040	AS-M24x1,5-30	1.31.2.0029
DP-FSL 540 S	1.11.1.0153	1.11.1.0154	1.13.1.0241	1.13.1.0043	AS-M24x1,5-30	1.31.2.0029
DP-FSL 630 S	1.11.1.0155	1.11.1.0156	1.13.1.0242	1.13.1.0046	on request	

Technical details

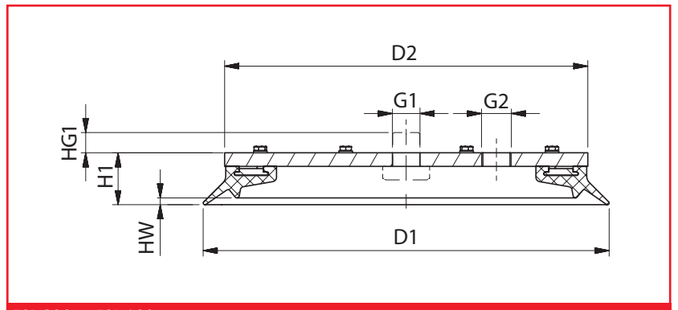
Type	Holding force* (N)	Volume** (l)	Weight (kg)
DP-FSL 300 S	2.900	1,3	7,0
DP-FSL 360 S	5.230	2,0	8,8
DP-FSL 400 S	6.140	2,3	10,1
DP-FSL 450 S	7.500	4,5	16,5
DP-FSL 540 S	12.500	6,8	27,8
DP-FSL 630 S	16.600	12,1	35,8

** Specifications at 60 % vacuum w/o safety factor, on smooth, dry surfaces*
*** Volume with suction pad not engaged and unloaded*

Flat suction plate, round

FSL 300 - FSL 630

FEZER
Simply move more.



FSL 300 ... FSL 630

Dimensions

Type	D1	D2	HW	H1	HG1	G1	G2
DP-FSL 300 S	300	262	6	34	12	25	G3/4
DP-FSL 360 S	360	322	6	34	12	25	G3/4
DP-FSL 400 S	400	346	14	29	12	25	G3/4
DP-FSL 450 S	450	375	17	50	15	25	G3/4
DP-FSL 540 S	540	465	17	50	15	25	G3/4
DP-FSL 630 S	630	555	17	50	15	25	G1

Suitable connection elements

Type	Suction pad retainers		Bolt type	Clamping plates
	SAS	SAK		
FSL 300 ... FSL 400	SAS-M20x1,5-M24x1,5	SAK-M20x1,5-M20x1,5	STG-M20x1,5	KP-AL-20
FSL 450 ... FSL 540	SAS-M30x1,5-M24x1,5	SAK-M30x1,5-M24x1,5	STG-M30x1,5	KP-AL-30
FSL 630	auf Anfrage			

Flat suction plate, oval

FSL 20x60 - FSL 80x370

FEZER
Simply move more.

Description
Robust and universally suitable flat suction pad with aluminum body and vulcanized sealing. Connection by flat head screws which allow to easily exchange the sealing. Please order connection screw separately.

Application
- workpieces with narrow suction areas (door elements, rods, bars, profiles)
- workpieces with smooth, slightly rough surfaces

FSL 20x60 ... FSL 80x370

Article numbers

Type	NBR-G	SI-T	Connection screw	
			Type	Art.-Nr:
DP-FSL 20x60	1.11.1.0398	1.11.1.0399	ASB-M5-20	1.31.2.0009
DP-FSL 30x80	1.11.1.0401	1.11.1.0402	ASB-M8-16	1.31.2.0068
DP-FSL 30x100	1.11.1.0404	1.11.1.0405	ASB-M8-16	1.31.2.0068
DP-FSL 35x200	1.11.1.0407	1.11.1.0408	AS-M5	1.31.2.0108
DP-FSL 40x110	1.11.1.0410	1.11.1.0411	ASB-M8-16	1.31.2.0068
DP-FSL 55x85	1.11.1.0413	1.11.1.0414	ASB-M12-17	1.31.2.0003
DP-FSL 55x100	1.11.1.0416	1.11.1.0417	ASB-M12-17	1.31.2.0003
DP-FSL 55x125	1.11.1.0419	1.11.1.0420	ASB-M12-17	1.31.2.0003
DP-FSL 55x150	1.11.1.0422	1.11.1.0423	AS-M8-16	1.31.2.0068
DP-FSL 55x200	1.11.1.0172	1.11.1.0426	AS-M8-16	1.31.2.0068
DP-FSL 55x250	1.11.1.0428	1.11.1.0429	AS-M8-16	1.31.2.0068
DP-FSL 55x300	1.11.1.0431	1.11.1.0432	AS-M8-16	1.31.2.0068
DP-FSL 80x250	1.11.1.0434	1.11.1.0435	AS-M16-22	1.31.2.0035
DP-FSL 80x370	1.11.1.0437	1.11.1.0438	AS-M16-22	1.31.2.0035

Technical details

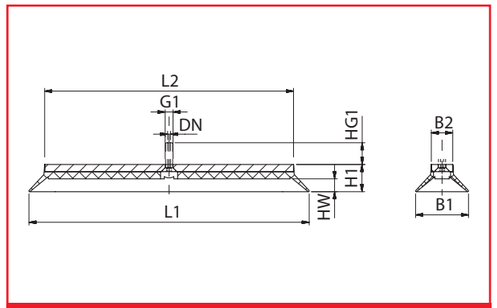
Type	Holding force* (N)	Suction radius min: (mm)	Volume** (l)	Weight (kg)
DP-FSL 20x60	50	18	0,004	0,018
DP-FSL 30x80	90	20	0,010	0,025
DP-FSL 30x100	110	25	0,015	0,030
DP-FSL 35x200	210	25	0,055	0,030
DP-FSL 40x110	140	30	0,035	0,045
DP-FSL 55x85	150	60	0,035	0,060
DP-FSL 55x100	175	60	0,040	0,080
DP-FSL 55x125	220	60	0,050	0,120
DP-FSL 55x150	270	60	0,060	0,150
DP-FSL 55x200	350	60	0,090	0,180
DP-FSL 55x250	440	60	0,100	0,210
DP-FSL 55x300	525	60	0,110	0,260
DP-FSL 80x250	670	80	0,190	0,370
DP-FSL 80x370	1.280	80	0,260	0,620

** Specifications at 60 % vacuum w/o safety factor, on smooth, dry surfaces*
*** Volume with suction pad not engaged and unloaded*

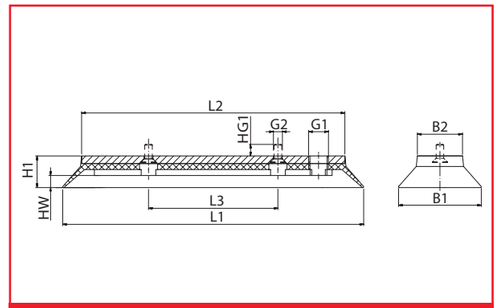
Flat suction plate, oval

FSL 20x60 - FSL 80x370

FEZER
Simply move more.



FSL 20x60 ... FSL 35x200



FSL 55x150 ... FSL 80x370

Dimensions

Type	L1	L2	L3	B1	B2	HW	H1	G1	HG1	G2
DP-FSL 20x60	60	50	---	20	12	4	13	5,2	15	---
DP-FSL 30x80	80	65	---	30	15	5	14	8,2	11	---
DP-FSL 30x100	100	85	---	30	15	5	15	8,2	11	---
DP-FSL 35x200	195	174	---	35	15	9	19	5,2	15	---
DP-FSL 40x110	110	85	---	40	15	10	20	8,2	11	---
DP-FSL 55x85	85	62	---	55	32	8	21	12,2	8	---
DP-FSL 55x100	100	70	---	55	32	9	21	12,2	8	---
DP-FSL 55x125	125	100	---	55	32	9	21	12,2	8	---
DP-FSL 55x150	150	125	50	55	32	9	21	G1/4	10	8,2
DP-FSL 55x200	200	160	75	55	32	9	21	G1/4	10	8,2
DP-FSL 55x250	250	220	90	55	32	8	21	G1/4	10	8,2
DP-FSL 55x300	300	277	110	55	32	8	21	G1/4	10	8,2
DP-FSL 80x250	250	222	90	80	52	10	26	G3/8	10	16,2
DP-FSL 80x370	370	347	140	80	52	10	26	G3/8	10	16,2

Suitable connection elements

Type	Suction pad retainer		Holders			Suspension bolt
	SAS	SAK	Holding bracket	Bushing	Holding joint	
FSL 20x60 ... 55x125	SAS-M12x1-M5	---	HSW-M12x1-M5	HSB-1/8-M5	HSG-1/8-M5	FS ... -M12x1*
FSL 35x200	SAS-M12x1-M5	---	---	---	---	FS ... -M12x1**
FSL 55x150 ... FSL 55x200	SAS-M12x1-M12	SAK-M12x1-M12	---	---	---	FS ... -M12x1**
FSL 55x250 ... FSL 80x370	SAS-M16x1,5-M16	SAK-M16x1,5-M16	---	---	---	FS ... -M16x1,5**

** Single connection, mounted with rotation-protected suspension bolt*
*** Double connection, mounted with 2 suspension bolts*

FEZER
Simply move more.

Flat suction plate, oval

FSL 100x200 - FSL 350x600

Description
Robust and universal flat suction pad with aluminum body and vulcanized sealing. Connection by flat head screws which allow to easily exchange the sealing. Please order connection screw separately.

Application
- heavy, narrow workpieces
- workpieces with smooth, slightly rough surface
- heavy-duty areas

FSL 100x200 ... FSL 350x600

Article numbers

Type	NBR-G	SI-T	Connection screw	
			Type	Art.-Nr:
DP-FSL 100x200	1.11.1.0157	1.11.1.0159	AS-M12-17	1.31.2.0010
DP-FSL 100x300	1.11.1.0161	1.11.1.0162	AS-M12-17	1.31.2.0010
DP-FSL 120x300	1.11.1.0440	1.11.1.0441	AS-M12-17	1.31.2.0010
DP-FSL 130x450	1.11.1.0443	1.11.1.0444	AS-M16-22	1.31.2.0035
DP-FSL 160x450	1.11.1.0449	1.11.1.0450	AS-M16-22	1.31.2.0035
DP-FSL 180x430	1.11.1.0452	1.11.1.0453	AS-M16-22	1.31.2.0035
DP-FSL 180x500	1.11.1.0455	1.11.1.0456	AS-M16-22	1.31.2.0035
DP-FSL 180x580	1.11.1.0458	1.11.1.0459	AS-M16-22	1.31.2.0035
DP-FSL 200x750	1.11.1.0461	1.11.1.0462	AS-M16-22	1.31.2.0035
DP-FSL 350x600	1.11.1.0464	1.11.1.0465	AS-M24x1,5-28	1.31.2.0069

Technical details

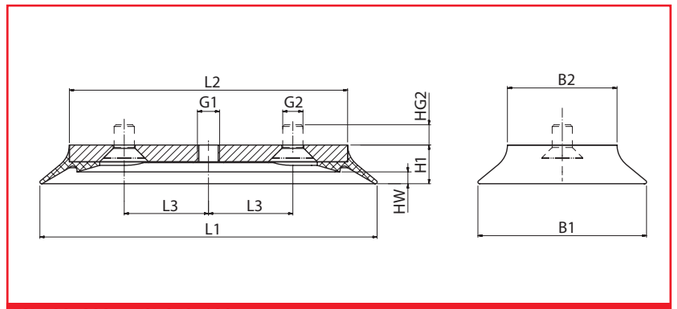
Type	Holding force* (N)	Volume** (l)	Weight (kg)
DP-FSL 100x200	750	0,17	1,25
DP-FSL 100x300	1.250	0,28	1,60
DP-FSL 120x300	1.450	0,32	1,80
DP-FSL 130x450	2.450	0,40	2,80
DP-FSL 160x450	3.000	0,60	3,60
DP-FSL 180x430	3.225	1,20	3,80
DP-FSL 180x500	3.750	1,40	4,10
DP-FSL 180x580	4.350	1,65	4,90
DP-FSL 200x750	6.250	4,20	6,30
DP-FSL 350x600	7.650	6,30	10,8

** Specifications at 60 % vacuum w/o safety factor, on smooth, dry surfaces*
*** Volume with suction pad not engaged and unloaded*

FEZER
Simply move more.

Flat suction plate, oval

FSL 100x200 - FSL 350x600



FSL 100x200 ... FSL 350x600

Dimensions

Type	L1	L2	L3	B1	B2	HW	H1	G1	HG1	G2	HG2
DP-FSL 100x200	200	160	50	100	65	7	23	G1/4	---	12,2	10
DP-FSL 100x300	300	260	100	100	65	7	23	G1/4	---	12,2	10
DP-FSL 120x300	300	245	100	120	70	6	24	G1/4	---	12,2	10
DP-FSL 130x450	450	415	150	130	100		23	G1/4	---	16,2	12
DP-FSL 160x450	450	413	150	160	120	9	26	G1/2	---	16,2	12
DP-FSL 180x430	430	395	150	180	150	6	20	G1/2	---	16,2	12
DP-FSL 180x500	500	433	150	180	120	20	42	G1/2	---	16,2	12
DP-FSL 180x580	580	544	200	180	150	10	26	G3/4	---	16,2	12
DP-FSL 200x750	750	663	200	200	120	29	54	G3/4	---	16,2	12
DP-FSL 350x600	600	460	200	350	210	30	55	G1	---	25	---

Suitable connection elements

Type	Suction pad retainers		Suspension bolt
	SAS	SAK	
FSL 100x200 ... FSL 120x300	SAS-M16x1,5-M12	SAK-M16x1,5-M12	FS ... -M16x1,5*
FSL 130x450 ... FSL 200x750	SAS-M20x1,5-M16	SAK-M20x1,5-M16	FS ... -M20x1,5*
FSL 350x600	SAS-M30x1,5-M20	SAK-M30x1,5-M20	FS ... -M20x1,5*

** Double connection, mounted with 2 suspension bolts*

Flat suction plate, oval

FSL 450x850

FEZER
Simply move more.

Description
Robust and resistant flat suction pad. The suction pad is available in two designs. With a steel body for heavy duty or an aluminum body for the handling of porous materials. Connection via thread in the body. Separate vacuum feed via designated connection threads.

Application
- extremelyely heavy and inherent workpieces
- workpieces with smooth, slightly rough surface
- handling of heavy, porous materials

FSL 450x850

Article numbers

Type	NBR-S	NBR-G	SI-R	VI-S
DP-FSL 450x850-ST	1.11.1.0119	---	1.11.1.0120	1.11.1.0225
DP-FSL 450x850-AL	---	1.11.1.0117	---	---

Technical details

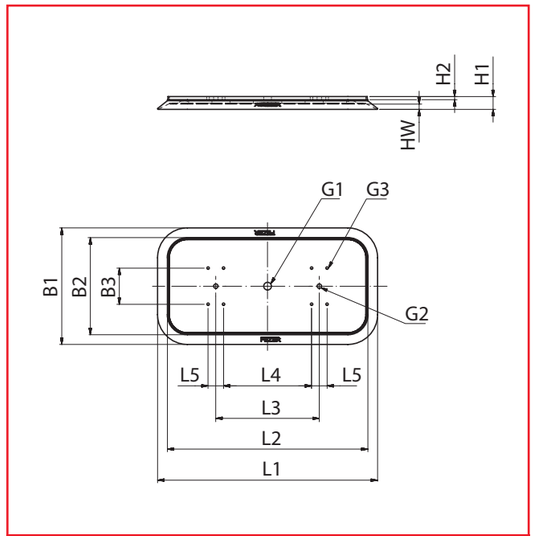
Type	Holding force* (N)	Volume** (l)	Weight (kg)
DP-FSL 450x850-ST	18.750	8,20	12,8
DP-FSL 450x850-AL	18.750	8,20	28,6

** Specifications at 60 % vacuum w/o safety factor, on smooth, dry surfaces*
*** Volume with suction pad not engaged and unloaded*

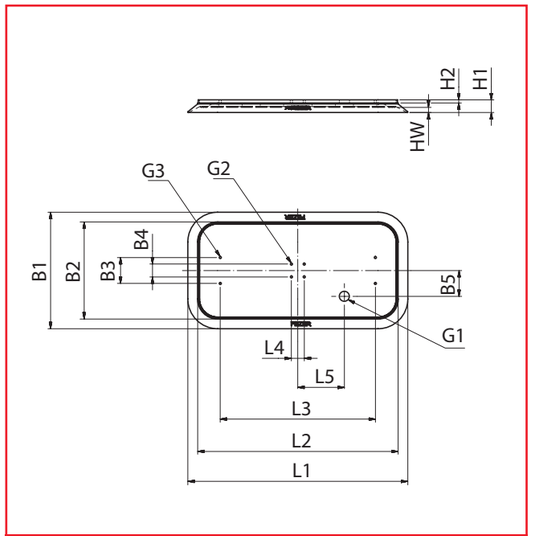
Flat suction plate, oval

FSL 450x850

FEZER
Simply move more.



FSL 450x850-ST



FSL 450x850-AL

Dimensions

Type	L1	L2	L3	L4	L5	B1	B2	B3	B4	B5	H1	H2	HW	G1	G2	G3
DP-FSL 450x850-ST	850	770	400	340	60	450	370	140	---	---	49	12	20	G1	M20	M12x1,75
DP-FSL 450x850-AL	850	770	600	50	180	450	370	100	50	100	49	12	20	G11/4	M10x1,5	M10x1,5

Bellows suction cup, round

GF 30 - GF 115 soft design

FEZER
Simply move more.

Description
Very elastic bellows suction pad with 1,5 bellows and inner support. The suction pads are clipped on the connection nipple and can be easily exchanged when worn out. Please order connection nipple separately.

Application
- workpieces with curved or uneven surfaces
- workpieces with extremelyely sensitive surfaces
- for especially soft setting-down
- autonomous height adjustment on uneven workpieces

FBS-GF 30 ... FBS-GF 115

Article numbers

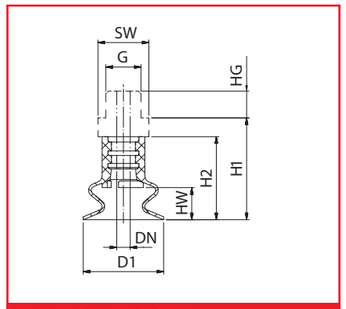
Type	NBR-S	SI-R	Connection nipple G1/4-A
FBS-GF 30	1.02.1.0018	1.02.1.0021	1.31.1.0014
FBS-GF 55	1.02.1.0028	1.02.1.0031	1.31.1.0014
FBS-GF 75	1.02.1.0034	1.02.1.0037	1.31.1.0014
FBS-GF 95	1.02.2.0003	1.02.2.0004	vulcanized
FBS-GF 115	1.02.2.0001	1.02.2.0002	vulcanized

Technical details

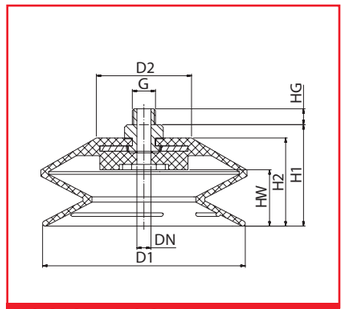
Type	Holding force* (N)	Suction radius min: (mm)	Volume** (l)	Weight (kg)
FBS-GF 30	26	25	0,01	0,008
FBS-GF 55	57	50	0,04	0,020
FBS-GF 75	92	70	0,10	0,045
FBS-GF 95	171	90	0,12	0,090
FBS-GF 115	320	110	0,21	0,150

** Specifications at 60 % vacuum w/o safety factor, on smooth, dry surfaces*
*** Volume with suction pad not engaged and unloaded*

Bellows suction cup, round
GF 30 - GF 115 soft design
FEZER
Simply move more.



FBS-GF 30 ... FBS-GF 75



FBS-GF 95 ... FBS-GF 115

Dimensions

Type	D1	D2	DN	HW	H1	H2	HG	G	SW
FBS-GF 30	30	22	5	11	31	38	10	G1/4	19
FBS-GF 55	55	22	5	15	41	48	10	G1/4	19
FBS-GF 75	75	22	5	19	41	48	10	G1/4	19
FBS-GF 95	95	28	8	22	36	44	9	G1/4	19
FBS-GF 115	115	54	8	32	50	58	9	G1/4	19

Suitable connection elements

Type	Suction pad retainer		Holders			Suspension bolt
	SAS	SAK	Holding bracket	Bushing	Holding joint	
FBS-GF 30 ... FBS-GF 75	SAS-M12x1-1/4	---	HSW-M12x1-1/4	HSB-1/4-1/4	HSG-M12x1-1/4	FS ... -M12x1
FBS-GF 95 ... FBS-GF 115	SAS-M16x1,5-1/4	---	HSW-M16x1,5-1/4	HSB-1/4-1/4	HSG-M12x1-1/4	FS ... -M16x1,5

Bellows suction cup, round

GF 10 - GF 75 hard design

FEZER
Simply move more.

Description
Very elastic and robust bellows suction pad with 1,5 bellows and inner support. The suction pads are clipped on the connection nipple aufgesteckt and can be easily exchanged when worn out. Please order connection nipple separately.

Application
- workpieces with curved or uneven surfaces
- for especially soft setting-down
- autonomous height adjustment on uneven workpieces
- various materials for different requirements

FBS-GF 10 S ... FBS-GF 75 S

Article numbers

Type	NBR-S	SI-T	CR-W	PU-B	FKM-S	NR-BR	Connection nipple	
							M5-A	G1/4-A
FBS-GF 10 S	1.02.1.0160	1.02.1.0161	1.02.1.0162	1.02.1.0003	1.02.1.0163	1.02.1.0164	1.31.1.0002	---
FBS-GF 15 S	1.02.1.0165	1.02.1.0166	1.02.1.0167	1.02.1.0008	1.02.1.0168	1.02.1.0169	1.31.1.0002	---
FBS-GF 20 S	1.02.1.0170	1.02.1.0171	1.02.1.0172	1.02.1.0014	1.02.1.0173	1.02.1.0174	---	1.31.1.0005
FBS-GF 30 S	1.02.1.0175	1.02.1.0176	1.02.1.0177	1.02.1.0019	1.02.1.0178	1.02.1.0179	---	1.31.1.0005
FBS-GF 40 S	1.02.1.0180	1.02.1.0181	1.02.1.0182	1.02.1.0024	1.02.1.0183	1.02.1.0184	---	1.31.1.0005
FBS-GF 50 S	1.02.1.0185	1.02.1.0186	1.02.1.0187	1.02.1.0195	1.02.1.0188	1.02.1.0189	---	1.31.1.0004
FBS-GF 75 S	1.02.1.0190	1.02.1.0191	1.02.1.0192	1.02.1.0035	1.02.1.0193	---	---	1.31.1.0006

Technical details

Type	Holding force* (N)	Suction radius min: (mm)	Volume** (l)	Weight (kg)
FBS-GF 10 S	1	10	0,001	0,001
FBS-GF 15 S	6	13	0,001	0,002
FBS-GF 20 S	12	18	0,003	0,005
FBS-GF 30 S	33	28	0,008	0,013
FBS-GF 40 S	55	37	0,014	0,019
FBS-GF 50 S	89	47	0,035	0,031
FBS-GF 75 S	197	70	0,010	0,090

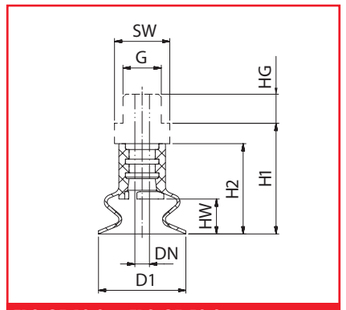
** Specifications at 60 % vacuum w/o safety factor, on smooth, dry surfaces*
*** Volume with suction pad not engaged and unloaded*

1. Basics
2. Suction Pads
3. Mounting Elements
4. Vacuum Generators
5. Valve Technology
6. Vacuum Supervision
7. Filter Elements
8. Connection Elements
9. System Technology

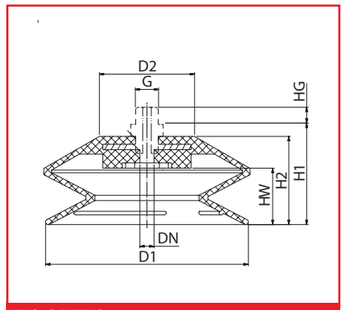
Bellows suction cup, round

GF 10 - GF 75 hard design

FEZER
Simply move more.



FBS-GF 10 S ... FBS-GF 50 S



FBS-GF 75 S

Dimensions

Type	D1	D2	DN	HW	H1	H2	HG	G	SW
FBS-GF 10 S	10	15	2,5	4	13,5	17	4,5	M5	8
FBS-GF 15 S	15	15	2,5	4	16	19,5	4,5	M5	8
FBS-GF 20 S	20	20	3	9	22	27	10	G1/4	17
FBS-GF 30 S	30	20	4	13	30,5	35,5	10	G1/4	17
FBS-GF 40 S	40	20	4	12,5	30,5	35,5	10	G1/4	17
FBS-GF 50 S	50	32	4	20	36,5	41,5	10	G1/4	17
FBS-GF 75 S	75	40	4	22	41	48	10	G1/4	17

Suitable connection elements

Type	Suction pad retainer		Holders			Suspension bolt
	SAS	SAK	Holding bracket	Bushing	Holding joint	
FBS-GF 10 ... FBS-GF 15	SAS-M8x1-M5	---	HSW-M8x1-M5	HSB-M5-1/4	HSG-M8x1-M5	FS ... -M8x1
FBS-GF 20 ... FBS-GF 75	SAS-M12x1-1/4	SAK-M12x1-1/4	HSW-M12x1-1/4	HSB-1/4-1/4	HSG-M12x1-1/4	FS ... -M12x1

FEZER
Simply move more.

Bellows suction cup, round

GF 20 - GF 85 Vulkollane

Description

Very robust and extremelyely resistant bellows suction pad with 1,5 bellows made of vulkollane. Vulkollane has an up to 10-fold higher durabilty than other materials and is suitable for the highest strains. The cups are clipped on connection nipples and can be easily exchanged when worn out. Please order the connection nipples separately.

Application

- workpieces with curved surfaces
- heavy-duty with minimum abrasion, especially on multi-shift processes
- Design „ÖN" with oil groove for higher cross acceleration on oily workpieces

FBS-GF 20 VU ... FBS-GF 85 VU-ÖN

Article numbers

Type	VU-BR	Connection nipple G1/4-A
FBS-GF 20 VU	1.02.1.0100	1.31.1.0021
FBS-GF 30 VU	1.02.1.0101	1.31.1.0021
FBS-GF 40 VU	1.02.1.0102	1.31.1.0020
FBS-GF 40 VU-ÖN	1.02.1.0103	1.31.1.0020
FBS-GF 50 VU	1.02.1.0104	1.31.1.0019
FBS-GF 60 VU	1.02.1.0105	1.31.1.0022
FBS-GF 60 VU-ÖN	1.02.1.0106	1.31.1.0022
FBS-GF 85 VU	1.02.1.0107	1.31.1.0022
FBS-GF 85 VU-ÖN	1.02.1.0108	1.31.1.0022

Technical details

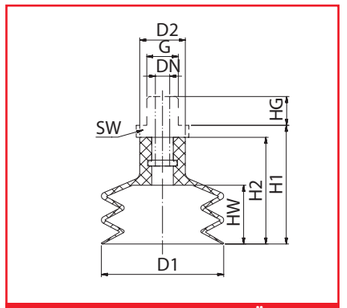
Type	Holding force* (N)	Suction radius min: (mm)	Volume** (l)	Weight (kg)
FBS-GF 20 VU	25	15	0,003	0,008
FBS-GF 30 VU	39	25	0,007	0,015
FBS-GF 40 VU	73	30	0,013	0,021
FBS-GF 40 VU-ÖN	75	30	0,015	0,020
FBS-GF 50 VU	106	40	0,028	0,028
FBS-GF 60 VU	160	50	0,034	0,039
FBS-GF 60 VU-ÖN	170	50	0,038	0,035
FBS-GF 85 VU	220	70	0,092	0,098

** Specifications at 60 % vacuum w/o safety factor, on smooth, dry surfaces*
*** Volume with suction pad not engaged and unloaded*

FEZER
Simply move more.

Bellows suction cup, round

GF 20 - GF 85 Vulkollane



FBS-GF 20 VU ... FBS-GF 85 VU-ÖN

Dimensions

Type	D1	D2	DN	HW	H1	H2	HG	G	SW
FBS-GF 20 VU	20	15	6	13	18	18	12	G1/4	19
FBS-GF 30 VU	30	15	6	13	22	22	12	G1/4	19
FBS-GF 40 VU	40	21	6	17	30	35	12	G1/4	19
FBS-GF 40 VU-ÖN	40	21	6	17	30	35	12	G1/4	19
FBS-GF 50 VU	51	23	6	24	41	49	10	G1/4	17
FBS-GF 60 VU	60	27	6	28	40	45	10	G1/4	19
FBS-GF 60 VU-ÖN	60	27	6	16	40	45	10	G1/4	19
FBS-GF 85 VU	85	30	6	26	57	62	10	G1/4	19
FBS-GF 85 VU-ÖN	85	30	6	26	57	62	10	G1/4	19

Suitable connection elements

Type	Suction pad retainer		Holders			Suspension bolt
	SAS	SAK	Holding bracket	Bushing	Holding joint	
FBS-GF 20 VU ... FBS-GF 30 VU	SAS-M8x1-1/4	---	HSW-M8x1-1/4	HSB-1/4-1/4	HSG-M8x1-1/4	FS ... -M8x1
FBS-GF 40 VU ... FBS-GF 60 VU	SAS-M12x1-1/4	---	HSW-M12x1-1/4	HSB-1/4-1/4	HSG-M12x1-1/4	FS ... -M12x1
FBS-GF 85 VU	SAS-M12x1-1/4	---	HSW-M16x1,5-1/4	HSB-1/4-1/4	HSG-M16x1,5-1/4	FS ... -M16x1,5

Bellows suction plate, round

GF 100 - GF 350

FEZER
Simply move more.

Description

Robust bellows suction pad with 1,5 bellows with aluminum body and vulcanized sealing. The suction pads have a central vacuum feed, starting with diameter 200 mm with lateral vacuum feed. Connection by flat head screws which allow a quick exchange of the sealing. Please order connection screw separately.

Application

- workpieces with curved, uneven surfaces
- for especially soft setting-down
- height adjustment on uneven workpieces

GF 100 ... GF 350

Article numbers

Type	NBR-G	SI-T	Connection screw	
			Type	Art.-Nr:
GF 100	1.12.1.0057	1.12.1.0058	ASB-M16-20	1.31.2.0084
GF 120	1.12.1.0005	1.12.1.0006	ASB-M16-20	1.31.2.0084
GF 150	1.12.1.0008	1.12.1.0009	ASB-M16-20	1.31.2.0084
GF 200	1.12.1.0011	1.12.1.0013	AS-M16-22	1.31.2.0035
GF 250	1.12.1.0015	1.12.1.0017	AS-M16-22	1.31.2.0035
GF 300	1.12.1.0019	1.12.1.0020	AS-M16-22	1.31.2.0035
GF 350	1.12.1.0022	1.12.1.0023	AS-M16-22	1.31.2.0035

Technical details

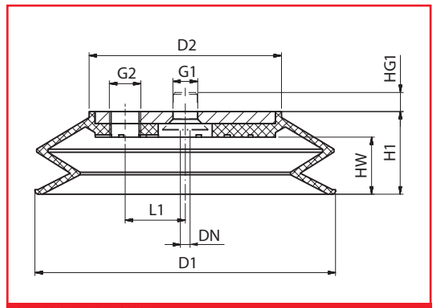
Type	Holding force* (N)	Ansaugradius min: (mm)	Volume** (l)	Weight (kg)
GF 100	220	180	0,15	0,12
GF 120	350	220	0,29	0,21
GF 150	500	280	0,48	0,40
GF 200	900	380	0,88	0,99
GF 250	1.630	480	1,40	1,85
GF 300	2.390	580	3,15	2,95
GF 350	3.230	680	4,20	4,40

** Specifications at 60 % vacuum w/o safety factor, on smooth, dry surfaces*
*** Volume with suction pad not engaged and unloaded*

Bellows suction plate, round

GF 100 - GF 350

FEZER
Simply move more.



GF 100 ... GF 350

Dimensions

Type	D1	D2	DN	HW	H1	HG1	G1	G2
GF 100	100	60	8	25	38	13	16,2	---
GF 120	120	82	8	35	55	13	16,2	---
GF 150	150	102	8	41	65	13	16,2	---
GF 200	200	128	8	38	55	13	16,2	G1/2
GF 250	250	178	8	42	59	13	16,2	G3/4
GF 300	300	200	8	58	78	13	16,2	G3/4
GF 350	350	248	8	57	82	13	16,2	G3/4

Suitable connection elements

Type	Suction pad retainer		Suspension bolt
	SAS	SAK	
GF 100 ... GF 150	SAS-M16x1,5-M16	SAK-M16x1,5-M16	FS ... -M16x1,5
GF 200 ... GF 350	SAS-M20x1,5-M16	SAK-M20x1,5-M16	FS ... -M20x1,5

Bellows suction cup, round

GFD 5 - GFD 90 hard design

FEZER
Simply move more.

Description

Very elastic and robust bellows suction pad with 2,5 bellows and inner support. The suction pads are clipped on the connection nipple and can be easily exchanged when worn out. Please order connection nipple separately.

Application

- workpieces with curved, uneven surfaces
- for especially soft setting-down
- autonomous height-adjustment on uneven workpieces
- various materials for various requirements

FBS-GFD 5 ... FBS-GFD 90

Article numbers

Type	NBR-S	NBR-S/AS	SI-T	SI-T/AS	CR-W	PU-B	FKM-S	NR-BR	Connection nipple	
									M5-A	G1/4-A
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	1.31.1.0002	---
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	---	1.02.1.0133	1.31.1.0002	---
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	1.31.1.0003	---
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	1.31.1.0003	---
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	1.31.1.0003	---
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	1.31.1.0003	---
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	---	1.31.1.0005
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	---	1.31.1.0005
FBS-GFD 60	1.02.1.0056	---	1.02.1.0058	---	---	1.02.1.0057	---	---	---	1.31.1.0005
FBS-GFD 90	1.02.1.0059	---	1.02.1.0061	---	---	---	---	---	---	1.31.1.0008

Technical details

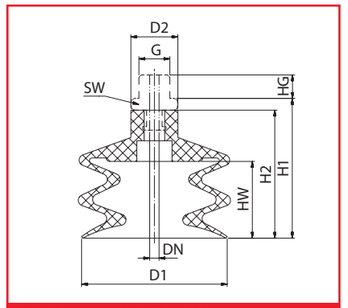
Type	Holding force* (N)	Suction radius min: (mm)	Volume** (l)	Weight (kg)
FBS-GFD 5	0,2	---	0,003	0,001
FBS-GFD 7	0,2	---	0,003	0,001
FBS-GFD 10	1,0	10	0,004	0,001
FBS-GFD 15	1,3	15	0,004	0,001
FBS-GFD 18	6,0	18	0,005	0,001
FBS-GFD 20	13	20	0,005	0,003
FBS-GFD 30	30	28	0,034	0,010
FBS-GFD 40	51	38	0,040	0,029
FBS-GFD 60	96	55	0,080	0,055
FBS-GFD 90	246	85	0,198	0,140

** Specifications at 60 % vacuum w/o safety factor, on smooth, dry surfaces*
*** Volume with suction pad not engaged and unloaded*

Bellows suction cup, round

GFD 5 - GFD 90 hard design

FEZER
Simply move more.



FBS-GFD 5 ... FBS-GFD 90

Dimensions

Type	D1	D2	DN	HW	H1	H2	HG	G	SW
FBS-GFD 5	5	6	2,5	3	10	13,5	4,5	M5	8
FBS-GFD 7	7	6	2,5	3	10	13,5	4,5	M5	8
FBS-GFD 10	9	9	3,5	3	15	17,5	4,5	M5	8
FBS-GFD 15	14	10	3,5	7	23	25,5	4,5	M5	8
FBS-GFD 18	18	10	3,5	8	23	25,5	4,5	M5	8
FBS-GFD 20	20	10	3,5	9	23	25,5	4,5	M5	8
FBS-GFD 30	32	18	3,5	14	37,5	42,5	10	G1/4	17
FBS-GFD 40	42	20	3,5	17	46	51	10	G1/4	17
FBS-GFD 60	62	22	3,5	23	55	60	10	G1/4	17
FBS-GFD 90	88	25	3,5	27	87,5	92,5	10	G1/4	17

Suitable connection elements

Type	Suction pad retainer		Holders			Suspension bolt
	SAS	SAK	Holding bracket	Bushing	Holding joint	
FBS-GFD 5 ... FBS-GFD 30	SAS-M8x1-M5	---	HSW-M8x1-M5	HSB-M5-1/4	HSG-M8x1-M5	FS ... -M8x1
FBS-GFD 40 ... FBS-GFD 60	SAS-M12x1-1/4	---	HSW-M12x1-1/4	HSB-1/4-1/4	HSG-M12x1-1/4	FS ... -M12x1
FBS-GFD 90	SAS-M16x1,5-1/4	---	HSW-M16x1,5-1/4	HSB-1/4-1/4	HSG-M16x1,5-1/4	FS ... -M16x1,5

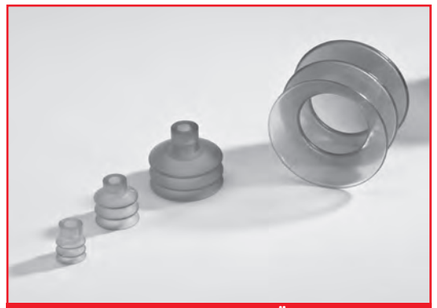
Bellows suction cup, round

GDF 20 - GFD 85 Vulkollane

FEZER
Simply move more.

Description

Very robust and extremelyely resistant bellows suction pad with 2,5 bellows made of vulkollane. Vulkollane has an up to 10-fold higher durabilty than other materials and is suitable for the highest strains. The cups are clipped on connection nipples and can be easily exchanged when worn out. Please order the connection nipples separately.



FBS-GFD 20 VU ... FBS-GFD 85 VU-ÖN

Application

- workpieces with curved surfaces
- heavy-duty with minimum abrasion, especially in multi-shift processes
- Design „ÖN" with oil groove for higher cross acceleration in oily workpieces

Article numbers

Type	VU-BR	Connection nipple G1/4-A
FBS-GFD 20 VU	1.02.1.0110	1.31.1.0021
FBS-GFD 30 VU	1.02.1.0111	1.31.1.0021
FBS-GFD 50 VU	1.02.1.0112	1.31.1.0020
FBS-GFD 60 VU	1.02.1.0113	1.31.1.0020
FBS-GFD 85 VU	1.02.1.0114	1.31.1.0022
FBS-GFD 85 VU-ÖN	1.02.1.0115	1.31.1.0022

Technical details

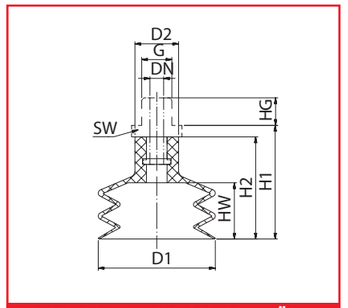
Type	Holding force* (N)	Suction radius min: (mm)	Volume** (l)	Weight (kg)
FBS-GFD 20 VU	24	20	0,004	0,019
FBS-GFD 30 VU	38	30	0,011	0,024
FBS-GFD 50 VU	95	45	0,048	0,031
FBS-GFD 60 VU	150	55	0,063	0,042
FBS-GFD 85 VU	280	80	0,170	0,112
FBS-GFD 85 VU-ÖN	290	80	0,170	0,112

** Specifications at 60 % vacuum w/o safety factor, on smooth, dry surfaces*
*** Volume with suction pad not engaged and unloaded*

Bellows suction cup, round

GDF 20 - GFD 85 Vulkollane

FEZER
Simply move more.



FBS-GFD 20 VU ... FBS-GFD 85 VU-ÖN

Dimensions

Type	D1	D2	DN	HW	H1	H2	HG	G	SW
FBS-GFD 20 VU	20	12	6	16	25	33	12	G1/4	19
FBS-GFD 30 VU	30	12	6	16	32	38	12	G1/4	19
FBS-GFD 50 VU	51	15	6	20	45	51	12	G1/4	19
FBS-GFD 60 VU	60	15	6	31	75	81	12	G1/4	19
FBS-GFD 85 VU	85	21	6	41	98	104	10	G1/4	19
FBS-GFD 85 VU-ÖN	85	21	6	41	86	92	10	G1/4	19

Suitable connection elements

Type	Suction pad retainer		Holders			Suspension bolt
	SAS	SAK	Holding bracket	Bushing	Holding joint	
FBS-GFD 20 VU ... FBS-GFD 30 VU	SAS-M8x1-1/4	---	HSW-M8x1-1/4	HSB-1/4-1/4	HSG-M8x1-1/4	FS ... -M8x1
FBS-GFD 50 VU ... FBS-GFD 60 VU	SAS-M12x1-1/4	---	HSW-M12x1-1/4	HSB-1/4-1/4	HSG-M12x1-1/4	FS ... -M12x1
FBS-GFD 85 VU	SAS-M16x1,5-1/4	---	HSW-M16x1,5-1/4	HSB-1/4-1/4	HSG-M16x1,5-1/4	FS ... -M16x1,5

Bellows suction plate, oval

GF 60x140 - GF 200x400

FEZER
Simply move more.

Description

Robust bellows suction pad in 1,5 bellows design with aluminum body and vulcanized sealing.The suction pads have central or lateral vacuum feed. Connection via flat head screws which allow a quick exchange of the pad when worn out. Please order the connection screw separately.

Application

- narrow workpieces with curved, uneven surfaces
- for especially soft setting-down
- height-adjustment on uneven workpieces

GF 60x140 ... GF 200x400

Article numbers

Type	NBR-G	SI-T	Connection screw	
			Type	Art.-Nr:
GF 60x140	1.12.1.0025	1.12.1.0026	ASB-M8-16	1.31.2.0068
GF 70x150	1.12.1.0065	1.12.1.0066	ASB-M8-16	1.31.2.0068
GF 100x200	1.12.1.0002	1.12.1.0003	AS-M16-25	1.31.2.0013
GF 100x350	1.12.1.0061	1.12.1.0062	AS-M16-25	1.31.2.0013
GF 150x300	1.12.1.0059	1.12.1.0060	AS-M16-25	1.31.2.0013
GF 200x400	1.12.1.0063	1.12.1.0064	AS-M16-25	1.31.2.0013

Technical details

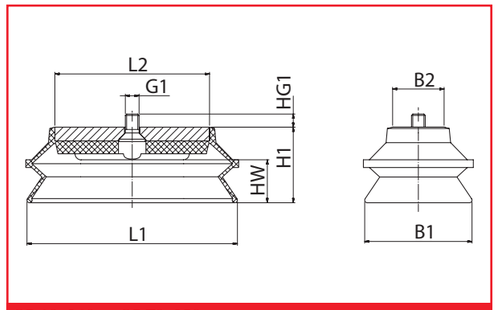
Type	Holding force* (N)	Suction radius (mm)	Volume** (l)	Weight (kg)
GF 60x140	190	35	0,12	0,24
GF 70x150	260	40	0,18	0,40
GF 100x200	510	55	0,98	1,00
GF 100x350	1.050	55	0,78	1,60
GF 150x300	1.280	90	1,08	2,05
GF 200x400	2.280	140	1,78	3,40

** Specifications at 60 % vacuum w/o safety factor, on smooth, dry surfaces*
*** Volume with suction pad not engaged and unloaded*

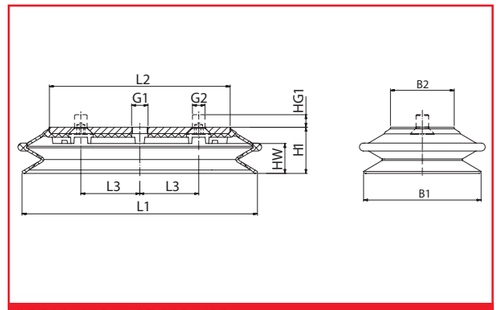
Bellows suction plate, oval

GF 60x140 - GF 200x400

FEZER
Simply move more.



GF 60x140 ... GF 70x150



GF 100x200 ... GF 200x400

Dimensions

Type	L1	L2	L3	B1	B2	HW	H1	G1	HG1	G2
GF 60x140	140	90	---	60	30	25	44	8,2	8	---
GF 70x150	150	110	---	70	30	15	26	8,2	8	---
GF 100x200	200	160	100	100	80	41	62	G1/2	12	16,5
GF 100x350	350	298	150	100	50	39	58	G1/2	12	16,5
GF 150x300	300	228	150	150	80	39	58	G1/2	12	16,5
GF 200x400	400	325	200	200	130	39	58	G3/4	12	16,5

Suitable connection elements

Type	Suction pad retainer		Holders			Suspension bolt
	SAS	SAK	Holding bracket	Bushing	Holding joint	
GF 60x140 ... GF 70x150	SAS-M16x1,5-M8	---	HSW-M16x1,5-M8	HSB-M8-1/8	HSG-M12x1-1/8	FS ... -M12x1*
GF 100x200 ... GF 100x350	SAS-M16x1,5-M16	SAK-M16x1,5-M16	---	---	---	FS ... -M16x1,5**
GF 150x300 ... GF 200x400	SAS-M20x1,5-M16	SAK-M20x1,5-M16	---	---	---	FS ... -M20x1,5**

** Single connection, mounted with rotation-protected suspension bolt*
*** Double connection, mounted with 2 suspension bolts*

Grip suction cup, round

GS 35 - GS 125 - Flat design

FEZER
Simply move more.

Description
Very robust and restistant flat suction cup with specially structured suction pad and connection screw. The special pad increases the friction coefficient which allows higher cross acceleration also on oily or wet surfaces.

Application
- thin-walled workpieces with smooth, oily or wet surfaces
- exact positioning of sheets
- highly dynamic process requirements

FS-GS 35 ... FS-GS 125

Article numbers

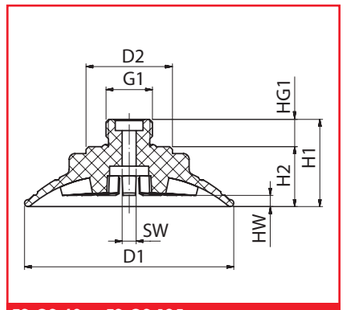
Type	PU
FS-GS 35	1.01.2.0031
FS-GS 50	1.01.2.0032
FS-GS 75	1.01.2.0033
FS-GS 100	1.01.2.0034
FS-GS 125	1.01.2.0035

Technical details

Type	Holding force* (N)	Suction radius min: (mm)	Volume** (l)	Weight (kg)
FS-GS 35	34	40	0,005	0,04
FS-GS 50	72	50	0,010	0,06
FS-GS 75	163	100	0,030	0,08
FS-GS 100	236	150	0,070	0,11
FS-GS 125	405	150	0,100	0,17

** Specifications at 60 % vacuum w/o safety factor, on smooth, dry surfaces*
*** Volume with suction pad not engaged and unloaded*

Grip suction cup, round
GS 35 - GS 125 - Flat design
FEZER
Simply move more.



FS-GS 40 ... FS-GS 125

Dimensions

Type	D1	D2	HW	H1	H2	HG1	G1	SW
FS-GS 35	35	24	2	29	18	10	G3/8	5
FS-GS 50	50	31	3	34	24	10	G3/8	7
FS-GS 75	75	43	4	31	20	10	G3/8	5
FS-GS 100	100	55	6	36	25	10	G3/8	10
FS-GS 125	126	55	8	42	29	10	G3/8	10

Suitable connection elements

Type	Suction pad retainer		Holders			Suspension bolt
	SAS	SAK	Holding bracket	Bushing	Holding joint	
FS-GS 35 ... FS-GS 75	SAS-M12x1-3/8	---	HSW-M12x1-3/8	HSB-3/8-3/8	HSG-M12x1-3/8	FS ... -M12x1
FS-GS 100 ... FS-GS 125	SAS-M16x1,5-3/8	---	HSW-M16x1,5-3/8	HSB-3/8-3/8	HSG-M16x1,5-3/8	FS ... -M16x1,5

FEZER
Simply move more.

Grip suction cup, round

GFS 40 - GFS 115 - Bellows design

Description
Very robust and resistant bellows suction cup with 1,5 bellows and a specially structured pad and connection screw. The special pad increases the friction coefficient which allows higher cross acceleration also on oily or wet surfaces.

Application
- thin-walled workpieces with smooth, oily or wet surfaces
- especially adaptable to work piece radiuses
- exact positioning of sheets
- highly dynamic process requirements

FBS-GFS 40 ... FBS-GFS 115

Article numbers

Type	PU
FBS-GFS 40	1.02.2.0013
FBS-GFS 60	1.02.2.0014
FBS-GFS 85	1.02.2.0015
FBS-GFS 110	1.02.2.0016

Technical details

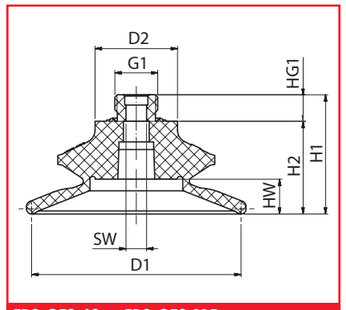
Type	Holding force* (N)	Suction radius min: (mm)	Volume** (l)	Weight (kg)
FBS-GFS 40	45	23	0,01	0,032
FBS-GFS 60	82	35	0,02	0,056
FBS-GFS 85	174	50	0,05	0,095
FBS-GFS 110	284	95	0,11	0,176

** Specifications at 60 % vacuum w/o safety factor, on smooth, dry surfaces*
*** Volume with suction pad not engaged and unloaded*

FEZER
Simply move more.

Grip suction pad, round

GFS 40 - GFS 115 - Bellows design



FBS-GFS 40 ... FBS-GFS 115

Dimensions

Type	D1	D2	HW	H1	H2	HG1	G1	SW
FBS-GFS 40	45	23	7	32	22	10	G3/8	8
FBS-GFS 60	61	23	10	36	25	10	G3/8	8
FBS-GFS 85	85	32	14	46	38	10	G3/8	5
FBS-GFS 110	115	45	21	63	52	10	G3/8	5

Suitable connection elements

Type	Suction pad retainer		Holders			Suspension bolt
	SAS	SAK	Holding bracket	Bushing	Holding joint	
FBS-GFS 40 ... FBS-GFS 60	SAS-M12x1-3/8	---	HSW-M12x1-3/8	HSB-3/8-3/8	HSG-M12x1-3/8	FS ... -M12x1
FBS-GFS 85 ... FBS-GFS 110	SAS-M16x1,5-3/8	---	HSW-M16x1,5-3/8	HSB-3/8-3/8	HSG-M16x1,5-3/8	FS- ... -M16x1,5

Grip suction plate, oval

GS 20x80 - GS 40x110 - Flat design

FEZER
Simply move more.

Description

Very robust and resistant flat suction cup in oval design with a specially structured pad and connection screw. The special pad increases the friction coefficient which allows higher cross acceleration also on oily or wet surfaces. The position of the cup can be adjusted by the connection screw.

Application

- thin-walled workpieces with smooth, oily or wet surfaces
- exact positioning of sheets
- highly dynamic process requirements

FS-GS 20x80 ... FS-GS 40x110

Article numbers

Type	PU
FS-GS 20x80	1.01.2.0054
FS-GS 30x90	1.01.2.0055
FS-GS 40x110	1.01.2.0056

Technical details

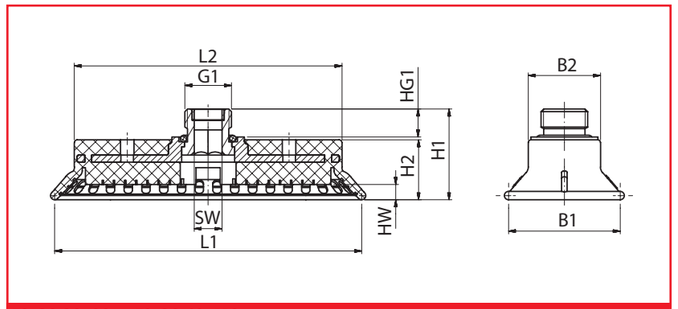
Type	Holding force* (N)	Suction radius min: (mm)	Volume** (l)	Weight (kg)
FS-GS 20x80	82	20	0,015	0,025
FS-GS 30x90	115	25	0,017	0,030
FS-GS 40x110	185	42	0,034	0,055

** Specifications at 60 % vacuum w/o safety factor, on smooth, dry surfaces*
*** Volume with suction pad not engaged and unloaded*

Grip suction plate, oval

GS 20x80 - GS 40x110 - Flat design

FEZER
Simply move more.



FS-GS 20x80 ... FS-GS 40x110

Dimensions

Type	L1	L2	B1	B2	HW	H1	H2	HG1	G1	SW
FS-GS 20x80	84	79	24	19	3	28	16	10	G3/8	5
FS-GS 30x90	92	79	33	19	4	28	16	10	G3/8	5
FS-GS 40x110	113	97	43	26	5	31	22	10	G3/8	8

Suitable connection elements

Type	Suction pad retainer		Holders			Suspension bolt
	SAS	SAK	Holding bracket	Bushing	Holding joint	
FS-GS 20x80 ... 30x90	SAS-M12x1-3/8	---	HSW-M12x1-3/8	HSB-3/8-3/8	HSG-M12x1-3/8	FS ... -M12x1*
FS-GS 40x110	SAS-M16x1,5-3/8	---	HSW-M16x1,5-3/8	HSB-3/8-3/8	HSG-M16x1,5-3/8	FS ... -M16x1,5*

** Single connection, mounted with rotation-protected suspension bolt*

Grip suction plate, oval

GFS 50x100 - GFS 80x180 - Bellows design

FEZER
Simply move more.

Description
Very robust and resistant bellows suction cup in oval design with 1,5 bellows and specially structured pad. The special pad increases the friction coefficient which increases cross acceleration also on oily or wet surfaces. The position of the suction cup can be adjusted by the connection screw.

Application
- formed workpieces with smooth oily or wet surfaces (workpiece is not pulled in)
- exact positioning of sheets
- highly dynamic process requirements

FBS-GFS 50x100 ... FBS-GFS 80x180

Article numbers

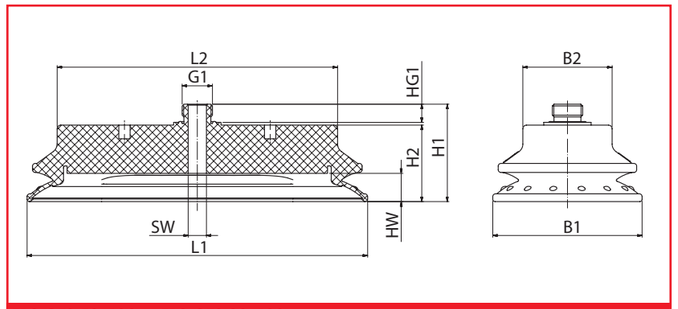
Type	PU
FBS-GFS 35x90	1.02.2.0017
FBS-GFS 50x140	1.02.2.0018
FBS-GFS 65x170	1.02.2.0019

Technical details

Type	Holding force* (N)	Suction radius min: (mm)	Volume** (l)	Weight (kg)
FBS-GFS 35x90	110	30	0,036	0,010
FBS-GFS 50x140	245	50	0,095	0,190
FBS-GFS 65x170	400	50	0,200	0,310

* *Specifications at 60 % vacuum w/o safety factor, on smooth, dry surfaces*
** *Volume with suction pad not engaged and unloaded*

Grip suction plate, oval
GFS 50x100 - GFS 80x180 - Bellows design
FEZER
Simply move more.



FBS-GFS 50x100 ... FBS-GFS 80x180

Dimensions

Type	L1	L2	B1	B2	HW	H1	H2	HG1	G1	SW
FBS-GFS 35x90	105	84	50	28	11	37	29	10	G3/8	10
FBS-GFS 50x140	157	130	67	38	13	46	38	10	G3/8	10
FBS-GFS 65x170	187	160	82	49	15	54	45	10	G3/8	10

Suitable connection elements

Type	Suction pad retainer		Holders			Suspension bolt
	SAS	SAK	Holding bracket	Bushing	Holding joint	
FBS-GFS 35x90 ... 50x140	SAS-M12x1-3/8	---	HSW-M12x1-3/8	HSB-3/8-3/8	HSG-M12x1-3/8	FS ... -M12x1*
FBS-GFS 65x170	SAS-M16x1,5-3/8	---	HSW-M16x1,5-3/8	HSB-3/8-3/8	HSG-M16x1,5-3/8	FS ... -M16x1,5*

* *Single connection, mounted with rotation-protected suspension bolt*

Bubble cap suction cup, round

GG 30 - GG 80

FEZER
Simply move more.

Description
Robust and resistant flat suction pad in bubble-cap design with inner pad. The suction pad has vulcanized connection nipple and is available in different materials.

Application
- workpieces with large curves and unevenness
- handling of chassis parts, also with oilyn surfaces

FS-GG 30 ... FS-GG 80

Article numbers

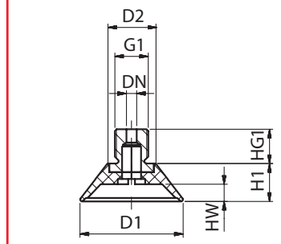
Type	NBR-G	SI-T
FS-GG 30	1.01.2.0073	1.01.2.0078
FS-GG 40	1.01.2.0074	1.01.2.0079
FS-GG 55	1.01.2.0075	1.01.2.0080
FS-GG 70	1.01.2.0076	1.01.2.0081
FS-GG 80	1.01.2.0077	1.01.2.0082

Technical details

Type	Holding force* (N)	Suction radius min: (mm)	Volume** (l)	Weight (g)
FS-GG 30	21	20	0,004	0,008
FS-GG 40	42	25	0,010	0,018
FS-GG 55	83	30	0,020	0,025
FS-GG 70	125	45	0,030	0,045
FS-GG 80	150	55	0,040	0,095

* *Specifications at 60 % vacuum w/o safety factor, on smooth, dry surfaces*
** *Volume with suction pad not engaged and unloaded*

Bubble cap suction cup, round
GG 30 - GG 80
FEZER
Simply move more.



FS-GG 30 ... FS-GG 80

Dimensions

Type	D1	D2	DN	HW	H1	HG1	G1
FS-GG 30	30	15	3	5	11	10	G1/8
FS-GG 40	40	20	3	8	14	10	G1/8
FS-GG 55	55	30	3	9	23	10	G1/4
FS-GG 70	70	50	3	12	23	10	G1/4
FS-GG 80	80	55	3	9	22	10	G3/8

Suitable connection elements

Type	Suction pad retainer		Holders			Suspension bolt
	SAS	SAK	Holding bracket	Bushing	Holding joint	
FS-GG 30 ... FS-GG 40	SAS-M12x1-1/8	---	HSW-M12x1-1/8	HSB-1/8-1/8	HSG-M12x1-1/8	FS ... -M12x1
FS-GG 55 ... FS-GG 70	SAS-M12x1-1/4	---	HSW-M12x1-1/4	HSB-1/4-1/4	HSG-M12x1-1/4	FS ... -M12x1
FS-GG 80	SAS-M12x1-3/8	---	HSW-M12x1-3/8	HSB-3/8-3/8	HSG-M12x1-3/8	FS ... -M12x1

Bubble cap suction cup, oval

GG 40x120 - GG 80x200

FEZER
Simply move more.

Description

Robust and resistant flat suction pad in bubble-cap design with inner pad. The suction pad has a body made of aluminum and is connected by a screw. When worn out the pad can be easily exchanged. Please order the connection screws separately.

Application

- workpieces with large curves and unevenness
- handling of chassis parts, also with oily surfaces

FS-GG 40x120 ... FS-GG 80x200

Article numbers

Type	NBR-G	SI-T	Connection screw	
			Type	Art.-Nr:
FS-GG 40x120	1.11.1.0484	1.11.1.0485	ASB-M8-16	1.31.2.0068
FS-GG 60x200	1.11.1.0286	1.11.1.0488	ASB-M8-16	1.31.2.0068
FS-GG 75x135	1.11.1.0281	1.11.1.0482	ASB-M12-17	1.31.2.0003
FS-GG 80x200	1.11.1.0287	1.11.1.0489	ASB-M12-17	1.31.2.0003

Technical details

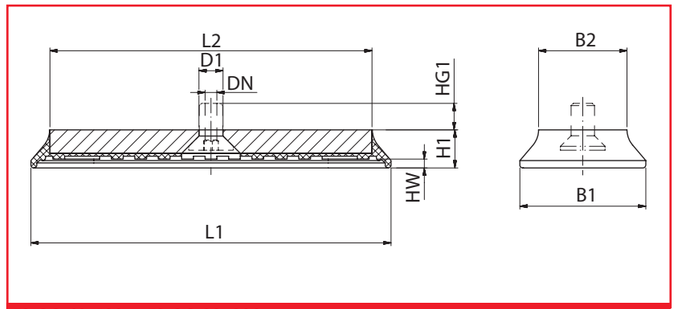
Type	Holding force* (N)	Suctrion radius min: (mm)	Volume** (l)	Weight (kg)
FS-GG 40x120	126	30	0,080	0,160
FS-GG 60x200	273	35	0,180	0,280
FS-GG 75x135	230	50	0,100	0,230
FS-GG 80x200	320	60	0,240	0,450

* *Specifications at 60 % vacuum w/o safety factor, on smooth, dry surfaces*
** *Volume with suction pad not engaged and unloaded*

Bubble cap suction cup, oval

GG 40x120 - GG 80x200

FEZER
Simply move more.



FS-GG 40x120 ... FS-GG 80x200

Dimensions

Type	L1	L2	L3	B1	B2	HW	H1	D1	DN	G1	HG1
FS-GG 40x120	123	110	---	40	30	4	13	8,2	4	---	10
FS-GG 60x200	205	180	70	65	40	4	18	8,2	---	G1/4	10
FS-GG 75x135	135	90	---	75	30	12	27	8,2	4	---	10
FS-GG 80x200	200	160	60	80	40	5	20	8,2	---	G1/4	10

Suitable connection elements

Type	Suction pad retainer		Holders			Suspension bolt
	SAS	SAK	Holding bracket	Bushing	Holding joint	
FS-GG 40x120, 75x135	SAS-M12x1-M8	---	HSW-M12x1-M8	HSB-M8-1/8	HSG-M12x1	FS ... -M12x1*
FS-GG 60x200, 80x200	SAS-M16x1,5-M12	---	HSW-M16x1,5-M12	HSB-M12-1/4	HSG-M16x1,5	FS ... -M16x1,5*

* *Single connection, mounted with rotation-protected suspension bolt*

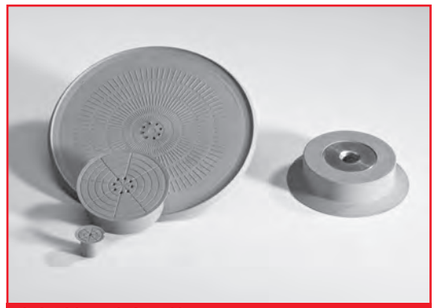
Soft suction cup

GP 20 - GP 140

FEZER
Simply move more.

Description
Robust and resistant flat suction cup with specially plane pad. With the few vacuum distribution grooves the pad has almost a completely plane area which does not pass on any deformation force to the workpiece. The suction cups are screwed on, the sealing can be easily exchanged when worn out (save for FS-GP 140 with vulcanized body)

Application
- workpieces with very sensitive surfaces
- extremely thin-walled workpieces like solar cells, silicium discs, semiconductors etc.



FS-GP 20 ... FS-GP 140

Article numbers

Type	NK-R	Connection nipple	
		Type	Art.-Nr:
FS-GP 20	1.01.2.0083	ANM-8-1/8	1.31.1.0032
FS-GP 40	1.01.2.0024	ANM-13-1/4	1.31.1.0033
FS-GP 60	1.01.2.0084	---	---
FS-GP 80	1.01.2.0085	---	---
FS-GP 140	1.01.2.0023	---	---

Technical details

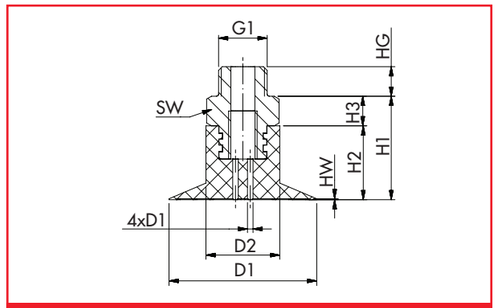
Type	Holding force* (N)	Volume** (l)	Weight (kg)
FS-GP 20	11	0,002	0,008
FS-GP 40	45	0,003	0,010
FS-GP 60	100	0,004	0,060
FS-GP 80	195	0,008	0,080
FS-GP 140	480	0,012	0,180

** Specifications at 60 % vacuum w/o safety factor, on smooth, dry surfaces*
*** Volume with suction pad not engaged and unloaded*

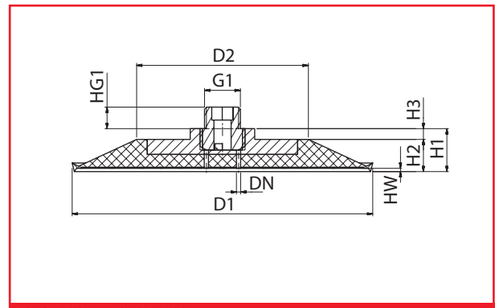
Soft suction cup

GP 20 - GP 140

FEZER
Simply move more.



FS-GP 20 ... FS-GP 40



FS-GP 60 ... FS-GP 140

Dimensions

Type	D1	D2	DN	HW	H1	H2	H3	HG1	G1	SW
FS-GP 20	20	12	1,5	0,25	29	15	7	7	G1/8	14
FS-GP 40	40	20	1,5	0,25	36	20	8	8	G1/4	17
FS-GP 60	60	50	1,5	0,25	30	20	10	10	G1/4	---
FS-GP 80	80	60	1,5	0,25	30	20	10	10	G1/4	---
FS-GP 140	140	80	1,5	1,5	20	15	5	10	G3/8	---

Suitable connection elements

Type	Suction pad retainer		Holders			Suspension bolt
	SAS	SAK	Holding bracket	Bushing	Holding joint	
FS-GP 20	SAS-M8x1-1/8	---	HSW-M8x1-1/8	HSB-1/8-1/8	HSG-M8x1-1/8	FS ... -M8x1
FS-GP 40 ... FS-GP 80	SAS-M12x1-1/4	---	HSW-M12x1-1/4	HSB-1/4-1/4	HSG-M12x1-1/4	FS ... -M12x1
FS-GP 140	SAS-M16x1,5-3/8	---	HSW-M6x1,5-1/4	HSB-3/8-3/8	HSG-M16x1,5-3/8	FS ... -M16x1,5

Foil suction cup

GO 30 - GO 50

FEZER
Simply move more.

Description

Special suction cup for handling of foils or foil-wrapped parts. The suction have a special pad which prevents that the foils are completely sucked in. The cup is clipped on a tube socket or connection nipple. To increase the safety the cups can be additionally fastened by hose clamps or cable ties. They can be easily exchanged when worn out. Please order the connection nipple separately.

Application

- handling of foil material
- handling of foil-wrapped parts

FS-GO 30 ... FS-GO 100

Article numbers

Type	NBR-G	SI-T	Connection nipple	
			Type	Art.-Nr:
FS-GO 30	1.11.1.0290	1.11.1.0468	ANF-10-1/4	1.31.1.0026
FS-GO 40	1.11.1.0470	1.11.1.0471	ANF-10-1/4	1.31.1.0026
FS-GO 50	1.11.1.0473	1.11.1.0474	ANF-10-1/4	1.31.1.0026
FS-GO 70	1.11.1.0476	1.11.1.0477	ANF-16-1/4	1.31.1.0031
FS-GO 100	1.11.1.0479	1.11.1.0480	ANF-16-1/4	1.31.1.0031

Technical details

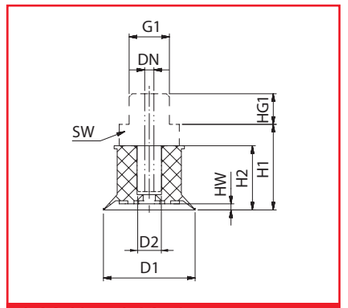
Type	Holding force* (N)	Volume** (l)	Weight (kg)
FS-GO 30	32	0,008	0,004
FS-GO 40	47	0,015	0,006
FS-GO 50	65	0,023	0,009
FS-GO 70	94	0,050	0,015
FS-GO 100	152	0,092	0,020

** Specifications at 60 % vacuum w/o safety factor, on smooth, dry surfaces*
*** Volume with suction pad not engaged and unloaded*

Foil suction cup

GO 30 - GO 50

FEZER
Simply move more.



FS-GO 30 ... FS-GO 50

Dimensions

Type	D1	D2	DN	HW	H1	H2	HG1	G	SW
FS-GO 30	30	8	5	2	36	21	10	G1/4	19
FS-GO 40	40	8	5	2	36	21	10	G1/4	19
FS-GO 50	50	10	5	5	39	24	10	G1/4	19
FS-GO 70	70	16	5	10	49	34	10	G1/4	19
FS-GO 100	80	16	5	10	58	43	10	G1/4	19

Suitable connection elements

Type	Suction pad retainer		Holders			Suspension bolt
	SAS	SAK	Holding bracket	Bushing	Holding joint	
FS-GO 30 ... FS-GO 100	SAS-M12x1-1/4	---	HSW-M12x1-1/4	HSB-1/4-1/4	HSG-M12x1-1/4	FS ... -M12x1

Structure suction plate, round

FSD 85 - FSD 260

FEZER
Simply move more.

Description
Flat suction plate with aluminum body in round design with vulcanized sealing and tapered pad. The suction pad has a very soft sealing and is available with central (Z) or lateral (S) vacuum feed. Please order connection screw separately.

Application
- workpieces with very rough or structured surface like chequered or studded sheets
- structures up to 5 mm height possible
- increased contact pressure required for suction

FSD 85-Z ... FSD 260-S

Article numbers

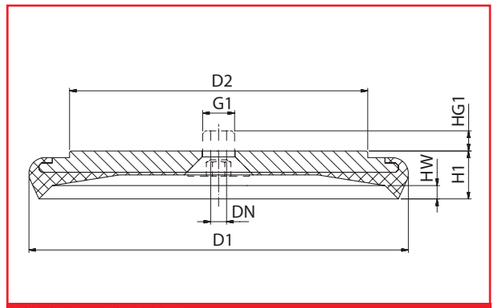
Type	Suction plate		Connection screw	
	NRS-G	SI-T	Type	Art.-Nr:
FSD 85 Z	1.11.1.0078	1.11.1.0079	ASB-M12-17	1.31.2.0003
FSD 85 S	1.11.1.0076	1.11.1.0077	AS-M12-17	1.31.2.0010
FSD 140 Z	1.11.1.0066	1.11.1.0067	ASB-M12-17	1.31.2.0003
FSD 140 S	1.11.1.0064	1.11.1.0065	AS-M12-17	1.31.2.0010
FSD 200 Z	1.11.1.0070	1.11.1.0071	ASB-M16-25	1.31.2.0007
FSD 200 S	1.11.1.0068	1.11.1.0069	AS-M16-25	1.31.2.0014
FSD 230 Z	1.11.1.0133	1.11.1.0138	ASB-M16-25	1.31.2.0007
FSD 230 S	1.11.1.0139	1.11.1.0140	AS-M16-25	1.31.2.0014
FSD 260 Z	1.11.1.0074	1.11.1.0075	ASB-M16-25	1.31.2.0007
FSD 260 S	1.11.1.0072	1.11.1.0073	AS-M16-25	1.31.2.0014

Technical details

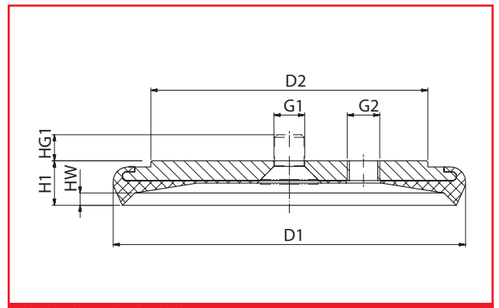
Type	Holding force* (N)	Volume** (l)	Weight (kg)
DP-FSD 85 Z/S	300	0,07	0,13
DP-FSD 140 Z/S	760	0,13	0,40
DP-FSD 200 Z/S	1.580	0,24	1,20
DP-FSD 230 Z/S	2.050	0,58	1,28
DP-FSD 260 Z/S	2.600	0,95	1,40

** Specifications at 60 % vacuum w/o safety factor, on smooth, dry surfaces*
*** Volume with suction pad not engaged and unloaded*

Structure suction plate, round
FSD 85 - FSD 260
FEZER
Simply move more.



FSD 85-Z ... FSD 260-Z



FSD 85-S ... FSD 260-S

Dimensions

Type	D1	D2	DN	HW	H1	HG1	G1	G2
FSD 85 Z	85	66	8	5	20	10	M16	---
FSD 85 S	85	66	---	5	20	---	---	G1/4
FSD 140 Z	140	112	8	5	20	10	M16	---
FSD 140 S	140	112	---	5	20	---	---	G1/4
FSD 200 Z	200	75	8	5	25	10	M16	---
FSD 200 S	200	75	---	5	25	---	---	G3/8
FSD 230 Z	230	75	8	5	25	10	M16	---
FSD 230 S	230	75	---	5	25	---	---	G3/8
FSD 260 Z	260	75	8	5	25	10	M16	---
FSD 260 S	260	75	---	5	25	---	---	G1/2

Suitable connection elements

Type	Suction pad retainer		Holders			Suspension bolt
	SAS	SAK	Holding bracket	Bushing	Holding joint	
FSD 85 ... FSD 140	SAS-M16x1,5-M16	SAK-M16x1,5-M16	HSW-M16x1,5-M16	HSB-M16-1/4	---	FS ... -M16x1,5
FSD 200 ... FSD 260	SAS-M20x1,5-M16	SAK-M20x1,5-M16	HSW-M20x1,5-M16	HSB-M20-M16	---	FS ... -M20x1,5

Structure suction plate, round

FSM 100 - FSM 320

FEZER
Simply move more.

Description
Flat suction plate with aluminum body in round design with pushed-in froth-rubber sealing and studded pad. The suction pad has a very soft sealing and is available with central (Z) or lateral (S) vacuum feed.
The sealing can be easily exchanged when worn out. The pad is fastened with a connection nipple. Please order the connection nipple separately.

Application
- workpieces with very rough or structured surface, like raw wooden boards
- structures up to 3 mm height possible
- increased contact pressure required for suction

FSM 100-Z ... FSM 320-S

Article numbers

Type	Suction plate M-G	Replacement sealing M-G	Replacement pad NBR-S	Connection screw Type	Connection screw Art.-Nr:
FSM 100-Z	1.11.1.0163	2.13.2.0043	2.13.2.0005	ASB-M16-20	1.31.2.0084
FSM 100-S	1.11.1.0523	2.13.2.0043	2.13.2.0005	AS-M16-22	1.31.2.0035
FSM 160-Z	1.11.1.0164	2.13.2.0046	2.13.2.0007	ASB-M16-20	1.31.2.0084
FSM 160-S	1.11.1.0522	2.13.2.0046	2.13.2.0007	AS-M16-22	1.31.2.0035
FSM 210-Z	1.11.1.0165	2.13.2.0048	2.13.2.0008	ASB-M16-20	1.31.2.0084
FSM 210-S	1.11.1.0521	2.13.2.0048	2.13.2.0008	AS-M16-22	1.31.2.0035
FSM 320-Z	1.11.1.0166	2.13.2.0050	2.13.2.0008	ASB-M16-20	1.31.2.0084
FSM 320-S	1.11.1.0520	2.13.2.0050	2.13.2.0008	AS-M16-22	1.31.2.0035

Technical details

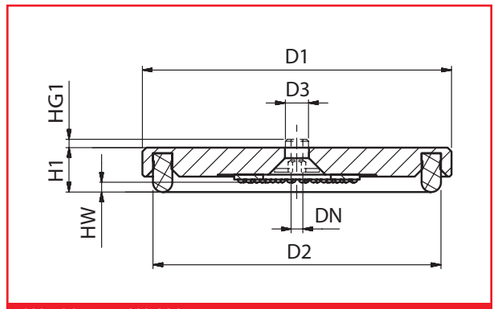
Type	Holding force* (N)	Volume** (l)	Weight (kg)
FSM 100-Z/S	300	0,04	0,6
FSM 160-Z/S	900	0,05	0,8
FSM 210-Z/S	1.550	0,13	1,2
FSM 320-Z/S	3.580	0,33	3,4

** Specifications at 60 % vacuum w/o safety factor, on smooth, dry surfaces*
*** Volume with suction pad not engaged and unloaded*

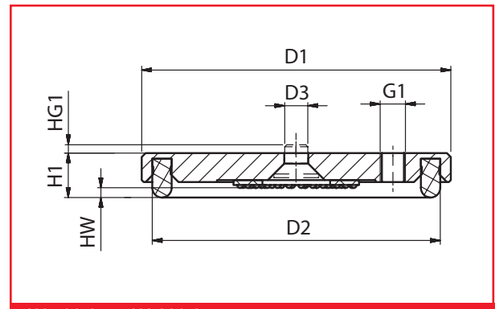
Structure suction plate, round

FSM 100 - FSM 320

FEZER
Simply move more.



FSM 100-Z ... FSM 320-Z



FSM 100-S ... FSM 320-S

Dimensions

Type	D1	D2	D3	HW	H1	HG1	G1
FSM 100-Z	100	90	16,2	3	18	10	---
FSM 100-S	100	90	16,2	3	18	10	G1/4
FSM 160-Z	160	150	16,2	3	18	10	---
FSM 160-S	160	150	16,2	3	18	10	G1/4
FSM 210-Z	206	195	16,2	3	18	10	---
FSM 210-S	206	195	16,2	3	18	10	G3/8
FSM 320-Z	312	300	16,2	4	26	10	---
FSM 320-S	312	300	16,2	4	26	10	G1/2

Suitable connection elements

Type	Suction pad retainer SAS	Suction pad retainer SAK	Suspension bolt
FSM 100 ... FSM 160	SAS-M16x1,5-M16	SAK-M16x1,5-M16	FSB/FSH-M16x1,5
FSM 210 ... FSM 320	SAS-M20x1,5-M16	SAK-M20x1,5-M16	FSB/FSH-M20x1,5

Structure suction plate, oval

FSM 75x180 - FSM 250x460

FEZER
Simply move more.

Description

Flat suction plate with aluminum body in oval design with pushed-in froth rubber sealing and grooved pad. The suction plate has a very soft sealing and are available with central vacuum connection. When worn out the sealing can be easily exchanged. The sealing plate is screwed on with 2 screws and double connection on 2 suspension bolts. Please order connection screws separately.

Application

- narrow workpieces with very rough or structured surface like wooden planks
- structures up to 2 mm height possible
- increased contact pressure required for suction

FSM 75x180 ... FSM 250x460

Article numbers

Type	Suction plate M-G	Replacement gasket M-G	Replacement pad NBR-G	Connection screw Type	Connection screw Art.-Nr:
FSM 75x180	1.13.1.0324	2.13.2.0093	2.13.2.0167	ASB-M16-20	1.31.2.0084
FSM 80x460	1.13.1.0310	2.13.2.0160	2.13.2.0165	AS-M16-22	1.31.2.0035
FSM 100x460	1.13.1.0311	2.13.2.0037	2.13.2.0166	AS-M16-22	1.31.2.0035
FSM 120x460	1.13.1.0217	2.13.2.0038	2.13.2.0168	AS-M16-22	1.31.2.0035
FSM 170x460	1.13.1.0313	2.13.2.0040	2.13.2.0169	AS-M16-22	1.31.2.0035
FSM 250x460	1.13.1.0314	2.13.2.0041	2.13.2.0170	AS-M16-22	1.31.2.0035

Technical details

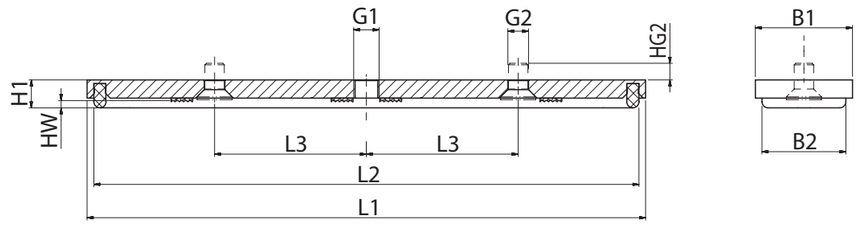
Type	Holding force* (N)	Volume** (l)	Weight (kg)
FSM 75x180	430	0,11	0,52
FSM 80x460	1130	0,20	1,37
FSM 100x460	1720	0,39	1,72
FSM 120x460	2200	0,58	2,05
FSM 170x460	3400	0,88	2,90
FSM 250x460	5420	1,25	4,25

** Specifications at 60 % vacuum w/o safety factor, on smooth, dry surfaces*
*** Volume with suction pad not engaged and unloaded*

Structure suction plate, oval

FSM 75x180 - FSM 250x460

FEZER
Simply move more.



FSM 75x180 ... FSM 250x460

Dimensions

Type	L1	L2	L3	B1	B2	HW	H1	HG1	HG2	G1	G2
FSM 75x180	180	170	---	75	65	6	23	---	---	17	---
FSM 80x460	460	450	125	80	70	6	23	---	10	G1/2	16,2
FSM 100x460	460	450	125	100	90	6	23	---	10	G1/2	16,2
FSM 120x460	460	450	125	120	110	6	23	---	10	G1/2	16,2
FSM 170x460	460	450	125	170	160	6	23	---	10	G1/2	16,2
FSM 250x460	460	450	125	250	240	6	23	---	10	G1/2	16,2

Suitable connection elements

Type	Suction pad retainer SAS	Suction pad retainer SAK	Suspension bolt
FSM 75x180	SAS-M16x1,5-M16	---	FS ... -M16x1,5*
FSM 80x460 ... FSM 120x460	SAS-M16x1,5-M16	SAK-M16x1,5-M16	FS ... -M16x1,5**
FSM 170x460 ... FSM 250x460	SAS-M20x1,5-M16	SAK-M20x1,5-M16	FS ... -M20x1,5**

** Single connection, mounted with rotation-protected suspension bolt*
*** Double connection, mounted with 2 suspension bolts*

Structure suction plate, oval

FSM 80x460 - FSM 250x460 with joint

FEZER
Simply move more.

Description

Flat suction pad with aluminum body and joint retainer in oval design with clipped in sponge rubber sealing an grooved pad. The joint retainer allows an excellent adjustment to the bending of long workpieces. The suction pad has a very soft sealing and is equipped with a lateral vacuum connection. When worn off the sealing can be easily exchanged.

Application

- narrow and very long workpieces with very rough of structured surface like wooden planks, gluelam beams etc.
- structures up to 2 mm height possible
- increased contact pressure required for suction

FSM 80x460 ... FSM 250x460

Article numbers

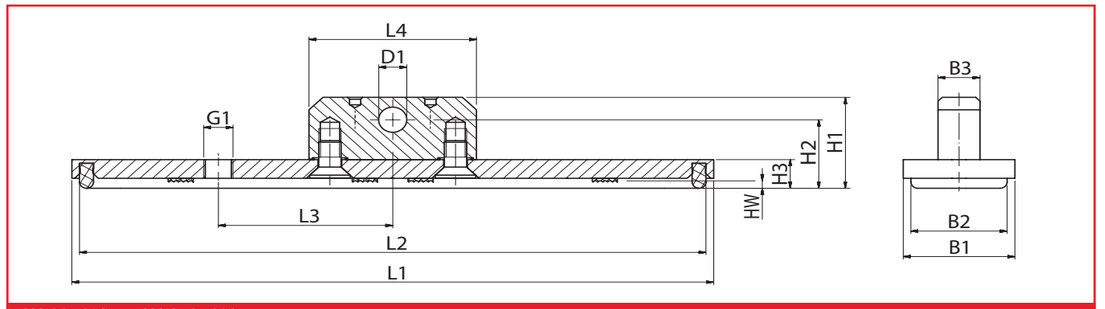
Type	Suction plate M-G	Gasket M-G	Replacement pad NBR-G
FSM-G 80x460	1.13.2.0054	2.13.2.0160	2.13.2.0165
FSM-G 100x460	1.13.2.0055	2.13.2.0037	2.13.2.0166
FSM-G 120x460	1.13.2.0056	2.13.2.0038	2.13.2.0168
FSM-G 170x460	1.13.2.0057	2.13.2.0040	2.13.2.0169
FSM-G 250x460	1.13.2.0058	2.13.2.0041	2.13.2.0170

Technical details

Type	Holding force* (N)	Volume** (l)	Weight (kg)
FSM-G 80x460	1130	0,20	1,87
FSM-G 100x460	1720	0,39	2,22
FSM-G 120x460	2200	0,58	2,55
FSM-G 170x460	3400	0,88	3,40
FSM-G 250x460	5420	1,25	4,75

** Specifications at 60 % vacuum w/o safety factor, on smooth, dry surfaces*
*** Volume with suction pad not engaged and unloaded*

Structure suction plate, oval
FSM 80x460 - FSM 250x460 with joint
FEZER
Simply move more.



FSM 80x460 ... FSM 250x460

Dimensions

Type	L1	L2	L3	L4	B1	B2	B3	HW	H1	H2	H3	D1	G1
FSM-G 80x460	460	450	125	120	80	70	30	6	73	55	22	20	G1/2
FSM-G 100x460	460	450	125	120	100	90	30	6	73	55	22	20	G1/2
FSM-G 120x460	460	450	125	120	120	110	30	6	73	55	22	20	G1/2
FSM-G 170x460	460	450	125	120	170	160	30	6	73	55	22	20	G1/2
FSM-G 250x460	460	450	125	120	250	240	30	6	73	55	22	20	G1/2

FEZER
Simply move more.

Separation suction plate

FSRLB 120 - FSRLB 290 with convex insert

Description
Very robust and resistant flat suction pad with aluminum body, grooved pad and a centered convex insert. This convex insert supports the separation of stacked plates. The gasket and the insert are clipped on and can be easily exchanged when worn out. The suction plates are available with central (Z) or lateral (S) vacuum feed.

Application
- separation and destacking of plates
- automated and robot technology

FSRLB 120-Z ... FSRLB 290-Z

Article numbers

Type	Suction plate		Replacement gasket		Connection screw	
	NBR-G	SI-T	NBR-G	SI-T	Type	Art.-Nr:
FSRLB 120 Z	1.11.1.0296	1.11.1.0368	2.11.2.0089	2.11.2.0102	ASB-M16-20	1.31.2.0084
FSRLB 120 S	1.11.1.0297	1.11.1.0369	2.11.2.0114	2.11.2.0126	AS-M16-22	1.31.2.0035
FSRLB 170 Z	1.11.1.0370	1.11.1.0371	2.11.2.0090	2.11.2.0119	ASB-M16-20	1.31.2.0084
FSRLB 170 S	1.11.1.0373	1.11.1.0372	2.11.2.0127	2.11.2.0128	AS-M16-22	1.31.2.0035
FSRLB 230 Z	1.11.1.0374	1.11.1.0375	2.11.2.0091	2.11.2.0120	ASB-M16-20	1.31.2.0084
FSRLB 230 S	1.11.1.0376	1.11.1.0377	2.11.2.0130	2.11.2.0131	AS-M16-22	1.31.2.0035
FSRLB 290 Z	1.11.1.0378	1.11.1.0379	2.11.2.0094	2.11.2.0121	ASB-M16-20	1.31.2.0084
FSRLB 290 S	1.11.1.0380	1.11.1.0381	2.11.2.0132	2.11.2.0133	AS-M16-22	1.31.2.0035

Technical details

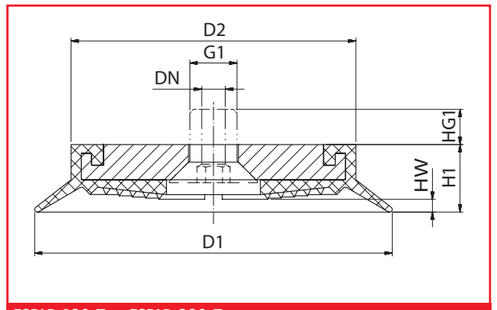
Type	Holding force* (N)	Volume** (l)	Weight (kg)
FSRLB 120 Z / S	550	0,06	0,35
FSRLB 170 Z / S	1.150	0,12	0,60
FSRLB 230 Z / S	2.100	0,20	1,12
FSRLB 290 Z / S	3.600	0,78	2,34

** Specifications at 60 % vacuum w/o safety factor, on smooth, dry surfaces*
*** Volume with suction pad not engaged and unloaded*

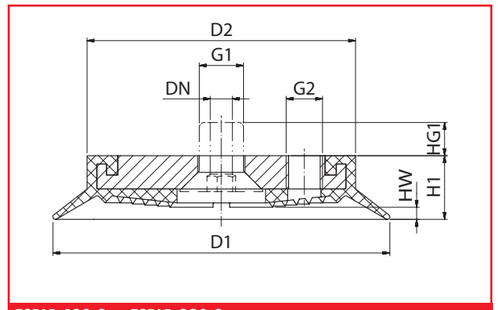
FEZER
Simply move more.

Separation suction plate

FSRLB 120 - FSRLB 290 with convex insert



FSRLB 120-Z ... FSRLB 290-Z



FSRLB 120-S ... FSRLB 290-S

Dimensions

Type	D1	D2	DN	HW	H1	HG1	G1	G2
FSRLB 120 Z	120	97	8	4,5	23	7	M16	---
FSRLB 120 S	120	97	---	4,5	23	7	---	G1/4
FSRLB 170 Z	170	147	8	4	23	7	M16	---
FSRLB 170 S	170	147	---	4	23	7	---	G1/4
FSRLB 230 Z	230	197	8	4	23	7	M16	---
FSRLB 230 S	230	197	---	4	23	7	---	G1/2
FSRLB 290 Z	290	267	8	4	23	7	M16	---
FSRLB 290 S	290	267	---	4	23	7	---	G1/2

Suitable connection elements

Type	Suction pad retainer		Suspension bolt
	SAS	SAK	
FSRLB 120 ... FSRLB 170	SAS-M16x1,5-M16	SAK-M16x1,5-M16	FS ...-M16x1,5
FSRLB 230 ... FSRLB 290	SAS-M20x1,5-M16	SAK-M20x1,5-M16	FS ...-M20x1,5

FEZER
Simply move more.

Separation suction plate

FSRLI 120 - FSRLI 290 with pressured air impulse connection

Description
Very robust and extremely resistant flat suction plate with integrated pressured air impulse connection . The gasket and the impulse insert are clipped on and can be easily exchanged when worn out. The suction plates have a lateral vacuum feed and a central pneumatic feed.

Application
- separation and destacking of porous workpieces like chip boards, MDF- or OSB-boards
- by applying pressurized air on the inner sealing ring an engagement of several plates is prevented

FSRLI 120 ... FSRLI 290

Article numbers

Type	Suction pad		Replacement gasket		Connection screw	
	NBR-G	SI-T	NBR-G	SI-T	Type	Art.-Nr:
FSRLI 120 S	1.11.1.0295	1.11.1.0506	2.11.2.0113	2.11.2.0154	ASB-M16-20	1.31.2.0084
FSRLI 170 S	1.11.1.0507	1.11.1.0508	2.11.2.0157	2.11.2.0156	ASB-M16-20	1.31.2.0084
FSRLI 230 S	1.11.1.0509	1.11.1.0510	2.11.2.0158	2.11.2.0159	ASB-M16-20	1.31.2.0084
FSRLI 290 S	1.11.1.0511	1.11.1.0512	2.11.2.0160	2.11.2.0161	ASB-M16-20	1.31.2.0084

Technical details

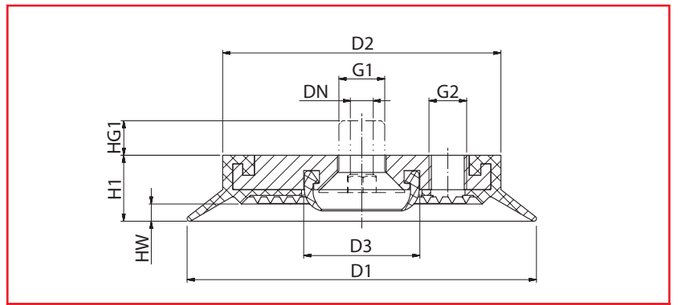
Type	Holding force* (N)	max.Abblasdruck (bar)	Volume** (l)	Weight (kg)
FSRLI 120	550	4	0,06	0,33
FSRLI 170	1.150	4	0,12	0,55
FSRLI 230	2.100	4	0,20	1,00
FSRLI 290	3.600	4	0,78	1,95

** Specifications at 60 % vacuum w/o safety factor, on smooth, dry surfaces*
*** Volume with suction pad not engaged and unloaded*

FEZER
Simply move more.

Separation suction plate

FSRLI 120 - FSRLI 290 with pressured air impulse connection



FSRLI 120 ... FSRLI 290

Dimensions

Type	D1	D2	D3	DN	H1	HW	HG1	G1	G2
FSRLI 120	120	97	40	8	23	6	7	M16	G1/4
FSRLI 170	170	147	40	8	23	6	7	M16	G1/4
FSRLI 230	230	197	40	8	23	6	7	M16	G1/4
FSRLI 290	290	267	40	8	23	6	7	M16	G1/4

Suitable connection elements

Type	Suction pad retainern		Suspension bolt
	SAS	SAK	
FSRLI 120 ... FSRLI 170	SAS-M16x1,5-M16	SAK-M16x1,5-M16	FS ... -M16x1,5
FSRLI 230 ... FSRLI 290	SAS-M20x1,5-M16	SAK-M20x1,5-M16	FS ... -M20x1,5

Bar suction plate

FSLS 30x50 - FSLS 60x470

FEZER
Simply move more.

Description

Special suction plate for handling of bars, spindles and tubes. The suction plates have a slightly curved and extremely long sealing lip, that adjusts to various diameters.
The suction plates FSLS 30x50 ... 30x100 can be connected to a tube or with the suitable connection nipples to connection elements. Starting with type FSLS 35x200 only via suitable connection elements.When worn out the suction plates can be easily exchanged.

Application

- Handling of tubes, bars, spindles or other round surfaces
- covers a relatively large area of diameters without having to change the pads

FSLS 30x50 ... FSLS 60x470

Article numbers

Type	NBR-G	SI-T	Connection nipple/screw	
			Type	Art.-Nr:
FSLS 30x50	1.11.1.0490	1.11.1.0494	ANF-10-1/4	1.31.1.0026
FSLS 30x100	1.11.1.0289	1.11.1.0495	ANF-10-1/4	1.31.1.0026
FSLS 35x200	1.11.1.0288	1.11.1.0496	AS-M8-16	1.31.2.0076
FSLS 35x300	1.11.1.0491	1.11.1.0497	AB-M8-16	1.31.2.0076
FSLS 60x140	1.11.1.0492	1.11.1.0498	ASB-M12-20	1.31.2.0011
FSLS 60x470	1.11.1.0493	1.11.1.0499	AS-M12-20	1.31.2.0011

Technical details

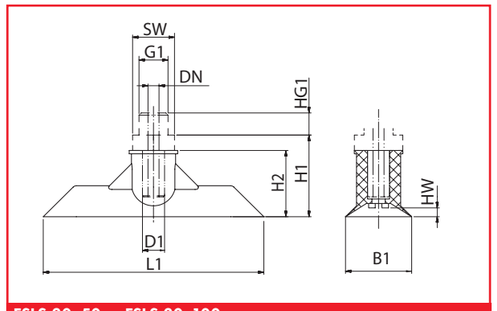
Type	Holding force* (N)	Suction radius min: (mm)	Volume** (l)	Weight (kg)
FSLS 30x50	70	35	0,006	0,007
FSLS 30x100	140	35	0,010	0,010
FSLS 35x200	180	20	0,050	0,013
FSLS 35x300	300	20	0,070	0,026
FSLS 60x140	200	40	0,100	0,120
FSLS 60x470	750	40	0,450	0,350

** Specifications at 60 % vacuum w/o safety factor, on smooth, dry surfaces*
*** Volume with suction pad not engaged and unloaded*

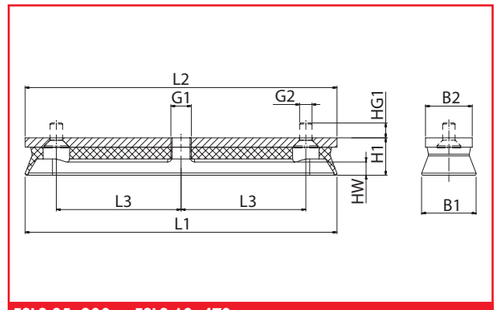
Bar suction plate

FSLS 30x50 - FSLS 60x470

FEZER
Simply move more.



FSLS 30x50 ... FSLS 30x100



FSLS 35x200 ... FSLS 60x470

Dimensions

Type	L1	L2	L3	B1	B2	HW	H1	HG1	D1	G1	G2
FSLS 30x50	50	---	---	30	---	2	23	10	10	G1/4	---
FSLS 30x100	100	---	---	30	---	4	30	10	10	G1/4	---
FSLS 35x200	200	200	70	35	30	8,5	24	8	---	G1/4	8,2
FSLS 35x300	300	300	100	35	30	8,5	24	8	---	G1/4	8,2
FSLS 60x140	140	83	---	60	35	13	27	10	---	12,2	---
FSLS 60x470	470	411	100	60	35	13	27	8	---	G1/4	12,2

Suitable connection elements

Type	Suction pad retainer		Suspension bolt
	SAS	SAK	
FSLS 30x50, 30x100, 60x140	SAS-M12x1-1/4	---	FS ... -M12x1*
FSLS 60x140	SAS-M16x1,5-1/4	---	FS ... -M16x1,5*
FSLS 35x200 ... FSLS 60x470	SAS-M12x1-M12	SAK-M12x1-M12	FS ... -M12x1**

** Single connection, mounted with rotation-protected suspension bolt*
*** Double connection, mounted with 2 suspension bolts*

FEZER
Simply move more.

Bar suction plate

FSLSE 120x300 - FSLSE 200x750

Description
Special suction plate for the handling of bars, tubes and spindles. The suction plates have a divided body, which allows adjustment to specified diameters. The special retainers allow to simply adapt to designated angles. When worn out the pads can be easily exchanged.

Application
- handling of tubes, rods, spindles or other round surfaces
- covers a relatively large range of diameters without having to change the pads

FSLSE 120x300 ... FSLSE 200x750

Article numbers

Type	NBR-G	SI-T
FSLSE 120x300	1.11.2.0004	1.11.2.0005
FSLSE 180x500	1.11.2.0006	1.11.2.0007
FSLSE 200x750	1.11.2.0008	1.11.2.0009

Technical details

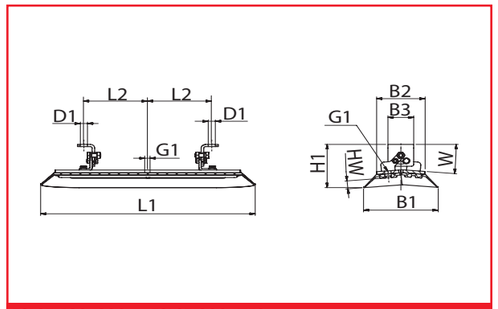
Type	Holding force* (N)	Suction radius min: (mm)	Volume** (l)	Weight (kg)
FSLSE 120x300	735	60	0,4	1,8
FSLSE 180x500	1.470	90	1,4	3,1
FSLSE 200x750	4.350	100	4,2	4,2

* *Specifications at 60 % vacuum w/o safety factor, on smooth, dry surfaces*
** *Volume with suction pad not engaged and unloaded*

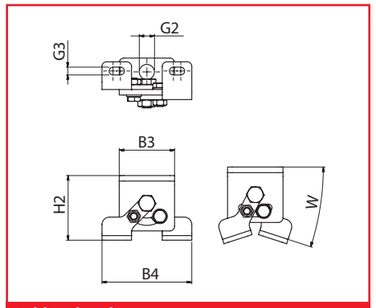
FEZER
Simply move more.

Bar suction plate

FSLSE 120x300 - FSLSE 200x750



FSLSE 120x300 ... FSLSE 200x750



Holding bracket

Dimensions

Type	L1	L2	B1	B2	B3	B4	HW	H1	H2	W	G1	G2	G3
FSLSE 120x300	300	100	120	70	30	35	16	34	70	0-18°	G1/4	16,5	8,5
FSLSE 180x500	500	150	180	110	50	55	22	41	70	0-18°	G3/8	16,5	8,5
FSLSE 200x750	750	275	200	110	50	55	29	54	70	0-18°	G3/4	16,5	8,5

Suitable connection elements

Type	Suction pad retainer		Suspension bolt
	SAS	SAK	
FSLSE 120x300 ... FSLSE 200x750	SAS-M20x1,5-M16	---	FS ... -M16x1,5*

* *Double connection, mounted with 2 suspension bolts*

High temperature suction plate

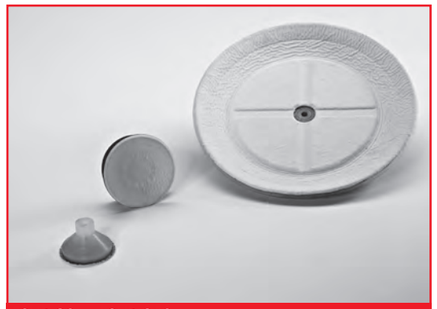
FSHB 90 - FSHB 250

FEZER
Simply move more.

Description
Robust and resistant suction plate in heat-resistant design. The sealing material consists of a silicone or viton mixture with special felt pad for high temperatures. When worn out the pad can be easily exchanged. Central vacuum feed via connection nipple or inside thread.

Application
- handling of hot workpieces
- long-time temperature 250/300°C (SI/VI)
- short-time temperature 350/400°C (SI/VI)

NB:
Since the felt pad does not seal perfectly, please use a larger vacuum pump!



FSHB 90 ... FSHB 250

Article numbers

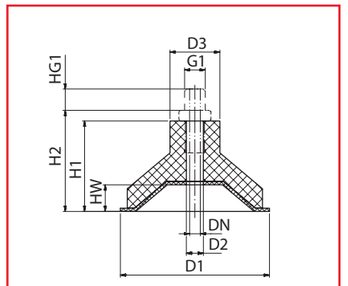
Type	Suction pad SI-T	Suction pad VI-S	Replacement gasket SI-T	Replacement gasket VI-S	Connection nipple/screw	
FSHB 25	1.01.1.0194	1.01.1.0195	---	---	ANF-8-1/8	1.31.1.0030
FSHB 40	1.01.1.0196	1.01.1.0197	---	---	ANF-8-1/8	1.31.1.0030
FSHB 70	1.01.1.0198	1.01.1.0199	---	---	ANF-8-1/8	1.31.1.0030
FSHB 90	1.11.1.0084	1.11.1.0545	2.11.2.0005	2.11.2.0004	ASB-3/8	1.31.2.0123
FSHB 120	1.11.1.0080	1.11.1.0548	2.11.2.0181	2.11.2.0001	ASB-3/8	1.31.2.0123
FSHB 180	1.11.1.0081	1.11.1.0547	2.11.2.0180	2.11.2.0002	ASB-3/8	1.31.2.0123
FSHB 250	1.11.1.0083	1.11.1.0546	2.11.2.0179	2.11.2.0003	ASB-1/2	1.31.2.0008

Technical details

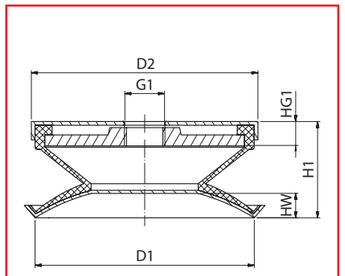
Type	Holding force* (N)	Volume** (l)	Weight (kg)
FSHB 25	10	0,06	0,03
FSHB 40	21	0,08	0,05
FSHB 70	50	0,12	0,16
FSHB 90	150	0,16	0,34
FSHB 120	210	0,21	0,56
FSHB 180	930	0,26	0,82
FSHB 250	1280	0,69	2,60

** Specifications at 60 % vacuum w/o safety factor, on smooth, dry surfaces*
*** Volume with suction pad not engaged and unloaded*

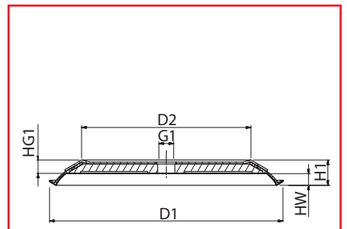
High temperature suction plate
FSHB 90 - FSHB 250
FEZER
Simply move more.



FSHB 25 ... 70



FSHB 90 ... FSHB 120



FSHB 180 ... FSHB 250

Dimensions

Type	D1	D2	DN	HW	H1	H2	HG1	G1
FSHB 25	24	24	8	3	36	44	10	G1/8
FSHB 40	37	24	8	5	37	47	10	G1/8
FSHB 70	70	24	8	8	37	47	10	G1/8
FSHB 90	90	93	---	10	40	---	12	G3/8
FSHB 120	120	110	---	14	40	---	12	G3/8
FSHB 180	180	126	---	12,5	27	---	10	G3/8
FSHB 250	250	194	---	12,5	27	---	10	G1/2

Suitable connection elements

Type	Suction pad retainern		Holders			Suspension bolt
	SAS	SAK	Holding bracket	Bushing	Holding joint	
FSHB 25 ... FSHB 70	SAS-M12x1-1/4	---	HSW-M12x1-1/4	HSB-1/4-1/4	HSG-M12x1-1/4	FS ... -M12x1
FSHB 90 ... HSHB 120	SAS-M16x1,5-3/8	---	---	---	---	FS ... -M16x1,5
FSHB 180 ... FSHB 250	SAS-M20x1,5-1/2	---	---	---	---	FS ... -M20x1,5

FEZER
Simply move more.

Rectangular suction plate

EP 30x100 - 50x300 with base plate

Description
Robust and resistant holding plate with protruding base plate which allows to connect and exchange them from the top.The sealing is vulcanized onto the base plate.

Application
- to screw onto holding tables with o-ring sealing
- also suitable for engagement of rods and tubes

EP 30x100 ... EP 100x300

Article numbers

Type	NBR-G	SI-T	Connection screw Type	
DP-EP 30x100	1.11.1.0012	1.11.1.0014	AS-M8-16	1.31.2.0076
DP-EP 30x200	1.11.1.0017	1.11.1.0018	AS-M8-16	1.31.2.0076
DP-EP 30x300	1.11.1.0021	1.11.1.0022	AS-M8-16	1.31.2.0076
DP-EP 40x100	1.11.1.0354	1.11.1.0415	AS-M8-16	1.31.2.0076
DP-EP 40x200	1.11.1.0355	1.11.1.0424	AS-M8-16	1.31.2.0076
DP-EP 40x300	1.11.1.0356	1.11.1.0425	AS-M8-16	1.31.2.0076
DP-EP 50x200	1.11.1.0357	1.11.1.0500	AS-M8-16	1.31.2.0076
DP-EP 50x300	1.11.1.0358	1.11.1.0501	AS-M8-16	1.31.2.0076

Technical details

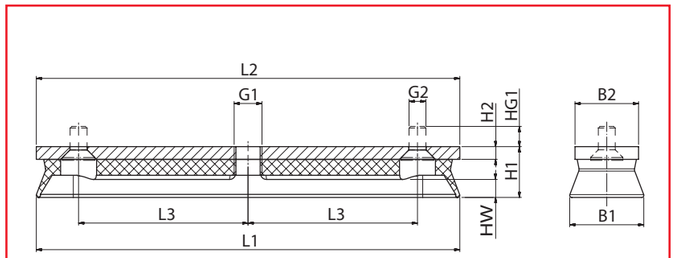
Type	Holding force* (N)	Suction radius min: (mm)	Volume** (l)	Weight (kg)
DP-EP 30x100	65	25	0,017	0,18
DP-EP 30x200	130	25	0,025	0,33
DP-EP 30x300	195	25	0,040	0,52
DP-EP 40x100	100	40	0,022	0,22
DP-EP 40x200	200	40	0,032	0,40
DP-EP 40x300	300	40	0,050	0,65
DP-EP 50x200	300	50	0,040	0,50
DP-EP 50x300	450	50	0,060	0,90

** Specifications at 60 % vacuum w/o safety factor, on smooth, dry surfaces*
*** Volume with suction pad not engaged and unloaded*

FEZER
Simply move more.

Recangular suction plate

EP 20x100 - 50x300 with base plate



EP 30x100 ... EP 100x300

Dimensions

Type	L1	L2	L3	B1	B2	HW	H1	H2	G1	G2
DP-EP 30x100	100	52	120	30	30	5	20	6	8,5	G1/8
DP-EP 30x200	200	102	220	30	30	5	20	6	8,5	G1/8
DP-EP 30x300	300	152	320	30	30	5	20	6	8,5	G1/8
DP-EP 40x100	100	52	120	40	30	6	22	6	8,5	G1/4
DP-EP 40x200	200	102	220	40	30	6	22	6	8,5	G1/4
DP-EP 40x300	300	152	320	40	30	6	22	6	8,5	G1/4
DP-EP 50x200	200	102	220	50	40	6	27	6	8,5	G1/4
DP-EP 50x300	300	152	320	50	40	6	27	6	8,5	G1/4

FEZER
Simply move more.

Rectangular suction plate

EP 13x43 - EP 96x96

Description
Special suction plate for very small and narrow workpieces. Can also be used as holding plates in machines. The suction plate consists of an aluminum body with vulcanized sealing with burling pad.

Application
- narrow, even workpieces
- small parts
- holding plates for machines, suction tables etc.

EP 13x43 ... EP 96x96

Article numbers

Type	NBR-S	NBR-G	SI-T
DP-EP 13x43	---	1.16.1.0010	1.16.1.0011
DP-EP 19x58	---	1.16.1.0015	1.16.1.0016
DP-EP 23x83	---	1.16.1.0023	1.16.1.0024
DP-EP 25x65	---	1.16.1.0017	1.16.1.0018
DP-EP 33x65	---	1.16.1.0019	1.16.1.0020
DP-EP 35x105	---	1.16.1.0001	1.16.1.0003
DP-EP 40x45	1.16.1.0012	---	1.16.1.0013
DP-EP 42x42	1.16.1.0008	---	1.16.1.0009
DP-EP 47x65	---	1.16.1.0021	1.16.1.0022
DP-EP 96x96	---	1.16.1.0025	1.16.1.0026

Technical details

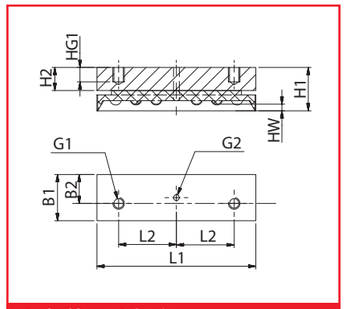
Type	Holding force* (N)	Volume** (l)	Weight (kg)
DP-EP 13x43	21	0,006	0,02
DP-EP 19x58	36	0,003	0,06
DP-EP 23x83	36	0,006	0,10
DP-EP 25x65	45	0,005	0,06
DP-EP 33x65	72	0,009	0,07
DP-EP 35x105	141	0,014	0,14
DP-EP 40x45	73	0,006	0,06
DP-EP 42x42	73	0,006	0,08
DP-EP 47x65	123	0,011	0,11
DP-EP 96x96	440	0,050	0,41

** Specifications at 60 % vacuum w/o safety factor, on smooth, dry surfaces*
*** Volume with suction pad not engaged and unloaded*

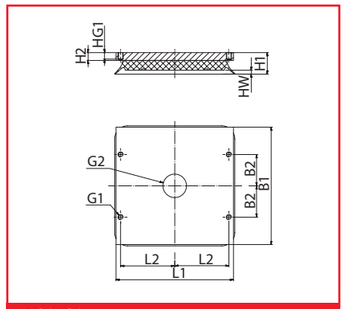
FEZER
Simply move more.

Rectangular suction plate

EP 13x43 - EP 96x96



EP 13x43 ... EP 47x65



EP 96x96

Dimensions

Type	L1	L2	B1	B2	HW	H1	H2	G1	G2
DP-EP 13x43	40	16,5	10	5	2	15	8	M4	3
DP-EP 19x58	55	20	16	18	2,5	15	8	M4	2
DP-EP 23x83	80	28	20	25	2	15	8	M4	6
DP-EP 25x65	60	20	20	10	2	13	6	M4	6
DP-EP 33x65	60	20	28	14	2,5	13	6	M4	10
DP-EP 35x105	100	30	32	16	2,5	13	6	M4	18
DP-EP 40x45	40	16,5	35	17,5	2,5	13	6	M4	10
DP-EP 42x42	42	16,5	42	21	2,5	13	6	M4	8
DP-EP 47x65	60	20	42	21	2,5	13	6	M4	18
DP-EP 96x96	92	41,5	92	24	2,5	16,5	6	M4	18

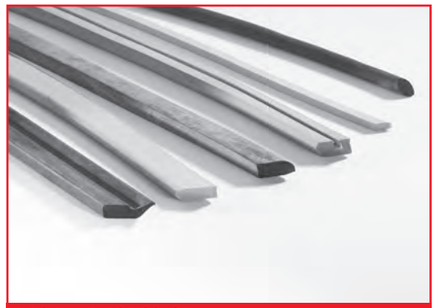
Sealing profiles

D-RS ... D-PGR

FEZER
Simply move more.

Description
Sealing profiles in metre lengths to install on individually formed bodies. The sealing profiles can be either clipped on or glued.

Application
- Individual suction plates for special geometries
- also suitable for curved and structured surfaces



D-RS 5 ... D-PGR 20x25

Article numbers

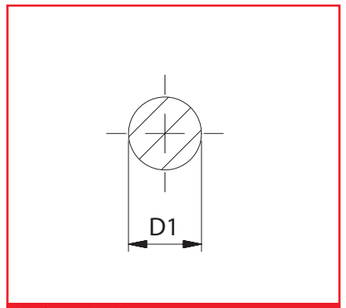
Type	Sealing profile	
	M-S	M-SI-W
D-RS 5	6.11.7.0011	6.11.7.0015
D-RS 6	6.11.7.0022	6.11.7.0017
D-RS 8	6.11.7.0018	6.11.7.0019
D-RS 10	6.11.7.0003	6.11.7.0004
D-RS 12	6.11.7.0005	6.11.7.0006
D-RS 15	6.11.7.0007	6.11.7.0008
D-PGO 6x8	2.19.2.0060	---
D-PGO 10x20	2.19.2.0138*	---
D-PGO 12x17	2.19.2.0057	---
D-PGR 10x10	2.19.2.0009	---
D-PGR 10x18	2.19.2.0018	---
D-PGR 20x25	2.19.2.0038	---

* grey design

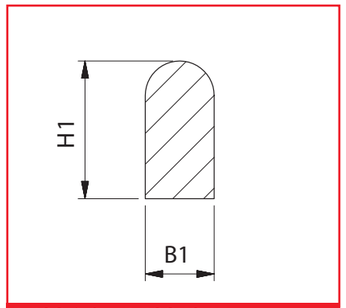
Sealing profiles

D-RS ... D-PGR

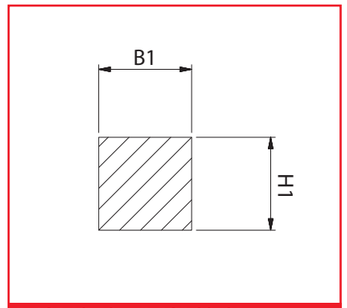
FEZER
Simply move more.



D-RS 5 ... D-RS 15



D-PGO 6x8 ... D-PGO 12x17



D-PGR 10x10 ... D-PGR 20x25

Dimensions

Type	D1	B1	H1	Groove dimensions	
				Width	Depth
D-RS 5	5	---	---	5,2 - 5,5	3,5
D-RS 6	6	---	---	6,3 - 6,6	4,2
D-RS 8	8	---	---	8,4 - 8,8	5,5
D-RS 10	10	---	---	10,5 - 11	7,0
D-RS 12	12	---	---	12,5 - 13	8,5
D-RS 15	15	---	---	15,5 - 16	10,5
D-PGO 6x8	---	---	8	5,8 - 6	4 - 5,5
D-PGO 10x20	---	10	20	9,8 - 10	10 - 14
D-PGO 12x17	---	12	17	11,8 - 12	8,5 - 12
D-PGR 10x10	---	10	10	9,8 - 10	5 - 7
D-PGR 10x18	---	10	18	9,8 - 10	9 - 12,5
D-PGR 20x25	---	20	25	19,5 - 20	12,5 - 17,5

FEZER
Simply move more.

Accessories for suction pads

Special glue for sealing profiles

Description
This glue is put onto both glued surfaces. Once it has become dry the surfaces are tightly pressed against each other. The pressure thus applied defines the firmness of the glued area.

Application
- glueing of cut ends of sealing profiles
- glueing of sealing profiles into grooves

Spezialkleber

Article numbers

	Contents	
Special glue for rubber-metal connections perbunane	670 g	1.55.9.0011
Special glue for rubber-metal connections perbunane	60 g	1.55.9.0008
Special glue for rubber-metal connections silicone	300 g	1.55.9.0002
Thinner for special glue	1000 g	1.55.9.0007

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Simply move more.

Accessories for suction pads

Textile cover TÜZ

Description
Special textile cover made of a porous fabric with elastic band to slip onto the suction pad.

Application
- to protect workpieces with extremely sensitive surfaces like polished plates, etc.

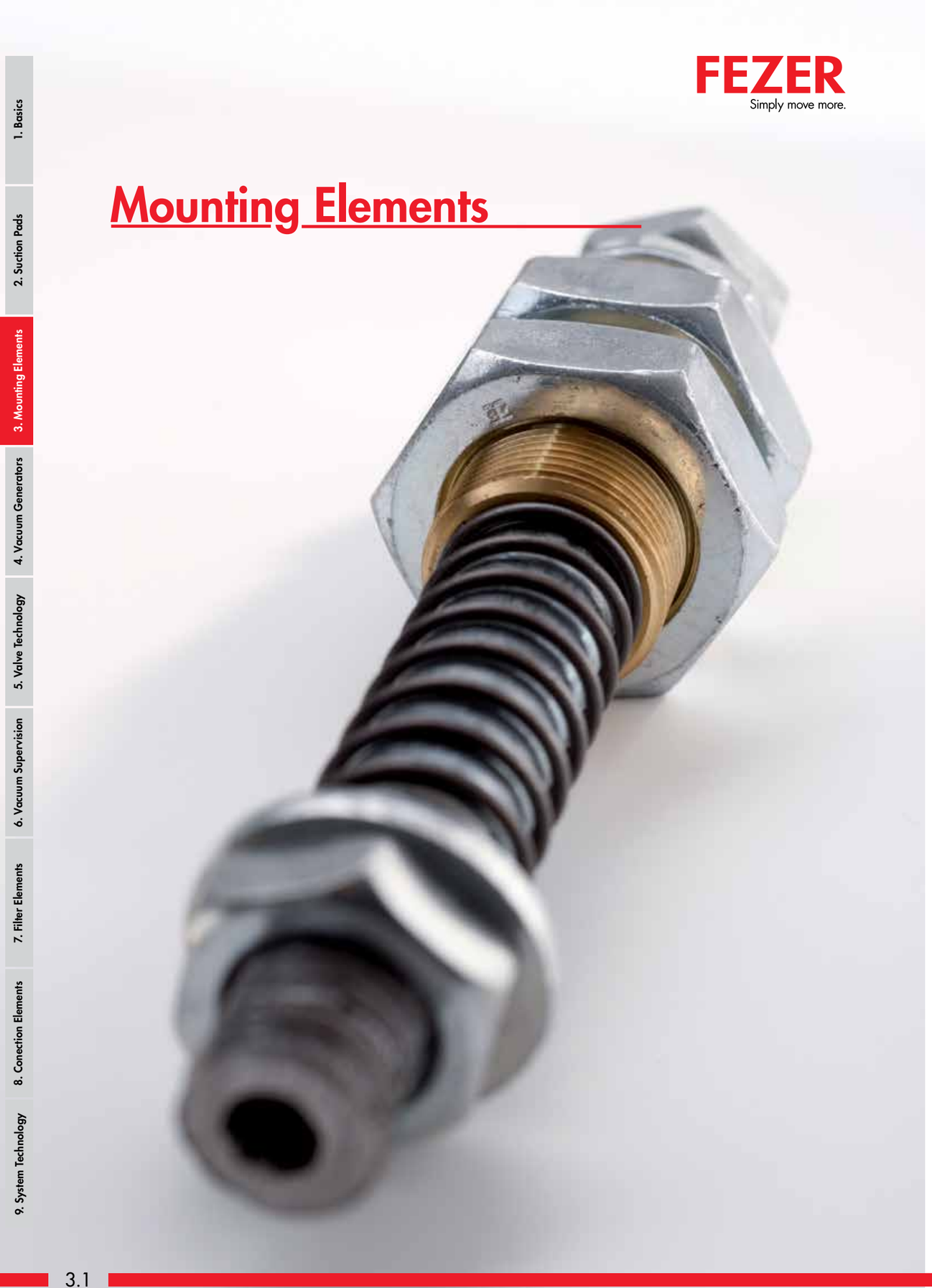
Advice
When using textile covers the vacuum generator needs more power as the covers do not seal the surface completely.


TÜZ 90 ... TÜZ 300

Article numbers

		for diameter (mm)
TÜZ 90	1.55.2.0014	90
TÜZ 100	1.55.2.0002	100
TÜZ 110	1.55.2.0003	110
TÜZ 130	1.55.2.0004	130
TÜZ 160	1.55.2.0006	160
TÜZ 180	1.55.2.0007	180
TÜZ 210	1.55.2.0009	210
TÜZ 220	1.55.2.0010	220
TÜZ 250	1.55.2.0011	250
TÜZ 300	1.55.2.0012	300

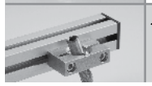
Mounting Elements



Connection Elements

Overview

Connection elements		Technical data		Description	Page
	Connection nipples	Connections :	G1/8" - G	to clip on suction pads	3.5
	Connection screws	Connections :	G1/8" - G	for suction pads with a fixed body	3.7
	Suction pad retainer SAS	Connections :	M5 - M30x1,5	rigid retainer for even surfaces	3.9
	Suction pad retainer SAK	Connections :	M12x1 - M30x1,5	articulated retainer for adjusting the suction pads to uneven surfaces	3.11

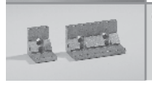
Holders for suction pads		Technical data		Description	Page
	Angle holder HSW	Connections :	M 5 - M16	Holder with angle connection for direct connection to drillings	3.13
	Bushing HSB	Connections :	G 1/8 - G 1/4	Holder with straight connections for direct connections	3.15
	Joint holder HSG	Connections :	M 5 - M 16 G 1/8 - G 1/4	Joint holder for adjustment of the pads to curved surfaces	3.17

Federstößel		Technical data		Description	Page
	Suspension bolt FSBI-DG	Connections:	M8x1 - M20x1,5	- turn-proof aluminum design - mounted on holder or drillings - sets down softly on workpieces	3.19
	Suspension bolt FSBE-DG	Connections:	M8x1 - M20x1,5	- turn-proof aluminum design - mounted on holder or drillings - sets down softly on workpieces	3.21
	Suspension bolt FSBB-DG	Connections:	M8x1 - M20x1,5	- turn-proof aluminum design - mounted on holder or drillings - sets down softly on workpieces	3.23
	Suspension bolt FSBE	Connections:	M16x1,5 - M30x1,5	- mounted on holder or drillings - sets down softly on workpieces	3.25
	Suspension bolt FSBB	Connections:	M16x1,5 - M30x1,5	- mounted on holder or drillings - sets down softly on workpieces - even load distribution	3.27
	Suspension bolt FSKE	Connections:	M12x1 - M20x1,5	- mounted on hollow profiles - sets down softly on workpieces	3.29
	Suspension bolt FSKB	Connections:	M12x1 - M20x1,5	- mounted on hollow profiles - sets down softly on workpieces - even load distribution	3.31

Connection Elements

Overview

Holder for suspension bolt		Technical data		Description	Page
	Holders HFSA			Holders for suspension bolts with slide bushing on aluminum profiles	3.33
	Holders HFSH	for hollow profiles:	30x30 - 60x60	Holders for suspension bolts with slide bushing on hollow profiles	3.35

Profile systems		Technical data		Description	Page
	Design of individual suction spiders			Design of suction spiders to flonge onto hoisting gear or robots	3.37
	Aluminum profiles	Dimensions:	40x40 - 100x100	robust and multi-purpose aluminum profiles	3.39
	Connection elements			Angle connections, sliding blocks, covers	3.41

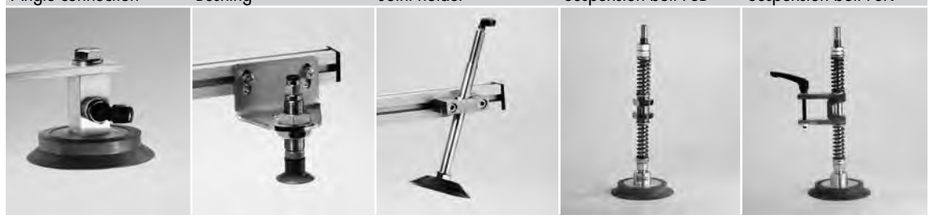
Single components		Technical data		Description	Page
	Slide bushing GS	Bolt diameter:	12 - 20 mm	for individual design of suspension bolts and suction pad connections	3.45
	Cross clamping pieces KKS	Bolt diameter:	12 - 20 mm	for individual design of suspension bolt and suction pad connections	3.47
	Clamping plates KP	Bolt diameter:	12 - 30 mm	for individual design of suspension bolt and suction pad connections	3.49
	Suspension bolts STN	Bolt diameter:	12 - 20 mm	Bolt with integrated vacuum feed and connection nipple	3.51
	Suspension bolts STI	Bolt diameter:	12 - 20 mm	Bolt with integrated vacuum feed and inner thread for threaded union	3.53
	Suspension bolts STG	Bolt diameter:	12 - 30 mm	solid bolt for high duty with separate vacuum feed	3.55
	Pressure springs	Diameter: Spring rates:	12 - 30 mm 0,5 - 500 N/mm	for individual design of suspension bolt characteristics	3.57
	Bolt ends			Connection elements for bolts	3.59

Connection Elements

Modular system

Available connections for suction pads

Angle connection | Bushing | Joint holder | Suspension bolt FSB | Suspension bolt FSK



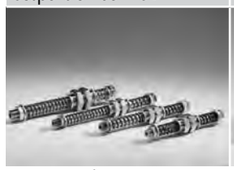
These holders are used for connecting the suspension bolts FSB to aluminum and hollow profiles.

Holder for suspension bolt FSB

for Al-Profile | hollow profile

Suspension bolt

Suspension bolt FSB



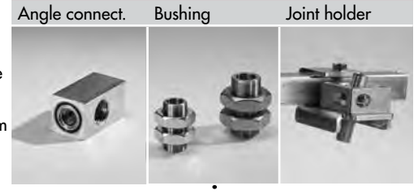
Suspension bolt

Suspension bolt FSK

Suspension bolts guaranteea soft touchdown and an even load distribution when several pads are being used. The design FSK can be direct-ly mounted on hollow or aluminum profiles (30x30 and 40x40).

Halter for Sauggreifer

Angle connect. | Bushing | Joint holder



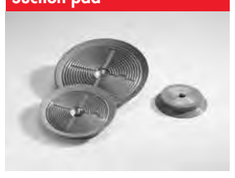
for connection of suc-tion pads to hollow or aluminum profiles. The holders are designed with integrated vacuum feed.

Suction pad retainer

rigid SAS | articulated SAK

in articulated and rigid de-sign to connect the suction pads to suspension bolts. The retainers are designed with integrated vacuum feed.

Suction pad



Connection Elements

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Connection nipple for suction pad AN

Description
Connection nipple with outer thread for flat or bellows suction cups in steel, brass or aluminum design.

Application
- to clip on the suction cups. Easy exchange when worn out
- to prevent unintentional pulling off the cups can be equippd with clamps


ANF ... ANA

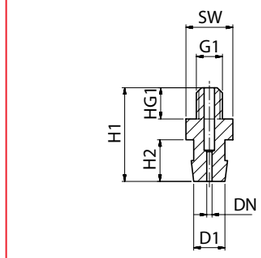
Article number

Typee		Temperature (°C)	Weight (kg)
ANF-6-M5	1.31.1.0011	-10 ... +80	0,002
ANF-6-1/4	1.31.1.0012	-10 ... +80	0,002
ANF-8-M5	1.31.1.0013	-10 ... +80	0,010
ANF-8-1/4	1.31.1.0014	-10 ... +80	0,010
ANF-10-1/4	1.31.1.0026	-10 ... +80	0,012
ANF-16-1/4	1.31.1.0031	-10 ... +80	0,015
ANM-8-1/8	1.31.1.0032	-10 ... +80	0,008
ANM-13-1/4	1.31.1.0033	-10 ... +80	0,012
ANC-1,2-M5	1.31.1.0001	-10 ... +80	0,010
ANC-2,5-M5	1.31.1.0002	-10 ... +80	0,003
ANC-3,5-M5	1.31.1.0003	-10 ... +80	0,010
ANC-4-1/4	1.31.1.0005	-10 ... +80	0,020
ANC-4,5-1/4	1.31.1.0004	-10 ... +80	0,008
ANC-5-1/4	1.31.1.0007	-10 ... +80	0,024
ANC-5,5-1/4	1.31.1.0006	-10 ... +80	0,007
ANC-8-1/4	1.31.1.0008	-10 ... +80	0,008
ANA-9-1/8	1.31.1.0018	-10 ... +80	0,010
ANA-9-1/4	1.31.1.0019	-10 ... +80	0,018
ANA-29-1/4	1.31.1.0020	-10 ... +80	0,021
ANA-32-1/4	1.31.1.0021	-10 ... +80	0,027
ANA-41-1/4	1.31.1.0022	-10 ... +80	0,032

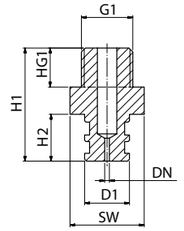
Connection Elements

FEZER
Simply move more.

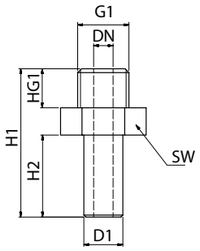
Connection nipple for suction pad AN



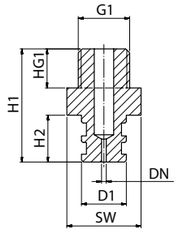
ANF-6-M5, ANF-6-1/4



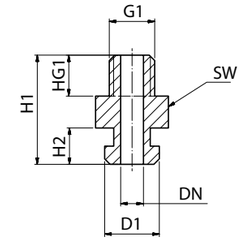
ANF-8-M5, ANF-8-1/4



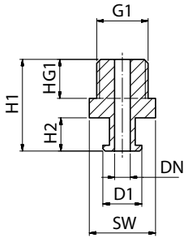
ANF-10-1/4, ANF-16-1/4



ANM-8-1/8, ANM-13-1/4



ANC-1,2-M5 ... ANC-8-1/4



ANA-9-1/8 ... ANA41-1/4

Dimensions

Type	D1	DN	H1	H2	G1	HG1	SW
ANF-6-M5	7	1	18	8	M 5	6	9
ANF-6-1/4	7	4	25	8	G1/4	10	17
ANF-8-M5	11	1	18	12	M 5	6	---
ANF-8-1/4	11,5	5	29	12	G1/4	10	19
ANF-10-1/4	10	5	38	21	G1/4	10	19
ANF-16-1/4	16	5	38	21	G1/4	10	19
ANM-8-1/8	8	3,5	23	8,5	G1/8	7	14
ANM-13-1/4	13	6,5	25	9	G1/4	8	17
ANC-1,2-M5	3	1,2	10,5	2,5	M 5	4,5	8
ANC-2,5-M5	6	2,5	12	4	M 5	4,5	8
ANC-3,5-M5	6,5	3,5	13,5	6,5	M 5	4,5	8
ANC-4-1/4	10	4	23,5	8,5	G1/4	10	17
ANC-4,5-1/4	14	4	23,5	8,5	G1/4	10	17
ANC-5-1/4	14	5	29,5	14,5	G1/4	10	17
ANC-5,5-1/4	M10x1,25	5,5	25	10	G1/4	10	17
ANC-8-1/4	18	8	37	22	G1/4	10	17
ANA-9-1/8	7	3	21	5,5	G1/8	9,5	14
ANA-9-1/4	13	6	26	6	G1/4	10	17
ANA-29-1/4	12	6	29	12	G1/4	12	19
ANA-32-1/4	12	6	26	9	G1/4	12	19
ANA-41-1/4	12	6	46	10	G1/4	10	19

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Connection Elements

Connection screws for suction pads AS

Description
Robust connection screws for suction pads with body. The screws are available with and without through-hole, depending on the connection to the pad.

Application
- to fasten suction pads with body
- in connection with suction pad retainers SAS/SAK
- in connection with holders for suction pads

AS-M5 ...ASB-M16

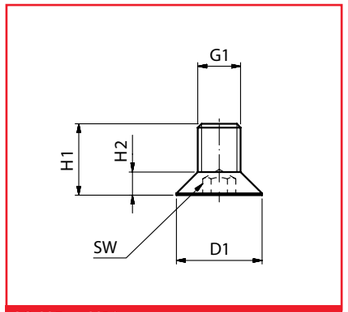
Article number

Type		Temperature (°C)	Weight (kg)
AS-M5-20	1.31.2.0108	-10 ... +80	0,004
AS-M8-16	1.31.2.0076	-10 ... +80	0,010
AS-M12-17	1.31.2.0010	-10 ... +80	0,022
AS-M12-20	1.31.2.0011	-10 ... +80	0,025
AS-M16-22	1.31.2.0035	-10 ... +80	0,042
AS-M24x1,5-28	1.31.2.0069	-10 ... +80	0,120
AS-M24x1,5-30	1.31.2.0029	-10 ... +80	0,160
ASB-M5-20	1.31.2.0009	-10 ... +80	0,003
ASB-M8-16	1.31.2.0068	-10 ... +80	0,008
ASB-M12-17	1.31.2.0003	-10 ... +80	0,020
ASB-M12-20	1.31.2.0082	-10 ... +80	0,022
ASB-M12-25	1.31.2.0083	-10 ... +80	0,026
ASB-M16-23	1.31.2.0046	-10 ... +80	0,036

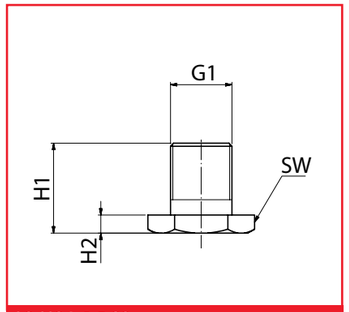
FEZER
Simply move more.

Connection Elements

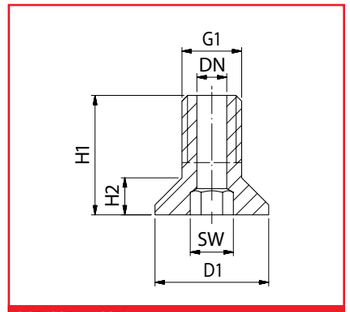
Connection screws for suction pad AS



AS-M5 ... M16



AS-M24x1,5-28



ASB-M5 ... M16

Dimensions

Type	D1	DN	H1	H2	G1	SW
AS-M5-20	11	---	20	3	M5	3
AS-M8-16	18	---	16	5	M8	5
AS-M12-17	27	---	17	7,5	M12	8
AS-M12-20	27	---	20	7,5	M12	8
AS-M16-22	33,5	---	22	8,8	M16	10
AS-M24x1,5-28	---	---	34	6	M24x1,5	36
AS-M24x1,5-30	---	---	42	12	M24x1,5	36
ASB-M5-20	11	2	20	3	M5	3
ASB-M8-16	18	4	16	5	M8	5
ASB-M12-17	27	8	17	7,5	M12	8
ASB-M12-20	27	8	20	7,5	M12	8
ASB-M12-25	27	8	25	7,5	M12	8
ASB-M16-20	33,5	10	23	8,8	M16	10

Connection Elements

FEZER
Simply move more.

Rigid suction pad retainer SAS

Description
Stable and robust suction pad retainers made of high-quality aluminum (outer thread in inches) or galvanized steel (metric thread). The suction pad retainers have a through-hole which also serves for an integrated vacuum feed (exceptions see table). For suction plates with a body the retainers are equipped with an o-ring which seals the connection.

Application
- rigid connection on suspension bolt and holders
- smooth, even surfaces

SAS-M8x1-M5 ... SAS-M30x1,5-M24

Article number

Type	
SAS-M8x1-M5	1.31.2.0126
SAS-M8x1-1/8	1.31.2.0124
SAS-M12x1-1/8	1.31.2.0063
SAS-M12x1-1/4	1.31.2.0064
SAS-M12x1-3/8	1.31.2.0125
SAS-M16x1,5-1/4	1.31.2.0102
SAS-M16x1,5-3/8	1.31.2.0103
SAS-M16x1,5-M8*	1.31.2.0100
SAS-M16x1,5-M12*	1.31.2.0101
SAS-M16x1,5-M16*	1.31.2.0072
SAS-M20x1,5-M16*	1.31.2.0073
SAS-M20x1,5-M20**	1.31.2.0027
SAS-M30x1,5-M24**	1.31.2.0028

** Design with o-ring sealing suction pad with body*
*** w/o integrated vacuum feed*

Technical data

Type	Tensile strain max. (N)	Bending mom. max. (Nm)	Temperature (°C)	Weight (kg)
SAS-M8x1-M5	80	4	-10 ... +80	0,009
SAS-M8x1-1/8	80	4	-10 ... +80	0,008
SAS-M12x1-1/8	250	20	-10 ... +80	0,010
SAS-M12x1-1/4	250	20	-10 ... +80	0,012
SAS-M12x1-3/8	250	20	-10 ... +80	0,014
SAS-M16x1,5-1/4	600	60	-10 ... +80	0,025
SAS-M16x1,5-3/8	600	60	-10 ... +80	0,023
SAS-M16x1,5-M8*	250	60	-10 ... +80	0,060
SAS-M16x1,5-M12*	600	60	-10 ... +80	0,074
SAS-M16x1,5-M16*	1.250	60	-10 ... +80	0,078
SAS-M20x1,5-M16*	2.500	120	-10 ... +80	0,102
SAS-M20x1,5-M20**	5.500	120	-10 ... +80	0,993
SAS-M30x1,5-M24**	9.500	350	-10 ... +80	0,918

1. Basics
2. Suction Pads
3. Mounting Elements
4. Vacuum Generators
5. Valve Technology
6. Vacuum Supervision
7. Filter Elements
8. Connection Elements
9. System Technology

Connection Elements

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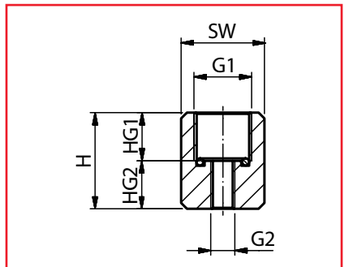
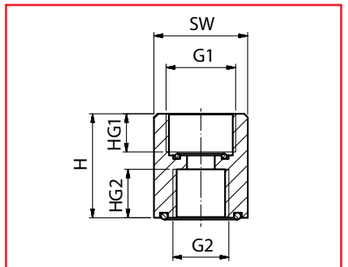
Simply move more.

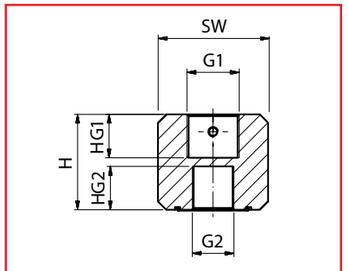
Rigid suction pad retainer SAS



SAS-M8x1 ...



SAS-M16x1,5 ... SAS-M20x1,5



SAS-M20x1,5-M24 ... SAS-M30x1,5-M24

Dimensions

Type	H	G1	G2	HG1	HG2	SW
SAS-M8x1-M5	28	M8x1	M5	10	10	13
SAS-M8x1-1/8	28	M8x1	G1/8	10	10	13
SAS-M12x1-1/8	28	M12x1	G1/8	10	10	15
SAS-M12x1-1/4	28	M12x1	G1/4	10	12	17
SAS-M12x1-3/8	28	M12x1	G3/8	10	12	19
SAS-M16x1,5-1/4	28	M16x1,5	G1/4	10	10	24
SAS-M16x1,5-3/8	28	M16x1,5	G3/8	10	10	24
SAS-M16x1,5-M8*	28	M16x1,5	M8	10	10	24
SAS-M16x1,5-M12*	28	M16x1,5	M12	10	10	24
SAS-M16x1,5-M16*	30	M16x1,5	M16	10	13	24
SAS-M20x1,5-M16*	30	M20x1,5	M16	12	14	27
SAS-M20x1,5-M20**	55	M20x1,5	M20	25	25	55
SAS-M30x1,5-M24**	55	M30x1,5	M24	25	25	55

FEZER
Simply move more.

Connection Elements

Articulated suction pad retainer SAK

Description
Stable and robust suction pad retainers made of galvanized steel with integrated vacuum feed for articulated connection of suction pads on suspension bolts. On suction pads with body the connection is sealed with an o-ring. Starting with connection thread M20 a separate vacuum feed is required.

Application
- articulated connection on suspension bolts
- curved, uneven surfaces

SAK-M16x1,5-M8 ... SAK-M30x1,5-M24

Article number

Type	
SAK-M16x1,5-M8	1.31.2.0104
SAK-M16x1,5-M12	1.31.2.0105
SAK-M16x1,5-M16	1.31.2.0049
SAK-M20x1,5-M16	1.31.2.0054
SAK-M20x1,5-M20*	1.31.2.0025
SAK-M30x1,5-M24*	1.31.2.0026

** w/o integrated vacuum feed*

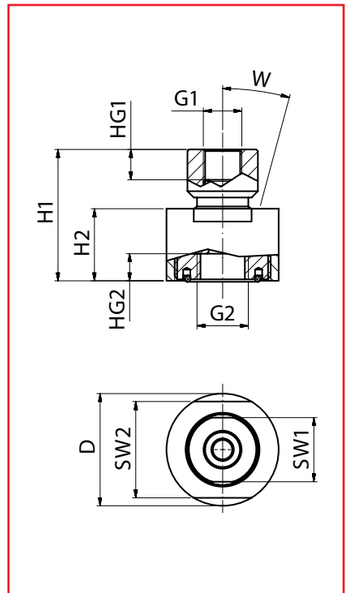
Technical data

Type	Tensile load max. (N)	Temperature (°C)	Weight (kg)
SAK-M16x1,5-M8	200	-10 ... +80	0,123
SAK-M16x1,5-M12	800	-10 ... +80	0,123
SAK-M16x1,5-M16	1.250	-10 ... +80	0,115
SAK-M20x1,5-M16	2.500	-10 ... +80	0,279
SAK-M20x1,5-M20*	5.500	-10 ... +80	1,309
SAK-M30x1,5-M24*	9.500	-10 ... +80	1,249

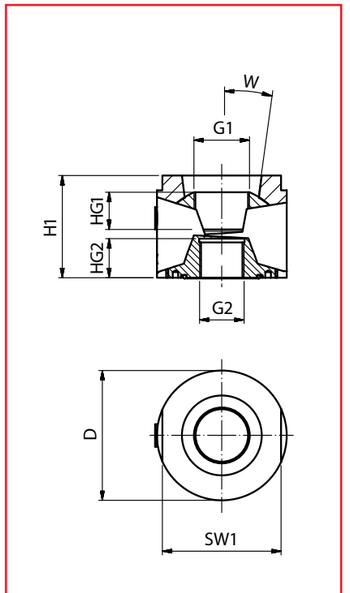
FEZER
Simply move more.

Connection Elements

Articulated suction pad retainer SAK



SAK-M16x1,5xM8 - SAK-M20x1,5-M16



SAK-M20x1,5-M20 ... SAK-M30x1,5-M24

Dimensions

Type	H1	H3	HG1	HG2	D	W	G1	G2	SW1	SW2
SAK-M16x1,5-M8	41,5	22,5	10	8	35	15°	M16x1,5	M8	20	30
SAK-M16x1,5-M12	41,5	22,5	10	8	35	15°	M16x1,5	M12	20	30
SAK-M16x1,5-M16	41,5	22,5	10	8	35	15°	M16x1,5	M16	20	30
SAK-M20x1,5-M16	50,5	29,5	10	8	50	15°	M20x1,5	M16	25	41
SAK-M20x1,5-M20*	55	---	20	19	70	7°	M20x1,5	M20x1,5	64	---
SAK-M30x1,5-M24*	55	---	20	19	70	7°	M30x1,5	M24x1,5	64	---

Holder for Suction Pads

Holding bracket HSW

FEZER
Simply move more.

Description
Stable holder with upper connectioin thread and lateral vacuum feed made of galvanized steel. The connection screw is encluded.
Holders with metric connection thread are designed for suction pads with body and are sealed by an o-ring.

Application
- used for limited space applications
- simple and quick installation
- mounted on suspension bolt for a lower vacuum connection

HSW-M12x1-M5 ... HSWO-M16x1,5-M16

Article number

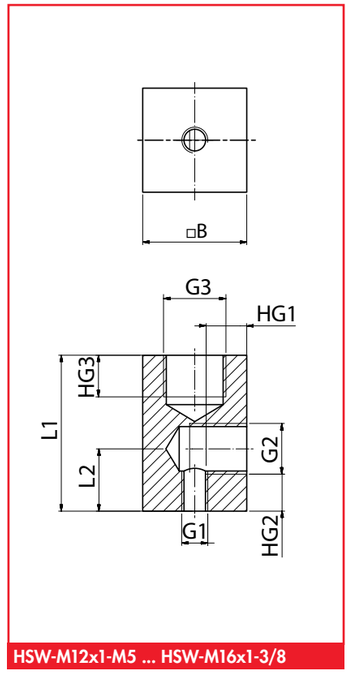
Type	
HSW-M12x1-M5	1.31.3.0012
HSW-M12x1-1/8	1.31.3.0013
HSW-M12x1-1/4	1.31.3.0014
HSW-M16x1,5-1/4	1.31.3.0020
HSW-M16x1,5-3/8	1.31.3.0021
HSWO-M12x1-M8*	1.31.3.0015
HSWO-M16x1,5-M12*	1.31.3.0016
HSWO-M16x1,5-M16*	1.31.3.0019

** design with o-ring sealing*

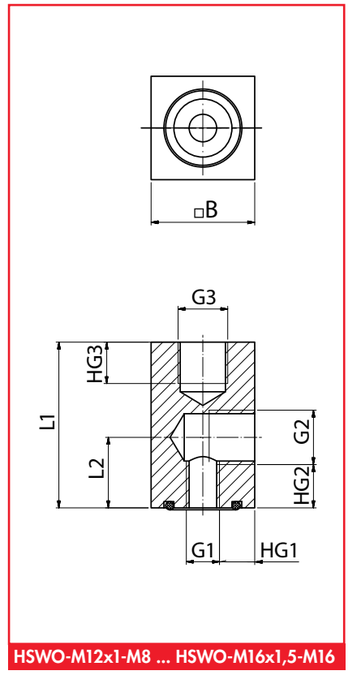
Technical data

Type	Tensile laod max. (N)	Bending mom. max. (Nm)	Temperature (°C)	Weight (kg)
HSW-M12x1-M5	250	20	-10 ... +80	0,09
HSW-M12x1-1/8	250	20	-10 ... +80	0,08
HSW-M12x1-1/4	250	20	-10 ... +80	0,16
HSW-M16x1,5-1/4	600	60	-10 ... +80	0,18
HSW-M16x1,5-3/8	600	60	-10 ... +80	0,18
HSWO-M12x1-M8*	250	20	-10 ... +80	0,17
HSWO-M16x1,5-M12*	600	60	-10 ... +80	0,18
HSWO-M16x1,5-M16*	600	60	-10 ... +80	0,18

Holder for Suction Pads
Holding bracket HSW
FEZER
Simply move more.



HSW-M12x1-M5 ... HSW-M16x1-3/8



HSWO-M12x1-M8 ... HSWO-M16x1,5-M16

Dimensions

Type	L1	L2	B	G1	G2	G3	HG1	HG2	HG3
HSW-M12x1-M5	30	12	20	M5	G1/8	M12x1	7,5	7	10
HSW-M12x1-1/8	35	15	20	G1/8	G1/8	M12x1	5	10	10
HSW-M12x1-1/4	40	17	25	G1/4	G1/4	M12x1	6	10	10
HSW-M16x1,5-1/4	50	22	25	G1/4	G1/4	M16x1,5	6	15	12
HSW-M16x1,5-3/8	50	22	25	G3/8	G3/8	M16x1,5	6	13,5	12
HSWO-M12x1-M8*	40	17	25	M8	G1/4	M12x1	8,5	10,5	10
HSWO-M16x1,5-M12*	50	22	25	M12	G1/2	M16x1,5	6,5	11,5	12
HSWO-M16x1,5-M16*	50	22	25	M16	G1/2	M16x1,5	4,5	11,5	12

Holder for Suction Pads

Bushing HSB

FEZER
Simply move more.

Description
Stable connection bushing made of brass with outer thread to be used in limited space conditions. The height adjustment of the bushing can compensate for any unevenness of the workpiece. Bushings with metric threads are designed for connection to suction pads with body and are sealed with an o-ring.

Application
- used for limited space applications
- compensation of height differences
- simple and quick installation
- mounted on suspension bolt for bottom vacuum feed

HSB-1/8-M5 ... HSB-1/2-M16

Article number

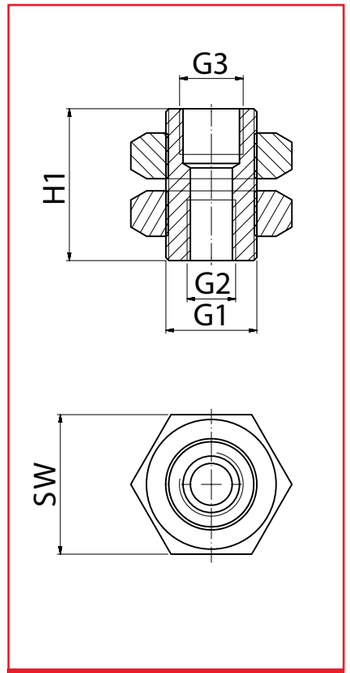
Type	
HSB-1/8-M5	1.34.1.0007
HSB-1/8-1/8	1.34.1.0008
HSB-1/4-1/4	1.34.1.0009
HSB-3/8-3/8	1.34.1.0013
HSB-1/8-M8*	1.34.1.0010
HSB-1/4-M12*	1.34.1.0011
HSB-1/2-M16*	1.34.1.0012

** design with o-ring sealing*

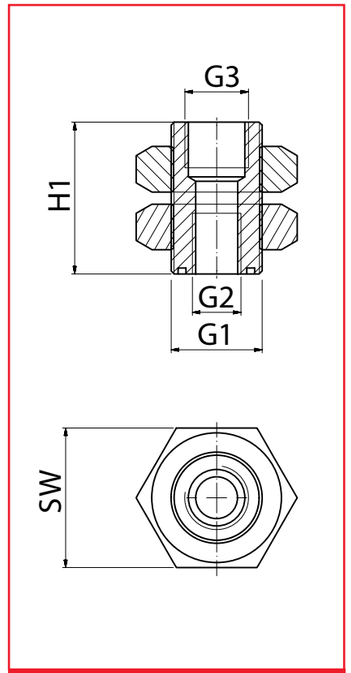
Technical data

Type	Tensile load max. (N)	Bending mom. max. (Nm)	Temperature (°C)	Weight (kg)
HSB-1/8-M5	100	20	-10 ... +80	0,20
HSB-1/8-1/8	200	20	-10 ... +80	0,18
HSB-1/4-1/4	300	20	-10 ... +80	0,28
HSB-3/8-3/8	600	60	-10 ... +80	0,27
HSB-1/8-M8*	200	20	-10 ... +80	0,19
HSB-1/4-M12*	600	60	-10 ... +80	0,32
HSB-1/2-M16*	2.500	60	-10 ... +80	0,48

Holder for Suction Pads
Bushing HSB
FEZER
Simply move more.



HSB-1/8-M5 ... HSB-3/8-3/8



HSB-1/8-M8 ... HSB-1/2-M16

Dimensions

Type	H1	G1	G2	G3	SW
HSB-1/8-M5	50	M16x1,5	M5	G1/8	30
HSB-1/8-1/8	50	M16x1,5	G1/8	G1/8	30
HSB-1/4-1/4	50	M20x1,5	G1/4	G1/4	36
HSB-3/8-3/8	60	M24x1,5	G3/8	G3/8	36
HSB-1/8-M8*	50	M16x1,5	M8	G1/4	30
HSB-1/4-M12*	50	M20x1,5	M12	G1/4	36
HSB-1/2-M16*	60	M30x1,5	M16	G1/2	46

Holder for Suction Pads

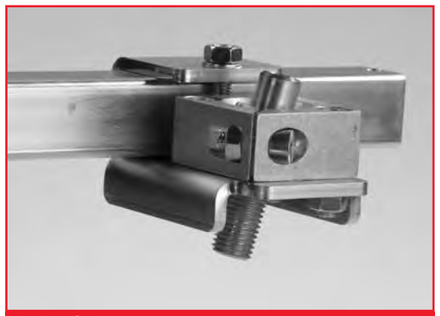
Joint holder HSG

FEZER
Simply move more.

Description
Universally suitable joint for installation of suction pads on aluminum and hollow profiles. The joints are adjustable to the workpieces both in height and in tilt angle. For connection to the suction pads please use the designated suction pad retainers.

Application
- in connection with suspension bolt
- inherently stable loads with strongly curved surfaces
- formed parts

HSG-AL- ...



HSG-30/40- ...

Article number

Type	Bolt length	
	75 mm	125 mm
HSG-AL-12x1	1.34.6.0002	1.34.6.0008
HSG-AL-16x1,5	1.34.6.0003	1.34.6.0007
HSG-30-12x1	1.34.6.0004	1.34.6.0009
HSG-30-16x1,5	1.34.6.0005	1.34.6.0010
HSG-40-16x1,5	1.34.6.0006	1.34.6.0011

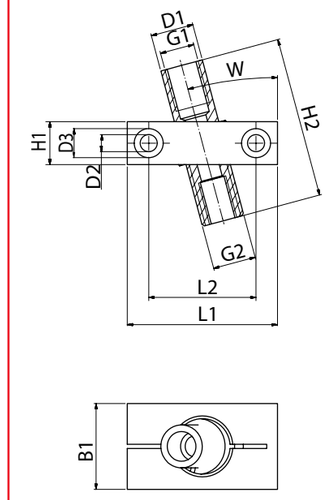
Technical data

Type	Tensile load max. (N)	Bend.mom. max. (Nm)	Temp. (°C)	Weight (kg)
HSG-AL-12x1	400	30	-10 ... +80	0,24
HSG-AL-16x1,5	600	45	-10 ... +80	0,25
HSG-30-12x1	400	30	-10 ... +80	0,78
HSG-30-16x1,5	600	45	-10 ... +80	0,80
HSG-40-16x1,5	600	45	-10 ... +80	0,72

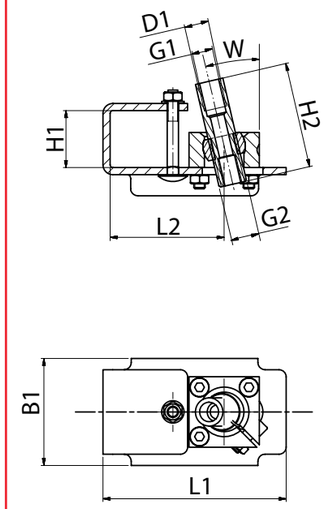
Holder for Suction Pads

Joint holder HSG

FEZER
Simply move more.



HSG-Al- ...



HSG-30/40 ...

Dimensions

Type	L1	L2	B	H1	H2	D1	D2	D3	G1	G2	W
HSG-AL-12x1-75	70	50	40	20	75	12	8	13,5	G1/4	M12x1	15°
HSG-AL-12x1-125	70	50	40	20	125	12	8	13,5	G1/4	M12x1	15°
HSG-AL-16x1,5-75	70	50	40	20	75	16	8	13,5	G1/4	M16x1,5	15°
HSG-AL-16x1,5-125	70	50	40	20	125	16	8	13,5	G1/4	M16x1,5	15°
HSG-30-12x1-75	105	66	66	30,5	75	12	---	---	G1/4	M12x1	13°
HSG-30-12x1-125	105	66	66	30,5	125	12	---	---	G1/4	M12x1	13°
HSG-30-16x1,5-75	105	66	66	30,5	75	12	---	---	G1/4	M16x1,5	13°
HSG-30-16x1,5-125	105	66	66	30,5	125	12	---	---	G1/4	M16x1,5	13°
HSG-40-16x1,5-75	105	66	66	30,5	75	12	---	---	G1/4	M16x1,5	13°
HSG-40-16x1,5-125	105	66	66	30,5	125	12	---	---	G1/4	M16x1,5	13°

Suspension Bolt

with bushing and turn-proof FSBI-DG

FEZER
Simply move more.

Description
Turn-proof suspension bolt made of high-quality aluminum with integrated vacuum feed and internal damping spring. The suspension bolt is hard-coated with a high longevity. The end positions is dampened by an o-ring. The bolt is also sealed with an o-ring against the suction pad retainers.

Application
- applications with high cycle rates
- when using oval suction plates
- soft touchdown on workpieces
- height adjustment via outside thread of the bushing

FSBI-DG-M8x1 ... FSBI-DG-M20x1,5

Article number

Type	
FSBI-DG-M8x1-25	1.34.2.0055
FSBI-DG-M12x1-25	1.34.2.0056
FSBI-DG-M16x1,5-50	1.34.2.0057
FSBI-DG-M20x1,5-50	1.34.2.0058

Technical data

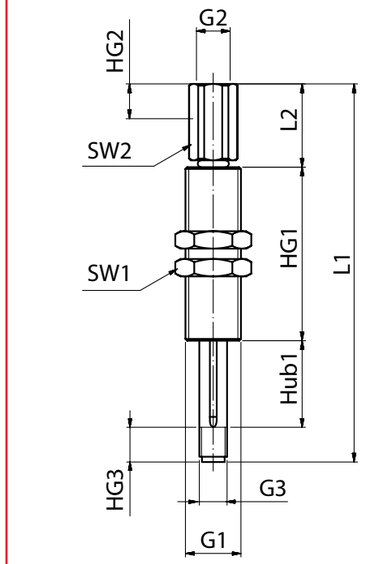
Type	Bolt stroke (mm)	Spring rate (N/mm)	Spring force max. (N)*	Tensile load max. (N)	Bending mom. max. (Nm)	Volume (l)	Temperature (°C)	Weight (kg)
FSBI-DG-M8x1-25	25	0,138	7,0	200	4	0,002	-10 ... +60	0,058
FSBI-DG-M12x1-25	25	0,176	10,1	800	10	0,003	-10 ... +60	0,084
FSBI-DG-M16x1,5-50	50	0,191	15,3	1.200	25	0,005	-10 ... +60	0,202
FSBI-DG-M20x1,5-50	50	0,224	18,3	2.500	50	0,008	-10 ... +60	0,259

** lower spring force at 50% of bolt stroke*

Suspension Bolt

with bushing and turn-proof FSBI-DG

FEZER
Simply move more.



FSBI-DG-M8x1 ... FSBI-DG-M20x1,5

Dimensions

Type	L1	L2	Hub1	G1	G2	G3	HG1	HG2	HG3	SW1	SW2
FSBI-DG-M8x1-25	109	24	25	M16x1,5	G1/8	M8x1	50	10	10	19	13
FSBI-DG-M12x1-25	109	24	25	M20x1,5	G1/8	M12x1	50	10	10	24	13
FSBI-DG-M16x1,5-50	166	25	50	M24x1,5	G3/8	M16x1,5	81	10	10	32	19
FSBI-DG-M20x1,5-50	166	25	50	M30x1,5	G3/8	M20x1,5	81	10	10	36	19

Suspension Bolt

with bushing and turn-proof FSBE-DG

FEZER
Simply move more.

Description
Turn-proof suspension bolt made of high-quality aluminum with internal vacuum feed and lower dampening spring. The bolt is hard-coated with a high longevity. There are various holders for the installation of the suspension bolt. The bolt is sealed with an o-ring against the suction pad retainers.

Application
- applications with high cycle rates
- soft touch-down on workpieces
- use of oval suction plates
- height adjustment via outer thread of the bushing

FSBE-DG-M8x1- ... FSBE-DG-M20x1,5-

Article number

Type	Bolt stroke 25 mm	Bolt stroke 50 mm	Bolt stroke 75 mm
FSBE-DG-M8x1	1.34.2.0072	---	---
FSBE-DG-M12x1	1.34.2.0065	1.34.2.0066	---
FSBE-DG-M16x1,5	---	1.34.2.0060	1.34.2.0061
FSBE-DG-M20x1,5	---	1.34.2.0067	1.34.2.0068

Technical data

Type	Bolt stroke (mm)	Spring rate (N/mm)	Spring force max. (N)*	Tensile load max. (N)	Bending mom. max. (Nm)	Volume (l)	Temperature (°C)	Weight (kg)
FSBE-DG-M8x1-25	25	2,268	57,2	200	4	0,004	-10 ... +60	0,10
FSBE-DG-M12x1-25	25	2,545	63,6	800	10	0,006	-10 ... +60	0,17
FSBE-DG-M12x1-50	50	1,647	82,3	800	10	0,009	-10 ... +60	0,18
FSBE-DG-M16x1,5-50	50	1,944	97,2	1.200	25	0,011	-10 ... +60	0,31
FSBE-DG-M16x1,5-75	75	1,512	113,4	1.200	25	0,013	-10 ... +60	0,32
FSBE-DG-M20x1,5-50	50	3,977	198,8	2.500	50	0,009	-10 ... +60	0,56
FSBE-DG-M20x1,5-75	75	2,574	193,0	2.500	50	0,011	-10 ... +60	0,59

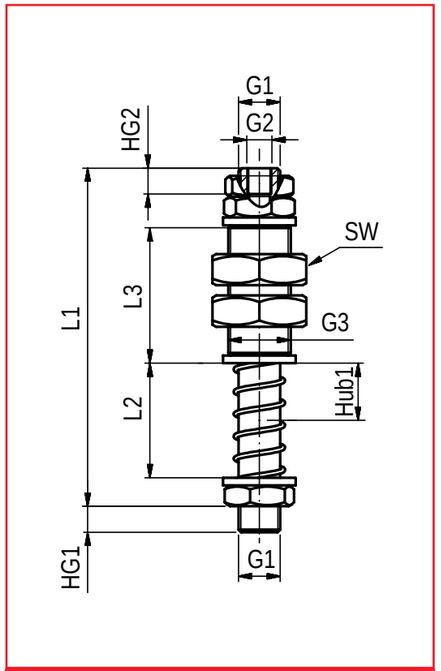
** lower spring force at 50% of bolt stroke*

1. Basics
2. Suction Pads
3. Mounting Elements
4. Vacuum Generators
5. Valve Technology
6. Vacuum Supervision
7. Filter Elements
8. Connection Elements
9. System Technology

Suspension bolt

with bushing and turn-proof FSBE-DG

FEZER
Simply move more.



FSBE-DG-M8x1- ... FSBE-DG-M20x1,5-

Dimensions

Type	L1	L2	L3	Hub1	G1	G2	G3	HG1	HG2	SW
FSBE-DG-M8x1-25	120	46,5	50	25	M8x1	M5	M16x1,5	10,5	10	19
FSBE-DG-M12x1-25	130	51	50	50	M12x1	M5	M20x1,5	10,5	10	24
FSBE-DG-M12x1-50	155	75	50	75	M12x1	M5	M20x1,5	10,5	10	24
FSBE-DG-M16x1,5-50	185	84	60	25	M16x1,5	G1/8	M24x1,5	10,5	15	32
FSBE-DG-M16x1,5-75	215	114	60	50	M16x1,5	G1/8	M24x1,5	10,5	15	32
FSBE-DG-M20x1,5-50	175	74	60	75	M20x1,5	G1/4	M30x1,5	10,5	15	36
FSBE-DG-M20x1,5-75	215	113,5	60	25	M20x1,5	G1/4	M30x1,5	10,5	15	36

Suspension Bolt

with bushing and turn-proof FSBB-DG

FEZER
Simply move more.

Description
Turn-proof suspension bolt made of high-quality aluminum with integrated vacuum feed and upper and lower dampening spring. The bolt is hard-coated with a high longevity. The suspension bolt can be directly mounted in drillings or with appropriate holders. The bolt is sealed with an o-ring against the suction pad retainers.

Application
- applications with high cycle rates
- soft touch-down on workpieces
- workpieces with uneven surfaces (load compensation)
- use of oval suction plates
- height adjustment via outer thread on the bushing

FSBB-M8x1- ... FSBB-M20x1.5-

Article number

Type	Bolt stroke 25 mm	Bolt stroke 50 mm	Bolt stroke 75 mm
FSBB-DG-M8x1	1.34.3.0073	---	---
FSBB-DG-M12x1	1.34.3.0066	1.34.3.0067	---
FSBB-DG-M16x1,5	---	1.34.3.0064	1.34.3.0065
FSBB-DG-M20x1,5	---	1.34.3.0070	1.34.3.0071

Technical data

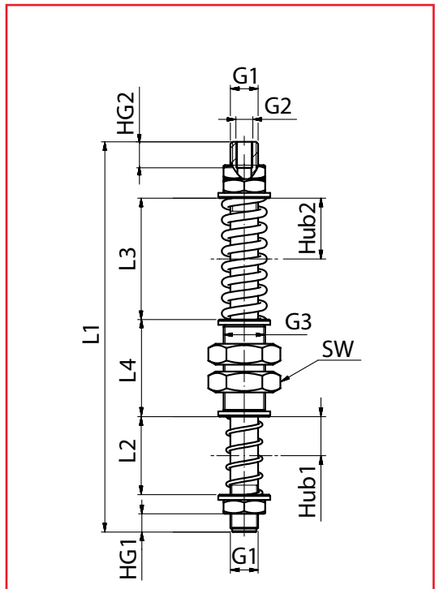
Type	Bolt stroke (mm)	Spring rate (N/mm)	Spring force max. (N)*	Tensile load max. (N)**	Bending mom. max. (Nm)	Volume (l)	Temperature (°C)	Weight (kg)
FSBB-DG-M8x1-25	25	0,921	24,8	70	4	0,006	-10 ... +60	0,10
FSBB-DG-M12x1-25	25	2,545	63,6	350	10	0,007	-10 ... +60	0,16
FSBB-DG-M12x1-50	50	1,647	47,7	350	10	0,008	-10 ... +60	0,18
FSBB-DG-M16x1,5-50	50	1,944	105,0	1.200	25	0,012	-10 ... +60	0,35
FSBB-DG-M16x1,5-75	75	1,512	118,7	1.200	25	0,014	-10 ... +60	0,37
FSBB-DG-M20x1,5-50	50	3,997	200,8	2.500	50	0,016	-10 ... +60	0,65
FSBB-DG-M20x1,5-75	75	2,574	193,0	2.500	50	0,012	-10 ... +60	0,68

** lower spring force at 50% of bolt stroke*
*** Tensile load refers to 50% stroke of the upper spring. Mounted suction pads must not exceed these capacities.*

Suspension Bolt

with bushing and turn-proof FSBB-DG

FEZER
Simply move more.



FSBB-M8x1- ... FSBB-M20x1.5-

Dimensions

Type	L1	L2	L3	L4	Hub1	Hub2	G1	G2	G3	HG1	HG2	SW
FSBB-DG-M8x1-25	157	39	44,5	50	25	20	M8x1	M5	M16x1,5	10,5	10	24
FSBB-DG-M12x1-25	165	51	41	50	25	20	M12x1	M5	M20x1,5	10,5	10	30
FSBB-DG-M12x1-50	190	73,5	41	50	50	20	M12x1	M5	M20x1,5	10,5	10	30
FSBB-DG-M16x1,5-50	250	81	70	60	50	24	M16x1,5	G1/8	M24x1,5	10,5	15	36
FSBB-DG-M16x1,5-75	280	111,5	70	60	75	24	M16x1,5	G1/8	M24x1,5	10,5	15	36
FSBB-DG-M20x1,5-50	260	74	80	60	50	24	M20x1,5	G1/4	M30x1,5	10,5	15	46
FSBB-DG-M20x1,5-75	300	115	80	60	75	13	M20x1,5	G1/4	M30x1,5	10,5	15	46

Suspension Bolt

with bushing FSBE

FEZER
Simply move more.

Description

Robust suspension bolt with lower dampening spring. The bolt consists of a precision tube with internal vacuum feed, the bushing is made of high-quality brass. The suspension bolt can be directly fastened to drillings or with appropriate holders to aluminum and hollow profiles.
The bolt is sealed with an o-ring against the suction pad retainers.

FSBE-M12x1- ... FSBE-M30x1,5-

Application

- applications with high cycle rates
- soft touch-down on workpieces
- height adjustment via outer thread of the bushing

Article number

Type	Bolt stroke 25 mm	Bolt stroke 50 mm	Bolt stroke 75 mm	Bolt stroke 100 mm
FSBE-M12x1-M5	1.34.2.0035	1.34.2.0036	1.34.2.0037	---
FSBE-M16x1,5-1/8	1.34.2.0029	1.34.2.0038	1.34.2.0039	---
FSBE-M20x1,5-1/4	1.34.2.0040	1.34.2.0041	1.34.2.0042	---
FSBE-M20x1,5*	---	1.34.2.0069	1.34.2.0070	1.34.2.0071
FSBE-M30x1,5*	---	1.34.2.0073	1.34.2.0074	1.34.2.0075

** w/o integrated vacuum feed*

Technical data

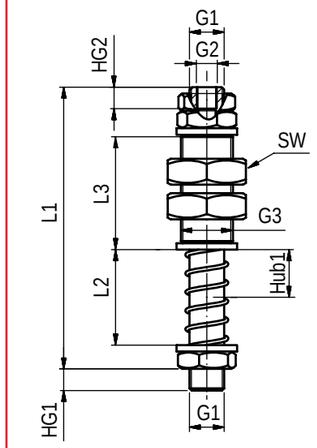
Type	Bolt stroke (mm)	Spring rate (N/mm)	Spring force max. (N)**	Tensile load max. (N)	Bending mom. max. (Nm)	Volume (l)	Temperature (°C)	Weight (kg)
FSBE-M12x1-M5-25	25	2,545	31,8	350	20	0,004	0 ... +80	0,30
FSBE-M12x1-M5-50	50	1,647	41,2	350	20	0,005	0 ... +80	0,32
FSBE-M12x1-M5-75	75	1,120	42,0	350	20	0,006	0 ... +80	0,35
FSBE-M16x1,5-1/8-25	25	3,711	46,4	1.250	50	0,009	0 ... +80	0,51
FSBE-M16x1,5-1/8-50	50	1,944	48,6	1.250	50	0,011	0 ... +80	0,55
FSBE-M16x1,5-1/8-75	75	1,512	56,7	1.250	50	0,013	0 ... +80	0,58
FSBE-M20x1,5-1/4-25	25	6,250	78,1	3.500	100	0,009	0 ... +80	0,93
FSBE-M20x1,5-1/4-50	50	3,977	99,4	3.500	100	0,011	0 ... +80	0,99
FSBE-M20x1,5-1/4-75	75	2,574	96,4	3.500	100	0,013	0 ... +80	1,08
FSBE-M20x1,5-50*	25	6,250	78,1	5.500	120	---	0 ... +80	1,08
FSBE-M20x1,5-75*	50	3,977	99,4	5.500	120	---	0 ... +80	1,12
FSBE-M20x1,5-100*	75	2,574	96,4	5.500	120	---	0 ... +80	1,23
FSBE-M30x1,5-50*	50	15,536	388	9.500	350	---	0 ... +80	3,41
FSBE-M30x1,5-75*	75	10,0	375	9.500	350	---	0 ... +80	3,74
FSBE-M30x1,5-100*	100	6,836	342	9.500	350	---	0 ... +80	4,29

*** lower spring force at 50% of bolt stroke*

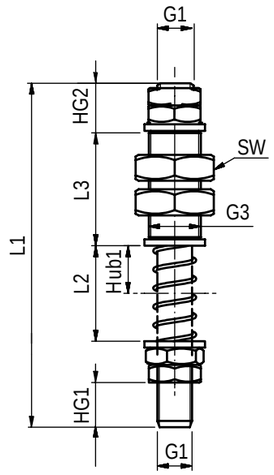
Suspension Bolt

with bushing FSBE

FEZER
Simply move more.



FSBE-M12x1- ... FSBE-M20x1,5-



FSBE-M20x1,5*- ... FSBE-M30x1,5*-

Dimensions

Type	L1	L2	L3	Hub1	G1	G2	G3	HG1	HG2	SW
FSBE-M12x1-M5-25	130	51	50	25	M12x1	M5	M20x1,5	10,5	10	30
FSBE-M12x1-M5-50	155	75	50	50	M12x1	M5	M20x1,5	10,5	10	30
FSBE-M12x1-M5-75	190	110	50	75	M12x1	M5	M20x1,5	10,5	10	30
FSBE-M16x1,5-1/8-25	140	44	60	25	M16x1,5	G1/8	M24x1,5	10,5	15	36
FSBE-M16x1,5-1/8-50	180	83	60	50	M16x1,5	G1/8	M24x1,5	10,5	15	36
FSBE-M16x1,5-1/8-75	210	115	60	75	M16x1,5	G1/8	M24x1,5	10,5	15	36
FSBE-M20x1,5-1/4-25	150	48	60	25	M20x1,5	G1/4	M30x1,5	10,5	15	46
FSBE-M20x1,5-1/4-50	175	73	60	50	M20x1,5	G1/4	M30x1,5	10,5	15	46
FSBE-M20x1,5-1/4-75	215	113	60	75	M20x1,5	G1/4	M30x1,5	10,5	15	46
FSBE-M20x1,5-50*	175	73	60	25	M20x1,5	---	M30x1,5	10,5	---	46
FSBE-M20x1,5-75*	215	113	60	50	M20x1,5	---	M30x1,5	10,5	---	46
FSBE-M20x1,5-100*	260	158	60	75	M20x1,5	---	M30x1,5	10,5	---	46
FSBE-M30x1,5-50*	270	90	80	50	M30x1,5	---	M42x1,5	35	---	65
FSBE-M30x1,5-75*	320	140	80	75	M30x1,5	---	M42x1,5	35	---	65
FSBE-M30x1,5-100*	410	205	80	100	M30x1,5	---	M42x1,5	35	---	65

Suspension Bolt

with bushing FSBB

FEZER
Simply move more.

Description
Robust suspension bolt with upper and lower dampening spring. The bolt consists of a precision steel tube with integrated vacuum feed, the bushing is made of high-quality brass. The suspension bolt can be directly fastened to drillings or with appropriate holders to aluminum or hollow profiles. The bolt is sealed with an o-ring against the suction pad retainers.

Application
- applications with high cycle times
- soft touch-down on workpieces
- workpieces with uneven surfaces (load compensation)
- height adjustment via outer thread of bushing

FSBB-M12x1- ... FSBB-M30x1.5-

Article number

Type	Bolt stroke 25 mm	Bolt stroke 50 mm	Bolt stroke 75 mm	Bolt stroke 100 mm
FSBB-M12x1-M5	1.34.3.0047	1.34.3.0048	1.34.3.0049	---
FSBB-M16x1,5-1/8	1.34.3.0037	1.34.3.0042	1.34.3.0043	---
FSBB-M20x1,5-1/4	1.34.3.0044	1.34.3.0045	1.34.3.0046	---
FSBB-M20x1,5*	---	1.34.3.0068	1.34.3.0069	1.34.3.0072
FSBB-M30x1,5*	---	1.34.3.0062	1.34.3.0074	1.34.3.0075

** w/o central vacuum feed*

Technical data

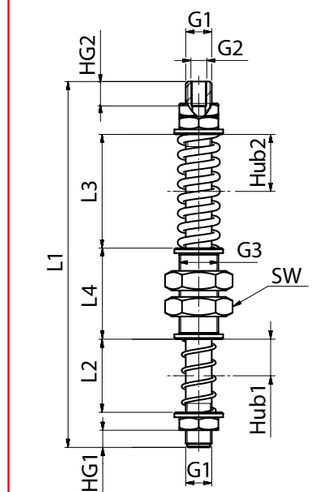
Type	Bolt stroke (mm)	Spring rate (N/mm)	Spring force max. (N)**	Tensile load max. (N)***	Bending mom. max. (Nm)	Volume (l)	Temperature (°C)	Weight (kg)
FSBB-M12x1-M5-25	25	2,545	31,8	350	20	0,006	0 ... +80	0,31
FSBB-M12x1-M5-50	50	1,647	41,2	350	20	0,007	0 ... +80	0,33
FSBB-M12x1-M5-75	75	1,120	42,0	350	20	0,008	0 ... +80	0,38
FSBB-M16x1,5-1/8-25	25	3,711	46,4	1.250	50	0,012	0 ... +80	0,58
FSBB-M16x1,5-1/8-50	50	1,944	48,6	1.250	50	0,014	0 ... +80	0,63
FSBB-M16x1,5-1/8-75	75	1,512	56,7	1.250	50	0,016	0 ... +80	0,67
FSBB-M20x1,5-1/4-25	25	6,250	78,1	3.500	100	0,012	0 ... +80	1,05
FSBB-M20x1,5-1/4-50	50	3,977	99,4	3.500	100	0,014	0 ... +80	1,10
FSBB-M20x1,5-1/4-75	75	2,574	96,4	3.500	100	0,016	0 ... +80	1,17
FSBB-M20x1,5-50*	50	6,250	78,1	5.500	120	---	0 ... +80	1,26
FSBB-M20x1,5-75*	75	3,977	99,4	5.500	120	---	0 ... +80	1,36
FSBB-M20x1,5-100*	100	2,574	96,4	5.500	120	---	0 ... +80	1,47
FSBB-M30x1,5-50*	50	15,536	388	9.500	350	---	0 ... +80	4,68
FSBB-M30x1,5-75*	75	10,0	375	9.500	350	---	0 ... +80	4,94
FSBB-M30x1,5-100*	100	6,836	342	9.500	350	---	0 ... +80	5,38

*** lower spring force at 50% of bolt stroke*
**** Tensile load relates to 50% stroke of the upper pressure spring. Mounted suction pads must not exceed these capacities.*

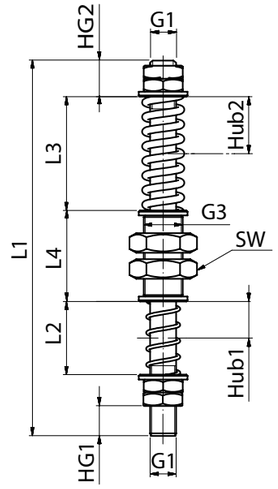
Suspension Bolt

with bushing FSBB

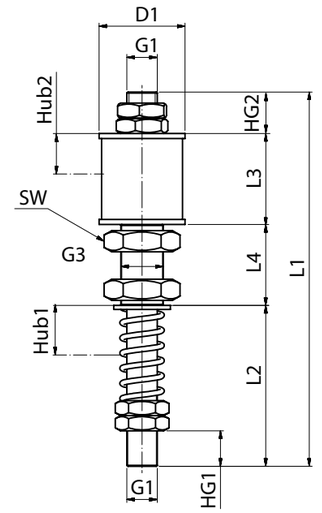
FEZER
Simply move more.



FSBB-M12x1- ... FSBB-M20x1,5-



FSBB-M20x1x1,5*-



FSBB-M30x1,5*-

Dimensions

Type	L1	L2	L3	L4	Hub1	Hub2	G1	G2	G3	D1	HG1	HG2	SW
FSBB-M12x1-M5-25	165	51	41	50	25	20	M12x1	M5	M20x1,5	---	10,5	10	36
FSBB-M12x1-M5-50	190	74	41	50	50	20	M12x1	M5	M20x1,5	---	10,5	10	36
FSBB-M12x1-M5-75	230	110	41	50	75	20	M12x1	M5	M20x1,5	---	10,5	10	36
FSBB-M16x1,5-1/8-25	210	42	70	63	25	24	M16x1,5	G1/8	M24x1,5	---	10,5	15	36
FSBB-M16x1,5-1/8-50	250	82	70	63	50	24	M16x1,5	G1/8	M24x1,5	---	10,5	15	36
FSBB-M16x1,5-1/8-75	280	112	70	63	75	24	M16x1,5	G1/8	M24x1,5	---	10,5	15	36
FSBB-M20x1,5-1/4-25	235	49	80	63	25	13	M20x1,5	G1/4	M30x1,5	---	10,5	15	46
FSBB-M20x1,5-1/4-50	260	74	80	63	50	13	M20x1,5	G1/4	M30x1,5	---	10,5	15	46
FSBB-M20x1,5-1/4-75	300	115	80	63	75	13	M20x1,5	G1/4	M30x1,5	---	10,5	15	46
FSBB-M20x1,5-50*	260	74	80	63	80	13	M20x1,5	---	M30x1,5	---	10,5	---	46
FSBB-M20x1,5-75*	300	115	80	63	75	13	M20x1,5	---	M30x1,5	---	10,5	---	46
FSBB-M20x1,5-100*	345	160	80	63	100	13	M20x1,5	---	M30x1,5	---	10,5	---	46
FSBB-M30x1,5-50*	370	80	80	83	50	13	M30x1,5	---	M42x1,5	85	35	---	65
FSBB-M30x1,5-75*	410	140	80	83	75	13	M30x1,5	---	M42x1,5	85	35	---	65
FSBB-M30x1,5-100*	480	205	80	83	100	13	M30x1,5	---	M42x1,5	85	35	---	65

Suspension Bolt

with cross clamping piece FSKE

FEZER
Simply move more.

Description

Robust suspension bolt with lower dampening spring. The bolt consists of a galvanized precision steel tube with inner vacuum feed. The cross clamping piece is made of high-quality aluminum with excellent sliding characteristics for profiles 30x30 and 40x40. The bolt is sealing with an o-ring against the suction pad retainerns.

Application

- use on closed frame constructions
- applications with high cycle rates
- soft touch-down on workpieces

FSKE-M12x1 ... FSKE-M20x1,5

Article number

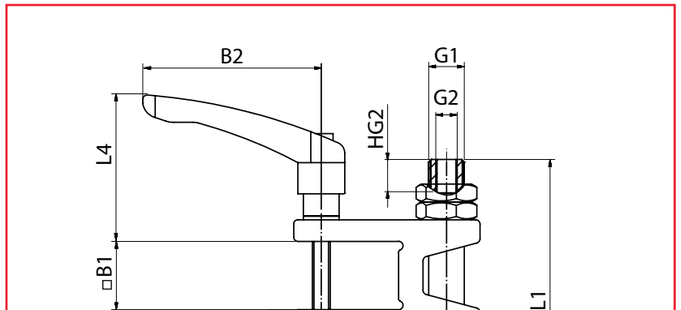
Type	Bolt stroke 25 mm	Bolt stroke 50 mm	Bolt stroke 75 mm
FSKE-30-M12x1-M5	1.34.2.0045	1.34.2.0046	1.34.2.0047
FSKE-30-M16x1,5-1/8	1.34.2.0048	1.34.2.0049	1.34.2.0050
FSKE-40-M16x1,5-1/8	1.34.2.0028	1.34.2.0043	1.34.2.0044
FSKE-40-M20x1,5-1/4	1.34.2.0051	1.34.2.0052	1.34.2.0053

Technical data

Type	Bolt stroke (mm)	Spring rate (N/mm)	Spr. force max. (N)*	Tensile load max. (N)	Bending mom. max. (Nm)	Volume (l)	Temperature (°C)	Weight (kg)
FSKE-30-M12x1-M5-25	25	2,545	31,8	350	20	0,004	0 ... +80	0,30
FSKE-30-M12x1-M5-50	50	1,647	41,2	350	20	0,005	0 ... +80	0,32
FSKE-30-M12x1-M5-75	75	1,120	42,0	350	20	0,006	0 ... +80	0,35
FSKE-30-M16x1,5-1/8-25	25	3,711	46,4	1.250	50	0,009	0 ... +80	0,38
FSKE-30-M16x1,5-1/8-50	50	1,944	48,6	1.250	50	0,011	0 ... +80	0,43
FSKE-30-M16x1,5-1/8-75	75	1,512	56,7	1.250	50	0,013	0 ... +80	0,46
FSKE-40-M16x1,5-1/8-25	25	3,711	46,4	1.250	50	0,009	0 ... +80	0,42
FSKE-40-M16x1,5-1/8-50	50	1,944	48,6	1.250	50	0,011	0 ... +80	0,46
FSKE-40-M16x1,5-1/8-75	75	1,512	56,7	1.250	50	0,013	0 ... +80	0,49
FSKE-40-M20x1,5-1/4-25	25	6,250	78,1	3.500	100	0,018	0 ... +80	0,60
FSKE-40-M20x1,5-1/4-50	50	3,977	99,4	3.500	100	0,021	0 ... +80	0,65
FSKE-40-M20x1,5-1/4-75	75	2,574	96,4	3.500	100	0,024	0 ... +80	0,73

* *lower spring force at 50% of bolt stroke*
** *Tensile load relates to 50% stroke of the upper pressure spring. Mounted suction pads must not exceed these capacities.*

Suspension Bolt
with cross clamping piece FSKE
FEZER
Simply move more.



FSKE-M12x1 ... FSKE-M20x1,5

Dimensions

Type	L1	L2	L3	L4	B1	B2	Hub1	G1	G2	HG1	HG2
FSKE-30-M12x1-M5-25	130	51	77	69	30,5	80	25	M12x1	M5	10,5	10
FSKE-30-M12x1-M5-50	155	77	103	69	30,5	80	50	M12x1	M5	10,5	10
FSKE-30-M12x1-M5-75	190	110	136	69	30,5	80	75	M12x1	M5	10,5	10
FSKE-30-M16x1,5-1/8-25	140	45	73	69	30,5	80	25	M16x1,5	G1/8	10,5	15
FSKE-30-M16x1,5-1/8-50	180	85	113	69	30,5	80	50	M16x1,5	G1/8	10,5	15
FSKE-30-M16x1,5-1/8-75	210	115	143	69	30,5	80	75	M16x1,5	G1/8	10,5	15
FSKE-40-M16x1,5-1/8-25	140	44	72	69	40,5	80	25	M16x1,5	G1/8	10,5	15
FSKE-40-M16x1,5-1/8-50	180	83	112	69	40,5	80	50	M16x1,5	G1/8	10,5	15
FSKE-40-M16x1,5-1/8-75	210	113	181	69	40,5	80	75	M16x1,5	G1/8	10,5	15
FSKE-40-M20x1,5-1/4-25	150	48	119	69	40,5	80	25	M20x1,5	G1/4	10,5	15
FSKE-40-M20x1,5-1/4-50	175	73	143	69	40,5	80	50	M20x1,5	G1/4	10,5	15
FSKE-40-M20x1,5-1/4-75	215	113	183	69	40,5	80	75	M20x1,5	G1/4	10,5	15

Suspension Bolt

with cross clamping piece FSKB

FEZER
Simply move more.

Description

Robust suspension bolt with upper and lower dampening spring. The bolt consists of a galvanized precision steel tube with inner vacuum feed. The cross clamping piece is made of high-quality aluminum with excellent sliding characteristics for profiles 30x30 and 40x40. The bolt is sealed with an o-ring against the suction pad retainers.

FSKB-M12 ... FSKB-M20

Application

- use on closed frame constructions
- application with high cycle rates
- soft touch-down on workpieces
- workpieces with uneven surfaces (load compensation)

Article number

Type	Bolt stroke 25 mm	Bolt stroke 50 mm	Bolt stroke 75 mm
FSKB-30-M12x1-M5	1.34.3.0055	1.34.3.0056	1.34.3.0057
FSKB-30-M16x1,5-1/8	1.34.3.0052	1.34.3.0053	1.34.3.0054
FSKB-40-M16x1,5-1/8	1.34.3.0038	1.34.3.0050	1.34.3.0051
FSKB-40-M20x1,5-1/4	1.34.3.0058	1.34.3.0059	1.34.3.0060

Technical data

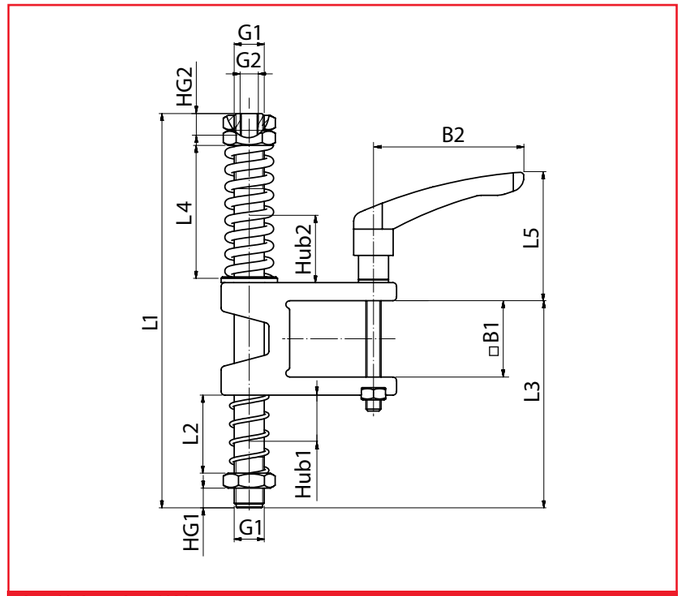
Type	Bolt stroke (mm)	Spring rate (N/mm)	Spring force max. (N)*	Tensile load max. (N)**	Bending mom. max. (Nm)	Volume (l)	Temperature (°C)	Weight (kg)
FSKB-30-M12x1-M5-25	25	2,545	31,8	350	20	0,006	0 ... +80	0,34
FSKB-30-M12x1-M5-50	50	1,647	41,2	350	20	0,007	0 ... +80	0,38
FSKB-30-M12x1-M5-75	75	1,120	42,0	350	20	0,008	0 ... +80	0,40
FSKB-30-M16x1,5-1/8-25	25	3,711	46,4	1.250	50	0,012	0 ... +80	0,52
FSKB-30-M16x1,5-1/8-50	50	1,944	48,6	1.250	50	0,014	0 ... +80	0,57
FSKB-30-M16x1,5-1/8-75	75	1,512	56,7	1.250	50	0,016	0 ... +80	0,60
FSKB-40-M16x1,5-1/8-25	25	3,711	46,4	1.250	50	0,012	0 ... +80	0,56
FSKB-40-M16x1,5-1/8-50	50	1,944	48,6	1.250	50	0,014	0 ... +80	0,61
FSKB-40-M16x1,5-1/8-75	75	1,512	56,7	1.250	50	0,016	0 ... +80	0,64
FSKB-40-M20x1,5-1/4-25	25	6,250	78,1	3.500	100	0,022	0 ... +80	0,80
FSKB-40-M20x1,5-1/4-50	50	3,977	99,4	3.500	100	0,025	0 ... +80	0,85
FSKB-40-M20x1,5-1/4-75	75	2,574	96,4	3.500	100	0,028	0 ... +80	0,92

** lower spring force at 50% of bolt stroke*
*** Tensile load relates to 50% stroke of upper pressure spring. Mounted suction pads must not exceed these capacities.*

Suspension Bolt

with cross clamping piece FSKB

FEZER
Simply move more.



FSKB-M12 ... FSKB-M20

Dimensions

Type	L1	L2	L3	L4	L5	B1	B2	Hub1	Hub2	G1	G2	HG1	HG2
FSKB-30-M12x1-M5-25	165	47	72	41	69	30,5	80	25	20	M12x1	M5	10,5	10
FSKB-30-M12x1-M5-50	190	72	97	41	69	30,5	80	50	20	M12x1	M5	10,5	10
FSKB-30-M12x1-M5-75	230	110	136	41	69	30,5	80	75	20	M12x1	M5	10,5	10
FSKB-30-M16x1,5-1/8-25	210	45	73	70	69	30,5	80	25	20	M16x1,5	G1/8	10,5	15
FSKB-30-M16x1,5-1/8-50	250	85	113	70	69	30,5	80	50	20	M16x1,5	G1/8	10,5	15
FSKB-30-M16x1,5-1/8-75	280	115	143	70	69	30,5	80	75	20	M16x1,5	G1/8	10,5	15
FSKB-40-M16x1,5-1/8-25	210	41	110	70	69	40,5	80	25	24	M16x1,5	G1/8	10,5	15
FSKB-40-M16x1,5-1/8-50	250	81	149	70	69	40,5	80	50	24	M16x1,5	G1/8	10,5	15
FSKB-40-M16x1,5-1/8-75	280	111	179	70	69	40,5	80	75	24	M16x1,5	G1/8	10,5	15
FSKB-40-M20x1,5-1/4-25	235	49	120	80	69	40,5	80	25	13	M20x1,5	G1/4	10,5	15
FSKB-40-M20x1,5-1/4-50	260	74	145	80	69	40,5	80	50	13	M20x1,5	G1/4	10,5	15
FSKB-40-M20x1,5-1/4-75	300	115	185	80	69	40,5	80	75	13	M20x1,5	G1/4	10,5	15

Holders for Suspension Bolt

for aluminum profiles HFSA

FEZER
Simply move more.

Description
Robust and stable holders made of galvanized steel for installation of suspension bolts on aluminum profiles.

HFSAG-12 ... HFSAW-20

Application
- quick and simple installation with sliding blocks
- limited space
- good adjustment sliding the holders along the slots of the aluminum profiles

Article number

Type	
HFSAG-8/12	2.33.1.0002
HFSAG-16/20	2.33.1.0001
HFSAW-8/12	2.33.1.0004
HFSAW-16/20	2.33.1.0003

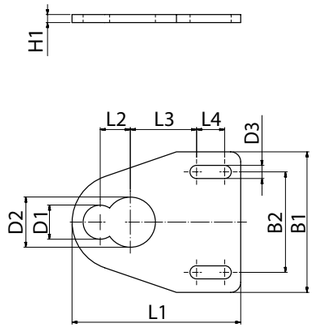
Technical data

Type	Tensile load max. (N)	Bending mom. max. (Nm)	Temperature (°C)	Weight (kg)
HFSAG-8/12	350	40	-10 ... +80	0,12
HFSAG-16/20	1.200	60	-10 ... +80	0,35
HFSAW-8/12	350	40	-10 ... +80	0,14
HFSAW-16/20	1.200	60	-10 ... +80	0,42

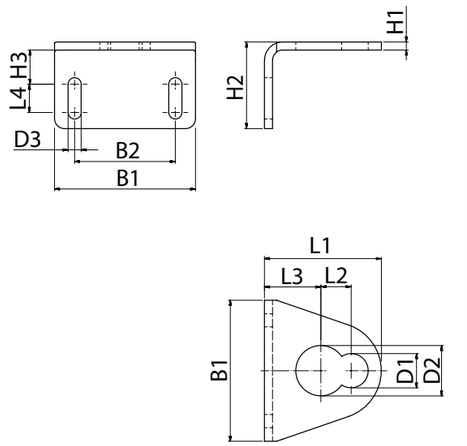
Holders for Suspension Bolt

for aluminum profiles HFSA

FEZER
Simply move more.



HFSAG-12 ... HFSAG-20



HFSAW-12 ... HFSAW-20

Dimensions

Type	L1	L2	L3	L4	B1	B2	H1	H2	H3	D1	D2	D3
HFSAG-8/12	84	12	33	14	70	50	4	---	---	17	21	6,5
HFSAG-16/20	114	14	53	10	90	60	8	---	---	25	31	8,5
HFSAW-8/12	58	12	29	14	70	50	4	43	21	17	21	6,5
HFSAW-16/20	79	14	42	10	90	60	8	57	23	25	31	8,5

Holders for Suspension Bolt

for hollow profiles HFSH

FEZER
Simply move more.

Description
Robust and stable holders made of galvanized steel for installation of suspension bolts on aluminum profiles.

HFSH-30 ... HFSH-40

Application
- quick and simple installation, also on closed frame constructions
- limited space
- good adjustment by sliding the holders along the hollow profile
- simple clamping by star or clamping handle

Article number

Type	
HFSH-30-8/12	2.33.1.0091
HFSH-40-8/12	2.33.1.0092
HFSH-40-16/20	2.33.1.0118
HFSH-50-16/20	2.33.1.0093
HFSH-60-16/20	2.33.1.0094

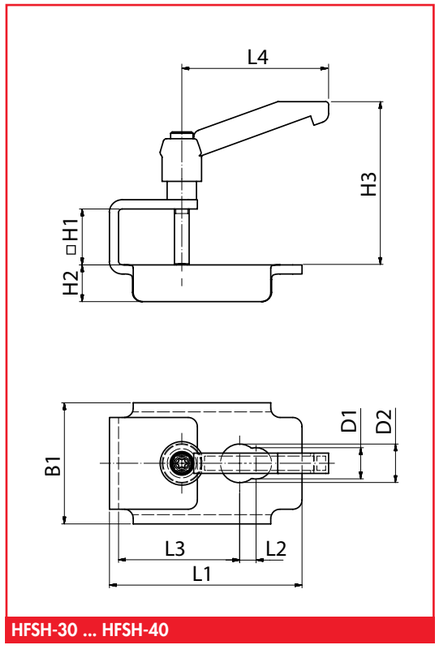
Technical data

Type	Tensile load max. (N)	Bending mom. max. (Nm)	Temperature (°C)	Weight (kg)
HFSH-30-8/12	800	50	-10 ... +80	0,48
HFSH-40-8/12	800	50	-10 ... +80	0,69
HFSH-40-16/20	2.000	100	-10 ... +80	0,67
HFSH-50-16/20	2.000	100	-10 ... +80	0,76
HFSH-60-16/20	2.000	100	-10 ... +80	0,85

Holders for Suspension Bolt

for hollow profiles HFSH

FEZER
Simply move more.

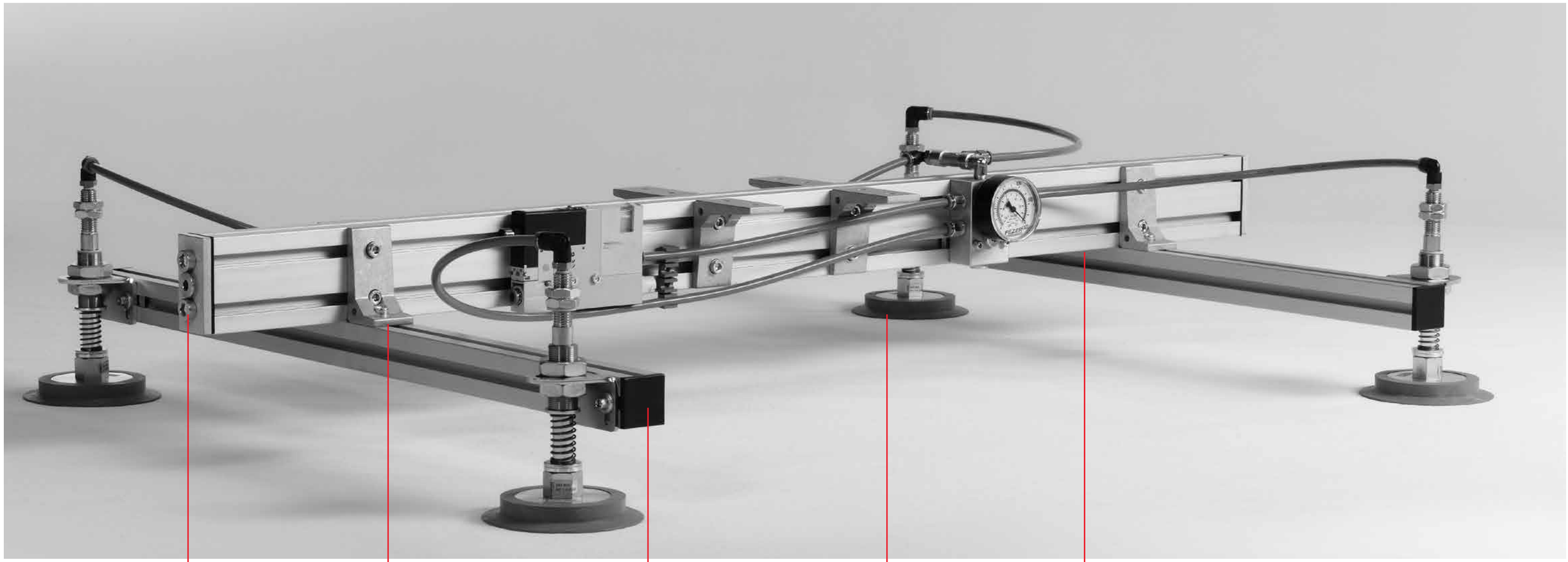


HFSH-30 ... HFSH-40

Dimensions

Type	L1	L2	L3	L4	B1	H1	H2	H3	D1	D2
HFSH-30-8/12	105	10	66	80	66	30,5	20	95	17	21
HFSH-40-8/12	125	10	81	80	76	40,5	20	105	17	21
HFSH-40-16/20	125	15	81	80	76	40,5	20	105	25	31
HFSH-50-16/20	135	15	91	80	76	50,5	20	117	25	31
HFSH-60-16/20	145	15	101	80	76	60,5	20	127	25	31

Profile Systems
design of individual suction spiders
FEZER Simply move more.



Cover plates

To allow to use the aluminum profiles also as safety tanks, rubber covers can be added.

Connection elements

To connect the aluminum profiles robust and stable connection elements are available. These can be fastened and adjusted by sliding blocks.

Cover elements

To cover the aluminum profiles and to guard against sharp edges stable plastic covers are available for all aluminum profiles.

Vacuum components

The vacuum components can be either fastened directly on the slots or installed with appropriate holders. The slots allow to adjust the mounted components as required.

Aluminum profiles

There is a variety of aluminum profiles available which can mostly be combined at will. Depending on the requirements and the weight to be transported, the suitable sizes can be calculated accordingly.

Description

For the design of individual suction spiders there is a variety of aluminum profiles and connection elements available. All connections can be screwed on, which allows an easy and adjustable combination.

Profile Systems

Aluminum profiles ALHP

FEZER
Simply move more.

Description

Stable and robust AL profiles for the design of individual suction frames which are flonged onto any type of hoisting gear. The AL profiles are available for sizes 40mm and 50mm. The profiles of the 50 series can be bolted together with vacuum-dense flonge plates and thus be used as safety tanks.

ALHP-40x40 ... ALHP 100x100

Application

- design of suction frames and load lifting devices
- connected to suction pads by suspension bolts and appropriate holders

Article number

Type	metre pieces
ALHP-40x40	6.11.3.0119
ALHP-40x80	6.11.3.0117
ALHP-80x80	6.11.3.0116
ALHP-50x50	6.11.3.0148
ALPH-50x100	6.11.3.0138
ALPH100x100	6.11.3.0103

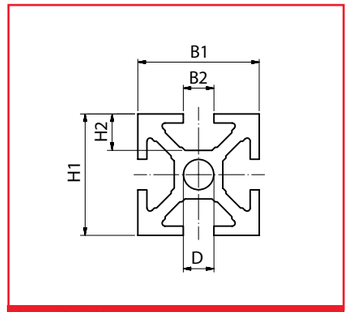
Technical data

Type	Material	Area	Area moment		Resistance moment		Weight
		A (cm²)	Ix (cm4)	Iy (cm4)	Wx (cm3)	Wy (cm3)	(kg)
ALHP-40x40	AlMgSi 0,5 F25	7,42	12,13	12,13	6,06	6,06	2,00
ALHP-40x80	AlMgSi 0,5 F25	13,40	83,26	83,26	22,62	20,84	3,62
ALHP-80x80	AlMgSi 0,5 F25	17,60	149,64	149,64	31,94	31,94	4,75
ALHP-50x50	AlMgSi 0,5 F25	10,84	29,90	29,90	11,96	11,96	2,85
ALPH-50x100	AlMgSi 0,5 F25	18,06	199,96	55,38	39,99	22,15	4,87
ALPH100x100	AlMgSi 0,5 F25	26,55	334,80	334,80	66,96	66,96	7,00

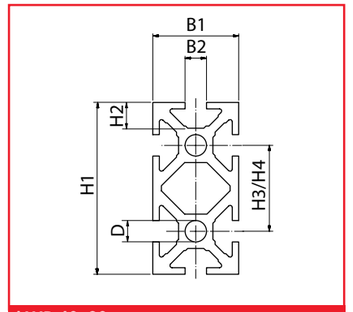
Profile Systems

Aluminum profiles ALHP

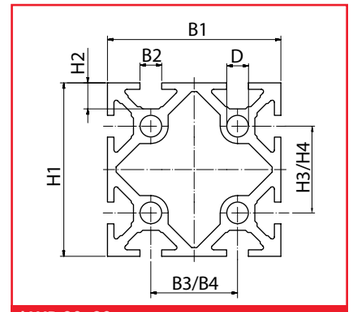
FEZER
Simply move more.



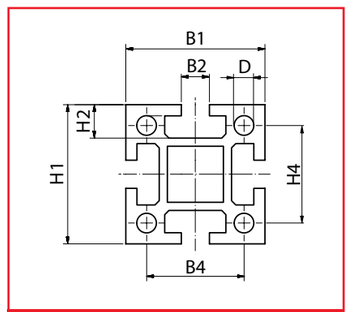
ALHP-40x40



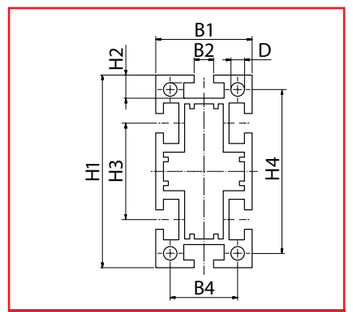
ALHP-40x80



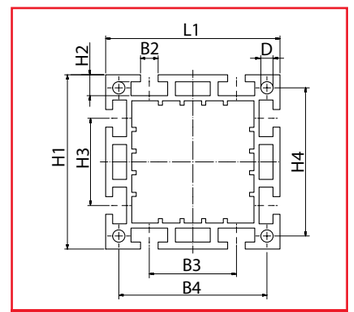
ALHP-80x80



ALHP-50x50



ALHP-50x100



ALHP-100x100

Dimensions

Type	B1	B2	B3	B4	H1	H2	H3	H4	D
ALHP-40x40	40	10,1	---	---	40	12	---	---	10
ALHP-40x80	40	10,1	---	---	80	12	40	40	10
ALHP-80x80	80	10,1	40	40	80	12	40	40	10
ALHP-50x50	50	10,1	---	35	50	12	---	35	7
ALPH-50x100	50	10,1	---	35	100	12	50	85	7
ALPH100x100	100	10,1	50	85	100	12	50	85	7

Profile Systems

FEZER
Simply move more.

Connection elements for AL profiles

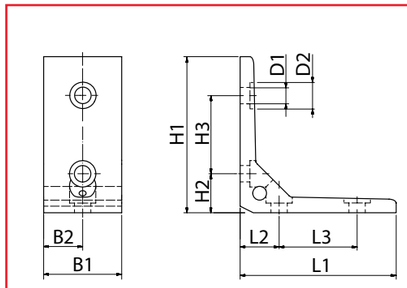
Angle connectors WV
Solid aluminum connection piece for angle connection of AL profiles.

WVE angle connector, single
WVL angle connector, single long
WVLL angle connector, double long
WVB angle connector, wide

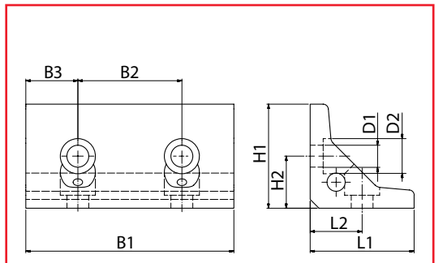

Angle connectors WV- ... WVL-

Article number

Type	Angle connector WVE	Angle connector WVL	Angle connector WVLL	Angle connector WVB
for ALHP-40	6.21.1.1374	6.21.1.1697	6.21.1.1698	6.21.1.0872
for ALHP-50	6.21.1.1677	6.21.1.1699	6.21.1.1700	6.21.1.1678



Angle connector WVE, VWL, WVLL



Angle connector WVB

Dimensions

Type	L1	L2	L3	B1	B2	B3	H1	H2	H3	D1	D2
WVE-40	40	20	---	40	20	---	40	20	---	8,4	13,5
WVL-40	40	20	---	40	20	---	80	20	40	8,4	13,5
WVLL-40	80	20	40	40	20	---	80	20	40	8,4	13,5
WVB-40	40	20	---	80	40	20	40	20	---	8,4	13,5
WVE-50	50	25	---	50	25	---	50	25	---	8,4	13,5
WVL-50	85	25	---	40	20	---	85	25	50	8,4	13,5
VWLL-50	85	25	50	40	20	---	85	25	50	8,4	13,5
WVB-50	50	25	---	100	50	25	50	25	---	8,4	13,5

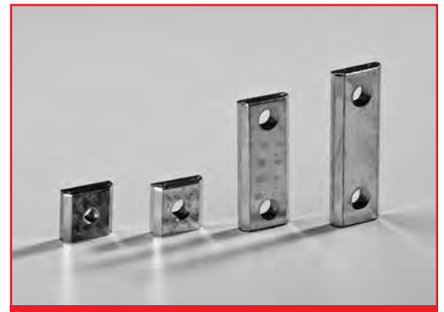
Profilsysteme

FEZER
Simply move more.

Connection elements for AL profiles

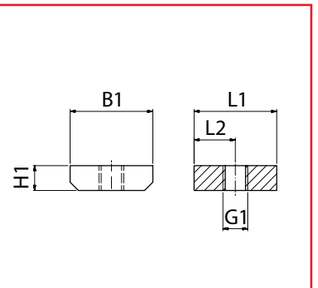
Sliding blocks NS
Sliding blocks for AL profiles in galvanized steel design

NS single sliding block
NSN single sliding block for later assembly
NSL long sliding block

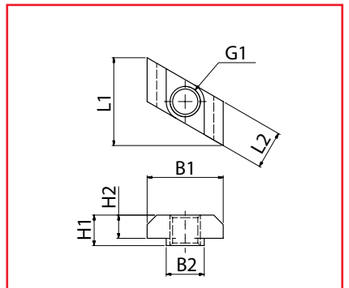

Nutensteine

Article number

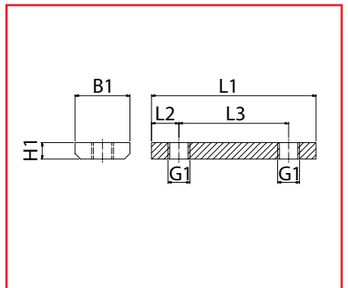
Type	M4	M5	M6	M8
NS-	6.21.1.1423	6.21.1.0813	6.21.1.0804	6.21.1.0790
NSN-	6.21.1.1690	6.21.1.1691	6.21.1.1529	6.21.1.1394
NSL-M8-40	---	---	---	6.21.1.1022
NSL-M8-50	---	---	---	6.21.1.1132



Sliding block NS-



Sliding block NSN-



Sliding block NSL-

Dimensions

Type	L1	L2	L3	B1	B2	H1	H2	G1
NS-M4	20	10	---	20	---	6	---	M4
NS-M5	20	10	---	20	---	6	---	M5
NS-M6	20	10	---	20	---	6	---	M6
NS-M8	20	10	---	20	---	6	---	M8
NSN-M4	20	10	---	20	10	8	6,1	M4
NSN-M5	20	10	---	20	10	8	6,1	M5
NSN-M6	23,1	10	---	20	10	8	6,1	M6
NSN-M8	23,1	10	---	20	10	8	6,1	M8
NSL-M8-40	60	10	40	20	---	6	---	M8
NSL-M8-50	70	10	50	20	---	6	---	M8

Profile Systems

Connection elements for AL profiles

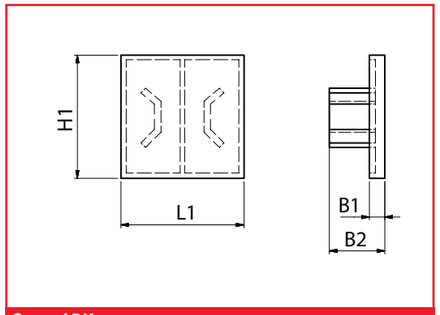
FEZER
Simply move more.

Covers ADK
Plastic covers to close open AL profile ends

Abdeckkappen

Article number

Type	
ADK-40x40	6.21.9.0077
ADK-80x40	6.21.9.0070
ADK-80x80	6.21.9.0124
ADK-50x50	6.21.9.0048
ADK-100x50	6.21.9.0130
ADK-100x100	6.21.9.0034



Cover ADK

Dimensions

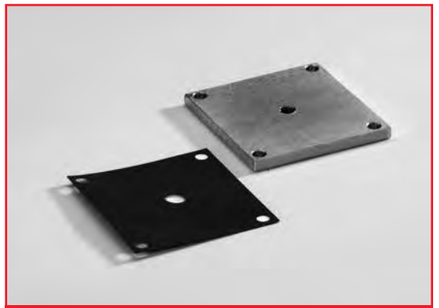
Type	L1	H1	B1	B2
ADK-40x40	40	40	5	18
ADK-80x40	80	40	5	18
ADK-80x80	80	80	5	18
ADK-50x50	50	50	5	18
ADK-100x50	100	50	5	18
ADK-100x100	100	100	5	18

Profile Systems

Connection elements for AL profiles

FEZER
Simply move more.

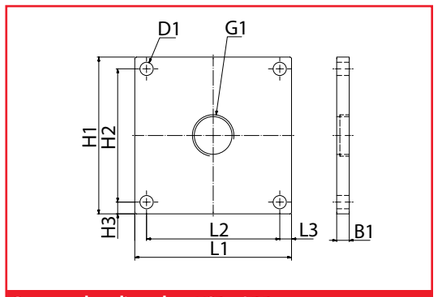
Cover plates VSP and sealing plates ADP
stable covers for vacuum-dense sealing of AL profiles (for use as safety tank, etc.). The plates have a central connection thread or hole and can be closed by a blind plug.



Sealing plates with gasket

Article number

Type for profile:	Cover plate VSP with connection	Sealing plate ADP-
80x80	5.21.9.0260	5.21.9.0264
100x50	5.21.9.0261	5.21.9.0265
100x100	5.21.9.0262	5.21.9.0266



Cover and sealing plate VSP-, ADP-

Dimensions

Type	L1	L2	L3	H1	H2	H3	B1	D1	G1
VSP-80x80	80	40	20	80	40	20	8	12,5	G1/2
VSP-100x50	100	85	7,5	50	35	7,5	8	8,5	G3/4
VSP-100x100	100	85	7,5	100	85	7,5	8	8,5	G3/4
ADP-80x80	80	40	20	80	40	20	2	12,5	20
ADP-100x50	100	85	7,5	50	35	7,5	2	8,5	27
ADP-100x100	100	85	7,5	100	85	7,5	2	8,5	27

FEZER
Simply move more.

Single Components

Slide bushing SBF

Description
Robust slide bushing made of high-quality brass alloy which can be fastened by an outside thread and is height-adjustable.

Application
- for individual installation of suspension bolts
- connection to drillings or appropriate holders
- for bolt diameter 8, 12, 16, 20 and 30 mm

SBF-M16x1,5-8 ... SBF-M42x1,5-30

Article number

Type	
SBF-M16x1,5-8	1.33.1.0003
SBF-M20x1,5-12	1.33.1.0007
SBF-M24x1,5-16	1.33.1.0001
SBF-M30x1,5-20	1.33.1.0002
SBF-M42x1,5-30	1.33.1.0014

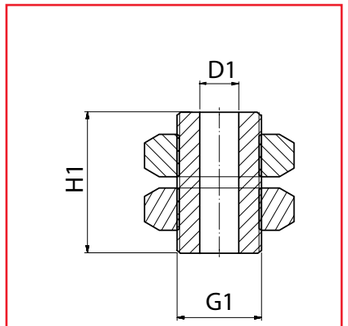
Technical data

Type	Tensile load max. (N)	Temperature (°C)	Weight (kg)
SBF-M16x1,5-8	200	-10 ... +60	0,10
SBF-M20x1,5-12	800	-10 ... +60	0,16
SBF-M24x1,5-16	2.500	-10 ... +60	0,26
SBF-M30x1,5-20	5.500	-10 ... +60	0,47
SBF-M42x1,5-30	9.500	-10 ... +60	1,20

FEZER
Simply move more.

Single Components

Slide bushing SBF



SBF-M16x1,5-8 ... SBF-M42x1,5-30

Dimensions

Type	H1	D1	G1	SW
SBF-M16x1,5-8	40	8,2	M16x1,5	24
SBF-M20x1,5-12	50	12,2	M20x1,5	30
SBF-M24x1,5-16	60	16,2	M24x1,5	36
SBF-M30x1,5-20	60	20,2	M30x1,5	46
SBF-M42x1,5-30	80	30,3	M42x1,5	65

FEZER
Simply move more.

Single Components

Cross clamping pieces KKS

Description
Robust cross clamping piece made of high-quality aluminum for bolt connection to hollow profiles. The cross clamping pieces are available in several sizes for various bolt diameters. All cross clamping pieces are supplied with clamping lever.


KKS-30-12 ... KKS-40-20

Application
- for individual installation of suspension bolts to fasten to hollow profiles
- for bolt diameters 8, 12, 16 and 20 mm
- can be adjusted and clamped by levers

Article number

Type	
KKS-30-12	1.33.2.0136
KKS-30-16	1.33.2.0135
KKS-40-16	1.33.2.0111
KKS-40-20	1.33.2.0120

Technical data

Type	Profile dims (mm)	Bolt-Ø (mm)	Tensile load max. (N)	Bending mom. max. (Nm)	Temperature (°C)	Weight (kg)
KKS-30-12	30x30	12	1.250	50	0 ... 80	0,20
KKS-30-16	30x30	16	1.250	50	0 ... 80	0,20
KKS-40-16	40x40	16	2.500	100	0 ... 80	0,25
KKS-40-20	40x40	20	2.500	100	0 ... 80	0,25

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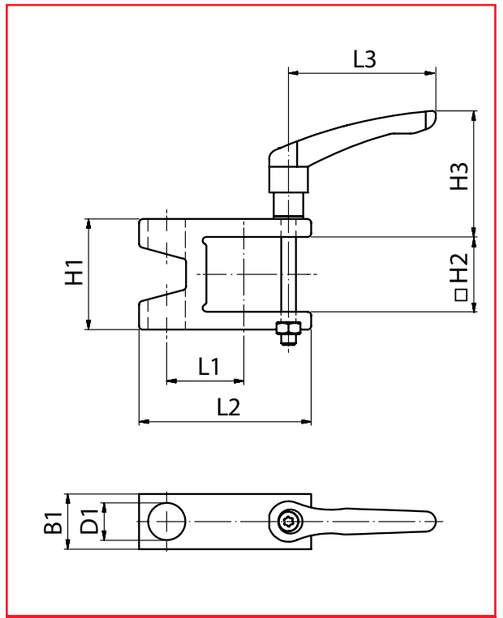
Single Components

Cross clamping pieces KKS



KKS-30-12 ... KKS-40-20

Dimensions

Type	L1	L2	L3	B1	H1	H2	H3	D1
KKS-30-12	36,5	83,5	80	25	50	30,5	69	12,2
KKS-30-16	36,5	83,5	80	25	50	30,5	69	16,2
KKS-40-16	41,5	92,5	80	25	60	40,5	69	16,2
KKS-40-20	41,5	92,5	80	30	60	40,5	69	20,2

Single Components

Clamping plates KP

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Description

Robust clamping plate made of aluminum or steel for the individual installation of suspension bolts. The clamping plates consist of a top and bottom clamping part, each with a brass bushing and a clamping screw to fasten the plates to the hollow profiles. The clamping plates are mounted between two profiles and easily adjustable and fastened.

Application

- suspension bolt assembly between two parallel profiles with a distance of 40 mm
- for bolt diameters 12, 16, 20 and 30mm
- can be adjusted and fastened

KP-AL-16 ... KP-ST-30

Article number

Type	Complete set	Clamping plate top	Clamping plate bottom	Bushing 16 mm	Bushing 20 mm	Bushing 30 mm
KP-AL-16	1.33.2.0105	1.33.2.0102	1.33.2.0104	2.33.1.0005	---	---
KP-AL-20	1.33.2.0108	1.33.2.0102	1.33.2.0104	---	2.33.1.0006	---
KP-ST-20	1.33.2.0052	1.33.2.0037	1.33.2.0038	---	2.33.1.0020	---
KP-ST-30	1.33.2.0058	1.33.2.0059	1.33.2.0045	---	---	1.33.2.0060

Technical data

Type	Prof.distance (mm)	Profile height (mm)	Bolt-Ø (mm)	Clamping screw	Tensile load max. (N)	Bending mom. max. (Nm)	Temperature (°C)	Weight (kg)
KP-AL-16	40	50 - 60	16	M12x90	1.250	50	0 ... +80	1,2
KP-AL-20	40	50 - 60	20	M12x90	2.500	100	0 ... +80	1,2
KP-ST-20	40	70 - 100	20	M12x120	5.500	100	0 ... +80	1,1
KP-ST-30	40	70 - 100	30	M12x120	9.500	300	0 ... +80	1,1

Single Components

Clamping plates KP

FEZER
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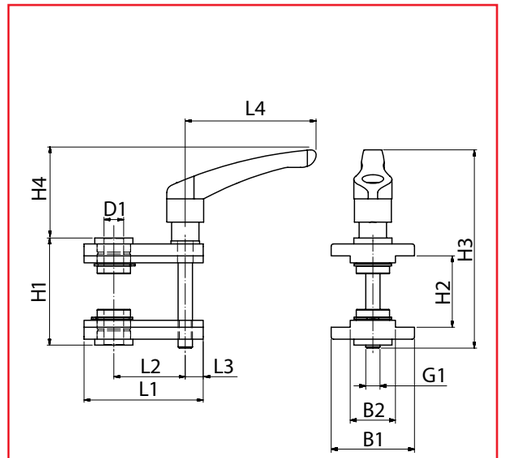
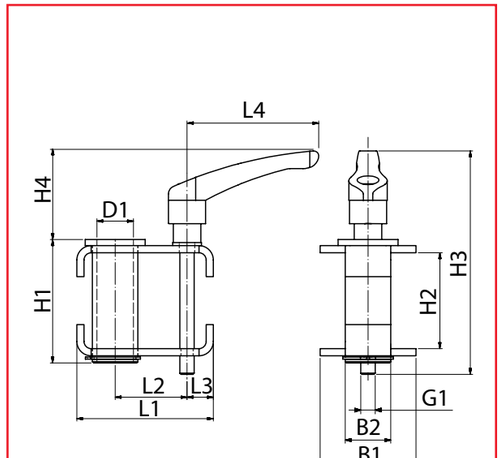


KP-AL-16 ... KP-AL-20



KP-ST-20 ... KP-ST-30

Dimensions

Type	L1	L2	L3	L4	B1	B2	H1	H2	H3	H4	D1
KP-AL-16	100	60	15	80	70	38	90	60	167	59	16,5
KP-AL-20	100	60	15	80	70	38	90	60	167	59	20,5
KP-ST-20	114	60	22	80	80	38	122	100	197	59	20,5
KP-ST-30	114	60	22	80	80	38	132	100	197	59	30,5

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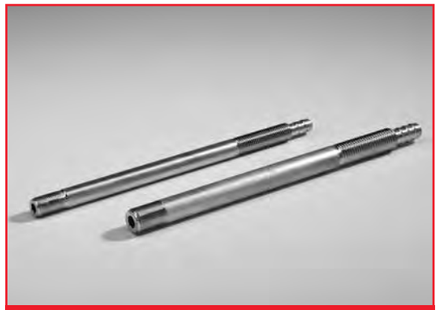
Single Components

Suspension bolt STN

Description
Suspension bolt made of a precise steel tube with integrated vacuum feed and hose nipple. The bolts are available in three lengths, uncushioned, one-sided or both-sided cushioned. For connecting them to suction pads there are various suction pad retainers available. The bolts have a groove which can be sealed with an o-ring.

Application
- single bolt for individual assembly
- for suction pads with central vacuum feed
- for installation on cross clamping pieces or clamping plates



STN-M12x1 ... STN-M20x1,5

Article number

Type	Length: short (uncushioned assembly)	Length: medium (single-side cushioning)	Length: long (both-side cushioning)
STN-M12x1	1.32.3.0118	1.32.3.0119	1.32.3.0120
STN-M16x1,5	1.32.3.0115	1.32.3.0114	1.32.3.0091
STN-M20x1,5	1.32.3.0116	1.32.3.0089	1.32.3.0090

Technical data

Type	Bolt length (mm)	Tensile load max. (N)	Bending mom. max. (Nm)	Temperature (°C)	Volume (l)	Weight (kg)
STN-M12x1-130	130	1.000	20	0 ... +80	0,004	0,09
STN-M12x1-190	190	1.000	20	0 ... +80	0,005	0,14
STN-M12x1-260	260	1.000	20	0 ... +80	0,007	0,20
STN-M16x1,5-130	130	2.500	50	0 ... +80	0,007	0,13
STN-M16x1,5-200	200	2.500	50	0 ... +80	0,010	0,22
STN-M16x1,5-280	280	2.500	50	0 ... +80	0,015	0,31
STN-M20x1,5-150	150	5.500	100	0 ... +80	0,012	0,24
STN-M20x1,5-230	230	5.500	100	0 ... +80	0,018	0,39
STN-M20x1,5-310	310	5.500	100	0 ... +80	0,025	0,53

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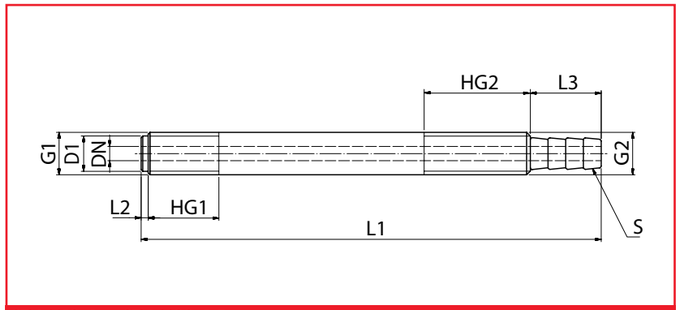
Single Components

Suspension bolt STN



STN-M12x1 ... STN-M20x1,5

Dimensions

Type	L1	L2	L3	D1	DN	G1	G2	HG1	HG2	S
STN-M12x1-130	130	2	20	10	4	M12x1	M12x1	20	20	6
STN-M12x1-190	190	2	20	10	4	M12x1	M12x1	20	20	6
STN-M12x1-260	260	2	20	10	4	M12x1	M12x1	20	20	6
STN-M16x1,5-130	130	2	25	14	8	M16x1,5	M16x1,5	25	24	10
STN-M16x1,5-200	200	2	25	14	8	M16x1,5	M16x1,5	25	24	10
STN-M16x1,5-280	280	2	25	14	8	M16x1,5	M16x1,5	25	24	10
STN-M20x1,5-150	150	2	25	18	10	M20x1,5	M20x1,5	25	30	1/2
STN-M20x1,5-230	230	2	25	18	10	M20x1,5	M20x1,5	25	30	1/2
STN-M20x1,5-310	310	2	25	18	10	M20x1,5	M20x1,5	25	30	1/2

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Single Components

Suspension bolt STI

Description

Suspension bolt made of a precise steel tube with integrated vacuum feed and outer thread for plug connections. The bolts are available in three lengths, uncushioned, one-sided or both-sided cushioned. For connecting them to suction pads there are various suction pad retainers available. The bolts have a groove which can be sealed with an o-ring.

Application

- single bolt for individual assembly
- for installation on cross clamping pieces and clamping plates

STI-M8x1 ... STI-M20x1,5

Article number

Type	Length: short (uncushioned assembly)	Length: medium (one-sided cushioning)	Length: long (both-sided cushioning)
STI-M8x1	1.32.4.0101	1.32.4.0102	1.32.4.0103
STI-M12x1	1.32.4.0104	1.32.4.0105	1.32.4.0106
STI-M16x1,5	1.32.4.0107	1.32.4.0108	1.32.4.0109
STI-M20x1,5	1.32.4.0110	1.32.4.0111	1.32.4.0112

Technical data

Type	Bolt length (mm)	Tensile load max. (N)	Bending mom. max. (Nm)	Temperature (°C)	Volume (l)	Weight (kg)
STI-M8x1-95	95	500	5	0 ... +80	0,001	0,04
STI-M8x1-145	145	500	5	0 ... +80	0,002	0,05
STI-M8x1-195	195	500	5	0 ... +80	0,003	0,06
STI-M12x1-95	95	1.000	20	0 ... +80	0,004	0,08
STI-M12x1-155	155	1.000	20	0 ... +80	0,005	0,12
STI-M12x1-215	215	1.000	20	0 ... +80	0,007	0,18
STI-M16x1,5-125	125	2.500	50	0 ... +80	0,007	0,11
STI-M16x1,5-195	195	2.500	50	0 ... +80	0,010	0,20
STI-M16x1,5-265	265	2.500	50	0 ... +80	0,015	0,29
STI-M20x1,5-125	125	5.500	100	0 ... +80	0,012	0,22
STI-M20x1,5-205	205	5.500	100	0 ... +80	0,018	0,37
STI-M20x1,5-285	285	5.500	100	0 ... +80	0,025	0,51

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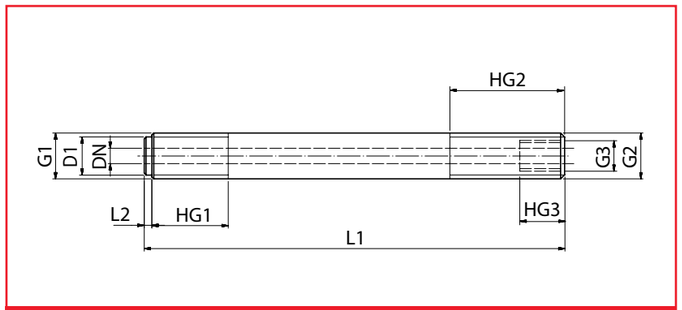
Simply move more.

Single Components

Suspension bolt STI



STI-M8x1 ... STI-M20x1,5

Dimensions

Type	L1	L2	D1	DN	G1	G2	G3	HG1	HG2	HG3
STI-M8x1-95	95	2	6	2	M8x1	M8x1	M5	20	20	10
STI-M8x1-145	145	2	6	2	M8x1	M8x1	M5	20	20	10
STI-M8x1-195	195	2	6	2	M8x1	M8x1	M5	20	20	10
STI-M12x1-95	95	2	10	4	M12x1	M12x1	M5	20	20	10
STI-M12x1-155	155	2	10	4	M12x1	M12x1	M5	20	20	10
STI-M12x1-215	215	2	10	4	M12x1	M12x1	M5	20	20	10
STI-M16x1,5-125	125	2	14	8	M16x1,5	M16x1,5	G1/8	25	25	15
STI-M16x1,5-195	195	2	14	8	M16x1,5	M16x1,5	G1/8	25	25	15
STI-M16x1,5-265	265	2	14	8	M16x1,5	M16x1,5	G1/8	25	25	15
STI-M20x1,5-125	125	2	18	10	M20x1,5	M20x1,5	G1/4	25	30	15
STI-M20x1,5-205	205	2	18	10	M20x1,5	M20x1,5	G1/4	25	30	15
STI-M20x1,5-285	285	2	18	10	M20x1,5	M20x1,5	G1/4	25	30	15

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Single Components

Suspension bolt STG

Description
Bolt made of solid precision steel tube. The bolts are suitable for suction pads with a lateral vacuum feed and are Die Stössel eignen sich for Sauggreifer mit separater Vakuumzuführung and available in three lengths, uncushioned, one-sided or both-sided cushioned. For connecting them to suction pads various suction pad retainers are available.

STG-M12x1 ... STG-M30x1,5

Application
- single bolt for individual assembly
- for installation with cross clamping pieces and clamping plates

Article number

Type	Length: short (uncushioned assembly)	Length: medium (one-sided cushioning)	Length: long (both-sided cushioning)
STG-M12x1	1.32.2.0096	1.32.2.0097	1.32.2.0098
STG-M16x1,5	1.32.2.0090	1.32.2.0091	1.32.2.0092
STG-M20x1,5	1.32.2.0093	1.32.2.0094	1.32.2.0095
STG-M30x1,5	---	1.32.2.0026	1.32.2.0027

Technical data

Type	Bolt length (mm)	Tensile load max. (N)	Bending mom. max. (Nm)	Temperature (°C)	Volume (l)	Weight (kg)
STG-M12x1-100	100	1.000	25	0 ... +80	---	0,10
STG-M12x1-160	160	1.000	25	0 ... +80	---	0,14
STG-M12x1-230	230	1.000	25	0 ... +80	---	0,20
STG-M16x1,5-105	105	2.500	60	0 ... +80	---	0,17
STG-M16x1,5-175	175	2.500	60	0 ... +80	---	0,27
STG-M16x1,5-255	255	2.500	60	0 ... +80	---	0,40
STG-M20x1,5-120	120	5.500	120	0 ... +80	---	0,29
STG-M20x1,5-200	200	5.500	120	0 ... +80	---	0,49
STG-M20x1,5-280	280	5.500	120	0 ... +80	---	0,69
STG-M30x1,5-205	205	9.500	350	0 ... +80	---	1,14
STG-M30x1,5-370	370	9.500	350	0 ... +80	---	2,05

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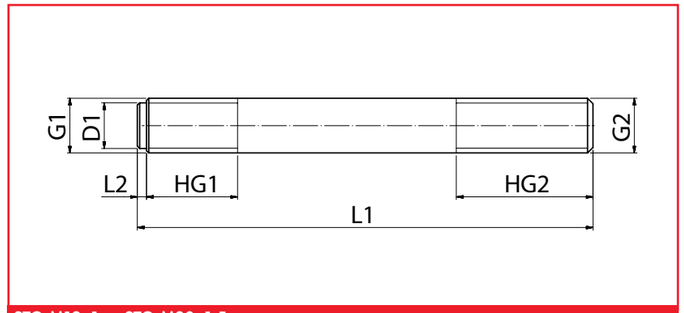
Single Components

Suspension bolt STG



STG-M12x1 ... STG-M30x1,5

Dimensions

Type	L1	D1	G1	G2	HG1	HG2
STG-M12x1-100	100	10	M12x1	M12x1	20	30
STG-M12x1-160	160	10	M12x1	M12x1	20	30
STG-M12x1-230	230	10	M12x1	M12x1	20	50
STG-M16x1,5-105	105	14	M16x1,5	M16x1,5	25	35
STG-M16x1,5-175	175	14	M16x1,5	M16x1,5	25	35
STG-M16x1,5-255	255	14	M16x1,5	M16x1,5	25	55
STG-M20x1,5-120	120	18	M20x1,5	M20x1,5	25	40
STG-M20x1,5-200	200	18	M20x1,5	M20x1,5	25	40
STG-M20x1,5-280	280	18	M20x1,5	M20x1,5	25	55
STG-M30x1,5-205	205	---	M30x1,5	M30x1,5	20	50
STG-M30x1,5-370	370	---	M30x1,5	M30x1,5	20	50

Single Components

Pressure springs DF

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Description
Special pressure springs for cushioned suspension of suction pads. The pressure springs are available for all bolts.

Application
- soft touchdown on workpieces
- even load distribution

DF-L50 ... DF-165

Article number

Type	Pressure spring for bolt-Ø 8mm	Pressure spring for bolt-Ø 12mm	Pressure spring for bolt-Ø 16mm	Pressure spring for bolt-Ø 20mm	Pressure spring for bolt-Ø 30mm
DF-L50-DI10-DS0,7	6.21.4.0241				
DF-L50-DI9-DS1	6.21.4.0234				
DF-L60-DI13-DS0,9		6.21.4.0024			
DF-L60-DI13-DS1,4		6.21.4.0023			
DF-L60-DI13-DS2		6.21.4.0240			
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-L80-DI21-DA50-EL				6.21.4.0092	
DF-L80-DI21-DA80-EL				6.21.4.0083	
DF-L100-DI32-DS5					6.21.4.0065
DF-L102-DI33-DS6					6.21.4.0243
DF-L110-DI33-DS8					6.21.4.0242
DF-L100-DI31-DA80-EL					6.21.4.0069

1. Basics
2. Suction Pads
3. Mounting Elements
4. Vacuum Generators
5. Valve Technology
6. Vacuum Supervision
7. Filter Elements
8. Connection Elements
9. System Technology

Single Components

Pressure spring DF

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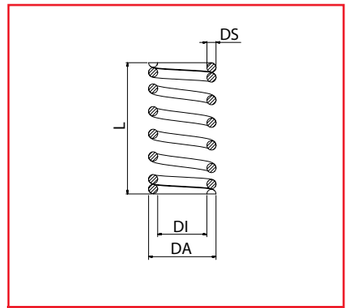
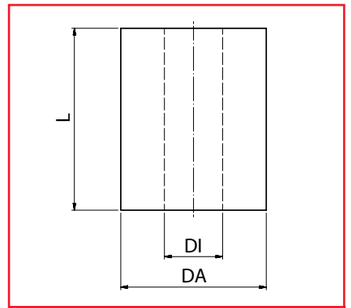


Pressure spring



Rubber spring

Dimensions and technical data

Type	Spring length L (mm)	Outer-Ø DA (mm)	Inner-Ø DI (mm)	Wire strength DS (mm)	max. Spring force (N)	max. Spring way (mm)	Spring rate (N/mm)	Weight (kg)
DF-L50-DI9-DS0,7	50	11,4	10	0,7	9,3	35	0,265	0,001
DF-L50-DI9-DS1	50	11	9	1,0	34	35	0,921	0,002
DF-L60-DI13-DS0,9	60	14,8	13	0,9	22	50	0,43	0,003
DF-L60-DI13-DS1,4	60	15,8	13	1,4	71	41	1,74	0,007
DF-L60-DI13-DS2	60	17	13	2	175	43	4,02	0,011
DF-L70-DI17-DS1,5	70	23	17	1,5	70	54	1,30	0,009
DF-L70-DI17-DS2	70	21	17	2	160	49	3,30	0,011
DF-L70-DI17-DS2,5	70	22	17	2,5	330	45	7,33	0,018
DF-L70-DI17-DS3	70	23	17	3	520	38	13,7	0,035
DF-L70-DI17-DS3,5	70	24	17	3,5	690	31	22,3	0,057
DF-L70-DI17-DS4	70	25	17	4	1.010	28	36,0	0,068
DF-L70-DI17-DS4,5	70	26	17	4,5	1.300	24	54,2	0,086
DF-L80-DI21-DS2	80	25	21	2	160	51	3,14	0,015
DF-L80-DI21-DS2,5	80	26	21	2,5	190	47	4,04	0,030
DF-L80-DI21-DS3	80	27	21	3	350	38	9,21	0,044
DF-L80-DI21-DS3,5	80	28	21	3,5	480	31	15,5	0,062
DF-L80-DI21-DS4	80	29	21	4	670	30	22,3	0,075
DF-L80-DI21-DS4,5	80	30	21	4,5	900	23	19,1	0,098
DF-L80-DI21-DS5	80	31	21	5	1.170	19	61,6	0,146
DF-L80-DI21-DS5,5	80	32	21	5,5	1.450	17	85,3	0,270
DF-L80-DI21-DS6	80	33	21	6	1.740	15	116,0	0,325
DF-L80-DI21-DS6,5	80	34	21	6,5	2.070	13	159,2	0,374
DF-L80-DI21-DS8	80	37	21	8	3.170	8	396,2	0,510
DF-L80-DI21-DA50-EL	80	50	21	---	6.000	30	200	0,650
DF-L80-DI21-DA80-EL	80	80	21	---	12.000	30	400	0,520
DF-L100-DI32-DS5	94	42	32	5	817	55	15,0	0,384
DF-L100-DI33-DS6	102	45	33	6	740	30	24,3	0,526
DF-L100-DI33-DS8	110	49	33	8	3.000	34	74	0,685
DF-L100-DI31-DA80-EL	100	80	31	---	18.000	40	450	0,750

Single Components

Bolt end elements

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Description
Discs, nuts and damping elements for individual assembly of suspension bolts. Generally a nut and disc are placed at the lower bolt end and a disc and 2 nuts at the top end. The nuts are countered to give a secure fixation. If required additional damping rings can be added.


Bolt end elements

Article number

Type	Accessory for bolt M8x1	Accessory for bolt M12x1	Accessory for bolt M16x1,5	Accessory for bolt M20x1,5	Accessory for bolt M30x1,5
Nut	6.21.1.1695	6.21.1.1692	6.21.1.1693	6.21.1.0454	6.21.1.1694
Flat nut	6.21.1.1688	6.21.1.1645	6.21.1.0035	6.21.1.0037	6.21.1.0746
Disc U-	6.21.1.0012	6.21.1.0002	6.21.1.0004	6.21.1.0005	6.21.1.0008
Damping element DE-	6.21.2.0357	6.21.2.0189	6.21.2.0442	6.21.2.0322	6.21.2.0382

Single Components
Bolt end elements
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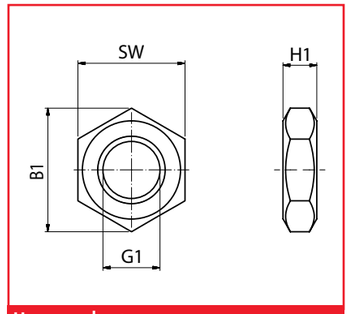
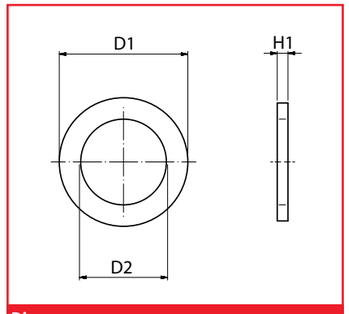
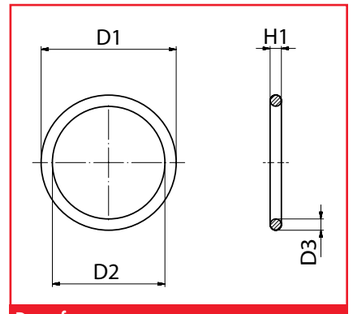


Hexagonal nut



Disc



Dampfer

Technical data

Type	D1	D2	D3	H1	G1	B1	SW
Nut M8x1	---	---	---	6,8	M8x1	14,4	13
Nut M12x1	---	---	---	10,8	M12x1	20	18
Nut M16x1,5	---	---	---	14,8	M16x1,5	26,8	24
Nut M20x1,5	---	---	---	18	M20x1,5	33	30
Nut M30x1,5	---	---	---	25,6	M30x1,5	50,9	46
Flat nut M8x1	---	---	---	4	M8x1	14,4	13
Flat nut M12x1	---	---	---	6	M12x1	20	18
Flat nut M16x1,5	---	---	---	8	M16x1,5	26,8	24
Flat nut M20x1,5	---	---	---	10	M20x1,5	33	30
Flat nut M30x1,5	---	---	---	15	M30x1,5	50,9	46
Disc U-8	16	8,4	---	1,8	---	---	---
Disc U-12	24	13	---	2,7	---	---	---
Disc U-16	30	17	---	3,3	---	---	---
Disc U-20	37	21	---	3,3	---	---	---
Disc U-30	56	31	---	4,3	---	---	---
Dampfing element DE-8	12	8	2	2	---	---	---
Damping element DE-12	16	12	2	2	---	---	---
Damping element DE-16	22	16	2	2	---	---	---
Damping element DE-20	26	20	2	2	---	---	---
Damping element DE-30	38	30	3	3	---	---	---

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Vacuum Generators

1. Basics
2. Suction Pads
3. Mounting Elements
4. Vacuum Generators
5. Valve Technology
6. Vakcuum Supervision
7. Filter Elements
8. Connection Elements
9. System Technology

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Vacuum generators

Overview

Vacuum pumps		Technical data		Page
	Oilless pump VP-T	Suction capacity (m³/h) Vacuum (mbar) Power (kW)	4 ... 140 -700 ... -900 0,18 ... 5,5	4.5
	Oilless pump VP-T silenced design	Suction capacity (m³/h) Vacuum (mbar) Power (kW)	16 ... 50 -700 ... -850 0,55 ... 1,25	4.9
	Oilless pump VP-TF-24V	Suction capacity (m³/h) Vacuum (mbar)	0,65 ... 8 -800 ... -850	4.13
	Oil-lubricated pump VP-0	Suction capacity (m³/h) Vacuum (mbar) Power (kW)	10 ... 250 -980 0,37 ... 7,5	4.17
	Vacuum flat tank VFS	Tank volume (l)	15 ... 200	4.21
	Vacuum energy unit VEE-T with oilless pump	Tank volume (l) Suction capacity (m³/h) Vacuum (mbar)	15 ... 200 4 ... 40 -820 ... -900	4.23
	Vacuum energy unit VEE-0 with oil-lubricated pump	Tank volume (l) Suction capacity (m³/h) Vacuum (mbar)	15 ... 200 10 ... 160 -980	4.27

Vacuum blowers		Technical data		Page
	directly driven SKV	Suction capacity (m³/h) Vacuum (mbar) Power (kW)	40 ... 720 -150 ... -400 0,37 ... 5,5	4.31
	with fly-wheel SD	Suction capacity (m³/h) Vacuum (mbar) Power (kW)	170 ... 280 -180 ... -250 0,9 ... 2,3	4.35
	belt-driven SKE	Suction capacity (m³/h) Vacuum (mbar) Power (kW)	160 ... 290 -500 2,2 ... 5,5	4.39
	silencer box SDB	Reduction of noise level (dB(A)	5 ... 10	4.43

Accessories for vacuum pumps and blowers		Description	Page
	Motor protection switch MSS	Overload protection on vacuum generators	4.45
	Vacuum-controlled motor switch VMS	Saving energy on vacuum pumps	4.47

Vacuum Generators

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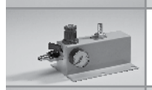
Overview

Ejectors		Technical data		Page
	Inline ejector FIG	Suction capacity (l/s) Vacuum (mbar)	0,12 ... 0,35 -870 ... .900	4.49
	Inline ejector FIS	Suction capacity (l/s) Vacuum (mbar)	0,1 ... 0,47 -860	4.53
	Inline ejektor FIM	Suction capacity (l/s) Vacuum (mbar)	0,24 ... 3,1 -750 ... -950	4.57
	Basic ejector unit VIP	Suction capacity (l/s) Vacuum (mbar)	1,42 -850	4.61
	Basic ejector FEG	Suction capacity (l/s) Vacuum (mbar)	0,1 ... 5,65 -610 ... -930	4.65
	Basic ejector with vacuum switch FEG-VS	Suction capacity (l/s) Vacuum (mbar)	0,12 ... 0,7 -610 ... -930	4.69
	Basic ejector with blow-off impulse FEG-AI	Suction capacity (l/s) Vacuum (mbar)	0,12 ... 1,54 -680 ... -930	4.73
	Basic ejector with vacuum valve FEG-VV	Suction capacity (l/s) Vacuum (mbar)	0,12 ... 3,1 -680 ... -930	4.77
	Basic ejector with vacuum valve and blow-off impulse FG-VA	Suction capacity (l/s) Vacuum (mbar)	0,12 ... 3,1 -680 ... -930	4.82
	Compact ejector FEK-VE	Suction capacity (l/s) Vacuum (mbar)	0,1 ... 1,48 -750 ... -930	4.85
	Compact ejector FEK-VD	Suction capacity (l/s) Vacuum (mbar)	0,1 ... 1,48 -750 ... -930	4.89
	Multi-stage ejector FEM	Suction capacity (l/s) Vacuum (mbar)	6,0 ... 24,0 -750	4.93
	Multi-stage ejector with air- saving-control FEMR	Suction capacity (l/s) Vacuum (mbar)	6,0 ... 24,0 -750	4.97

1. Basics
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Vacuum Generators

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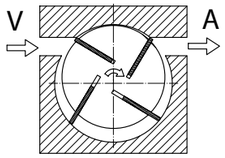
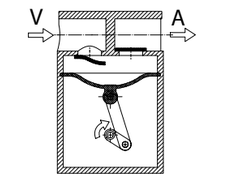
Functional principle of vacuum generators



Rotary valve pumps

Rotary valve vacuum pumps

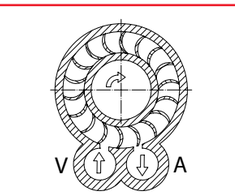
An off-centre mounted carrying wheel presses the rotorvanes outwards and they seal the chambers against the chamber housing. The following expansion in the individual chamber creates the vacuum.



Membrane pumps

Membrane vacuum pumps

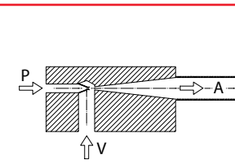
An eccentric lever moves a membrane upwards and downwards, air is sucked via one channel and blown out wia a second channel. Flap-traps close the channels.



Vacuum blowers

Vacuum blowers

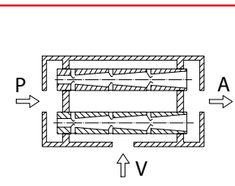
The carrying wheel accelerates and condenses the air which creates a vacuum on the suction side and an overpressure on the exhaust side. The large cross sections create a very high volume flow.



Single-stage ejectors

Ejector, single-stage

A Venturi nozzle accelerates the compressed air which is later decompressed via an expansion channel. This expansion creates vacuum on the suction side. Both the sucked on air and the compressed air exit via the silencer.



Multi-stage ejectors

Ejector, multi-stage

On multi-stage ejectors several Venturi nozzles are placed in line, thus the exiting air of the first stage is compressed again in the following stage. The first stage creates the maximum vacuumm the following stages increase the suction capacity.

Vacuum Pumps

Oilless pumps VP-T

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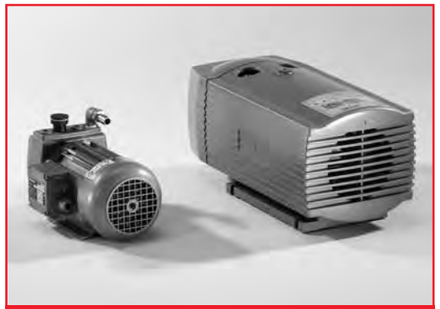
Description
Robust, low-maintenance and long-lasting vacuum pump working after the rotation principle. The pumps have permanently lubricated suspensions, are air-cooled and work absolutely oilless. The pumps are furnished with an integrated filter insert.

Options
- additional vacuum filter
- motor protection switch, vacuum-controlled motor switch
- other voltages on request

Application
- Handling of dense to slightly porous workpieces
- can be mounted in any position



VP-T 4.4 ... VP - T4.250

Article number

Type		Integrated filter insert	Additional vacuum filter*		Additional filter insert	Motor protection switch**	Vacuum-contr. motor switch***
VP-T4.4-230V	1.41.2.0017	2.41.2.0171	VF-1/2	1.53.2.0002	2.53.2.0009	6.35.7.0004	---
VP-T4.4-230/400V	1.41.2.0016	2.41.2.0171	VF-1/2	1.53.2.0002	2.53.2.0009	6.35.7.0007	---
VP-T4.8-230V	1.41.2.0019	2.41.2.0172	VF-1/2	1.53.2.0002	2.53.2.0009	6.35.7.0001	6.35.4.0290
VP-T4.8-230/400V	1.41.2.0018	2.41.2.0172	VF-1/2	1.53.2.0002	2.53.2.0009	6.35.7.0004	6.35.4.0263
VP-T4.16-230V	1.41.2.0015	2.41.2.0120	VF-3/4	1.53.2.0006	2.53.2.0014	6.35.7.0001	6.35.4.0289
VP-T4.16-230/400V	1.41.2.0014	2.41.2.0120	VF-3/4	1.53.2.0006	2.53.2.0014	6.35.7.0000	6.35.4.0264
VP-T4.25-230/400V	1.41.2.0004	2.41.2.0099	VF-11/4A	1.53.2.0003	2.53.2.0005	6.35.7.0000	6.35.4.0265
VP-T4.40-230/400V	1.41.2.0005	2.41.2.0099	VF-11/4A	1.53.2.0003	2.53.2.0005	6.35.7.0001	6.35.4.0266
VP-T4.50-230/400V	1.41.2.0069	2.41.2.0099	VF-11/4A	1.53.2.0003	2.53.2.0005	6.35.7.0001	6.35.4.0288
VP-T4.60-EURO-230/400V	1.41.2.0044	2.41.2.0107	VF-11/4A	1.53.2.0003	2.53.2.0005	6.35.7.0002	6.35.4.0267
VP-T4.80-EURO-230/400V	1.41.2.0046	2.41.2.0107	VF-11/4B	1.53.2.0004	2.53.2.0004	6.35.7.0002	6.35.4.0268
VP-T4.100-EURO-230/400V	1.41.2.0047	2.41.2.0107	VF-11/4B	1.53.2.0004	2.53.2.0004	6.35.7.0005	6.35.4.0269
VP-T4.140-EURO-230/400V	1.41.2.0048	2.41.2.0107	VF-11/4B	1.53.2.0004	2.53.2.0006	6.35.7.0005	6.35.4.0270
VP-T4.250-EURO-400/690V	1.41.2.0049	2.41.2.0105	VF-21/2	1.53.2.0005	2.53.2.0006	6.35.7.0018	6.35.4.0271

* *please order separately*
** *motor protection switch with housing for 400V, 50Hz*
*** *vacuum generator is switched on and off depending on vacuum level (energy saving module).*

Vacuum Pumps
Oilless pumps VP-T
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Technical data

Type	Vacuum (mbar)	Suction volume (m³/h) 50 Hz	Suction volume (m³/h) 60 Hz	Suction volume (l/s) 50 Hz	Suction volume (l/s) 60 Hz	Rotation speed (1/min) 50 Hz	Rotation speed (1/min) 60 Hz	Weight (kg)	Noise level dB (A)*
VP-T4.4-230V	-850	4,1	---	1,14	---	2750	---	7,0	59
VP-T4.4-230/400V	-850	4,1	4,7	1,14	1,30	2800	3360	7,0	59
VP-T4.8-230V	-850	8,0	---	2,22	---	2700	---	11,5	58
VP-T4.8-230/400V	-850	8,0	9,1	2,22	2,53	2800	3150	11,5	58
VP-T4.16-230V	-850	16	---	4,45	---	1370	---	22,5	61
VP-T4.16-230/400V	-850	16	19	4,45	5,28	1420	1700	22,5	61
VP-T4.25-230/400V	-850	25	30	6,95	8,34	1420	1700	26,0	62
VP-T4.40-230/400V	-850	40	48	11,1	13,3	1420	1700	38,5	67
VP-T4.50-230/400V	-700	50	60	13,9	15,3	1420	1700	38,5	69
VP-T4.60-EURO-230/400V	-900	55	66	15,3	18,3	1440	1740	69,0	71
VP-T4.80-EURO-230/400V	-900	67	78	18,6	21,8	1440	1740	69,0	72
VP-T4.100-EURO-230/400V	-900	98	112	27,2	31,1	1455	1749	101	75
VP-T4.140-EURO-230/400V	-900	129	154	35,8	42,8	1460	1760	111	76
VP-T4.250-EURO-400/690V	-800	248	300	68,9	83,3	975	1175	250	77

** Angaben at 50 Hz*

Electrical data

Type	Power (kW) 50 Hz	Power (kW) 60 Hz	Voltage (V) 50 Hz	Voltage (V) 60 Hz	Current consumption (A) 50 Hz	Current consumption (A) 60 Hz	Safety category	Efficiency category
VP-T4.4-230V	0,18	0,21	220-240	220-240	1,65	1,65	IP54	IE1
VP-T4.4-230/400V	0,18	0,21	175-260/300-450	202-300/350-520	1,08/0,62	1,08/0,62	IP54	IE1
VP-T4.8-230V	0,35	0,42	220-240	220-240	3,90	3,40	IP54	IE1
VP-T4.8-230/400V	0,35	0,44	175-260/300-450	202-300/350-520	2,35/1,35	2,4/1,4	IP54	IE1
VP-T4.16-230V	0,55	0,44	220-240	220-240	4,6/5,2	4,6/5,2	IP54	IE1
VP-T4.16-230/400V	0,55	0,70	175-260/300-450	202-300/350-520	3,8/2,25	3,9/2,25	IP54	IE1
VP-T4.25-230/400V	0,75	0,90	190-255/330-440	190-290/330-500	6,0/3,5	6,0/3,5	IP54	IE1
VP-T4.40-230/400V	1,25	1,50	190-255/330-440	190-290/330-500	6,9/4,0	6,9/4,0	IP54	IE1
VP-T4.50-230/400V	1,25	1,50	190-255/330-440	190-290/330-500	6,9/4,0	6,9/4,0	IP54	IE1
VP-T4.60-EURO-230/400V	2,4	3,0	230/400 +/-10%	265/460 +/-10%	8,4/4,8	8,1/4,6	IP54	IE2
VP-T4.80-EURO-230/400V	2,4	3,0	230/400 +/-10%	265/460 +/-10%	8,4/4,8	8,1/4,6	IP54	IE2
VP-T4.100-EURO-230/400V	3,0	3,5	230/400 +/-10%	265/460 +/-10%	10,7/6,2	10,8/6,2	IP54	IE2
VP-T4.140-EURO-230/400V	4,0	4,8	230/400 +/-10%	265/460 +/-10%	14,3/8,3	14,7/8,5	IP54	IE2
VP-T4.250-EURO-400/690V	5,5	6,3	230/400 +/-10%	265/460 +/-10%	19,9/11,5	19,9/11,5	IP54	IE2

Vacuum Pumps

Oilless pumps VP-T

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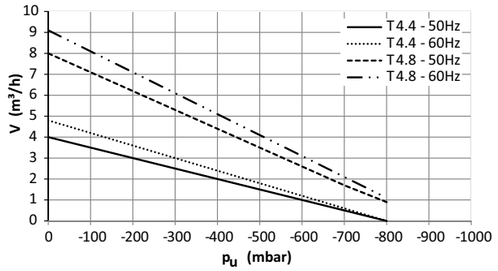
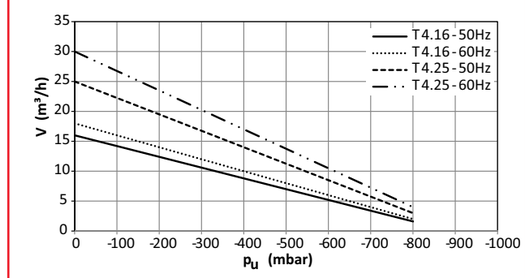
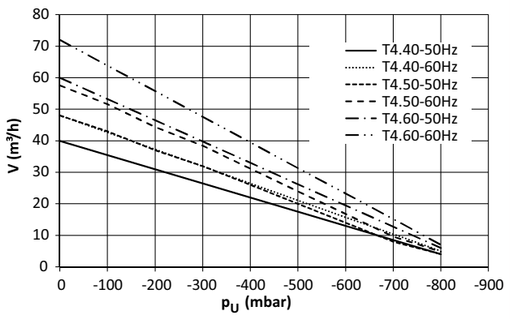


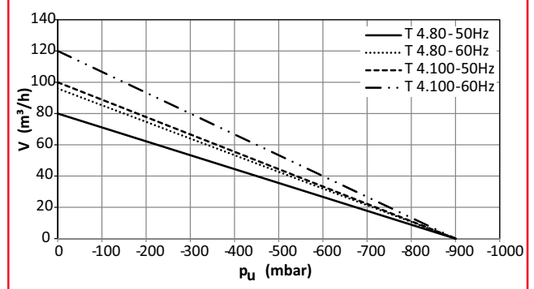
Air flow T4.4, T4.8 in dependance to grade of evacuation



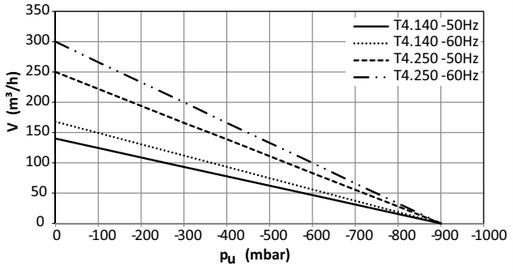
Air flow T4.16, T4.25 in dependance to grade of evacuation



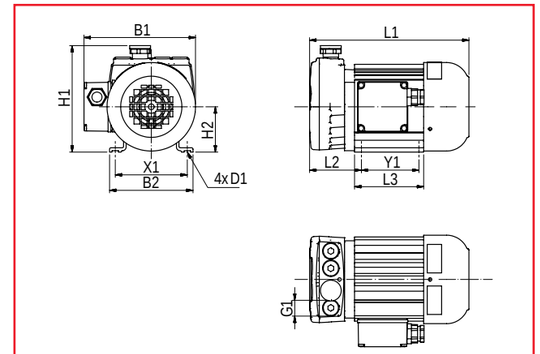
Air flow T4.40, T4.60 in dependance to grade of evacuation



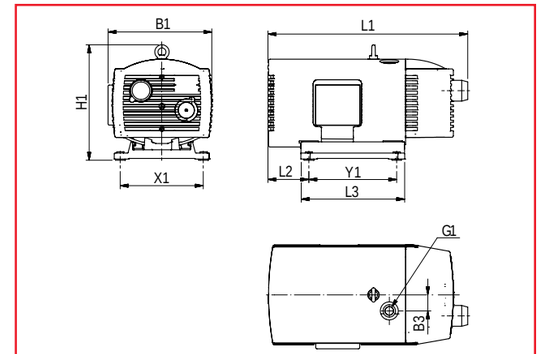
Air flow T4.80, T4.100 in dependance to grade of evacuation



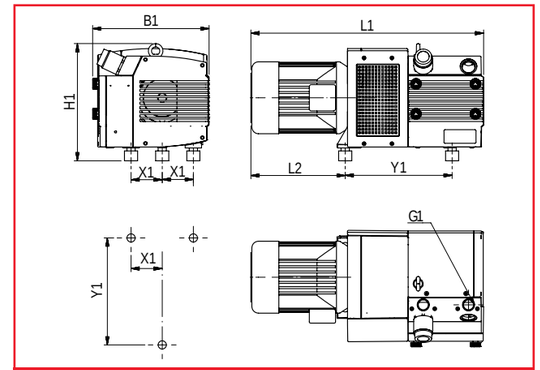
Air flow T4.140, T4.250 in dependance to grade of evacuation



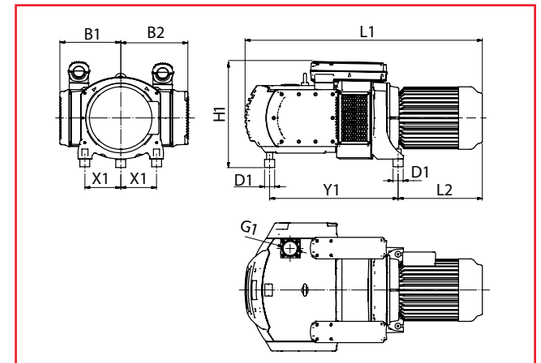
VP-T 4.4 ... VP-T4.8



VP-T 4.16 ... VP-T4.50



VP-T 4.60 ... VP-T4.140



VP-T 4.250 ... VP-T4.360

Dimensions

Type	L1	L2	L3	B1	B2	H1	G1	X1	Y1	D1
VP-T4.4-230V	221	71,5	96	155	116	148	G1/4	100	80	7
VP-T4.4-230/400V	221	71,5	96	155	116	148	G1/4	100	80	7
VP-T4.8-230V	231	61,5	96	155	116	154	G3/8	100	80	7
VP-T4.8-230/400V	231	61,5	96	155	116	154	G3/8	100	80	7
VP-T4.16-230V	452	73	242	231	155	205	G1/2	125	202	7
VP-T4.16-230/400V	452	73	242	231	155	205	G1/2	125	202	7
VP-T4.25-230/400V	505	96	260	260	238	253	G3/4	190	220	7
VP-T4.40-230/400V	572	131	260	260	238	253	G3/4	208	220	7
VP-T4.50-230/400V	572	131	260	260	238	253	G3/4	208	220	7
VP-T4.60-EURO-230/400V	709	287	---	353	---	328	G1	95	326	M8
VP-T4.80-EURO-230/400V	709	287	---	353	---	328	G1	95	326	M8
VP-T4.100-EURO-230/400V	835	297	---	470	---	336	G11/2	122,5	398	M8
VP-T4.140-EURO-230/400V	835	297	---	470	---	336	G11/2	122,5	398	M8
VP-T4.250-EURO-400/690V	1.250	481	---	644	---	580	G21/2	190	645	M10

Vacuum Pumps

Oilless pumps, silenced VP-TS

FEZER
Simply move more.

Description
Robust, low-maintenance and long-lasting vacuum pump working after the rotation principle. To reduce the noise level the pumps are equipped with a cover made of foamed plastic. The pumps are air-cooled and work absolutely oilless. The pumps are equipped with an integrated filter and a vacuum regulation valve.

VP-TS4.16 ... VP-TS4.50

Options
- additional vacuum filter
- motor protection switch, vacuum-controlled motor switch
- other voltages on request

Application
- handling of dense to slighly porous workpieces
- environments with low noise level requirements
- can be mounted in any position

Article number

Type		Additional vacuum filter*		Additional filter insert	Motor protection switch**	Vacuum-contr. motor switch***
VP-TS4.16-230V	1.41.2.0068	VF-3/4	1.53.2.0006	2.53.2.0014	6.35.7.0000	6.25.4.0289
VP-TS4.16-230/400V	1.41.2.0067	VF-11/4A	1.53.2.0003	2.53.2.0005	6.35.7.0000	6.25.4.0264
VP-TS4.25-230/400V	1.41.2.0070	VF-11/4A	1.53.2.0003	2.53.2.0005	6.35.7.0000	6.25.4.0265
VP-TS4.40-230/400V	1.41.2.0071	VF-11/4A	1.53.2.0003	2.53.2.0005	6.35.7.0001	6.25.4.0266
VP-TS4.50-230/400V	1.41.2.0072	VF-11/4A	1.53.2.0003	2.53.2.0005	6.35.7.0001	6.25.4.0288

* *please order separately*
** *motor protection switch with housing for 400V, 50Hz*
*** *vacuum generator is switched on and off depending on vacuum level (energy saving module).*

Vacuum Pumps
Oilless pumps, silenced VP-TS
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Technical data

Type	Vacuum (mbar)	Suction volume (m³/h) 50 Hz	Suction volume (m³/h) 60 Hz	Suction volume (l/s) 50 Hz	Suction volume (l/s) 60 Hz	Rotation speed (1/min) 50 Hz	Rotation speed (1/min) 60 Hz	Weight (kg)	Noise level dB (A)*
VP-TS4.16-230V	-850	16	---	4,45	---	1370	---	33,0	55
VP-TS4.16-230/400V	-850	16	19	4,45	5,28	1420	1700	33,0	55
VP-TS4.25-230/400V	-850	25	30	6,95	8,34	1420	1700	42,0	56
VP-TS4.40-230/400V	-850	40	48	11,1	13,3	1420	1700	42,0	57
VP-TS4.50-230/400V	-700	50	60	13,9	15,3	1420	1700	42,0	62

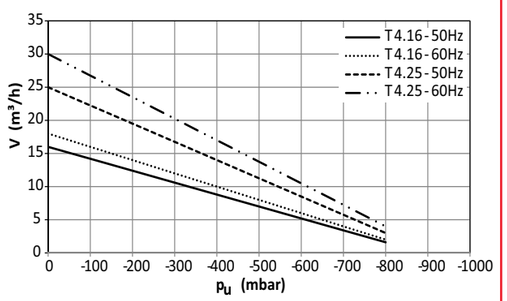
** Specification at 50 Hz*

Electrical data

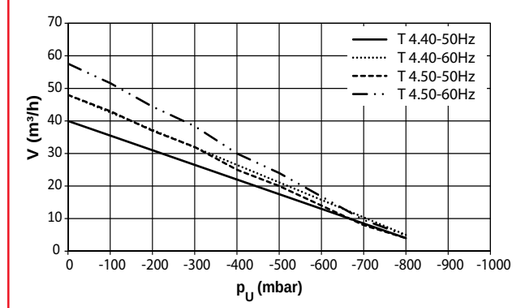
Type	Power (kW) 50 Hz	Power (kW) 60 Hz	Voltage (V) 50 Hz	Voltage (V) 60 Hz	Current consumption (A) 50 Hz	Current consumption (A) 60 Hz	Safety category	Efficiency category
VP-TS4.16-230V	0,55	0,44	220-240	220-240	4,6/5,2	4,6/5,2	IP54	IE1
VP-TS4.16-230/400V	0,55	0,70	175-260/300-450	202-300/350-520	3,8/2,25	3,9/2,25	IP54	IE1
VP-TS4.25-230/400V	0,75	0,90	190-255/330-440	190-290/330-500	6,0/3,5	6,0/3,5	IP54	IE1
VP-TS4.40-230/400V	1,25	1,50	190-255/330-440	190-290/330-500	6,9/4,0	6,9/4,0	IP54	IE1
VP-TS4.50-230/400V	1,25	1,50	190-255/330-440	190-290/330-500	6,9/4,0	6,9/4,0	IP54	IE1

Vacuum Pumps

Oilless pumps, silenced VP-TS



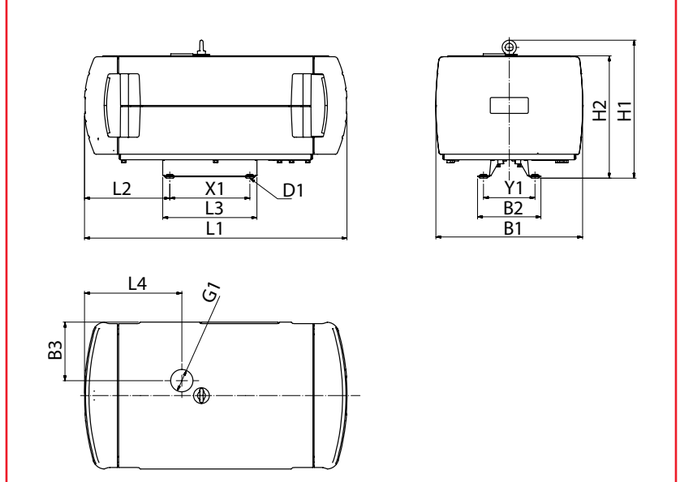
Air flow T4.16, T4.25 in dependance to grade of evacuation



Air flow T4.40, T4.50 in dependance to grade of evacuation

Vacuum Pumps

Oilless pumps, silenced VP-TS



VP-TS4.16 ... VP-TS4.50

Dimensions

Type	L1	L2	L3	L4	B1	B2	B3	H1	H2	X1	Y1	D1	G1
VP-TS4.16-230V	662	215	237	245	370	160	148	348	308	202	130	8	G1/2
VP-TS4.16-230/400V	806	282	267	360	445	230	182	366	326	220	203	8	G1/2
VP-TS4.25-230/400V	806	282	267	360	445	230	182	366	326	220	203	8	G3/4
VP-TS4.40-230/400V	806	282	267	360	445	230	182	366	326	220	203	8	G3/4
VP-TS4.50-230/400V	806	282	267	360	445	230	182	366	326	220	203	8	G3/4

Vacuum Pumps

Oilless pumps VP-TF-24V

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Description
Robust, low-maintenance and long-lasting vacuum pump working after the rotation principle. The pumps have permanently lubricated suspensions, are air-cooled and work absolutely oillessly. The pumps are designed for operation with batteries or a direct 24V supply.


VP-TF4.2 ... VP-TF4.6

Options
- additional vacuum filter
- motor protection switch, vacuum-controlled motor switch
- other voltages on request

Application
- handling of dense workpieces
- can be mounted in any position
- self-sufficient operation via batteries

Article number

Type		Additional vacuum filter*		Additional filter insert	Vacuum-controlled motor switch**
VP-TF4.2-24V-0,05kW	1.41.2.0043	VF-1/2	1.53.2.0002	2.41.2.0106	6.35.4.0291
VP-TF4.4-24V-0,17kW	1.41.2.0073	VF-1/2	1.53.2.0002	2.41.2.0106	6.35.4.0292
VP-TF4.6-24V-0,25kW	1.41.2.0066	VF-1/2	1.53.2.0002	2.41.2.0106	6.35.4.0293

* *please order separately*

** *vacuum generator is switched on and off depending on vacuum level (energy saving module).*

Vacuum Pumps
Oilless pumps VP-TF-24V
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Technical data

Type	Vacuum (mbar)	Suction volume (m^3/h)	Suction volume (l/s)	Rotation speed (1/min)	Weight (kg)	Noise level dB (A)*
VP-TF4.2-24V-0,05kW	-800	2,0	0,55	1370	3,7	56
VP-TF4.4-24V-0,17kW	-850	4,1	1,14	1420	11,0	59
VP-TF4.6-24V-0,25kW	-850	6,0	1,67	1420	11,0	59

Electrical data

Type	Voltage (V)	Current consumption (A)	Power (kW)	Safety category
VP-TF4.2-24V-0,05kW	24	2,1	0,05	IP44
VP-TF4.4-24V-0,17kW	24	10,5	0,17	IP44
VP-TF4.6-24V-0,25kW	24	16,0	0,25	IP44

Vacuum Pumps

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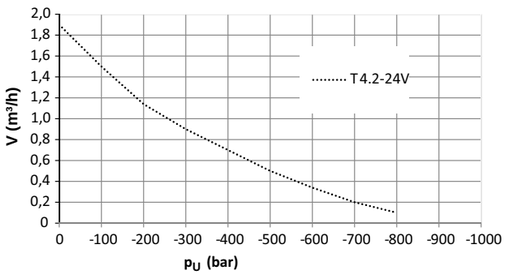
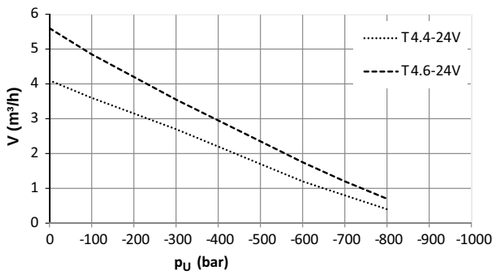
Oilless pumps VP-TF-24V



Air flow T4.2-24V in dependance to grade of evacuation



Air flow T4.4, T4.6-24V in dependance to grade of evacuation

1. Basics
2. Suction Pads
3. Mounting Elements
4. Vacuum Generators
5. Valve Technology
6. Vacuum Supervision
7. Filter Elements
8. Connection Elements
9. System Technology

Vacuum pumps

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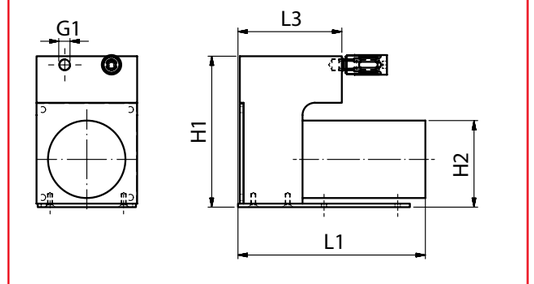
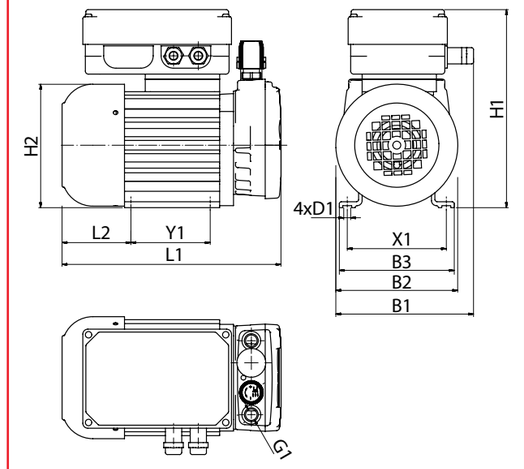
Oilless pumps VP-TF-24V



VP-TF4.2



VP-TF4.4 ... VP-TF4.6

Dimensions

Type	L1	L2	L3	B1	B2	B3	H1	H2	D1	G1	X1	Y1
VP-TF4.2-24V-0,05kW	152,5	70	84,5	82	80	---	123	70,5	4,5	G1/8	70	60
VP-TF4.4-24V-0,17kW	221	69,5	---	139	123	116	200	124,5	7	G1/4	100	80
VP-TF4.6-24V-0,25kW	221	69,5	---	139	123	116	200	124,5	7	G1/4	100	80

Vacuum pumps

Oil-lubricated pumps VP-O

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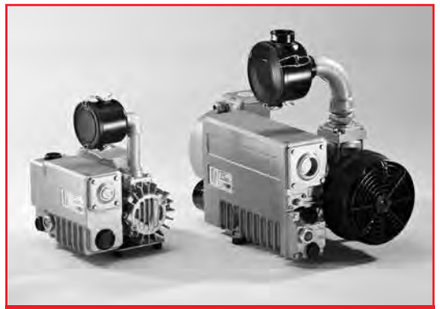
Description
Robust, low-maintenance and long-lasting vacuum pump working after the rotation principle. The pumps are air-cooled and have an internal oil circuit. The exhaust is cleaned by an oil mist filter. The pumps are equipped with an integrated non-return valve and an additional vacuum filter.


VP-010.1 ... VP-0250.1

Options
- additional gas balancing valve which prevents a mixing of oil and water at high Temperaturees
- motor protection switch, vacuum-controlled motor switch
- other voltages on request

Application
- handling of dense to slightly porous workpieces
- central vacuum supply of stationary equipment
- stable, horizontal mounting position

Article number

Type		Additional vacuum filter*		Additional filter insert	Motor protection switch**	Vacuum-contr. motor switch***
VP-010.1-230/400V	1.41.1.0001	VF-3/4	1.53.2.0006	2.53.2.0014	6.35.7.0003	6.35.4.0272
VP-016.1-230/400V	1.41.1.0003	VF-3/4	1.53.2.0006	2.53.2.0014	6.35.7.0004	6.35.4.0273
VP-025.3EURO-230/400V	1.41.1.0045	VF-11/4A	1.53.2.0003	2.53.2.0005	6.35.7.0000	6.35.4.0274
VP-025.3MULTI-230/400V	1.41.1.0038	VF-11/4A	1.53.2.0003	2.53.2.0005	6.35.7.0000	6.35.4.0281
VP-040.3EURO-230/400V	1.41.1.0046	VF-11/4A	1.53.2.0003	2.53.2.0005	6.35.7.0000	6.35.4.0275
VP-040.3MULTI-230/400V	1.41.1.0039	VF-11/4A	1.53.2.0003	2.53.2.0005	6.35.7.0001	6.35.4.0282
VP-063.3EURO-230/400V	1.41.1.0047	VF-11/4A	1.53.2.0003	2.53.2.0005	6.35.7.0001	6.35.4.0276
VP-063.3MULTI-230/400V	1.41.1.0040	VF-11/4A	1.53.2.0003	2.53.2.0005	6.35.7.0001	6.35.4.0283
VP-0100.3EURO-230/400V	1.41.1.0048	VF-11/4B	1.53.2.0004	2.53.2.0004	6.35.7.0001	6.35.4.0277
VP-0100.3MULTI-230/400V	1.41.1.0041	VF-11/4B	1.53.2.0004	2.53.2.0004	6.35.7.0002	6.35.4.0284
VP-0160.3EURO-230/400V	1.41.1.0049	VF-21/2	1.53.2.0005	2.53.2.0006	6.35.7.0002	6.35.4.0278
VP-0160.3MULTI-230/400V	1.41.1.0042	VF-21/2	1.53.2.0005	2.53.2.0006	6.35.7.0005	6.35.4.0285
VP-0250.3EURO-230/400V	1.41.1.0050	VF-21/2	1.53.2.0005	2.53.2.0006	6.35.7.0005	6.35.4.0287
VP-0250.3MULTI-230/400V	1.41.1.0043	VF-21/2	1.53.2.0005	2.53.2.0006	6.35.7.0018	6.35.4.0286

* *enclosed as standard*
** *motor protection switch with housing for 400V, 50Hz*
*** *vacuum generator is switched on and off depending on vacuum level (energy saving module).*

Article number and technical data of motor oil

Motor oil for vacuum pump	Content 1l	2.41.1.0527
viscosity:	(mm^2/s)	100 at 40°C
relative denseness:	(kg/m^3)	884 at 15°C
steam pressure:	(mbar)	1013 at 360°C
ignition Temperaturee:	(°C)	> 250
burning point:	(°C)	> 240
boiling point:	(°C)	>= 360

1. Basics
2. Suction Pads
3. Mounting Elements
4. Vacuum Generators
5. Valve Technology
6. Vakcuum Supervision
7. Filter Elements
8. Connection Elements
9. System Technology

Vacuum Pumps

Oil-lubricated pumps VP-O

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Technical data

Type	Vacuum (mbar)	Suction volume (m^3/h) 50 Hz	Suction volume (m^3/h) 60 Hz	Suction volume (l/s) 50 Hz	Suction volume (l/s) 60 Hz	Rotation speed (1/min) 50 Hz	Rotation speed (1/min) 60 Hz	Oil q'ty (l)	Weight (kg)	Noise level dB (A)*
VP-010.1-230/400V	-980	10	12	2,77	3,33	2800	3400	0,3	16	59
VP-016.1-230/400V	-980	16	19	4,44	5,28	2700	3280	0,3	18	60
VP-025.3EURO-230/400V	-995	25	---	6,94	---	1410	---	1,0	34	62
VP-025.3MULTI-230/400V	-995	25	30	6,94	8,33	1435	1750	1,0	34	62
VP-040.3EURO-230/400V	-995	40	---	11,11	---	1420	---	1,0	38	64
VP-040.3MULTI-230/400V	-995	40	48	11,11	13,33	1440	1730	1,0	38	64
VP-063.3EURO-230/400V	-995	63	---	17,50	---	1425	---	2,0	52	64
VP-063.3MULTI-230/400V	-995	63	76	17,50	21,11	1450	1740	2,0	52	64
VP-0100.3EURO-230/400V	-995	100	---	27,78	---	1445	---	2,0	70	65
VP-0100.3MULTI-230/400V	-995	100	120	27,78	33,33	1450	1740	2,0	70	65
VP-0160.3EURO-230/400V	-995	160	---	44,44	---	1460	---	6,5	160	70
VP-0160.3MULTI-230/400V	-995	160	190	44,44	52,77	1475	1765	6,5	160	70
VP-0250.3EURO-230/400V	-995	250	---	69,44	---	1460	---	6,5	195	72
VP-0250.3MULTI-230/400V	-995	250	300	69,44	83,33	1475	1765	6,5	195	72

** Specification at 50 Hz*

Electrical data

Type	Power (kW) 50 Hz	Power (kW) 60 Hz	Voltage (V) 50 Hz	Voltage (V) 60 Hz	Current consumption (A) 50 Hz	Current consumption (A) 60 Hz	Safety category	Efficiency category
VP-010.1-230/400V	0,37	0,45	200-240/346-415	200-277/346-480	2,1/1,2	1,9/1,1	IP54	IE1
VP-016.1-230/400V	0,55	0,65	200-240/346-415	200-277/346-480	2,6/1,5	2,6/1,5	IP54	IE1
VP-025.3EURO-230/400V	0,75	---	230/400 +/-10%	---	3,1/1,8	---	IP55	IE2
VP-025.3MULTI-230/400V	1,1	1,2	190-208/380-415	220-230/440-460	4,8/2,4	4,8/2,4	IP55	IE2
VP-040.3EURO-230/400V	1,1	---	230/400 +/-10%	---	4,7/2,7	---	IP55	IE2
VP-040.3MULTI-230/400V	1,4	1,7	190-208/380-415	220-230/440-460	7,0/3,5	6,6/3,3	IP55	IE2
VP-063.3EURO-230/400V	1,5	---	230/400 +/-10%	---	6,3/3,7	---	IP55	IE2
VP-063.3MULTI-230/400V	2,0	2,4	190-208/380-415	220-230/440-460	9,4/4,7	9,4/4,7	IP55	IE2
VP-0100.3EURO-230/400V	2,2	---	230/400 +/-10%	---	8,5/4,9	---	IP55	IE2
VP-0100.3MULTI-230/400V	2,7	3,4	190-208/380-415	220-230/440-460	11,8/5,9	12,4/6,2	IP55	IE2
VP-0160.3EURO-230/400V	4,0	---	230/400 +/-10%	---	14,1/8,1	---	IP55	IE2
VP-0160.3MULTI-230/400V	5,5	6,6	190-208/380-415	220-230/440-460	24,4/12,2	23,8/11,9	IP55	IE2
VP-0250.3EURO-230/400V	5,5	---	400/690 +/-10%	---	10,5/6,1	---	IP55	IE2
VP-0250.3MULTI-230/400V	7,5	9,2	190-208/380-415	220-230/440-460	31,1/15,5	31/15,5	IP55	IE2

Vacuum Pumps

Oil-lubricated pumps VP-O

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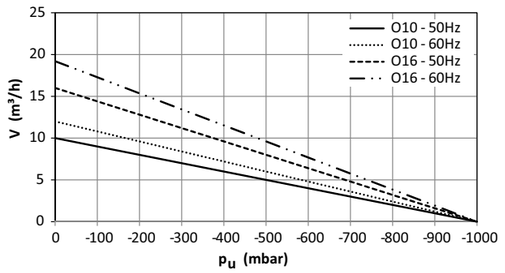
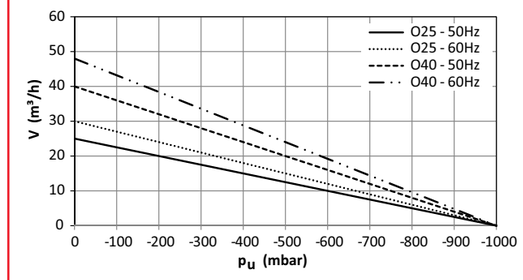
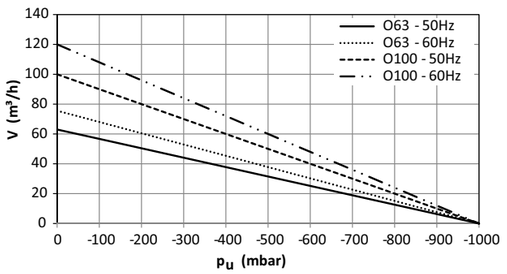


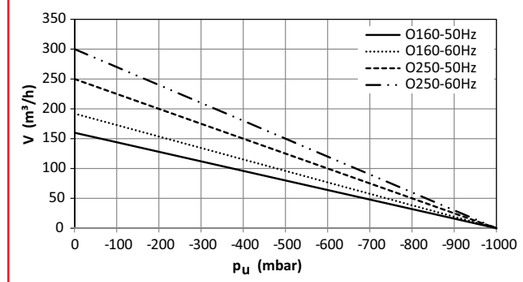
Air flow 010.1, 016.1 in dependance to grade of evacuation



Air flow 025.1, 040.1 in dependance to grade of evacuation



Air flow 063.1, 0100.1 in dependance to grade of evacuation



Air flow 0160.1, 0250.1 in dependance to grade of evacuation

Vacuum Pumps

Oil-lubricated pumps VP-O

FEZER
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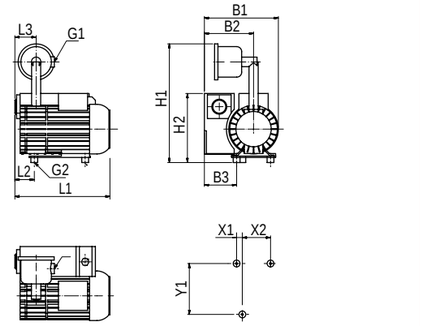
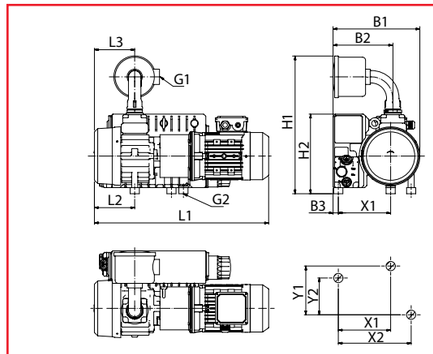
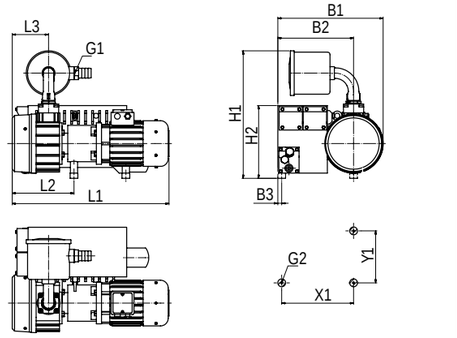


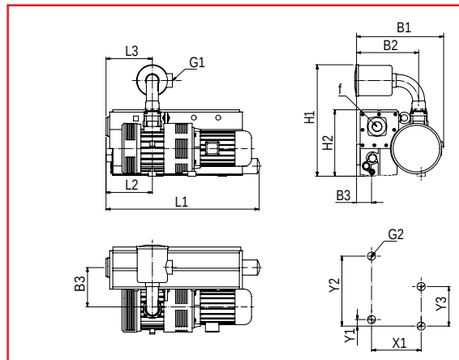
VP-010.1 ... VP-016.1



VP-025.1 ... VP-040.1



VP-063.1 ... VP-0100.1



VP-0160.1 ... VP-0250.1

Dimensions

Type	L1	L2	L3	B1	B2	B3	H1	H2	G1	G2	X1	X2	Y1	Y2	Y3
VP-010.1 ...	271	49	60	218	151	98	350	201	G3/4	M6	17	83	150	75	
VP-016.1 ...	301	79	60	218	151	96	360	196	G3/4	M6	17	83	150	----	---
VP-025.3EURO- ...	568	131	131	284	195	17	471	260	G11/4	M8	171	67	120	39	---
VP-025.3MULTI- ...	585	131	131	284	195	17	471	260	G11/4	M8	171	67	120	39	
VP-040.3EURO- ...	625	151	151	284	195	17	471	260	G11/4	M8	171	67	123	56	---
VP-040.3MULTI- ...	625	151	151	284	195	17	471	260	G11/4	M8	171	67	123	56	
VP-063.3EURO- ...	614	137	140	406	292	15	502	280	G11/4	M8	277	---	199	---	---
VP-063.3MULTI- ...	627	137	140	406	292	15	502	280	G11/4	M8	277	---	199	---	
VP-0100.3EURO- ...	696	170	170	406	292	15	502	280	G11/4	M8	277	---	226	---	---
VP-0100.3MULTI- ...	701	170	170	406	292	15	502	280	G2	M10	277	---	226	---	
VP-0160.3EURO- ...	921	279	279	554	389	99	703	418	G2	M10	305	---	40	390	263
VP-0160.3MULTI- ...	977	279	279	554	389	99	703	418	G2	M10	305	---	40	390	263
VP-0250.3EURO- ...	1056	319	319	583	389	54	703	418	G2	M10	350	---	8,7	390	303
VP-0250.3MULTI- ...	1086	319	319	583	389	54	703	418	G2	M10	350	---	8,7	390	303

Vacuum Pumps

Vacuum flat tanks VFS

FEZER
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Description
Vacuum flat tank made of a welded-steel construction with mounted vacuum gauge, non-return valve and 2/2-ways shut-off cock.

Options
- vacuum filter
- water separator

Application
- keeping up the vacuum in case of a power failure
- additional volume on applications with high cycle times
- any mounting position

VFS-15 ... VFS-200

Article number

Type		Additional vacuum filter		Additional water separator	
VSF-15L	1.42.0.0002	VF-3/4	1.53.2.0006	WA-3/4	1.53.4.0002
VSF-50L	1.42.0.0004	VF-1	1.53.2.0014	WA-1	1.53.4.0006
VSF-100L	1.42.0.0001	VF-11/4A	1.53.2.0003	WA-11/4	1.53.4.0004
VSF-200L	1.42.0.0003	VF-11/4B	1.53.2.0004	WA-11/2	1.53.4.0005

Technical data

Type	Volume (l)	Weight (kg)
VSF-15L	15	15
VSF-50L	50	30
VSF-100L	100	45
VSF-200L	200	90

Vacuum Pumps

Vacuum flat tank VFS

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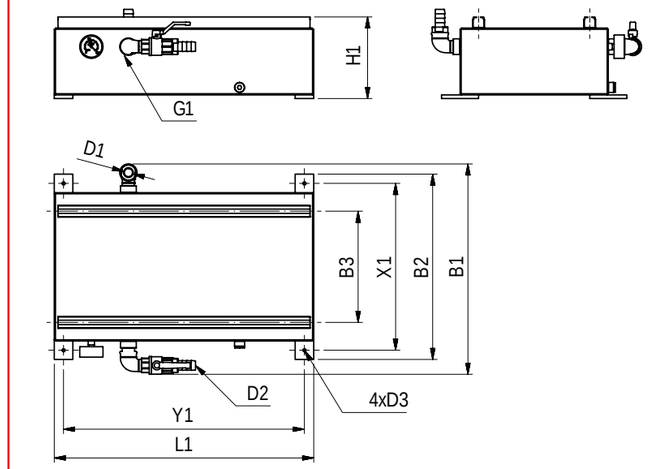


VFS-15 ... VFS-200

Dimensions

Type	L1	B1	B2	B3	H1	D1	D2	D3	G1	X1	Y2
VSF-15L	450	423	380	210	160	3/4	1/2	8,5	G3/4	330	400
VSF-50L	700	568	500	300	220	1	1	8,5	G1	450	650
VSF-100L	700	681	600	300	320	11/4	11/4	8,5	G11/4	550	650
VSF-200L	1000	913	800	300	340	11/4	11/4	11	G11/4	750	950

Vacuum Pumps

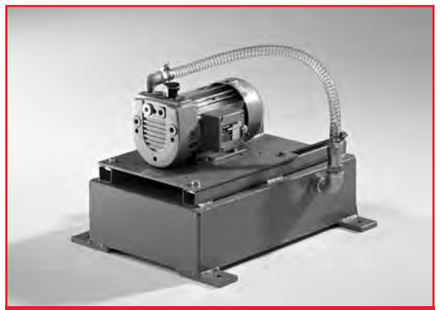
Vacuum energy unit with oilless pump VEE ... T

FEZER
Simply move more.

Description
The vacuum energy unit is wired ready-for-connection and consists of a vacuum tank with mounted oilless vacuum pump with integrated filter, non-return valve, vacuum gauge and a 2/2-ways shut-off cock.

Options
- additional vacuum filter and water separator
- motor protection switch, vacuum-controlled motor switch
- other voltages on request

Application
- central vacumm supply for several work stations
- applications with extremely short cycle times



VEE-15L-T4.4 ... VEE-200L-T4.40

Article number

Type		Additional vacuum filter		Additional water separator		Motor protection switch*	Vacuum-controlled motor switch**
VEE-15L-T4.8	1.42.2.0017	VF-3/4	1.53.2.0006	WA-3/4	1.53.4.0002	6.35.7.0004	6.35.4.0263
VEE-15L-T4.16	1.42.2.0013	VF-3/4	1.53.2.0006	WA-3/4	1.53.4.0002	6.35.7.0000	6.35.4.0264
VEE-50L-T4.8	1.42.2.0035	VF-1	1.53.2.0014	WA-1	1.53.4.0006	6.35.7.0004	6.35.4.0263
VEE-50L-T4.16	1.42.2.0027	VF-1	1.53.2.0014	WA-1	1.53.4.0006	6.35.7.0000	6.35.4.0264
VEE-50L-T4.25	1.42.2.0029	VF-1	1.53.2.0014	WA-1	1.53.4.0006	6.35.7.0000	6.35.4.0265
VEE-100L-T4.16	1.42.2.0002	VF-11/4A	1.53.2.0003	WA-11/4	1.53.4.0004	6.35.7.0000	6.35.4.0264
VEE-100L-T4.25	1.42.2.0004	VF-11/4A	1.53.2.0003	WA-11/4	1.53.4.0004	6.35.7.0000	6.35.4.0265
VEE-100L-T4.40	1.42.2.0005	VF-11/4A	1.53.2.0003	WA-11/4	1.53.4.0004	6.35.7.0002	6.35.4.0266
VEE-200L-T4.25	1.42.2.0021	VF-11/4B	1.53.2.0004	WA-11/2	1.53.4.0005	6.35.7.0000	6.35.4.0265
VEE-200L-T4.40	1.42.2.0022	VF-11/4B	1.53.2.0004	WA-11/2	1.53.4.0005	6.35.7.0002	6.35.4.0266

* *motor protection switch with housing for 400V, 50Hz*

** *vacuum generator is switched on and off depending on vacuum level (energy saving module).*

Vacuum Pumps
Vacuum energy unit with oilless pump VEE ... T
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Technical data

Type	Vacuum (mbar)	Volumen (l)	Suction volume (m³/h)		Suction volume (l/s)		Rotation speed (1/min)		Weight (kg)	Noise level dB (A)*
			50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz		
VEE-15L-T4.8	-850	15	8,0	9,1	2,22	2,53	2800	3150	30	58
VEE-15L-T4.16	-850	15	16	19	4,45	5,28	1420	1700	42	61
VEE-50L-T4.8	-850	50	8,0	9,1	2,22	2,53	2800	3150	48	58
VEE-50L-T4.16	-850	50	16	19	4,45	5,28	1420	1700	60	61
VEE-50L-T4.25	-850	50	25	30	6,95	8,34	1420	1700	64	62
VEE-100L-T4.16	-850	100	16	19	4,45	5,28	1420	1700	75	61
VEE-100L-T4.25	-850	100	25	30	6,95	8,34	1420	1700	80	62
VEE-100L-T4.40	-850	100	40	48	11,1	13,3	1420	1700	93	67
VEE-200L-T4.25	-850	200	25	30	6,95	8,34	1420	1700	122	62
VEE-200L-T4.40	-850	200	40	48	11,1	13,3	1420	1700	135	67

* *Angaben at 50 Hz*

Electrical data

Type	Power (kW)		Voltage (V)		Current consumption (A)		Safety category	Efficiency category
	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz		
VEE-15L-T4.8	0,37	0,44	175-260/300-450	202-300/350-520	2,35/1,35	2,4/1,4	IP54	IE1
VEE-15L-T4.16	0,55	0,70	175-260/300-450	202-300/350-520	3,8/2,25	3,9/2,25	IP54	IE1
VEE-50L-T4.8	0,37	0,44	175-260/300-450	202-300/350-520	2,35/1,35	2,4/1,4	IP54	IE1
VEE-50L-T4.16	0,55	0,70	175-260/300-450	202-300/350-520	3,8/2,25	3,9/2,25	IP54	IE1
VEE-50L-T4.25	0,75	0,90	190-255/330-440	190-290/330-500	6,0/3,5	6,0/3,5	IP54	IE1
VEE-100L-T4.16	0,55	0,70	175-260/300-450	202-300/350-520	3,8/2,25	3,9/2,25	IP54	IE1
VEE-100L-T4.25	0,75	0,90	190-255/330-440	190-290/330-500	6,0/3,5	6,0/3,5	IP54	IE1
VEE-100L-T4.40	1,25	1,50	190-255/330-440	190-290/330-500	6,9/4,0	6,9/4,0	IP54	IE1
VEE-200L-T4.25	0,75	0,90	190-255/330-440	190-290/330-500	6,0/3,5	6,0/3,5	IP54	IE1
VEE-200L-T4.40	1,25	1,50	190-255/330-440	190-290/330-500	6,9/4,0	6,9/4,0	IP54	IE1

Vacuum Pumps

Vacuum energy unit with oilless pump VEE ... T

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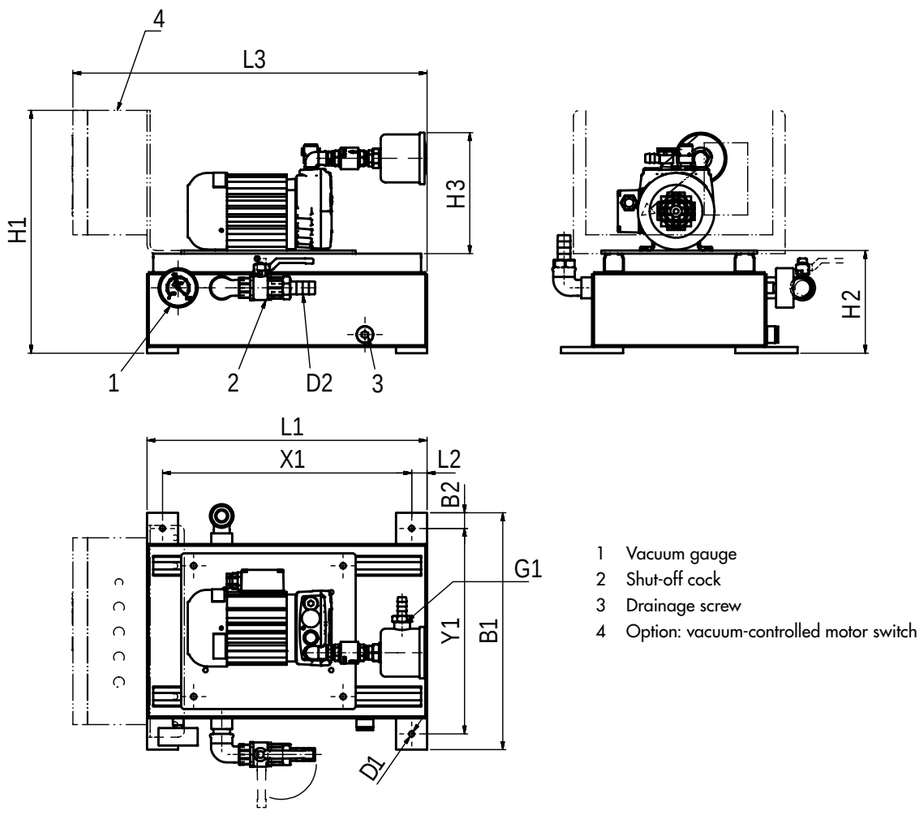

1 Vacuum gauge
2 Shut-off cock
3 Drainage screw
4 Option: vacuum-controlled motor switch

VEE-15L-T4.4 ... VEE-200L-T4.40

Vacuum Pumps

Vacuum energy unit with oilless pump VEE ... T

FEZER
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Dimensions

Type	L1	L2	L3	B1	B2	H1	H2	H3	D1	D2	X1	Y1
VEE-15L-T4.8	450	25	570	380	25	360	158	170	8,5	3/4"	400	330
VEE-15L-T4.16	450	25	570	380	25	360	158	215	8,5	3/4"	400	330
VEE-50L-T4.8	700	25	820	500	25	420	220	170	8,5	1"	650	450
VEE-50L-T4.16	700	25	820	500	25	420	220	215	8,5	1"	650	450
VEE-50L-T4.25	700	25	820	500	25	420	220	290	8,5	1"	650	450
VEE-100L-T4.16	700	25	820	600	25	520	320	215	8,5	38	650	550
VEE-100L-T4.25	700	25	820	600	25	520	320	290	8,5	38	650	550
VEE-100L-T4.40	700	25	820	600	25	520	320	290	8,5	38	650	550
VEE-200L-T4.25	1000	25	1120	800	25	540	338	290	11	38	950	750
VEE-200L-T4.40	1000	25	1120	800	25	540	338	290	11	38	950	750

Vacuum Pumps

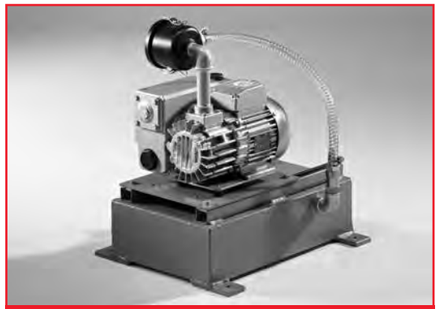
Vacuum energy unit with oil-lubricated pump VEE ... 0

FEZER
Simply move more.

Description
The vacuum energy unit is wired ready-for-connection and consists of a vacuum tank with mounted oil-lubricated vacuum pump with integrated filter, non-return valve, additional vacuum filter, vacuum gauge and a 2/2-ways shut-off cock.

Options
- additional vacuum filter and water separator
- motor protection switch, vacuum-controlled motor switch
- other voltages on request

Application
- roboter applications and linear axles
- central vacuum supply for several work stations
- applications with extremely short cycle times



VEE-15L-016 ... VEE-200L-0160

Article number

Type		Additional vacuum filter		Additional water separator		Motor prot. switch*	Vacuum-controlled motor switch**
VEE-15L-010.1	1.42.1.0008	VF-3/4	1.53.2.0006	WA-3/4	1.53.4.0002	6.35.7.0003	6.35.4.0272
VEE-50L-016.1	1.42.1.0018	VF-1	1.53.2.0014	WA-1	1.53.4.0006	6.35.7.0004	6.35.4.0273
VEE-50L-025.3EURO	1.42.1.0019	VF-1	1.53.2.0014	WA-1	1.53.4.0006	6.35.7.0000	6.35.4.0274
VEE-50L-025.3MULTI	1.42.1.0043	VF-1	1.53.2.0014	WA-1	1.53.4.0006	6.35.7.0000	6.35.4.0274
VEE-100L-025.3EURO	1.42.1.0004	VF-11/4A	1.53.2.0003	WA-11/4	1.53.4.0004	6.35.7.0000	6.35.4.0274
VEE-100L-025.3MULTI	1.42.1.0052	VF-11/4A	1.53.2.0003	WA-11/4	1.53.4.0004	6.35.7.0000	6.35.4.0274
VEE-100L-040.3EURO	1.42.1.0005	VF-11/4A	1.53.2.0003	WA-11/4	1.53.4.0004	6.35.7.0000	6.35.4.0275
VEE-100L-040.3MULTI	1.42.1.0071	VF-11/4A	1.53.2.0003	WA-11/4	1.53.4.0004	6.35.7.0000	6.35.4.0275
VEE-100L-063.3EURO	1.42.1.0006	VF-11/4A	1.53.2.0003	WA-11/4	1.53.4.0004	6.35.7.0001	6.35.4.0276
VEE-100L-063.3MULTI	1.42.1.0074	VF-11/4A	1.53.2.0003	WA-11/4	1.53.4.0004	6.35.7.0001	6.35.4.0276
VEE-100L-0100.3EURO	1.42.1.0001	VF-11/4A	1.53.2.0003	WA-11/4	1.53.4.0004	6.35.7.0001	6.35.4.0277
VEE-100L-0100.3MULTI	1.42.1.0077	VF-11/4A	1.53.2.0003	WA-11/4	1.53.4.0004	6.35.7.0001	6.35.4.0277
VEE-200L-040.3EURO	1.42.1.0015	VF-11/4B	1.53.2.0004	WA-11/2	1.53.4.0005	6.35.7.0000	6.35.4.0275
VEE-200L-040.3MULTI	1.42.1.0085	VF-11/4B	1.53.2.0004	WA-11/2	1.53.4.0005	6.35.7.0000	6.35.4.0275
VEE-200L-063.3EURO	1.42.1.0016	VF-11/4B	1.53.2.0004	WA-11/2	1.53.4.0005	6.35.7.0001	6.35.4.0276
VEE-200L-063.3MULTI	1.42.1.0088	VF-11/4B	1.53.2.0004	WA-11/2	1.53.4.0005	6.35.7.0001	6.35.4.0276
VEE-200L-0100.3EURO	1.42.1.0010	VF-11/4B	1.53.2.0004	WA-11/2	1.53.4.0005	6.35.7.0001	6.35.4.0277
VEE-200L-0100.3MULTI	1.42.1.0091	VF-11/4B	1.53.2.0004	WA-11/2	1.53.4.0005	6.35.7.0001	6.35.4.0277
VEE-200L-0160.3EURO	1.42.1.0012	VF-11/4B	1.53.2.0004	WA-11/2	1.53.4.0005	6.35.7.0002	6.35.4.0278
VEE-200L-0160.3MULTI	1.42.1.0094	VF-11/4B	1.53.2.0004	WA-11/2	1.53.4.0005	6.35.7.0002	6.35.4.0278

* *motor protection switch with housing for 400V, 50Hz*

** *vacuum generator is switched on and off depending on vacuum level (energy saving module).*

Vacuum Pumps
Vacuum energy unit with oil-lubricated pump VEE ... 0
FEZER
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Technical data

Type	Vacuum (mbar)	Volumen (l)	Suction volume (m³/h) 50 Hz	Suction volume (m³/h) 60 Hz	Suction volume (l/s) 50 Hz	Suction volume (l/s) 60 Hz	Rotation speed (1/min) 50 Hz	Rotation speed (1/min) 60 Hz	Oil q'ty (l)	Weight (kg)	Noise level dB (A)*
VEE-15L-010.1	-980	15	10	12	2,77	3,33	2800	3400	0,5	36	59
VEE-50L-016.1	-980	50	16	19	4,44	5,28	2700	3280	0,5	54	60
VEE-50L-025.3EURO	-980	50	25	---	6,94	---	1410	---	1,0	74	62
VEE-50L-025.3MULTI	-980	50	25	30	6,94	8,33	1435	1750	1,0	74	62
VEE-100L-025.3EURO	-980	50	25	---	6,94	---	1410	---	1,0	90	62
VEE-100L-025.3MULTI	-980	50	25	30	6,94	8,33	1435	1750	1,0	90	62
VEE-100L-040.3EURO	-980	100	40	---	11,11	---	1420	---	1,0	92	64
VEE-100L-040.3MULTI	-980	100	40	48	11,11	13,33	1440	1730	1,0	92	64
VEE-100L-063.3EURO	-980	100	63	---	17,50	---	1425	---	2,0	107	65
VEE-100L-063.3MULTI	-980	100	63	76	17,50	21,11	1450	1740	2,0	107	65
VEE-100L-0100.3EURO	-980	100	100	---	27,78	---	1445	---	2,0	126	67
VEE-100L-0100.3MULTI	-980	100	100	120	27,78	33,33	1450	1740	2,0	126	67
VEE-200L-040.3EURO	-980	200	40	---	11,11	---	1420	---	1,0	133	64
VEE-200L-040.3MULTI	-980	200	40	48	11,11	13,33	1440	1730	1,0	133	64
VEE-200L-063.3EURO	-980	200	63	---	17,50	---	1425	---	2,0	150	65
VEE-200L-063.3MULTI	-980	200	63	76	17,50	21,11	1450	1740	2,0	150	65
VEE-200L-0100.3EURO	-980	200	100	---	27,78	---	1445	---	2,0	170	67
VEE-200L-0100.3MULTI	-980	200	100	120	27,78	33,33	1450	1740	2,0	170	67
VEE-200L-0160.3EURO	-980	200	160	---	44,44	---	1460	---	6,0	230	70
VEE-200L-0160.3MULTI	-980	200	160	190	44,44	52,77	1475	1765	6,0	230	70

** Specification at 50 Hz*

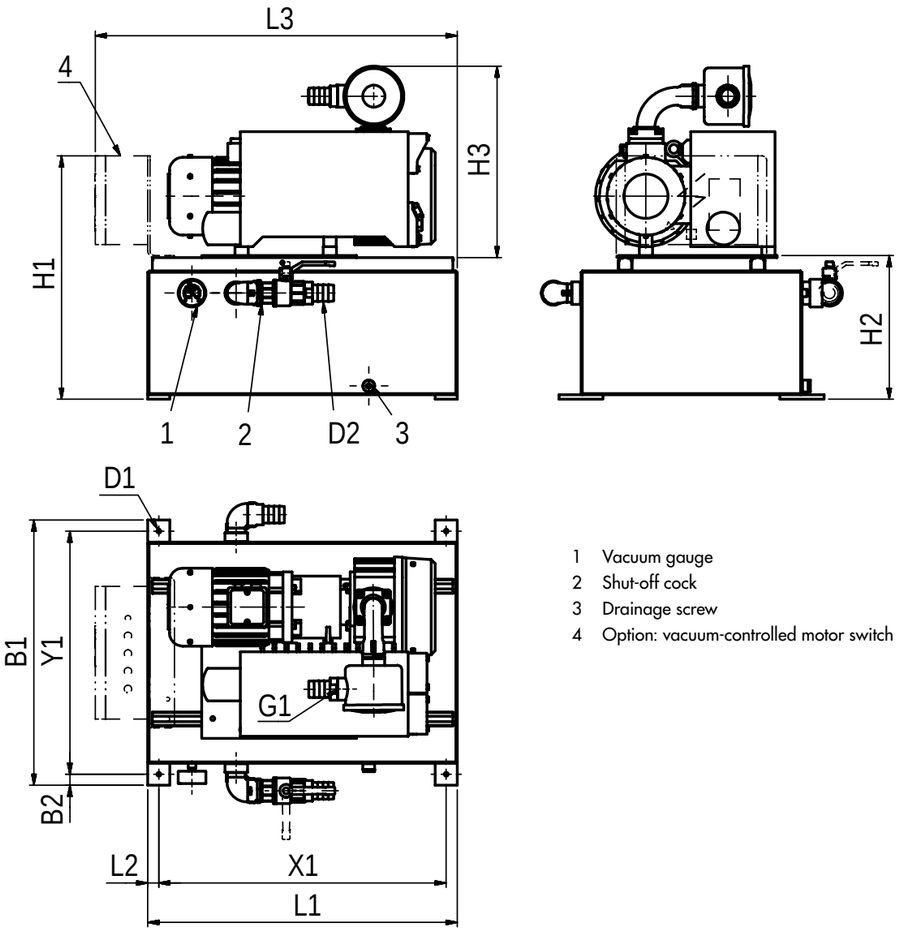
Electrical data

Type	Power (kW) 50 Hz	Power (kW) 60 Hz	Voltage (V) 50 Hz	Voltage (V) 60 Hz	Current consumption (A) 50 Hz	Current consumption (A) 60 Hz	Safety category	Efficiency category
VEE-15L-010.1	0,37	0,45	200-240/346-415	200-277/346-480	2,1/1,2	1,9/1,1	IP54	IE1
VEE-50L-016.1	0,55	0,65	200-240/345-420	200-277/346-480	2,6/1,5	2,6/1,5	IP54	IE1
VEE- ... -025.3EURO	0,75	---	200-240/345-420	---	3,2/1,9	---	IP54	IE2
VEE- ... -025.3MULTI	1,1	1,2	190-208/380-415	220-230/440-460	4,8/2,4	4,8/2,4	IP54	IE2
VEE- ... -040.3EURO	1,1	---	200-240/345-420	---	4,6/2,7	---	IP54	IE2
VEE- ... -040.3MULTI	1,5	1,7	190-208/380-415	220-230/440-460	7,0/3,5	6,6/3,3	IP54	IE2
VEE- ... -063.3EURO	1,5	---	200-240/345-420	---	5,8/3,3	---	IP54	IE2
VEE- ... -063.3MULTI	2,0	2,4	190-208/380-415	220-230/440-460	9,4/4,7	9,4/4,7	IP54	IE2
VEE- ... -0100.3EURO	2,2	---	200-240/345-420	---	8,6/5,0	---	IP54	IE2
VEE- ... -0100.3MULTI	2,7	3,4	190-208/380-415	220-230/440-460	11,8/5,9	12,4/6,2	IP54	IE2
VEE- ... -0160.3EURO	4,0	---	200-240/345-420	---	13,5/8,0	---	IP54	IE2
VEE- ... -0160.3MULTI	5,5	6,6	190-208/380-415	220-230/440-460	24,4/12,2	23,8/11,9	IP54	IE2

Vacuum Pumps

Vacuum energy unit with oil-lubricated pump VEE ... 0

FEZER
Simply move more.



1 Vacuum gauge
2 Shut-off cock
3 Drainage screw
4 Option: vacuum-controlled motor switch

VEE-15L-016 ... VEE-200L-0160

Vacuum Pumps

Vacuum energy unit with oil-lubricated pump VEE ... 0

FEZER
Simply move more.

Dimensions

Type	L1	L2	L3	B1	B2	H1	H2	H3	D1	D2	X1	Y1
VEE-15L-010.1	450	25	570	380	25	360	158	360	8,5	3/4"	400	330
VEE-50L-016.1	450	25	570	380	25	360	158	360	8,5	3/4"	400	330
VEE-50L-025.3EURO	450	25	570	380	25	360	158	471	8,5	3/4"	400	330
VEE-50L-025.3MULTI	450	25	570	380	25	360	158	471	8,5	3/4"	400	330
VEE-100L-025.3EURO	700	25	820	500	25	420	220	471	8,5	1"	650	450
VEE-100L-025.3MULTI	700	25	820	500	25	420	220	471	8,5	1"	650	450
VEE-100L-040.3EURO	700	25	820	500	25	420	220	471	8,5	1"	650	450
VEE-100L-040.3MULTI	700	25	820	500	25	420	220	471	8,5	1"	650	450
VEE-100L-063.3EURO	700	25	820	500	25	420	220	482	8,5	1"	650	450
VEE-100L-063.3MULTI	700	25	820	500	25	420	220	482	8,5	1"	650	450
VEE-100L-0100.3EURO	700	25	820	600	25	520	320	482	8,5	38	650	550
VEE-100L-0100.3MULTI	700	25	820	600	25	520	320	482	8,5	38	650	550
VEE-200L-040.3EURO	700	25	820	600	25	520	320	471	8,5	38	650	550
VEE-200L-040.3MULTI	700	25	820	600	25	520	320	471	8,5	38	650	550
VEE-200L-063.3EURO	700	25	820	600	25	520	320	482	8,5	38	650	550
VEE-200L-063.3MULTI	700	25	820	600	25	520	320	482	8,5	38	650	550
VEE-200L-0100.3EURO	1000	25	1120	800	25	540	338	482	11	38	950	750
VEE-200L-0100.3MULTI	1000	25	1120	800	25	540	338	482	11	38	950	750
VEE-200L-0160.3EURO	1000	25	1120	800	25	540	338	615	11	38	950	750
VEE-200L-0160.3MULTI	1000	25	1120	800	25	540	338	615	11	38	950	750

Vacuum Blowers

directly driven SKV

FEZER
Simply move more.

Description

Directly driven, air-cooled vacuum blower made of solid aluminum diecast housing and precision carrying wheel. The contact-free run of the carrying wheel guarantees a low-wear and low-maintenance operation of the blower. Depending on the type the blowers are available in one-stage or double-stage design.

Application

- handling of highly porous workpieces like chipboards, MDF-board, cardboard boxes etc.
- control of the vacuum by reversing valve UV
- any mounting position

SKV- ...

Article number

Type		suitable vacuum filter		Motor protection switch*
SKV-100/2-1,5kW	1.43.1.0034	VF-11/4A	1.53.2.0003	6.35.7.0002
SKV-160/2-3,0kW	1.43.1.0035	VF-11/4B	1.53.2.0004	6.35.7.0005
SKV-180/1-2,0kW	1.43.1.0036	SFS-50	4.26.4.0121	6.35.7.0002
SKV-240/2-3,0kW	1.43.1.0037	SFS-50	4.26.4.0121	6.35.7.0005
SKV-290/1-3,0kW	1.43.1.0038	SFS-50	4.26.4.0121	6.35.7.0005
SKV-350/2-9,0kW	1.43.1.0039	SFS-50	4.26.4.0121	6.35.7.0018
SKV-470/1-5,5kW	1.43.1.0040	SFS-50	4.26.4.0121	6.35.7.0005
SKV-720/1-9,0kW	1.43.1.0041	SFS-50	4.26.4.0121	6.35.7.0018

** motor protection switch for 400V, 50Hz*

Vacuum Blowers

directly driven SKV

FEZER
Simply move more.

Technical data

Type	Vacuum (mbar)		Suction volume (m³/h)		Suction volume (l/s)		Rotation speed (1/min)		Weight (kg)	Noise level dB (A) *
	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz		
SKV-100/2-1,5kW	-375	-375	98	117	27	32	2900	3400	32	68
SKV-160/2-3,0kW	-400	-400	162	189	45	52	2900	3400	40	76
SKV-180/1-2,0kW	-250	-280	181	217	50	60	2900	3400	32	69
SKV-240/2-3,0kW	-325	-300	240	290	67	81	2900	3400	40	76
SKV-290/1-3,0kW	-275	-270	293	338	81	94	2900	3400	49	74
SKV-350/2-9,0kW	-400	-400	355	435	98	121	2900	3400	115	71
SKV-470/1-5,5kW	-300	-270	472	485	13	135	2900	3400	95	74
SKV-720/1-9,0kW	-285	-265	720	895	200	248	2900	3400	110	75

** at 50 Hz*

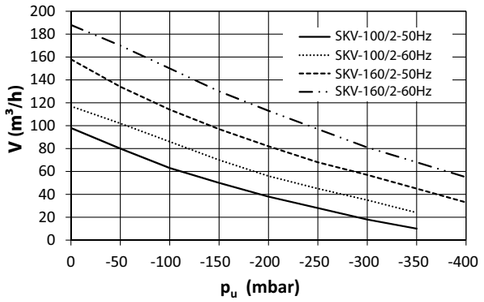
Electrical data

Type	Power (kW)		Voltage (V)		Current consumption (A)		Safety category	Efficiency category
	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz		
SKV-100/2-1,5kW	1,5	1,8	190-255/330-440	190-290/330-500	6,0-7,0/3,5-4,0	7,5-6,1/4,3-3,5	IP55	IE1
SKV-160/2-3,0kW	3,0	3,6	230/400 +/-10%	230/400 +/-10%	12,5/7,2	12,5/7,2	IP55	IE1
SKV-180/1-2,0kW	2,0	2,4	190-255/330-440	190-290/330-500	8,0-8,5/4,6-4,9	9,7-7,8/5,6-4,5	IP55	IE1
SKV-240/2-3,0kW	3,0	3,6	190-255/330-440	190-290/330-500	12,5/7,2	12,5/7,2	IP55	IE1
SKV-290/1-3,0kW	3,0	3,6	230/400 +/-10%	230/400 +/-10%	12,5/7,2	12,5/7,2	IP55	IE1
SKV-350/2-9,0kW	9,0	9,0	400/690 +/-10%	400/690 +/-10%	16,4/9,5	16,0/9,2	IP55	IE2
SKV-470/1-5,5kW	5,5	6,4	400/690 +/-10%	400/690 +/-10%	10,4/6,0	11,5/6,6	IP55	IE2
SKV-720/1-9,0kW	9,0	9,0	400/690 +/-10%	400/690 +/-10%	16,4/9,5	16,0/9,2	IP55	IE2

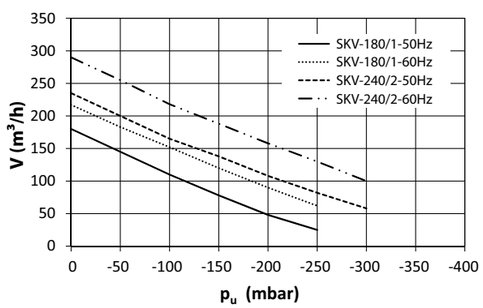
Vacuum Blowers

directly driven SKV

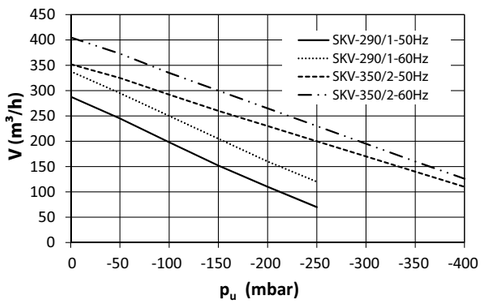
FEZER
Simply move more.



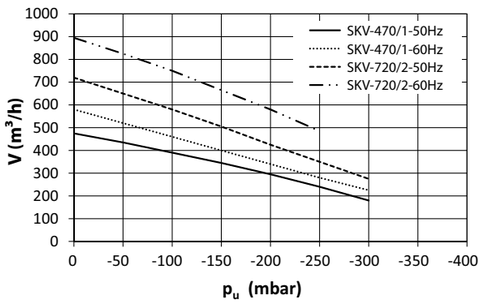
Suction capacity SKV-100 ... SKV-160 in dependance to evacuation grade



Suction capacity SKV-180 ... SKV-240 in dependance to evacuation grade



Suction capacity SKV-290 ... SKV-350 in dependance to evacuation grade

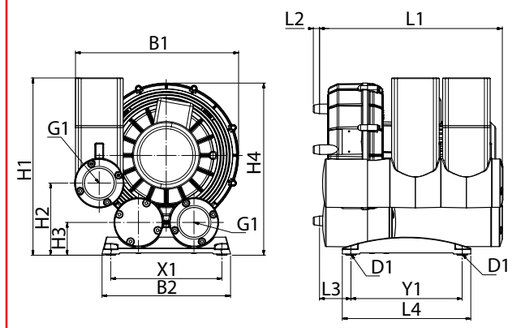


Suction capacity SKVD-470 ... SKVD-720 in dependance to evacuation grade

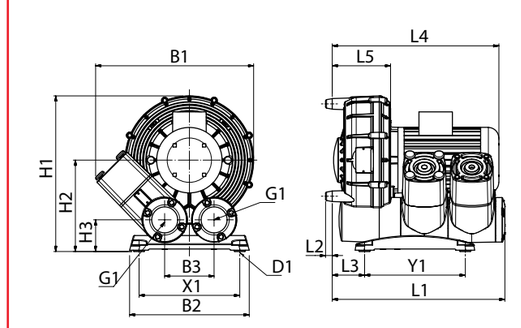
Vacuum Blowers

directly driven SKV

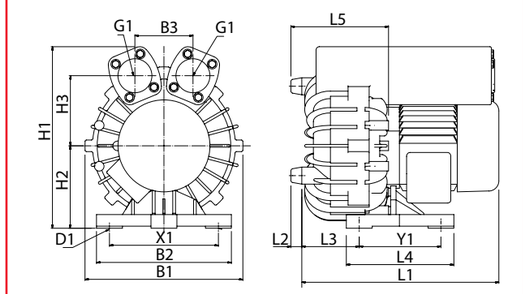
FEZER
Simply move more.



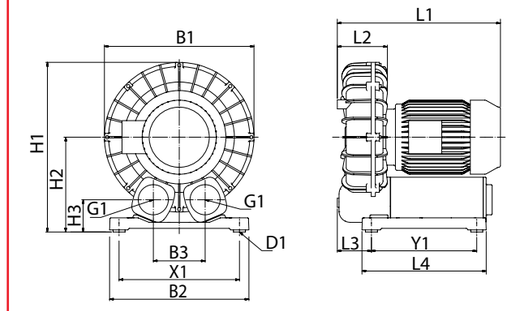
SKV-100-, SKV-160-, SKV-240-



SKV-180-, SKV-290-



SKV-350-



SKV-470-, SKV-720-

Dimensions

Type	L1	L2	L3	L4	L5	B1	B2	B3	H1	H2	H3	H4	D1	G1	X1	Y1
SKV-100/2-1,5kW	413	16	77	285	---	349	285	---	402	148	72	371	11	G11/4	240	240
SKV-160/2-3,0kW	464	16	70	335	---	420	335	---	449	196	90	449	12	G21/2	290	290
SKV-180/1-2,0kW	412	16	77	397	139	377	285	118	371	218	76	---	12	G2	240	240
SKV-240/2-3,0kW	497	16	82	335	---	420	335	---	449	195	92	---	12	G21/2	290	290
SKV-290/1-3,0kW	464	16	70	335	142	498	335	---	449	261	86	---	12	G21/2	290	290
SKV-350/2-9,0kW	657	16	141	410	207	497	460	339	666	348	199	---	M8	G4	400	350
SKV-470/1-5,5kW	515	16	114	480	167	497	460	172	515	282	74	---	M8	G3	400	350
SKV-720/1-9,0kW	515	16	149	560	207	497	460	184	666	315	93	---	M8	G4	400	350

Vacuum Blowers

with fly-wheel SD

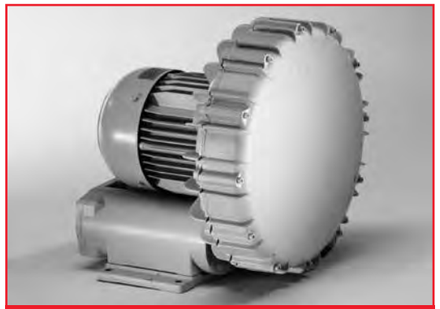
FEZER
Simply move more.

Description

Directly driven vacuum blower with solid diecast housing and closed grooved ball bearing with life-time lubrication. The blower is equipped with a fly-wheel which guarantees an increased deceleration. Ribs on the housing and cover allow a very good heat conduction. As a standard with mounted silencer to reduce the noise level.

Application

- handling of highly porous workpieces like chipboards, MDF-board, cardboard boxes etc.
- use for manual handling devicers. The fly-wheel guarantees an increased rotation time in case of a power failure(DIN EN 13155)
- control of the vacuum by reversing valve
- any mounting position



SD- ...

Article number

Type		suitable vacuum filter		Motor protection switch*
SD-4-170-230/400V-1,1kW	1.43.1.0010	VF-2 1/2	1.53.2.0005	6.35.7.0001
SD-400-170-230/400V-1,5kW	1.43.1.0028	VF-2 1/2	1.53.2.0005	6.35.7.0001
SD-6-280-230/400V-2,3kW	1.43.1.0013	VF-2 1/2	1.53.2.0005	6.35.7.0002

** motor protection switch with housing for 400V, 50Hz*

Vacuum Blowers
with fly-wheel SD
FEZER
Simply move more.

Technical data

Type	Vacuum (mbar)	Suction volume (m³/h) 50 Hz	Suction volume (m³/h) 60 Hz	Suction volume (l/s) 50 Hz	Suction volume (l/s) 60 Hz	Rotation speed (1/min) 50 Hz	Rotation speed (1/min) 60 Hz	Weight (kg)	Noise level dB (A)*
SD-4-170-230/400V-1,1kW	-185	168	204	46,7	56,7	2830	3400	22	76
SD-400-170-230/400V-1,5kW	-260	168	204	46,7	55,7	2840	3450	23	76
SD-6-280-230/400V-2,3kW	-230	276	324	76,7	90,0	2870	3480	33	78

** at 50 Hz*

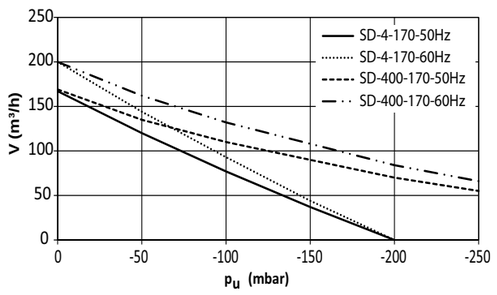
Electrical data

Type	Power (kW) 50 Hz	Power (kW) 60 Hz	Voltage (V) 50 Hz	Voltage (V) 60 Hz	Current consumption (A) 50 Hz	Current consumption (A) 60 Hz	Safety category	Efficiency category
SD-4-170-230/400V-1,1kW	1,1	1,32	230/400	277/480	4,00/2,30	3,75/2,15	IP 54	IE2
SD-400-170-230/400V-1,5kW	1,5	1,8	230/400	277/480	5,20/3,00	5,30/3,05	IP 54	IE2
SD-6-280-230/400V-2,3kW	2,3	2,74	230/400	277/480	7,55/4,35	7,7/4,45	IP 54	IE2

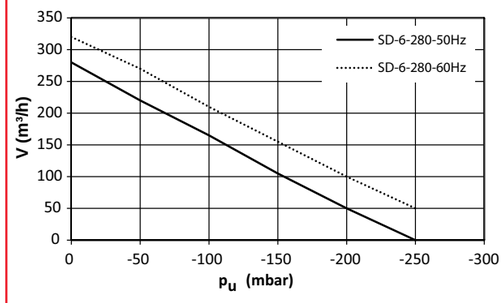
Vacuum Blowers

with fly-wheel SD

FEZER
Simply move more.



Suction capacity SD-4/400 in dependance to evacuation grade

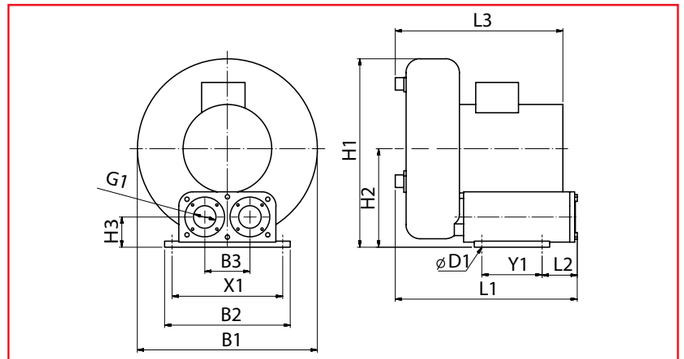


Suction capacity SD-6 in dependance to evacuation grade

Vacuum Blowers

with fly-wheel SD

FEZER
Simply move more.



SD- ...

Dimensions

Type	L1	L2	L3	B1	B2	B3	H1	H2	H3	D1	G1	X1	Y1
SD4-170-230/400V-1,1kW	358	66	332	358	220	90	375	196	60	11	G11/2	220	120
SD-400-170-230/400V-1,5kW	358	66	332	358	220	90	375	196	60	11	G11/2	220	120
SD-6-280-230/400V-2,3kW	435	72	383	396	350	125	423	225	80	13	G2	310	160

Blowers

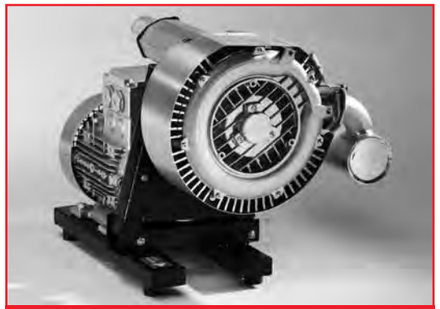
belt-driven SKE

FEZER
Simply move more.

Description
Belt-driven vacuum blower with solid diecast housing and closed grooved bearing and lifetime lubrication. Ribs on the housing and cover allow a very good heat conduction, which supports the motor airflow.

As a standard with mounted silencers to reduce the noise level. Additionally a silencer box can be added, which makes a noise reduction to ca. 65 dB(A) possible.

Application
- handling of very porous workpieces like chipboards, MDF-board, cardboard boxes etc.
- to be used with tube lifters
- requires stable, horizontal installation position



SKE- ...

Article number

Type		suitable Vacuum filter		Motor protection switch*
SKE-0080-230/400V-2,2kW	4.26.3.0008	SFS-50	4.26.4.0121	6.35.7.0002
SKE-0080-230/400V-3,0kW	4.26.3.0043	SFS-50	4.26.4.0121	6.35.7.0005
SKE-0120-230/400V-4,0kW	4.26.3.0010	SFS-50	4.26.4.0121	6.35.7.0005

** Motor protection switch with housing for 400V, 50Hz*

Blowers
belt-driven SKE
FEZER
Simply move more.

Technical data

Type	Vacuum (mbar)	Suction volume (m³/h) 50 Hz	Suction volume (m³/h) 60 Hz	Suction volume (l/s) 50 Hz	Suction volume (l/s) 60 Hz	Rotation speed (1/min) 50 Hz	Rotation speed (1/min) 60 Hz	Weight (kg)	Noise level dB (A)*
SKE-0080-230/400V-2,2kW	-500	168	---	46,67	---	2890	---	42	79
SKE-0080-230/400V-3,0kW	-500	190	---	46,67	---	2905	---	46	79
SKE-0120-230/400V-4,0kW	-500	288	---	80,00	---	2950	---	50	83

** at 50 Hz*

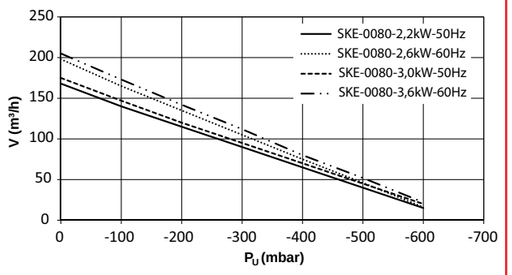
Electrical data

Type	Power (kW) 50 Hz	Power (kW) 60 Hz	Voltage (V) 50 Hz	Voltage (V) 60 Hz	Current consumption (A) 50 Hz	Current consumption (A) 60 Hz	Safety category	Efficiency category
SKE-0080-230/400V-2,2kW	2,2	---	230/400 +/-10%	---	7,6/4,4	---	IP55	IE2
SKE-0080-230/400V-3,0kW	3,0	---	230/400 +/-10%	---	10,6/6,1	---	IP55	IE2
SKE-0120-230/400V-4,0kW	4,0	---	230/400 +/-10%	---	13,6/7,8	---	IP55	IE2

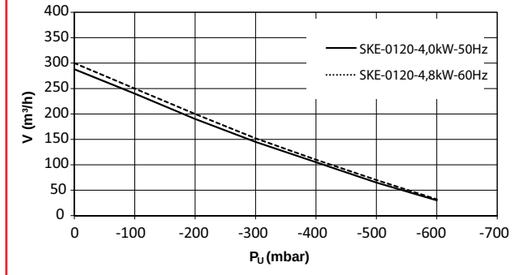
Blowers

belt-driven SKE

FEZER
Simply move more.



Suction capacity SKE-080 in dependance to evacuation grade

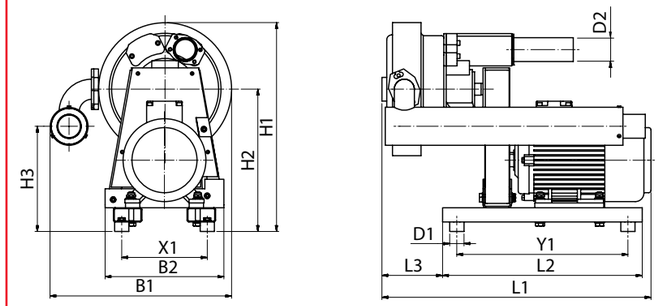


Suction capacity SKE-0120 in in dependance to evacuation grade

Blowers

belt-driven SKE

FEZER
Simply move more.



SKE- ...

Dimensions

Type	L1	L2	L3	B1	B2	H1	H2	H3	D1	D2	X1	Y1
SKE-0080-230/400V-2,2kW	566	420	125	382	250	440	300	221	30	50	180	360
SKE-0080-230/400V-3,0kW	620	420	125	382	250	440	300	221	30	50	180	360
SKE-0120-230/400V-4,0kW	650	420	125	382	250	470	300	221	30	50	180	360

FEZER
Simply move more.

Blowers

Silencer box SDB

Description
Silencer box made of laminated plastic and glued-in insulation material for belt-driven blowers (SKE- ...).
The silencer box reduces the noise level by ca. 8 - 10 db(A)

Application:
- environments with low noise level requirements

SKVR- ...

Article number

Type	Article number
SDB-SKVR-170	4.26.3.0031
SDB-SKVR-280	4.26.3.0032

Technical data

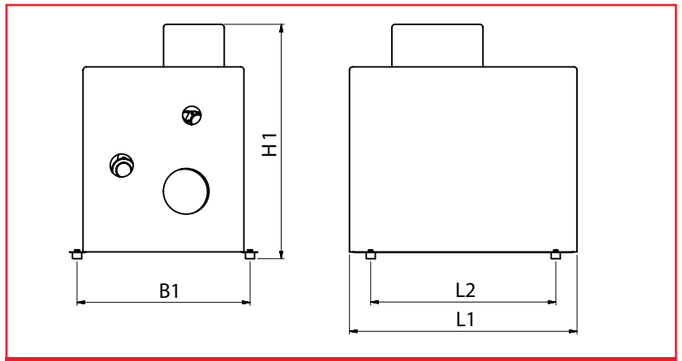
Type	Weight (kg)	Noise level reduction dB (A) *
SDB-SKVR-170	21,0	- 10
SDB-SKVR-280	21,0	- 8

** at 50 Hz operational frequency*

FEZER
Simply move more.

Blowers

Silencer box SDB



SKVR- ...

Dimensions

Type	L1	L2	B1	H1
SDB-SKVR-170	750	610	570	772
SDB-SKVR-280	750	610	570	772

Acessories for Vacuum Pumps and Blowers

FEZER
Simply move more.

Motor protection switch MSS

Description
Motor protection switch with housing protect the vacuum generator from too a current consumption.
The motor protection switches are available in normal and lockable design, to ensure against unintentional switch-on during maintanence.

Application
- to protect pumps and blowers from damages

MSS ...

Article number

Type	normal design	lockable design
MSS-0,63-1	6.35.7.0007	6.35.7.0016
MSS-1-1,6	6.35.7.0003	6.35.7.0012
MSS-1,6-2,5	6.35.7.0004	6.35.7.0013
MSS-2,5-4	6.35.7.0000	6.35.7.0009
MSS-4-6,3	6.35.7.0001	6.35.7.0010
MSS-6,3-10	6.35.7.0002	6.35.7.0011
MSS-10-16	6.35.7.0005	6.35.7.0014
MSS-16-20	6.35.7.0018	6.35.7.0019
MSS-20-25	6.35.7.0008	6.35.7.0017

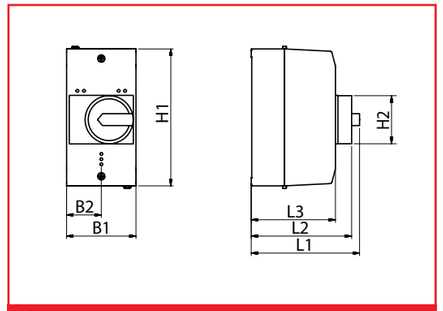
Technical data

Type	Mains voltage (V)	Motor nom. current (A)	Weight (kg)
MSS-0,63-1	400	0,63 - 1,0	0,6
MSS-1-1,6	400	1,0 - 1,6	0,6
MSS-1,6-2,5	400	1,6 - 2,5	0,6
MSS-2,5-4	400	2,5 - 4,0	0,6
MSS-4-6,3	400	4,0 - 6,3	0,6
MSS-6,3-10	400	6,3 - 10	0,6
MSS-10-16	400	10 - 16	0,6
MSS-16-20	400	16 - 20	0,6
MSS-20-25	400	20 - 25	0,6

Zubehör for Vacuum pumps and -gebläse

FEZER
Simply move more.

Motor protection switch MSS



MSS ...

Dimensions

Type	L1	L2	L3	B1	B2	H1	H2
MSS ...	125	116	97	80	40	158	55

Accessories for Vacuum Pumps and Blowers

FEZER
Simply move more.

Vacuum-controlled motor switch VMS

Description
Suitable for vacuum energy units. Via a vacuum switch the vacuum pump is switched on and off - depending on the actual vacuum.

Scope of delivery
Control box with installed motor protection switch, power supply unit (24V DC), contactor and terminal strip, cable (5m), connection cable to pump (5m), connection cable for vacuum switch VSD- 1/8 (2m) and grounding cable (0,5m). Please order the vacuum switch separately.

Application
- in connection with vacuum energy units
- to control vacuum pumps in dependance to vacuum level
- energy conservation as the vacuum generator is only switched on when it is actually required

VMS ...

Article number

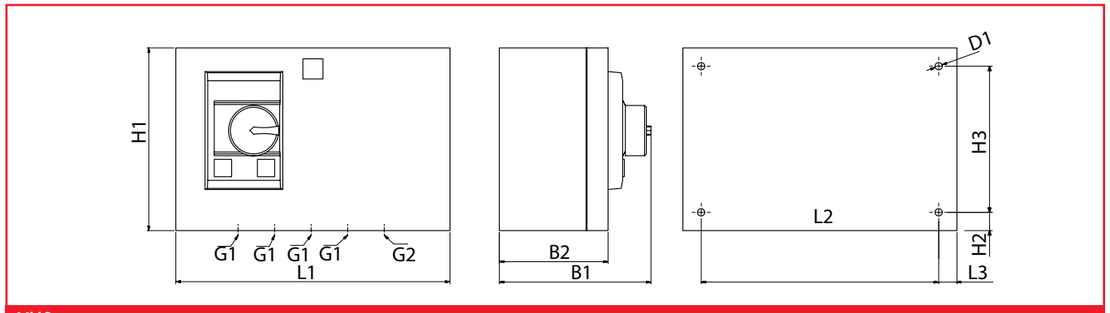
VMS- for oilless pumps		VMS- for oil-lubricated pumps	
VP-TF4.2-24V-0,05kW*	6.35.4.0291	VP-010.1-230/400V	6.35.4.0272
VP-TF4.4-24V-0,17kW*	6.35.4.0292	VP-016.1-230/400V	6.35.4.0273
VP-TF4.6-24V-0,25kW*	6.35.4.0293	VP-025.3EURO-230/400V	6.35.4.0274
VP-T4.8-230V	6.35.4.0290	VP-025.3MULTI-230/400V	6.35.4.0281
VP-T4.8-230/400V	6.35.4.0263	VP-040.3EURO-230/400V	6.35.4.0275
VP-T4.16-230V	6.35.4.0289	VP-040.3MULTI-230/400V	6.35.4.0282
VP-T4.16-230/400V	6.35.4.0264	VP-063.3EURO-230/400V	6.35.4.0276
VP-T4.25-230/400V	6.35.4.0265	VP-063.3MULTI-230/400V	6.35.4.0283
VP-T4.40-230/400V	6.35.4.0266	VP-0100.3EURO-230/400V	6.35.4.0277
VP-T4.50-230/400V	6.35.4.0288	VP-0100.3MULTI-230/400V	6.35.4.0284
VP-T4.60-EURO-230/400V	6.35.4.0267	VP-0160.3EURO-230/400V	6.35.4.0278
VP-T4.80-EURO-230/400V	6.35.4.0268	VP-0160.3MULTI-230/400V	6.35.4.0285
VP-T4.100-EURO-230/400V	6.35.4.0269	VP-0250.3EURO-230/400V	6.35.4.0287
VP-T4.140-EURO-230/400V	6.35.4.0270	VP-0250.3MULTI-230/400V	6.35.4.0286
VP-T4.250-EURO-400/690V	6.35.4.0271		

* w/o motor protection switch

Technical data

Type	Mains voltage (V)	Control voltage (V)	Current range	Weight (kg)
VMS- ... -24V	24	24	2,0 ... 16	4,0
VMS- ... -230V	230	24	1,6 ... 4,6	6,5
VMS- ... -230/400	230/400	24	1,0 ... 31	6,5

Accessories for Vacuum Pumps and Blowers
Vacuum-controlled motor switch VMS
FEZER
Simply move more.



VMS ...

Dimensions

Type	L1	L2	L3	B1	B2	H1	H2	H3	D	G1	G2
VMS ...	300	260	20	166	119	200	20	120	8	M16	M12

Ejectors

Inline ejector FIG

FEZER
Simply move more.

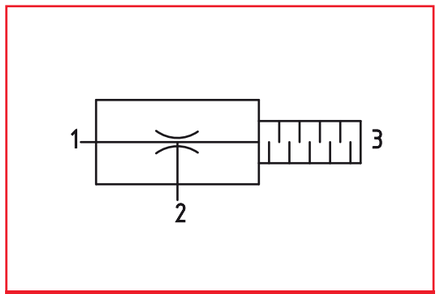
Description
Inline ejector for installation in suspension bolt assembly with compressed air supply. The ejector consists of a stable aluminum body with brass nozzle. Available in 3 different powers.

Application
- for direct installation in suspension bolt
- use in handling systems with different occupancy grades
- evacuation of small volumes
- any mounting position

FIG-05 ... FIG-09

Article number

Type	Article number
FIG-05	1.44.1.0001
FIG-07	1.44.1.0002
FIG-09	1.44.1.0003



Schaltbild FIG

1 Compressed air connection
2 Vacuum connection
3 Exhaust

1. Basics
2. Suction Pads
3. Mounting Elements
4. Vacuum Generators
5. Valve Technology
6. Vakcuum Supervision
7. Filter Elements
8. Connection Elements
9. System Technology

Ejectors

Inline ejector FIG

FEZER
Simply move more.

Technical data

Type	Vacuum*	Suction volume*		Air consumption*		Pressure** (bar)		Noise level*	Temperature	Weight
	(mbar)	(l/s)	(m^3/h)	(l/min)	(m^3/h)	max.	opt.	dB (A)	(°C)	(kg)
FIG-05	-870	0,12	0,03	12	0,20	2 ... 8	5	62	0 ... +60	0,015
FIG-07	-900	0,23	0,06	21	0,35	2 ... 8	5	64	0 ... +60	0,015
FIG-09	-900	0,35	0,1	36	0,60	2 ... 8	5	67	0 ... +60	0,015

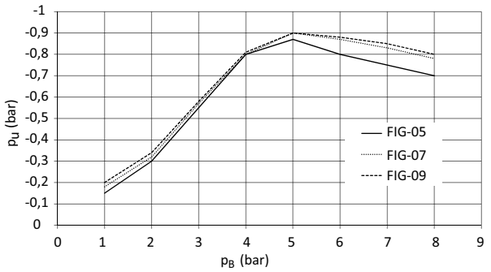
* at optimum operational pressure,
** dry, filtered, oil-free compressed air

Evacuation and ventilation time (s) for 1l volume

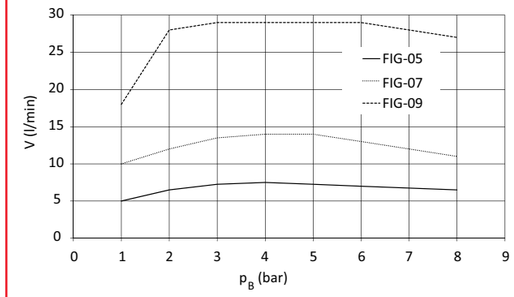
Type	Vacuum level (mbar)								Ventilation time at max. vacuum level
	-100	-200	-300	-400	-500	-600	-700	-800	
FIG-05	0,7	1,5	2,5	3,8	5,6	7,8	12,5	26,8	1,8
FIG-07	0,5	0,9	1,5	2,2	3,3	4,8	7,9	15,8	1,2
FIG-09	0,3	0,5	0,9	1,3	1,9	2,8	4,5	8,8	0,9

Ejectors

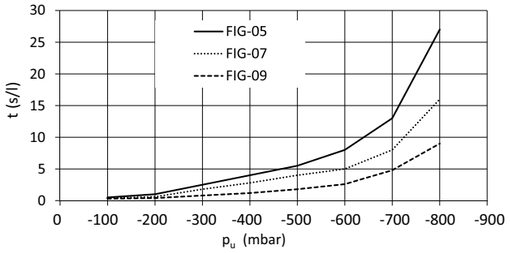
Inline ejector FIG



Vacuum level FIG at different operational pressures



Suction volume FIG at different operational pressures



Evacuation time FIG at different operational pressures

Ejectors

Inline ejector FIG

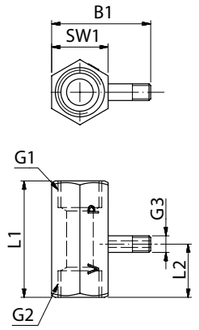


FIG-05 ... FIG-09

Dimensions

Type	L1	L2	B1	G1	G2	G3	SW
FIG-05	35	16	21,3	G1/4	G1/4	M5	17
FIG-07	35	16	21,3	G1/4	G1/4	M5	17
FIG-09	35	16	21,3	G1/4	G1/4	M5	17

Ejectors

Inline ejector FIS

FEZER
Simply move more.

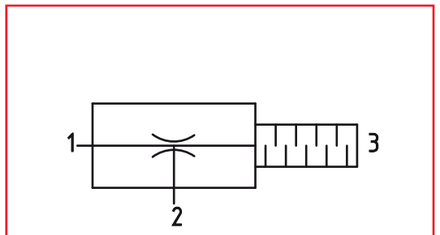
Description
Low-weight inline ejector in stable plastic design for direct installation in hose lines.
Installation with plug connections which allow a simple and quick mounting of the ejectors.

Application
- for direct installation in hose lines
- use in handling systems with different occupancy grades
- evacuation of small volumes
- any mounting position

FIS-05 ... FIS-10

Article number

Type	Article number
FIS-05	1.44.1.0067
FIS-07	1.44.1.0061
FIS-10	1.44.1.0068



Schaltbild FIS

1 Compressed air connection
2 Vacuum connection
3 Exhaust

Ejectors

Inline ejector FIS

FEZER
Simply move more.

Technical data

Type	Vacuum*	Suction volume*		Air consumption*		Pressure** (bar)		Noise level*	Temperature	Weight
	(mbar)	(m^3/h)	(l/s)	(m^3/h)	(l/s)	max.	opt.	dB (A)	(°C)	(kg)
FIS-05	-860	0,37	0,10	0,72	0,19	2 ... 8	5,0	57	0 ... +60	0,005
FIS-07	-860	0,81	0,22	1,66	0,45	2 ... 8	5,0	62	0 ... +60	0,005
FIS-10	-860	1,68	0,47	3,46	0,96	2 ... 8	5,0	71	0 ... +60	0,010

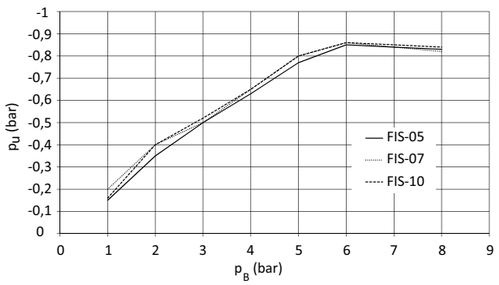
* at optimum pressure
** dry, filtered, oil-free compressed air

Evacuation and ventilation time (s) for 1l volume

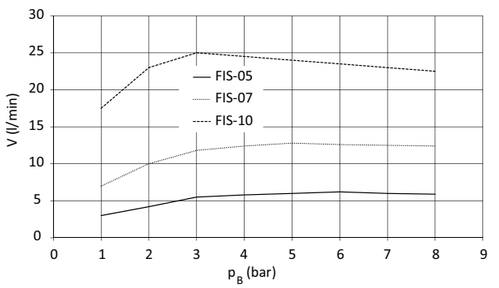
Type	Vacuum level (mbar)								Ventilation time at
	-100	-200	-300	-400	-500	-600	-700	-800	max. vacuum level
FIS-05	1,1	1,5	3,0	4,3	6,0	9,0	12,5	18,4	4,7
FIS-07	1,0	1,1	1,5	2,3	2,9	4,0	6,1	9,3	2,1
FIS-10	0,2	0,4	0,7	1,0	1,4	1,9	2,9	4,7	0,96

Ejectors

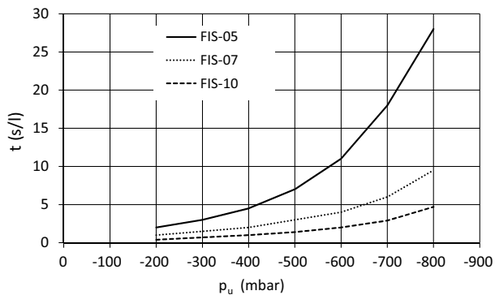
Inline ejector FIS



Vacuum level FIS-HV at different operating pressures



Suction volume FIS-HV at different operating pressures

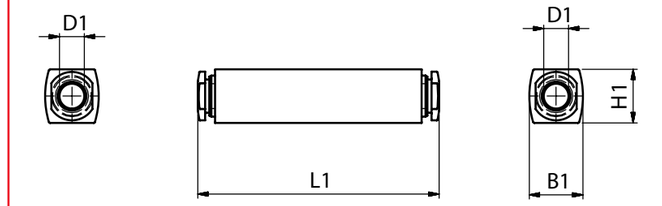


Evacuation time FIS-HV at different grades of evacuation

FEZER
Simply move more.

Ejectors

Inline ejector FIS



FIS-05 ... FIS-10

Dimensions

Type	L1	B1	H1	D1
FIS-05	58,6	13	13	6
FIS-07	58,6	13	13	6
FIS-10	66,1	13	22	6

1. Basics
2. Suction Pads
3. Mounting Elements
4. Vacuum Generators
5. Valve Technology
6. Vakcuum Supervision
7. Filter Elements
8. Connection Elements
9. System Technology

Ejectors

Inline ejector FIM

FEZER
Simply move more.

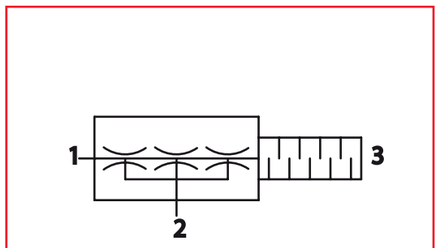
Description
Low-weight multi-stage inline ejector in solid plastic design for direct installation in hose lines. The multi-stage nozzle geometry allows a very quick vacuum with relatively little air consumption. Quick and simple installation of the ejectors by plug connections. There are 3 powers available.

Application
- direct installation in hose lines
- use for handling systems with different occupancy grades
- evacuation of larger volumes
- any mounting position

FIM-10 ... FIM-30

Article number

Type	Article number
FIM-10-HV	1.44.2.0008
FIM-20-HV	1.44.2.0009
FIM-30-HV	1.44.2.0010



Schaltbild FIM

1 Compressed air connection
2 Vacuum connection
3 Exhaust

1. Basics
2. Suction Pads
3. Mounting Elements
4. Vacuum Generators
5. Valve Technology
6. Vakcuum Supervision
7. Filter Elements
8. Connection Elements
9. System Technology

Ejectors

Inline ejector FIM

FEZER
Simply move more.

Technical data

Type	Vacuum*	Suction volume*		Air consumption*		Pressure** (bar)		Noise level*	Temperature	Weight
	(mbar)	(m^3/h)	(l/s)	(m^3/h)	(l/s)	max.	opt.	dB (A)	(°C)	(kg)
FIM-10-HV	-840	1,15	0,32	0,97	0,27	2 ... 8	4,0	64 ... 80	0 ... +60	0,010
FIM-20-HV	-900	2,05	0,57	1,58	0,44	2 ... 8	3,1	69 ... 85	0 ... +60	0,030
FIM-30-HV	-900	9,72	2,70	6,58	1,83	2 ... 8	3,0	90 ... 98	0 ... +60	0,090

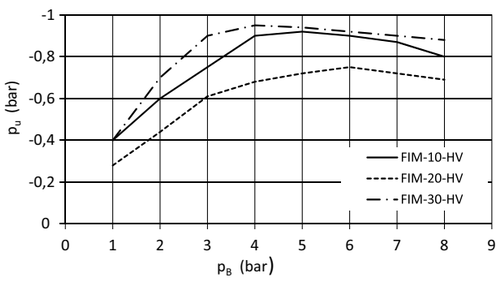
* at optimum pressure
** dry, filtered, oil-free compressed air

Evacuation and ventilation time (s) for 1l volume

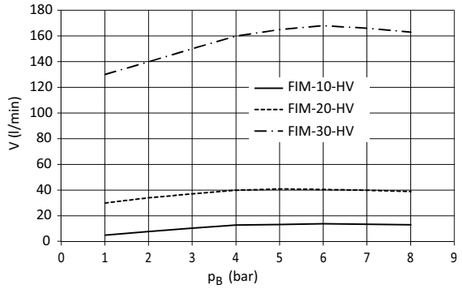
Type	Vacuum level (mbar)								Ventilation time at max. vacuum level
	-100	-200	-300	-400	-500	-600	-700	-800	
FIM-10-HV	0,33	0,73	1,20	2,00	3,10	5,00	8,30	16,60	6,2
FIM-20-HV	0,20	0,46	0,83	1,10	1,80	2,70	4,00	6,40	2,0
FIM-30-HV	0,04	0,10	0,18	0,30	0,48	0,71	1,05	1,85	0,6

Ejectors

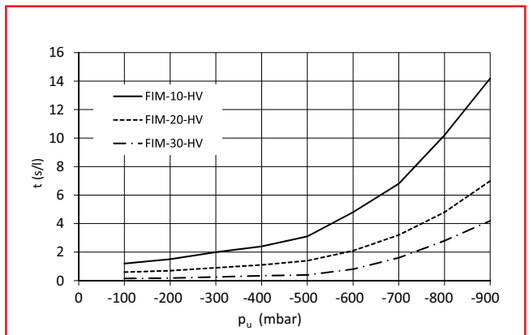
Inline ejector FIM



Vacuum level FIM-HV at different operating pressures



Suction volume FIM-HV at different operating pressures

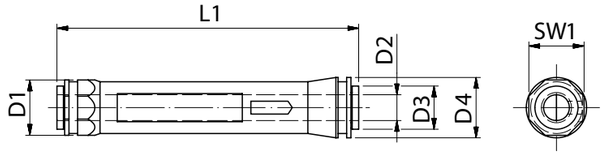


Evacuation time FIM-HV at different grades of evacuation

FEZER
Simply move more.

Ejectors

Inline ejector FIM



FIM-10 ... FIM-30

Dimensions

Type	L1	D1	D2	D3	D4	SW1
FIM-10-HV	70	6	6	10	14,2	14
FIM-20-HV	96	8	8	15	19,4	19
FIM-30-HV	155	8	12	20	28,1	28

1. Basics
2. Suction Pads
3. Mounting Elements
4. Vacuum Generators
5. Valve Technology
6. Vakcuum Supervision
7. Filter Elements
8. Connection Elements
9. System Technology

Ejectors

FEZER
Simply move more.

Basic ejector unit VIP-8-SP

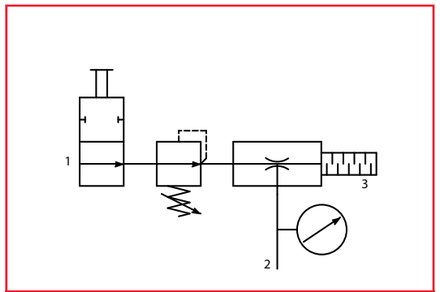
Description
Basic unit consisting of basic ejector, pressure reducer to adjust the operating pressure, vacuum gauge and shut-off cock. The unit comes in a sheet metal housing and is sound-reduced.

Application
- supply of single suction pads
- any mounting position

VIP-8-SP

Article number

Type	Article number
VIP-8-SP	1.44.1.0036



Schaltbild FIM

1 Compressed air connection
2 Vacuum connection
3 Exhaust

Ejectors

FEZER
Simply move more.

Basic ejector unit VIP-8-SP

Technical data

Type	Vacuum* (mbar)	Suction volume* (m^3/h)	(l/s)	Air consumption* (m^3/h)	(l/s)	Pressure** (bar) max.	opt.	Noise level* dB (A)	Temperature (°C)	Weight (kg)
VIP-8-SP	-850	4,8	1,35	7,6	2,1	1 ... 7	4	63	0 ... +60	1,1

* *at optimum pressure,*
** *dry, filtered, oil-free compressed air*

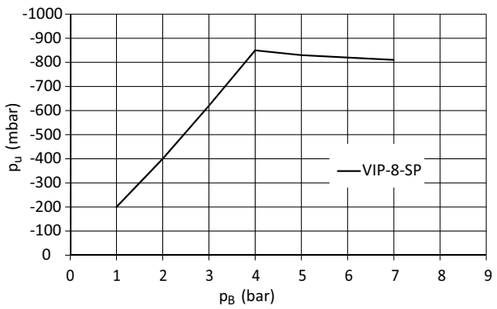
Evacuation and ventilation time (s) for 1l volume

Type	Vacuum level(mbar) -100	-200	-300	-400	-500	-600	-700	-800	Ventilation time at max. vacuum level
VIP-8-SP	0,4	0,6	0,8	1,2	1,6	2,2	3,5	9,2	1,3

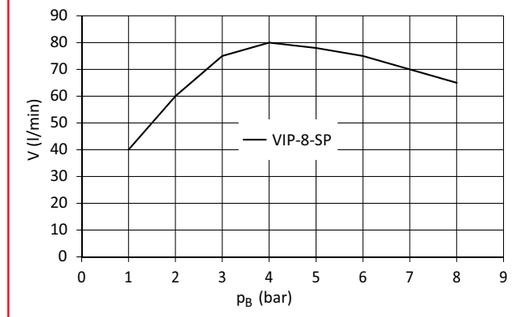
Ejectors

FEZER
Simply move more.

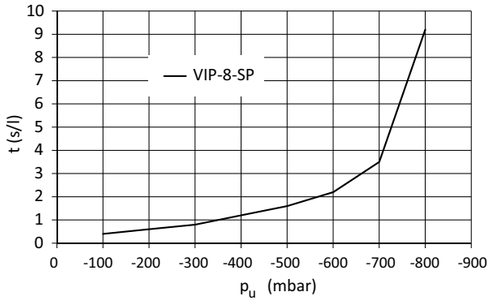
Grandejektoreinheit VIP-8-SP



Vacuum level VIP-8-SP at different pressures



Suction volume VIP-8-SP at different pressures

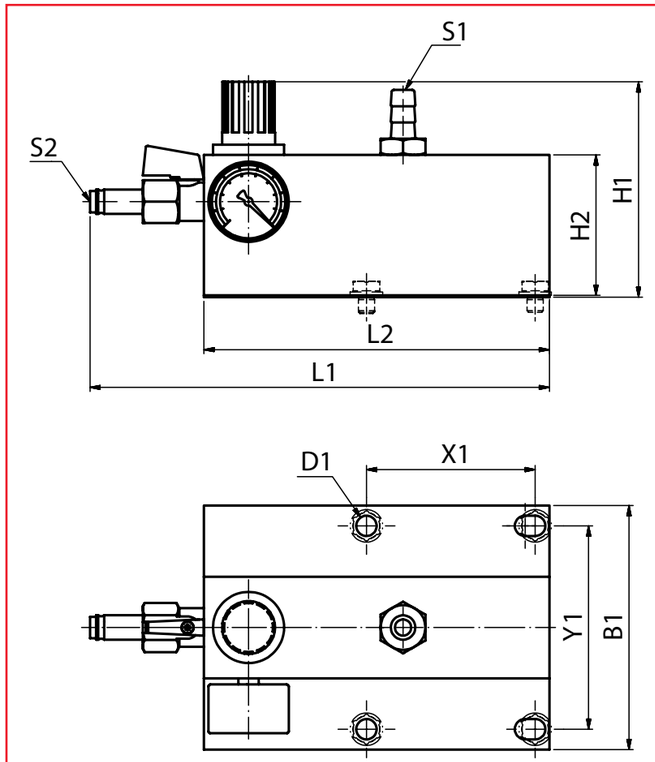


Evacuation time VIP-8-SP at different grades of evacuation

Ejectors

FEZER
Simply move more.

Basic ejector unit VIP-8-SP



VIP-8-SP

Technical data

Type	L1	L2	B1	H1	H2	D1	S1	S2	X1	Y1
VIP-8-SP	226	170	120	106	70	10	10	10	83	100

Ejectors

Basic ejector FEG

FEZER
Simply move more.

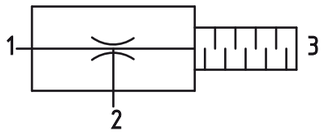
Description
Low weight and small basic ejector with solid plastic housing in t-design with open silencer. There are 6 powers available with either high grade of evacuation (HV) or high suction volume (HS). With plug connections.

Application
- for direct mounting hose lines
- use in handling systems with different occupancy grades
- can be controlled by separate pneumatic valves or valve islands
- any mounting position

FEG-05 ... FEG-30

Article number

Type	
FEG-05-HV	1.44.1.0092
FEG-05-HS	1.44.1.0044
FEG-07-HV	1.44.1.0037
FEG-07-HS	1.44.1.0039
FEG-10-HV	1.44.1.0042
FEG-10-HS	1.44.1.0045
FEG-15-HV	1.44.1.0046
FEG-15-HS	1.44.1.0043
FEG-20-HV	1.44.1.0038
FEG-20-HS	1.44.1.0047
FEG-30-HV	1.44.1.0040
FEG-30-HS	1.44.1.0104



Schaltbild FEG

1 Compressed air connection
2 Vacuum connection
3 Exhaust

Ejectors
Basic ejector FEG
FEZER
Simply move more.

Technical data

Type	Vacuum*	Suction volume*		Air consumption*		Pressure** (bar)		Noise level*	Temperature	Weight
	(mbar)	(m^3/h)	(l/s)	(m^3/h)	(l/s)	max.	opt.	dB (A)	(°C)	(kg)
FEG-05-HV	-880	0,36	0,10	0,66	0,18	2 ... 8	4,5	50	0 ... +60	0,015
FEG-05-HS	-620	0,96	0,27	0,72	0,20	2 ... 8	5,0	52	0 ... +60	0,015
FEG-07-HV	-880	0,96	0,27	1,69	0,47	2 ... 8	4,7	56	0 ... +60	0,015
FEG-07-HS	-530	2,34	0,66	1,69	0,47	2 ... 8	6,2	67	0 ... +60	0,015
FEG-10-HV	-890	1,50	0,42	3,30	0,92	2 ... 8	4,5	66	0 ... +60	0,026
FEG-10-HS	-650	3,78	1,05	3,30	0,92	2 ... 8	4,0	68	0 ... +60	0,026
FEG-15-HV	-880	3,12	0,87	7,08	1,97	2 ... 8	5,0	77	0 ... +60	0,026
FEG-15-HS	-610	5,40	1,50	7,08	1,97	2 ... 8	6,0	77	0 ... +60	0,026
FEG-20-HV	-920	5,88	1,63	14,1	3,92	2 ... 8	3,5	55	0 ... +60	0,185
FEG-20-HS	-920	11,3	3,14	14,1	3,92	2 ... 8	3,0	57	0 ... +60	0,185
FEG-30-HV	-930	11,2	3,11	28,8	8,0	2 ... 8	3,7	70	0 ... +60	0,185
FEG-30-HS	-830	20,3	5,64	28,8	8,0	2 ... 8	6,0	70	0 ... +60	0,185

* *at optimum pressure,*
** *dry, filtered, oil-free compressed air*

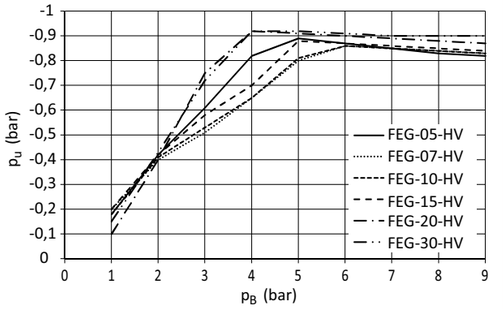
Evacuation- and ventilation time (s) for 1l volume

Type	Vacuum level (mbar)								Ventilation time at
	-100	-200	-300	-400	-500	-600	-700	-800	max. vacuum level
FEG-05-HV	1,1	1,5	3,0	4,3	6,0	9,0	12,5	18,4	4,8
FEG-05-HS	0,4	0,8	1,1	1,8	3,1	6,8	11,2	---	1,7
FEG-07-HV	0,8	1,0	1,5	2,2	2,9	3,4	6,1	9,2	1,9
FEG-07-HS	0,2	0,3	0,5	1,0	2,2	---	---	---	0,5
FEG-10-HV	0,3	0,5	0,7	1,0	1,4	2,0	2,9	4,7	1,1
FEG-10-HS	0,1	0,2	0,3	0,5	1,0	2,3	4,5	---	0,46
FEG-15-HV	0,1	0,2	0,3	0,45	0,6	1,0	1,8	2,7	0,5
FEG-15-HS	0,05	0,1	0,2	0,3	0,9	1,5	---	---	0,25
FEG-20-HV	0,1	0,15	0,2	0,3	0,4	0,5	0,8	1,2	0,2
FEG-20-HS	0,03	0,05	0,08	0,1	0,16	0,22	0,33	0,5	0,15
FEG-30-HV	0,05	0,1	0,15	0,25	0,3	0,35	0,4	0,5	0,1
FEG-30-HS	0,05	0,1	0,15	0,07	0,09	0,13	0,12	0,45	0,1

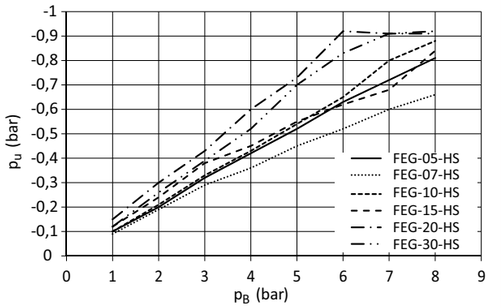
Ejectors

FEZER
Simply move more.

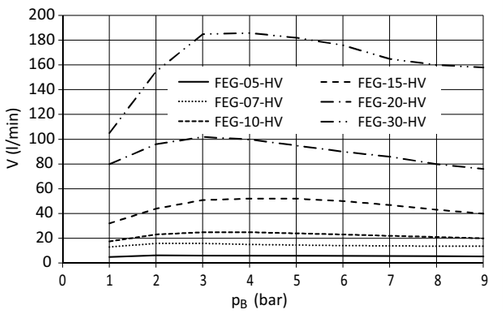
Basic ejector FEG



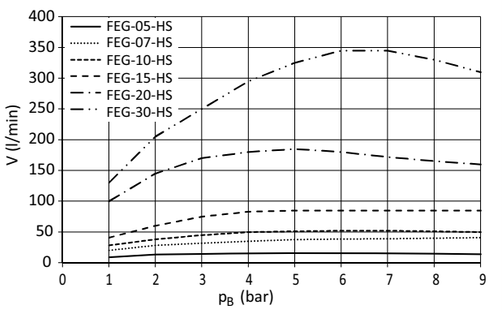
Vacuum level FEG-HV at different pressures



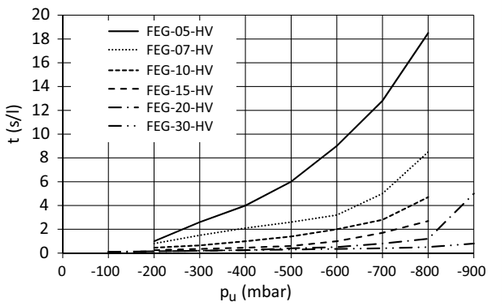
Vacuum level FEG-HS at different pressures



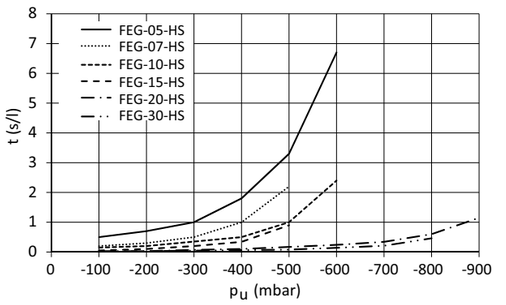
Suction volume FEG-HV at different pressures



Suction volume FEG-HS at different pressures



Evacuation time FEG-HV at different grades of evacuation

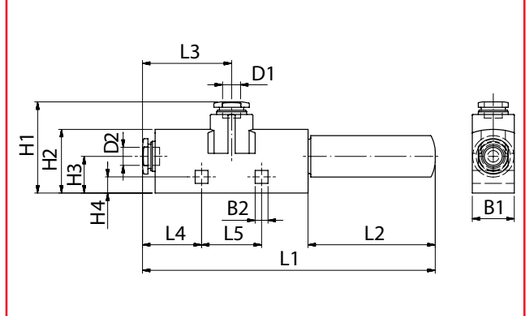


Evacuation time FEG-HS at different grades of evacuation

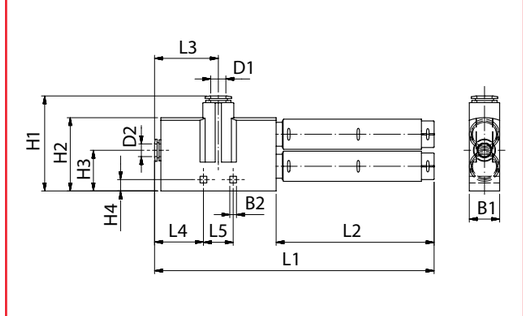
Ejectors

FEZER
Simply move more.

Basis ejector FEG



FEG-05-HV/HS-SA ... FEG-15-HV/HS-SA



FEG-20-HV/HS-SA ... FEG-30-HV/HS-SA

Dimensions

Type	L1	L2	L3	L4	L5	B1	B2	H1	H2	H3	H4	D1	D2
FEG-05-HV/HS-SA	97,6	42,4	29,7	19,7	20	14	4,3	30,4	21,3	12,3	5,4	6	6
FEG-07-HV/HS-SA	97,6	42,4	29,7	19,7	20	14	4,3	30,4	21,3	12,3	5,4	6	6
FEG-10-HV/HS-SA	97,6	42,4	29,7	19,7	20	14	4,3	30,4	21,3	12,3	5,4	6	6
FEG-15-HV/HS-SA	125,5	70,3	29,7	19,7	20	18	4,3	35,9	21,3	12,3	5,4	8	6
FEG-20-HV/HS-SA	221	124,9	50,4	38,6	23,5	24	5,3	75,1	57,9	32,2	9	12	10
FEG-30-HV/HS-SA	221	124,9	50,4	38,6	23,5	24	5,3	75,1	57,9	32,2	9	12	10

Ejectors

FEZER
Simply move more.

Basic ejector with integrated vacuum switch FEG-VS

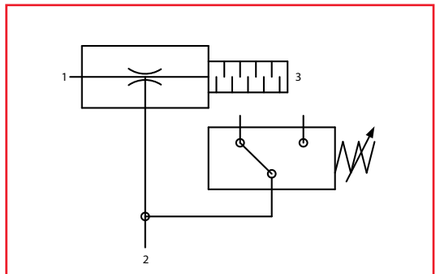
Description
Low-weight and robust basic ejector with integrated vacuum switch. The vacuum switch can pass on signals to the control and thus the suction condition of the ejector can be super-wised. The ejectors are available in 3 powers with either high grade of evacuation (HV) or high suction volume (HS) as well as vacuum switches with fixed or variable hysteresis. Teach-in switches for threshold and hysteresis. With plug-in connection.

Application
- use in automation and robot operations
- simple connection to electrical controls
- in connection with separate pneumatic valves or valve islands
- any mounting position

FEG-VS-05 ... FEG-VS-10

Article number

Type	Vacuum switch -V1 fixed hysteresis	Vacuum switch -V2 variable hysteresis
FEG-VS-05-HV- ...	1.44.1.0049	1.44.1.0060
FEG-VS-05-HS- ...	1.44.1.0093	1.44.1.0050
FEG-VS-07-HV- ...	1.44.1.0094	1.44.1.0051
FEG-VS-07-HS- ...	1.44.1.0052	1.44.1.0095
FEG-VS-10-HV- ...	1.44.1.0053	1.44.1.0096
FEG-VS-10-HS- ...	1.44.1.0054	1.44.1.0097



Schaltbild FEG-VS

1 Compressed air connection
2 Vacuum connection
3 Exhaust

Ejectors

FEZER
Simply move more.

Basic ejector with integrated vacuum switch FEG-VS

Technical data

Type	Vacuum* (mbar)	Suction volume* (m^3/h)	Suction volume* (l/s)	Air consumption* (m^3/h)	Air consumption* (l/s)	Pressure** (bar) max.	Pressure** (bar) opt.	Noise level* dB (A)	Temp. (°C)	Weight (kg)
FEG-VS-05-HV	-920	0,43	0,12	0,60	0,17	2 ... 8	4,9	50	0 ... +60	0,035
FEG-VS-05-HS	-620	0,84	0,23	0,66	0,17	2 ... 8	5,0	52	0 ... +60	0,035
FEG-VS-07-HV	-920	0,96	0,27	1,44	0,40	2 ... 8	4,4	56	0 ... +60	0,035
FEG-VS-07-HS	-650	1,86	0,52	1,32	0,37	2 ... 8	4,0	62	0 ... +60	0,035
FEG-VS-10-HV	-930	1,32	0,37	2,10	0,58	2 ... 8	3,5	62	0 ... +60	0,043
FEG-VS-10-HS	-610	2,52	0,70	2,76	0,77	2 ... 8	5,0	71	0 ... +60	0,043

* *at optimum pressure,*
** *dry, filtered, oil-free compressed air*

Technical data vacuum switch

Operating voltages:	(V DC)	15 ... 30	Electrical connection:	M8x1, 3-cores
Voltage drop:	(V)	< 1,5	Switching exit:	PNP
max. output current:	(mA)	100	Switch element function:	closer
Residual current:	(mA)	< 0,3	Switching function:	threshold with fixed hysteresis, 2 teach points
Opening/closing time:	(ms)	< 4		threshold with variable hysteresis
Setting range threshold	(bar)	-1 ... 0	Switch cond. display:	LED
Switching exactness	% FS*	1,5	Polarity security:	for all electrical connections
Hysteresis	% FS*	2 at fester Hysteresis	Overload firmness:	existing
Temperature coefficient	%/K)	0,05	Safety grade:	IP 40

** % FS = % of the measure range's final value*

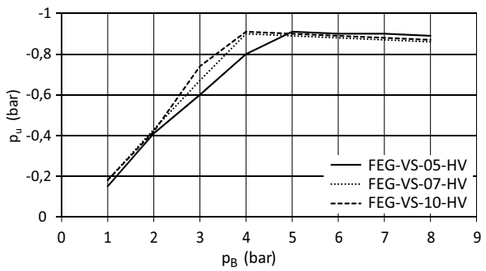
Evacuation and ventilation time (s) for 1l volume

Type	Vacuum level (mbar) -100	-200	-300	-400	-500	-600	-700	-800	Ventilation time at max. vacuum level
FEG-VS-05-HV	1,0	2,0	3,0	4,8	6,1	8,2	12,0	20	5,6
FEG-VS-05-HS	0,4	0,9	1,4	2,2	3,0	4,6	12,8	---	1,9
FEG-VS-07-HV	0,8	1,0	1,3	2,0	2,5	3,5	4,5	7,0	2,2
FEG-VS-07-HS	0,3	0,7	1,1	1,3	1,6	2,2	3,5	---	0,6
FEG-VS-10-HV	0,5	0,7	0,9	1,1	1,4	2,1	2,9	4,0	1,4
FEG-VS-10-HS	0,1	0,2	0,4	0,8	1,2	1,6	3,0	---	0,4

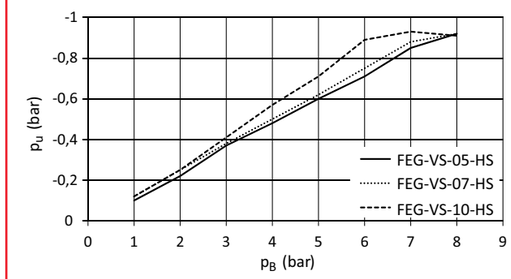
Ejectors

FEZER
Simply move more.

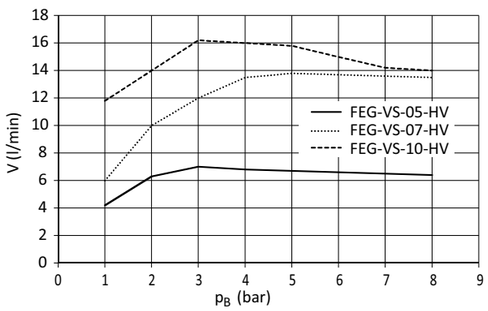
Basic ejector with integrated vacuum switch FEG-VS



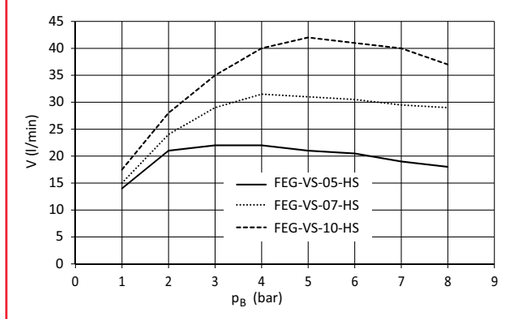
Vacuum level FEG-VS-HV at different pressures



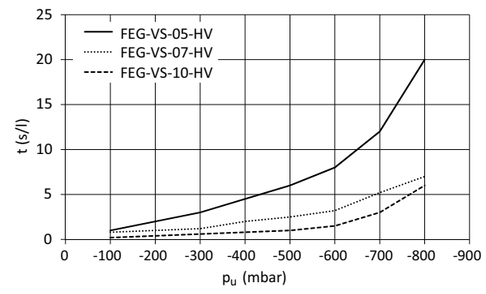
Vacuum level FEG-VS-HS at different pressures



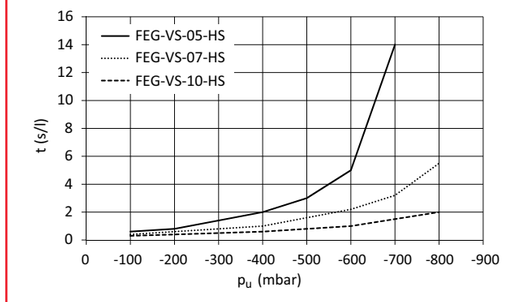
Suction volume FEG-VS-HV at different pressures



Suction volume FEG-VS-HS at different pressures



Evacuation time FEG-VS-HV at different grades of evacuation



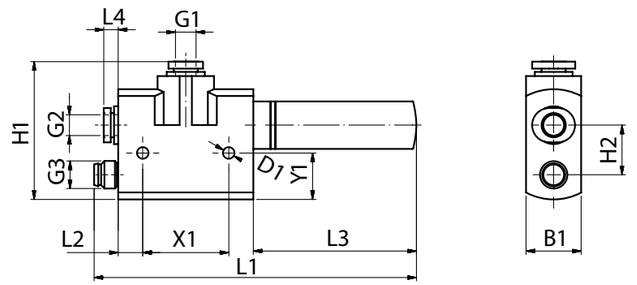
Evacuation time FEG-VS-HS at different grades of evacuation

1. Basics
2. Suction Pads
3. Mounting Elements
4. Vacuum Generators
5. Valve Technology
6. Vakcuum Supervision
7. Filter Elements
8. Connection Elements
9. System Technology

Ejectors

FEZER
Simply move more.

Basic ejector with integrated vacuum switch FEG-VS



FEG-VS-05 ... FEG-VS-10

Dimensions

Type	L1	L2	L3	L4	B1	H1	H2	D1	X1	Y1	G1	G2	G3
FEG-VS-05-HV/HS	93,6	6,5	49,4	4,2	16	40	14,4	3,4	25	13,5	6	6	M8x1-3P
FEG-VS-07-HV/HS	107	6,5	46,5	4,2	16	40	14,4	3,4	25	13,5	6	6	M8x1-3P
FEG-VS-10-HV/HS	107	6,5	46,5	4,2	16	40	14,4	3,4	25	13,5	6	6	M8x1-3P

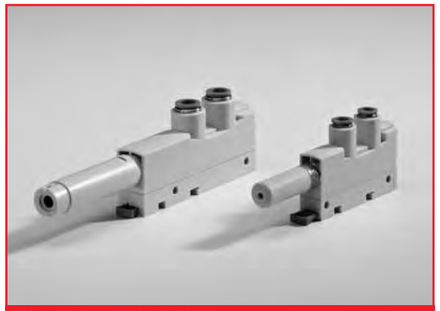
Ejectors

Basic ejector with integrated blow-off impulse FEG-AI

FEZER
Simply move more.

Description
Low-weight basic ejector in stable plastic housing with integrated blow-off impulse. When the compressed air feed stops an integrated safety tank supplies a brief blow-off impulse, which releases engaged workpieces quickly. There are 4 powers available with either high grade of evacuation (HV) or high suction volume (HS). With plug-connection. The ejectors can be either screwed in or fastened to flat bars.

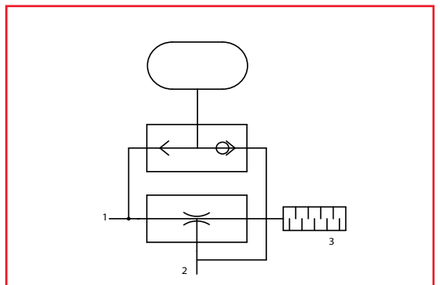
Application
- handling tasks with high dynamic requirements and short cycle times
- control of different suction circuits
- in connection with separate pneumatic valves or valve islands
- any mounting position



FEG-AI-05 ... FEG-AI-30

Article number

Type	
FEG-AI-05-HV	1.44.1.0055
FEG-AI-05-HS	1.44.1.0069
FEG-AI-07-HV	1.44.1.0072
FEG-AI-07-HS	1.44.1.0073
FEG-AI-10-HV	1.44.1.0075
FEG-AI-10-HS	1.44.1.0077
FEG-AI-15-HV	1.44.1.0079
FEG-AI-15-HS	1.44.1.0081



Schaltbild FEG-VS

1 Compressed air connection
2 Vacuum connection
3 Exhaust

Ejectors
Basic ejector with integrated blow-off impulse FEG-AI
FEZER
Simply move more.

Technical data

Type	Vacuum* (mbar)	Suction volume* (m^3/h)	(l/s)	Air consumption* (m^3/h)	(l/s)	Pressure** (bar) max.	opt.	Noise level* dB (A)	Temp. (°C)	Weight (kg)
FEG-AI-05-HV	-920	0,43	0,12	0,54	0,15	2 ... 8	4	49	0 ... +60	0,060
FEG-AI-05-HS	-800	0,82	0,23	1,01	0,28	2 ... 8	5	50	0 ... +60	0,060
FEG-AI-07-HV	-920	0,97	0,27	1,26	0,35	2 ... 8	4	61	0 ... +60	0,065
FEG-AI-07-HS	-680	1,85	0,52	1,50	0,42	2 ... 8	5	62	0 ... +60	0,065
FEG-AI-10-HV	-930	1,31	0,36	2,28	0,63	2 ... 8	4	65	0 ... +60	0,090
FEG-AI-10-HS	-700	2,43	0,68	2,76	0,77	2 ... 8	5	68	0 ... +60	0,090
FEG-AI-15-HV	-920	2,93	0,81	4,92	1,37	2 ... 8	4	65	0 ... +60	0,100
FEG-AI-15-HS	-730	5,56	1,54	6,00	1,67	2 ... 8	5	69	0 ... +60	0,100

* *at optimum pressure,*
** *dry, filtered, oil-free compressed air*

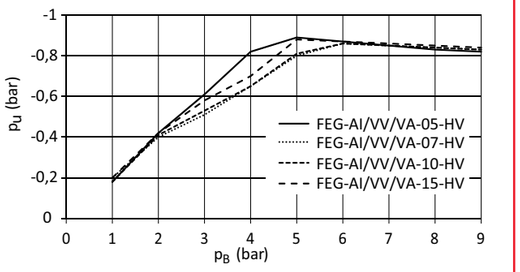
Evacuation and ventilation time (s) for 1l volume

Type	Vacuum level (mbar) -100	-200	-300	-400	-500	-600	-700	-800	Ventilation time at max. vacuum level
FEG-AI-05-HV	0,8	1,6	2,8	4,1	5,4	7,8	12,2	21,8	0,02
FEG-AI-05-HS	0,4	0,8	1,2	1,8	2,6	4,5	7,5	---	0,02
FEG-AI-07-HV	0,6	0,8	1,0	1,2	1,8	3,6	4,8	6,8	0,02
FEG-AI-07-HS	0,3	0,4	0,8	1,0	1,3	1,8	3,9	---	0,02
FEG-AI-10-HV	0,5	0,6	0,8	1,0	1,4	1,8	2,9	5,2	0,02
FEG-AI-10-HS	0,1	0,2	0,35	0,5	0,75	1,05	1,6	3,2	0,01
FEG-AI-15-HV	0,2	0,25	0,3	0,5	0,7	1,0	1,5	2,2	0,01
FEG-AI-15-HS	0,05	0,1	0,15	0,2	0,3	0,45	0,6	0,9	0,01

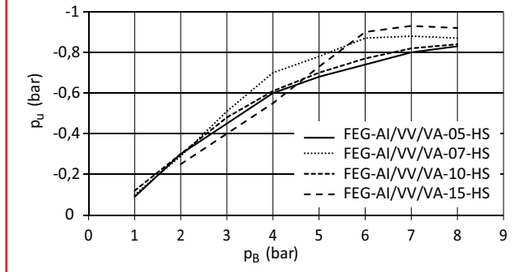
Ejectors

FEZER
Simply move more.

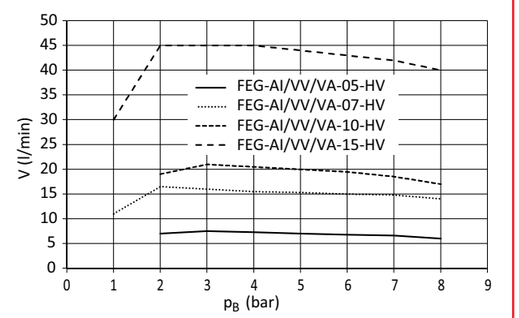
Basic ejector with integrated blow-off impulse FEG-AI



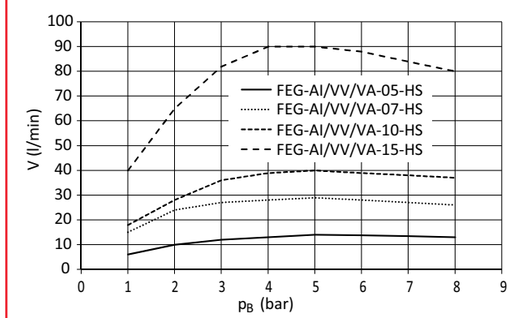
Vacuum level FEG-AI-HV at different pressures



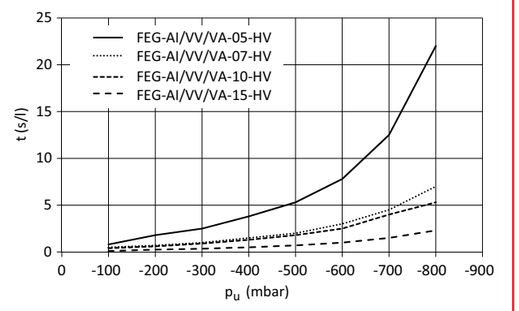
Vacuum level FEG-AI-HS at different pressures



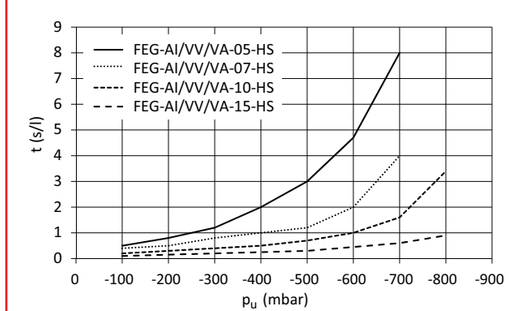
Suction volume FEG-AI-HV at different pressures



Suction volume FEG-AI-HS at different pressures



Evacuation time FEG-AI-HV at different grades of evacuation



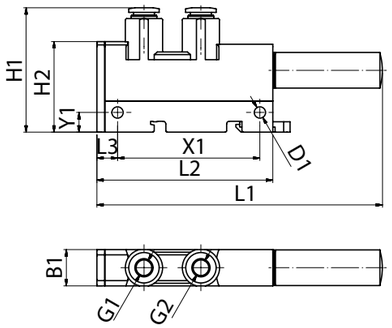
Evacuation time FEG-AI-HS at different grades of evacuation

1. Basics
2. Suction Pads
3. Mounting Elements
4. Vacuum Generators
5. Valve Technology
6. Vakcuum Supervision
7. Filter Elements
8. Connection Elements
9. System Technology

Ejectors

FEZER
Simply move more.

Basic ejector with integrated blow-off impulse FEG-AI



FEG-AI-05-GA ... FEG-AI-15-GA

Dimensions

Type	L1	L2	L3	B1	H1	H2	D1	X1	Y1	G1	G2
FEG-AI-05-HV/HS	110	68	8	14	48	35	4,4	55	7,6	6	6
FEG-AI-07-HV/HS	119	68	8	14	48	35	4,4	55	7,6	6	6
FEG-AI-10-HV/HS	119	68	8	14	48	35	4,4	55	7,6	6	6
FEG-AI-15-HV/HS	166	98	8,7	18	50	39	4,4	63	7,5	8	8

Ejectors

Basic ejector with integrated vacuum valve FEG-VV

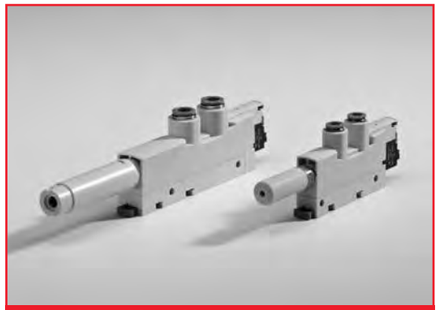
FEZER
Simply move more.

Description

Basic ejector made of a stable plastic housing with integrated vacuum valve. The vacuum valve can directly control the ejector. When the compressed air feed stops an integrated safety tank supplies a brief blow-off impulse, which releases engaged workpieces quickly. Available in 6 powers with either high grade of evacuation (HV) or high suction volume (HS). With plug-in connections. The ejectors can be either screwed in or fastened to flat bars.

Application

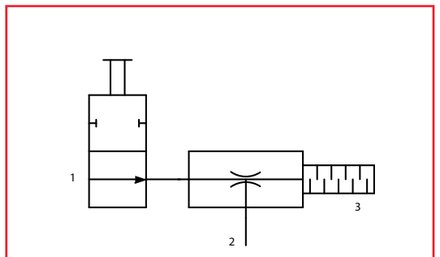
- Applications with highly dynamic requirements
- direct control of suction pads by ejector
- any mounting position



FEG-VV-05 ... FEG-VV-30

Article number

Type	
FEG-VV-05-HV	1.44.1.0082
FEG-VV-05-HS	1.44.1.0083
FEG-VV-07-HV	1.44.1.0084
FEG-VV-07-HS	1.44.1.0085
FEG-VV-10-HV	1.44.1.0086
FEG-VV-10-HS	1.44.1.0087
FEG-VV-15-HV	1.44.1.0088
FEG-VV-15-HS	1.44.1.0089
FEG-VV-20-HV	1.44.1.0090
FEG-VV-30-HV	1.44.1.0091



Schaltbild FEG-VS

1 Compressed air connection
2 Vacuum connection
3 Exhaust

Electrical data of solenoid valve

Operating voltage range:	(V DC)	21,6 ... 26,4
Switch-on time:	(%)	100
Safety class		IP40
Valve function:		2/2-ways valve
Supplementary hand operation		push-button
Electrical connection		plug

Ejectors
Basic ejector with integrated vacuum valve FEG-VV
FEZER
Simply move more.

Technical data

Type	Vacuum*	Suction volume*		Air consumption*		Pressure** (bar)		Noise level*	Temp.	Weight
	(mbar)	(m^3/h)	(l/s)	(m^3/h)	(l/s)	max.	opt.	dB (A)	(°C)	(kg)
FEG-VV-05-HV	-920	0,43	0,12	0,54	0,15	2 ... 8	4	49	0 ... +60	0,060
FEG-VV-05-HS	-800	0,82	0,23	0,60	0,17	2 ... 8	5	50	0 ... +60	0,060
FEG-VV-07-HV	-920	0,97	0,27	1,26	0,35	2 ... 8	4	61	0 ... +60	0,065
FEG-VV-07-HS	-680	1,85	0,52	1,50	0,42	2 ... 8	5	62	0 ... +60	0,065
FEG-VV-10-HV	-930	1,31	0,36	2,28	0,63	2 ... 8	4	65	0 ... +60	0,090
FEG-VV-10-HS	-700	2,43	0,68	2,76	0,77	2 ... 8	5	68	0 ... +60	0,090
FEG-VV-15-HV	-920	2,93	0,81	4,92	1,37	2 ... 8	4	65	0 ... +60	0,100
FEG-VV-15-HS	-730	5,56	1,54	6,00	1,67	2 ... 8	5	69	0 ... +60	0,100
FEG-VV-20-HV	-900	5,88	1,63	14,10	3,92	2 ... 8	4	73	0 ... +60	0,220
FEG-VV-30-HV	-910	11,16	3,10	28,80	8,00	2 ... 8	4	76	0 ... +60	0,225

* *at optimum pressure,*
** *dry, filtered, oil-free compressed air*

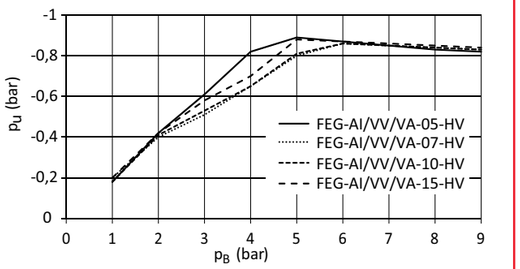
Evacuation and ventilation time (s) for 1l volume

Type	Vacuum level (mbar)								Ventilation time at
	-100	-200	-300	-400	-500	-600	-700	-800	max. vacuum level
FEG-05-HV	0,8	1,6	2,8	4,1	5,4	7,8	12,2	21,8	0,12
FEG-05-HS	0,4	0,8	1,2	1,8	2,6	4,5	7,5	---	0,07
FEG-07-HV	0,6	0,8	1,0	1,2	1,8	3,6	4,8	6,8	0,09
FEG-07-HS	0,3	0,4	0,8	1,0	1,3	1,8	3,9	---	0,06
FEG-10-HV	0,5	0,6	0,8	1,0	1,4	1,8	2,9	5,2	0,06
FEG-10-HS	0,1	0,2	0,35	0,5	0,75	1,05	1,6	---	0,05
FEG-15-HV	0,2	0,25	0,3	0,5	0,7	1,0	1,5	2,2	0,05
FEG-15-HS	0,05	0,1	0,15	0,2	0,3	0,45	0,6	---	0,04
FEG-20-HV	0,05	0,1	0,15	0,25	0,35	0,5	0,7	1,0	0,04
FEG-30-HV	0,05	0,06	0,08	0,1	0,2	0,3	0,4	0,55	0,03

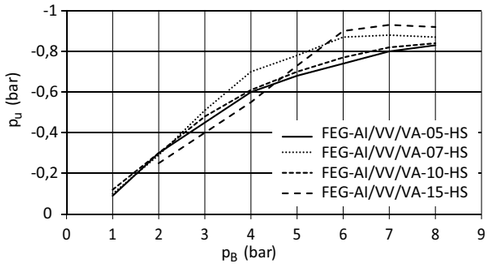
Ejectors

FEZER
Simply move more.

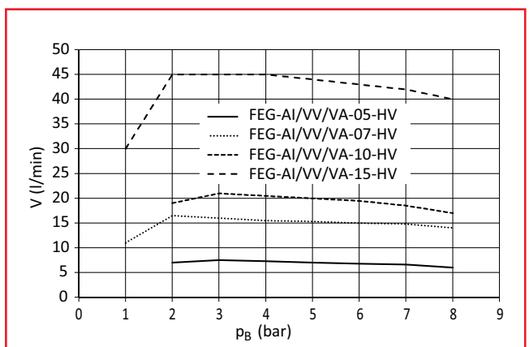
Basic ejector with integrated vacuum valve FEG-VV



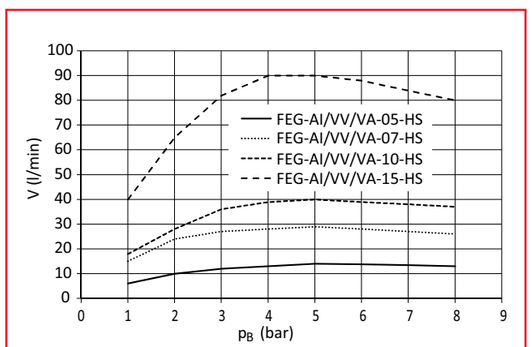
Vacuum level FEG-VV-HV at different pressures



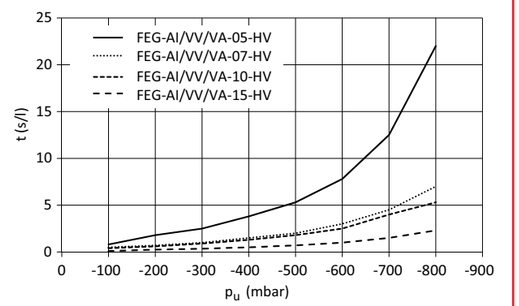
Vacuum level FEG-VV-HS at different pressures



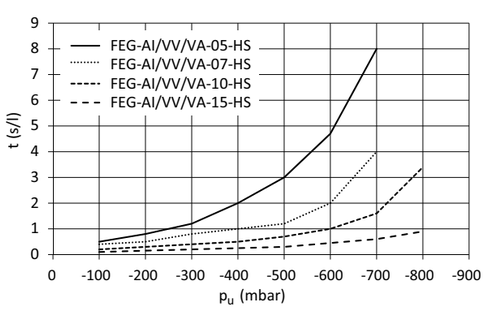
Suction volume FEG-VV-HV at different pressures



Suction volume FEG-VV-HS at different pressures



Evacuation time FEG-VV-HV at different grades of evacuation



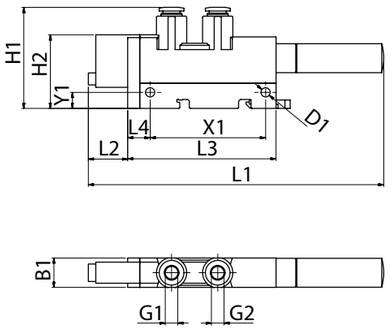
Evacuation time FEG-VV-HS at different grades of evacuation

1. Basics
2. Suction Pads
3. Mounting Elements
4. Vacuum Generators
5. Valve Technology
6. Vakcuum Supervision
7. Filter Elements
8. Connection Elements
9. System Technology

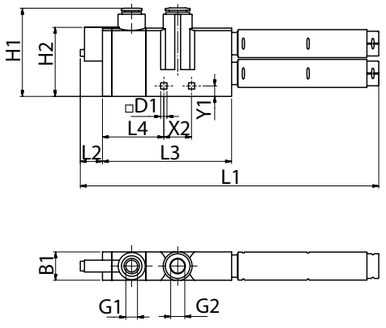
Ejectors

FEZER
Simply move more.

Basic ejector with integrated vacuum valve FEG-VV



FEG-VV-05- ... FEG-VV-15-



FEG-VV-20- ... FEG-VV-30-

Dimensions

Type	L1	L2	L3	L4	B1	H1	H2	D1	X1	Y1	G1	G2
FEG-VV-05-HV/HS	110	14	68	8	14	48	32,5	4,4	55	7,6	6	6
FEG-VV-07-HV/HS	119	14	68	8	14	48	32,5	4,4	55	7,6	6	6
FEG-VV-10-HV/HS	119	14	68	8	14	48	32,5	4,4	55	7,6	6	6
FEG-VV-15-HV/HS	166	15	98	8,7	18	50	34	4,4	63	4,5	8	8
FEG-VV-20-HV	253	18,5	110	52	24	75	60	5,3	23,5	9	10	12
FEG-VV-30-HV	253	18,5	110	52	24	75	60	5,3	23,5	9	10	12

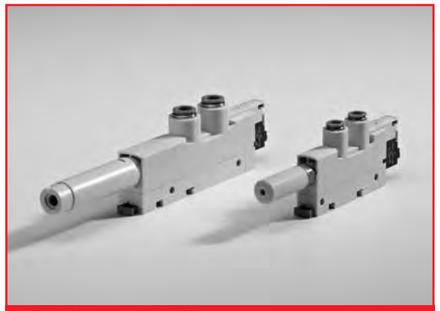
Ejectors

FEZER
Simply move more.

Basic ejector with vac.valve and blow-off impulse FEG-VA

Description

Basic ejector made of stable plastic housing with integrated vacuum valve and blow-off impulse. The vacuum valve can directly control the ejector.
When the compressed air feed stops an integrated safety tank supplies a brief blow-off impulse, which releases engaged workpieces quickly. There are 4 powers available with either high grade of evacuation (HV) or high suction volume (HS).
With plug connection. The ejectors can be either screwed in or fastened to flat bars.



FEG-VV-05 ... FEG-VV-30

Application

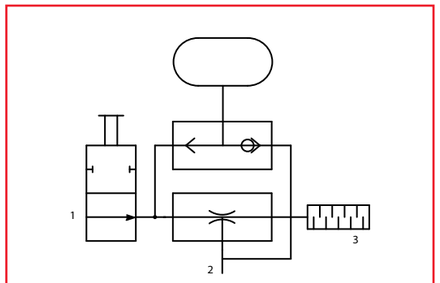
- Applications with highly dynamic requirements and short cycle times
- direct control of suction pads with ejector
- any mounting position

Article number

Type	
FEG-VA-05-HV	1.44.1.0062
FEG-VA-05-HS	1.44.1.0063
FEG-VA-07-HV	1.44.1.0098
FEG-VA-07-HS	1.44.1.0099
FEG-VA-10-HV	1.44.1.0100
FEG-VA-10-HS	1.44.1.0101
FEG-VA-15-HV	1.44.1.0102
FEG-VA-15-HS	1.44.1.0103

Electrical data solenoid valve

Operating voltage range:	(V DC)	21,6 ... 26,4
Switch-on time:	(%)	100
Safety class:		IP40
Valve function:		2/2-ways valve
Supplementary hand operation		push-buttons
Electrical connection:		plug



Schaltbild FEG-VS

1 Compressed air connection
2 Vacuum connection
3 Exhaust

Ejectors

FEZER
Simply move more.

Basic ejector with vac. valve and blow-off impulse FEG-VA

Technical data

Type	Vacuum*	Suction volume*		Air consumption*		Pressure** (bar)		Noise level*	Temperature	Weight
	(mbar)	(m^3/h)	(l/s)	(m^3/h)	(l/s)	max.	opt.	dB (A)	(°C)	(kg)
FEG-VA-05-HV	-920	0,43	0,12	0,54	0,15	2 ... 8	4	49	0 ... +60	0,060
FEG-VA-05-HS	-800	0,82	0,23	0,60	0,17	2 ... 8	5	50	0 ... +60	0,060
FEG-VA-07-HV	-920	0,97	0,27	1,26	0,35	2 ... 8	4	61	0 ... +60	0,065
FEG-VA-07-HS	-680	1,85	0,52	1,50	0,42	2 ... 8	5	62	0 ... +60	0,065
FEG-VA-10-HV	-930	1,31	0,36	2,28	0,63	2 ... 8	4	65	0 ... +60	0,090
FEG-VA-10-HS	-700	2,43	0,68	2,76	0,77	2 ... 8	5	68	0 ... +60	0,090
FEG-VA-15-HV	-920	2,93	0,81	4,92	1,37	2 ... 8	4	65	0 ... +60	0,100
FEG-VA-15-HS	-730	5,56	1,54	6,00	1,67	2 ... 8	5	69	0 ... +60	0,100

* *at optimum pressure,*
** *dry, filtered, oil-free compressed air*

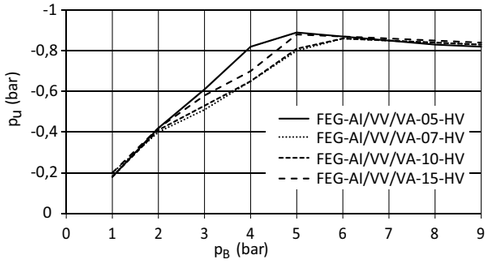
Evacuation and ventilation time (s) for 1l volume

Type	Vacuum level (mbar)								Ventilation time at
	-100	-200	-300	-400	-500	-600	-700	-800	max. vacuum level
FEG-VA-05-HV	0,8	1,6	2,8	4,1	5,4	7,8	12,2	21,8	0,04
FEG-VA-05-HS	0,4	0,8	1,2	1,8	2,6	4,5	7,5	---	0,04
FEG-VA-07-HV	0,6	0,8	1,0	1,2	1,8	3,6	4,8	6,8	0,03
FEG-VA-07-HS	0,3	0,4	0,8	1,0	1,3	1,8	3,9	---	0,03
FEG-VA-10-HV	0,5	0,6	0,8	1,0	1,4	1,8	2,9	5,2	0,03
FEG-VA-10-HS	0,1	0,2	0,35	0,5	0,75	1,05	1,6	---	0,03
FEG-VA-15-HV	0,2	0,25	0,3	0,5	0,7	1,0	1,5	2,2	0,03
FEG-VA-15-HS	0,05	0,1	0,15	0,2	0,3	0,45	0,6	0,9	0,03

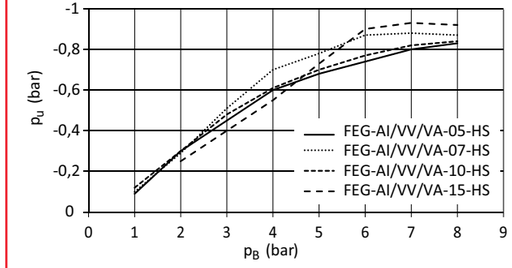
Ejectors

FEZER
Simply move more.

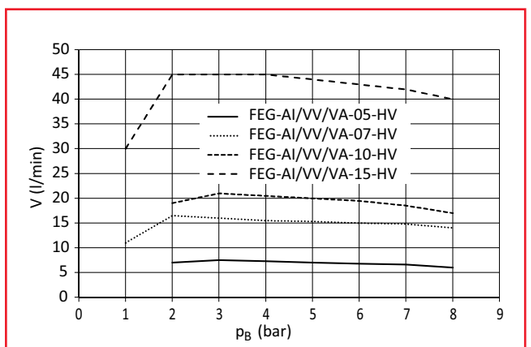
Basic ejector with vac. valve and blow-off impulse FEG-VA



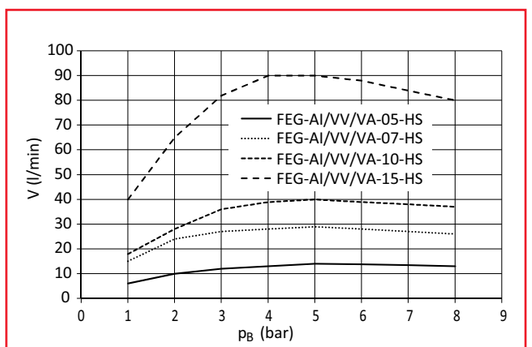
Vacuum level FEG-VA-HV at different pressures



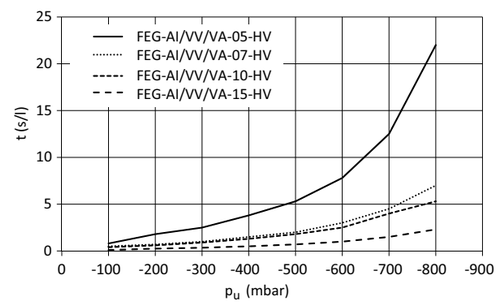
Vacuum level FEG-VA-HS at different pressures



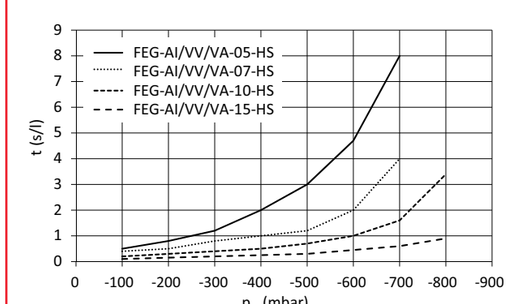
Suction volume FEG-VA-HV at different pressures



Suction volume FEG-VA-HS at different pressures



Evacuation time FEG-VA-HV at different grades of evacuation



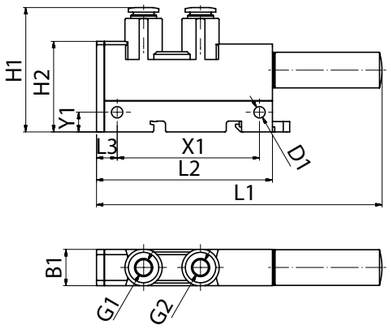
Evacuation time FEG-VA-HS at different grades of evacuation

1. Basics
2. Suction Pads
3. Mounting Elements
4. Vacuum Generators
5. Valve Technology
6. Vakcuum Supervision
7. Filter Elements
8. Connection Elements
9. System Technology

Ejectors

FEZER
Simply move more.

Basic ejector with vac. valve and blow-off impulse FEG-VA



FEG-AI-05-GA ... FEG-AI-15-GA

Dimensions

Type	L1	L2	L3	B1	H1	H2	D1	X1	Y1	G1	G2
FEG-VA-05-HV/HS	110	68	8	14	48	35	4,4	55	7,6	6	6
FEG-VA-07-HV/HS	119	68	8	14	48	35	4,4	55	7,6	6	6
FEG-VA-10-HV/HS	119	68	8	14	48	35	4,4	55	7,6	6	6
FEG-VA-15-HV/HS	166	98	8,7	18	50	39	4,4	63	7,5	8	8

Ejectors

Compakt ejector FEK-VE

FEZER
Simply move more.

Description
Compact ejector with integrated vacuum and blow-off valve, exchangeable vacuum filter and a vacuum sensor with LED display to superwise the underpressure and display the condition of switching exit and solenoid valves. Theree are 4 powers available with high grade of evacuation (HV) or high suction volume (HS).

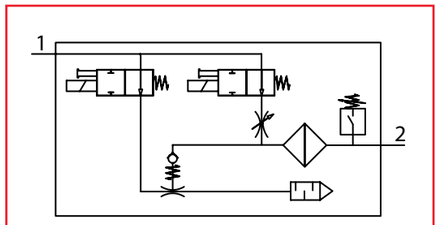
Vacuum valve
The compressed air supply is controlled by solenoid valve. This valve is available with functions NC/NO. Control via switching entrance of a higher system.
- NC - Vacuum is generated with active voltage
- NO - Vacuum is generated with inactive voltage

Blow-off impulse
A second integrated solenoid valve opens the blow-off impulse whose intensity is adjustable. Control via switching entrance of a higher system.

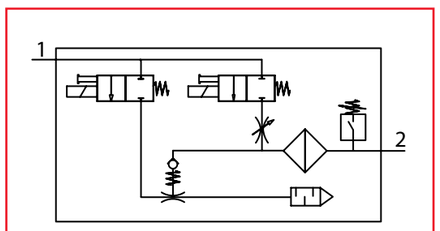
Vacuum sensor
The integrated vacuum sensor possesses a digital switching exit, configurated as a closer. The switching function is configured as a threshold comparator. The switching point is set at teach funkcion minus a reserve of 35%. The hysteresis to the switching point has a fixed value of 20 mbar.
- SP = TP - 35% * TP

Air saving automatic
A higher control can also establish an air saving automatic in the range of the reserve. If the vacuum exceeds the swtiching point it can be shut off. On again reaching the switching point the vacuum valve is re-activated and vacuum is again created.

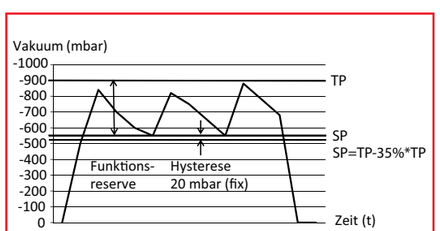
FEK-VE-05 ... FEK-VE-15



Switching diagram FEK-VE-05 ... FEK-VE-15-NO



Switching diagram FEK-VE-05 ... FEK-VE-15-NC



Principle of external air saving automatic

Ejectors

Compact ejector FEK-VE

FEZER
Simply move more.

Article number

Type	High vacuum HV	High suction volume HS
FEK-VE-05- ... -NO-1P	1.44.3.0063	1.44.3.0036
FEK-VE-05- ... -NO-1N	1.44.3.0064	1.44.3.0035
FEK-VE-05- ... -NC-1P	1.44.3.0050	1.44.3.0034
FEK-VE-05- ... -NC-1N	1.44.3.0049	1.44.3.0033
FEK-VE-07- ... -NO-1P	1.44.3.0054	1.44.3.0040
FEK-VE-07- ... -NO-1N	1.44.3.0053	1.44.3.0039
FEK-VE-07- ... -NC-1P	1.44.3.0052	1.44.3.0038
FEK-VE-07- ... -NC-1N	1.44.3.0051	1.44.3.0037
FEK-VE-10- ... -NO-1P	1.44.3.0058	1.44.3.0044
FEK-VE-10- ... -NO-1N	1.44.3.0057	1.44.3.0043
FEK-VE-10- ... -NC-1P	1.44.3.0056	1.44.3.0042
FEK-VE-10- ... -NC-1N	1.44.3.0055	1.44.3.0041
FEK-VE-15- ... -NO-1P	1.44.3.0062	1.44.3.0048
FEK-VE-15- ... -NO-1N	1.44.3.0061	1.44.3.0047
FEK-VE-15- ... -NC-1P	1.44.3.0060	1.44.3.0046
FEK-VE-15- ... -NC-1N	1.44.3.0059	1.44.3.0045

Technical data

Type	Vacuum* (mbar)	Suction volume* (m³/h)	Suction volume* (l/s)	Air consumption* (m³/h)	Air consumption* (l/s)	Pressure** (bar) max.	Pressure** (bar) opt.	Noise level* dB (A)	Temp. (°C)	Weight (kg)
FEK-VE-05-HV ...	-930	0,36	0,10	0,47	0,13	2 ... 8	5,1	51	0 ... +50	0,365
FEK-VE-05-HS ...	-620	0,78	0,22	0,58	0,16	2 ... 8	6,0	45	0 ... +50	0,365
FEK-VE-07-HV ...	-930	0,96	0,27	1,26	0,35	2 ... 8	4,1	58	0 ... +50	0,365
FEK-VE-07-HS ...	-750	1,89	0,53	1,73	0,48	2 ... 8	6,0	53	0 ... +50	0,365
FEK-VE-10-HV ...	-930	1,12	0,31	2,19	0,61	2 ... 8	3,5	73	0 ... +50	0,370
FEK-VE-10-HS ...	-880	2,70	0,75	3,17	0,88	2 ... 8	6,0	64	0 ... +50	0,370
FEK-VE-15-HV ...	-930	3,03	0,84	4,57	1,27	2 ... 8	3,6	77	0 ... +50	0,370
FEK-VE-15-HS ...	-900	5,32	1,48	6,91	1,92	2 ... 8	6,0	70	0 ... +50	0,370

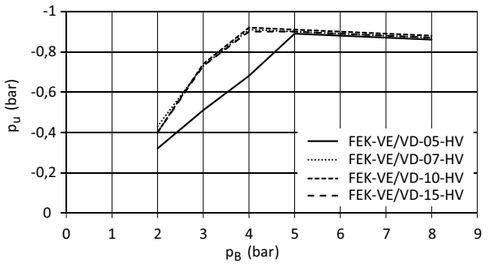
* *at optimum pressure*
** *dry, filtered, oil-free compressed air*

Technical data vacuum sensor VE

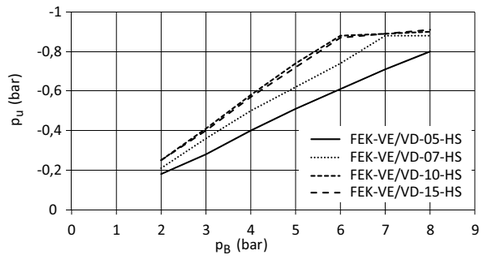
Operating voltage range:	(V DC)	20,4 ... 27,6	Electrical connection:	M12x1, 5-polig
max. exit current:	(mA)	100	Switching exit:	1xPNP, 1xNPN
residual current:	(mA)	< 0,1	Switch element function:	closer
Switching time on/off:	(ms)	< 4	Switching function:	threshold comparator
Threshold range	(bar)	-1 ... 0	Switching cond. display:	optical
Hysteresis range	(bar)	fest, 20 mbar	Display type:	LED
Switching precision	% FS*	1,5	Pole safety:	for all electrical connections
Repeat precision:	% FS*	0,6	Safety type:	IP 65

Ejectors

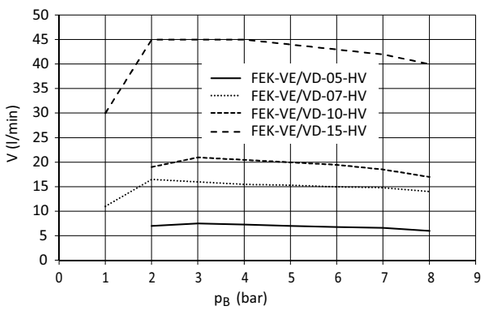
Compact ejector FEK-VE



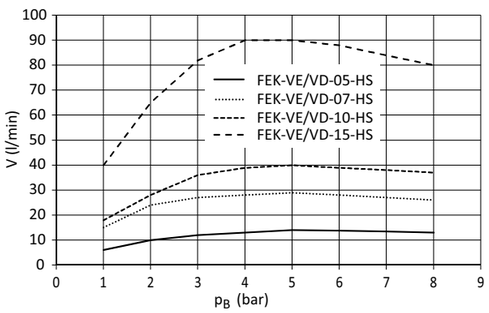
Vacuum level FEK-VE-HV at different pressures



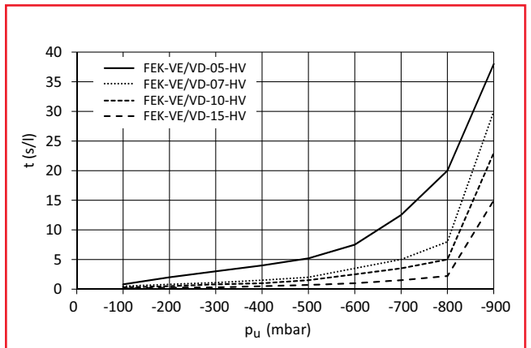
Vacuum level FEK-VE-HS at different pressures



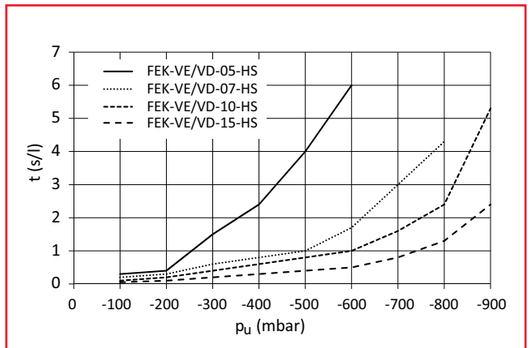
Suction volume FEK-VE-HV at different pressures



Suction volume FEK-VE-HS at different pressures



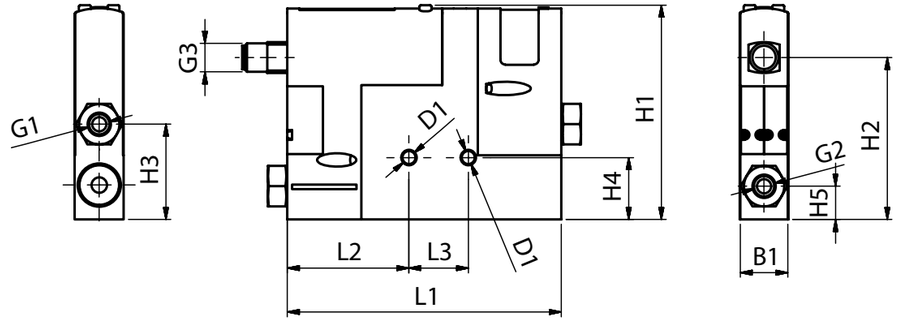
Evacuation time FEK-VE-HV at different grades of evacuation



Evacuation time FEK-VE-HS at different grades of evacuation

Ejectors

Compact ejector FEK-VE



FEK-05 ... FEK-15

Dimensions

Type	L1	L2	L3	B1	H1	H2	H3	H4	H5	D1	G1	G2	G3
FEK-VE-05- ...	115	51	25	20,5	90	68	40	26	14,5	5,5	6	6	M12x1
FEK-VE-07- ...	161	51	25	20,5	90	68	40	26	14,5	5,5	8	8	M12x1
FEK-VE-10- ...	161	51	25	20,5	90	68	40	26	14,5	5,5	8	8	M12x1
FEK-VE-15- ...	161	57	25	20,5	90	68	40	26	14,5	5,5	8	8	M12x1

Evacuation and ventilation time (s) for 1l volume

Type	Vacuum level (mbar)								Ventilation time at max. vacuum level*
	-100	-200	-300	-400	-500	-600	-700	-800	
FEK-VE-05-HV	1,0	2,0	3,0	4,0	6,0	7,5	12,5	18	0,02
FEK-VE-05-HS	0,3	0,8	1,5	2,4	4,0	6,0	---	---	0,02
FEK-VE-07-HV	0,5	1,0	1,5	2,0	2,5	3,5	5,0	8,0	0,01
FEK-VE-07-HS	0,2	0,3	0,6	0,8	1,0	1,6	3,0	---	0,01
FEK-VE-10-HV	0,4	0,9	1,3	1,6	2,0	2,8	3,8	5,0	0,01
FEK-VE-10-HS	0,1	0,2	0,4	0,6	0,8	1,0	1,3	2,4	0,01
FEK-VE-15-HV	0,3	0,5	0,8	1,0	1,3	1,6	1,9	2,5	0,01
FEK-VE-15-HS	0,1	0,1	0,2	0,3	0,4	0,6	0,8	1,1	0,01

* at optimum pressure with max. blow-off impulse

Ejectors

Compact ejector FEK-VD

FEZER
Simply move more.

Description
Compact ejector with integrated vacuum- and blow-off valve, exchangeable vacuum filter and a vacuum sensor with LCD display to supervise and visualise the vacuum and to control the air saving automatic. Additionally electrical signals can be passed on to a higher control which allows a time diagnosis of the compact ejector. There are 4 powers available with high grade of evacuation (HV) or high suction volume (HS).

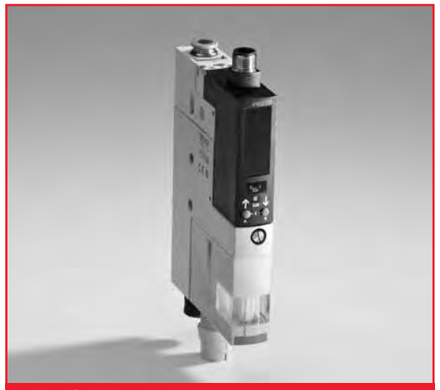
Vacuum valve
The compressed air supply is controlled by solenoid valve. This valve is avaiable as NC/NO.
- NC - vacuum generation with active voltage
- NO - vacuum generation with inactive voltage

Blow-off impulse
A second integrated valve is activated when the vacuum valve is switched off and automatically opens a blow-off impulse. This impulse is adjustable 0 ... 10s.

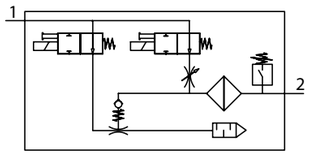
Vacuum sensor
The integrated vacuum sensor possesses two digital switching exits. These exists are available as openers or closers. Additionally the switching functions can be appointed as threshold or window comparators.

Air saving automatic
The integrated air saving automatic makes the ejector work only when required i.e. if an upper threshold value is reached the vacuum valve switches off. An integrated non-return valve prevents the reduction of the vacuum. Leakage (rough surfaces, porous materials), however, slowly decreases the vacuum until a lower threshold value is reached. The vacuum valve opens automatically and increases the vacuum back to the upper threshold value.

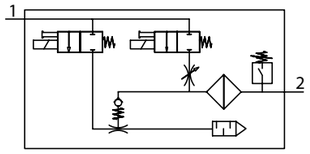
Condition monitoring and diagnosis
The most important operating parameters like vacuum, evacuation and ventilation time are constantly supervised and controlled against the set must values. Discrepancies are shown on the display and an electrical signal is submitted to the higher control.
This allows to take maintenance measures in time and keep up the operation safety.



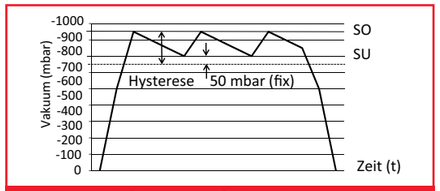
FEK-VD-05 ... FEK-VD-15



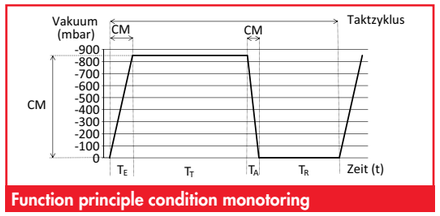
Switching diagram FEK-VD-05 ... FEK-VD-15-NO



Switching diagram FEK-VD-05 ... FEK-VD-15-NC



Function principle integrated air saving automatic



Function principle condition monotoring

Ejectors
Compact ejector FEK-VD
FEZER
Simply move more.

Article number

Type	High vacuum HV	High suction volume HS
FEK-VD-05- ... -NO-2P	1.44.3.0002	1.44.3.0001
FEK-VD-05- ... -NO-2N	1.44.3.0004	1.44.3.0003
FEK-VD-05- ... -NC-2P	1.44.3.0006	1.44.3.0005
FEK-VD-05- ... -NC-2N	1.44.3.0008	1.44.3.0007
FEK-VD-07- ... -NO-2P	1.44.3.0010	1.44.3.0009
FEK-VD-07- ... -NO-2N	1.44.3.0012	1.44.3.0011
FEK-VD-07- ... -NC-2P	1.44.3.0014	1.44.3.0013
FEK-VD-07- ... -NC-2N	1.44.3.0016	1.44.3.0015
FEK-VD-10- ... -NO-2P	1.44.3.0018	1.44.3.0017
FEK-VD-10- ... -NO-2N	1.44.3.0020	1.44.3.0019
FEK-VD-10- ... -NC-2P	1.44.3.0022	1.44.3.0021
FEK-VD-10- ... -NC-2N	1.44.3.0024	1.44.3.0023
FEK-VD-15- ... -NO-2P	1.44.3.0026	1.44.3.0025
FEK-VD-15- ... -NO-2N	1.44.3.0028	1.44.3.0027
FEK-VD-15- ... -NC-2P	1.44.3.0030	1.44.3.0029
FEK-VD-15- ... -NC-2N	1.44.3.0032	1.44.3.0031

Technical data

Type	Vacuum* (mbar)	Suction volume* (m³/h)	(l/s)	Air consumption* (m³/h)	(l/s)	Pressure** (bar) max.	opt.	Noise level* dB (A)	Temperature (°C)	Weight (kg)
FEK-VD-05-HV ...	-930	0,36	0,10	0,47	0,13	2 ... 8	5,1	51	0 ... +50	0,370
FEK-VD-05-HS ...	-620	0,78	0,22	0,58	0,16	2 ... 8	6,0	45	0 ... +50	0,370
FEK-VD-07-HV ...	-930	0,96	0,27	1,26	0,35	2 ... 8	4,1	58	0 ... +50	0,370
FEK-VD-07-HS ...	-750	1,89	0,53	1,73	0,48	2 ... 8	6,0	53	0 ... +50	0,370
FEK-VD-10-HV ...	-930	1,12	0,31	2,19	0,61	2 ... 8	3,5	73	0 ... +50	0,395
FEK-VD-10-HS ...	-880	2,70	0,75	3,17	0,88	2 ... 8	6,0	64	0 ... +50	0,395
FEK-VD-15-HV ...	-930	3,03	0,84	4,57	1,27	2 ... 8	3,6	77	0 ... +50	0,395
FEK-VD-15-HS ...	-900	5,32	1,48	6,91	1,92	2 ... 8	6,0	70	0 ... +50	0,395

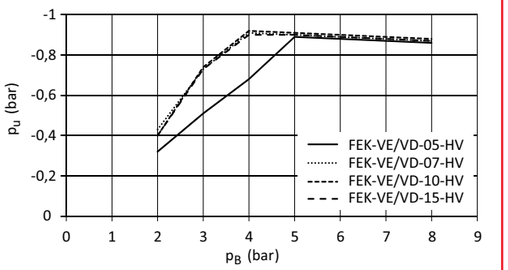
* *at optimum pressure*
** *dry, filtered, oil-free compressed air*

Technical data vacuum sensor VD

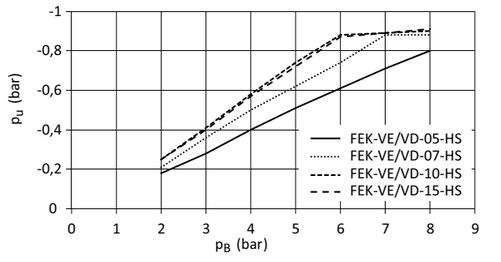
Operating voltage range:	(V DC)	20,4 ... 27,6	Electrical connection	M12x1, 5 cores
max. exit current:	(mA)	100	Switching exit:	2xPNP, 2xNPN
Residual current:	(mA)	< 0,1	Switch element function:	opener/closer
Switching time on/off:	(ms)	< 4	Switching function:	Window comparator
Threshold range	(bar)	-0,99 ... 0		Threshold comparator
Hysteresis range	(bar)	-0,90 ... 0	Switching condition display	optical via LCD display
Switching precision	% FS*	1,5	Display type:	4 digits, background illuminated display
Repeat precision:	% FS*	0,6	Pole safety:	for all electrical connections
Hysteresis	% FS*	2 at fixed hysteresis	Safety type	IP 65

Ejectors

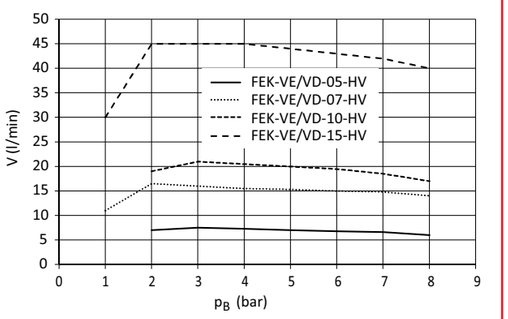
Kompaktejektor FEK-VD



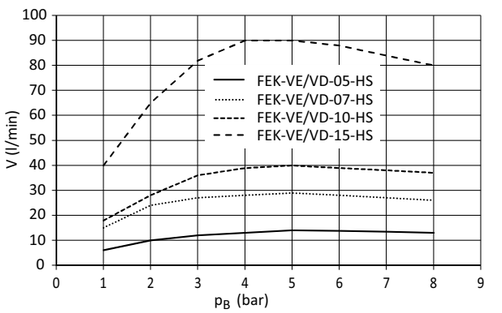
Vacuum level FEK-VD-HV at different Pressures



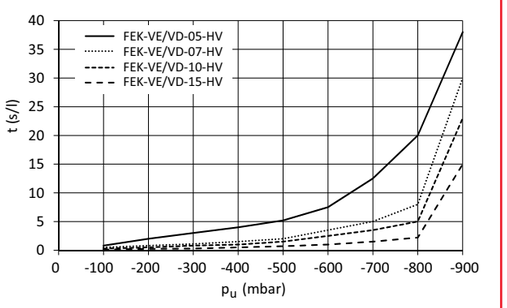
Vacuum level FEK-VD-HS at different Pressures



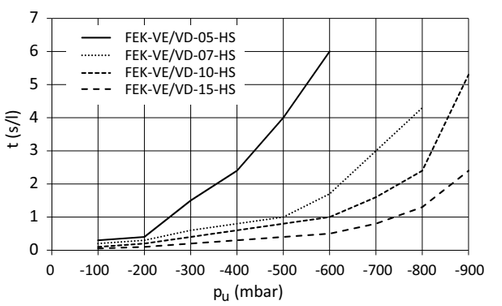
Suction volume FEK-VD-HV at different Pressures



Suction volume FEK-VD-HS at different Pressures



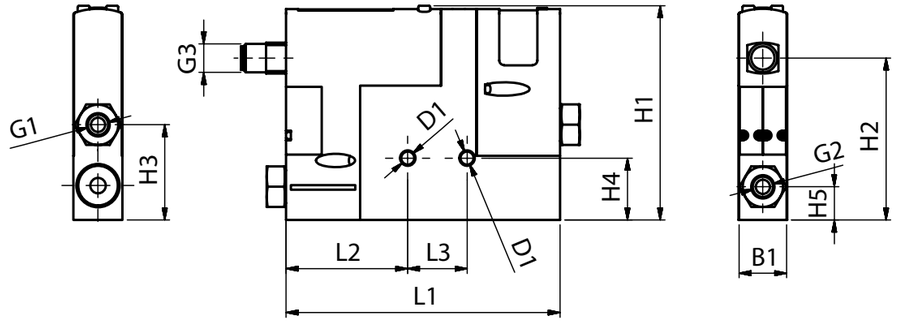
Evacuation time FEK-VD-HV at different Grades of evacuation



Evacuation time FEK-VD-HS at different Grades of evacuation

Ejectors

Compact ejector FEK-VD



FEK-VD-05 ... FEK-VD-15

Dimensions

Type	L1	L2	L3	B1	H1	H2	H3	H4	H5	D1	G1	G2	G3
FEK-VE-05- ...	115	51	25	20,5	90	68	40	26	14,5	5,5	6	6	M12x1
FEK-VE-07- ...	161	51	25	20,5	90	68	40	26	14,5	5,5	8	8	M12x1
FEK-VE-10- ...	161	51	25	20,5	90	68	40	26	14,5	5,5	8	8	M12x1
FEK-VE-15- ...	161	57	25	20,5	90	68	40	26	14,5	5,5	8	8	M12x1

Evacuation and ventilation time (s) for 1l volume

Type	Vacuum level (mbar)								Ventilation time at max. vacuum level*
	-100	-200	-300	-400	-500	-600	-700	-800	
FEK-VD-05-HV	1,0	2,0	3,0	4,0	6,0	7,5	12,5	18	0,02
FEK-VD-05-HS	0,3	0,8	1,5	2,4	4,0	6,0	---	---	0,02
FEK-VD-07-HV	0,5	1,0	1,5	2,0	2,5	3,5	5,0	8,0	0,01
FEK-VD-07-HS	0,2	0,3	0,6	0,8	1,0	1,6	3,0	---	0,01
FEK-VD-10-HV	0,4	0,9	1,3	1,6	2,0	2,8	3,8	5,0	0,01
FEK-VD-10-HS	0,1	0,2	0,4	0,6	0,8	1,0	1,3	2,4	0,01
FEK-VD-15-HV	0,3	0,5	0,8	1,0	1,3	1,6	1,9	2,5	0,01
FEK-VD-15-HS	0,1	0,1	0,2	0,3	0,4	0,6	0,8	1,1	0,01

* at optimum pressure with max. blow-off impulse

Ejectors

Multi-stage ejector FEM

FEZER
Simply move more.

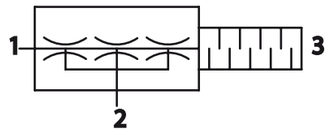
Description
Robust and powerful multi-stage ejector in modular design. Depending on the power requirements this ejector can be upgraded with up to 6 three-stage nozzles. The modular design allows to configure the ejector at any time and adjust it to altered requirements. The ejector consists of a low-weight plastic housing and is supplied with a silencer.

Application
- evacutation of large volumes
- handling of porous materials
- any mounting position

FEM-6 ... FEM-36

Article number

Type		Silencer
FEM-6	1.44.2.0011	2.44.2.0003
FEM-12	1.44.2.0012	2.44.2.0003
FEM-18	1.44.2.0013	2.44.2.0003
FEM-24	1.44.2.0014	2.44.2.0003



Switching diagram FIM

1 Compressed air connection
2 Vacuum connection
3 Exhaust

Ejectors

Multi-stage ejector FEM

FEZER
Simply move more.

Technical data

Type	Vacuum* (mbar)	Suction volume* (m³/h)	(l/s)	Air consumption* (m³/h)	(l/s)	Pressure** (bar) max.	opt.	Noise level* dB (A)	Temperature (°C)	Weight (kg)
FEM-6	-750	21,6	6	0,49	1,75	7	6	60 ... 77	-10 ... 60	0,67
FEM-12	-750	43,2	12	0,97	3,50	7	6	60 ... 77	-10 ... 60	0,72
FEM-18	-750	64,8	18	1,46	5,25	7	6	60 ... 77	-10 ... 60	0,89
FEM-24	-750	86,4	24	1,94	7,00	7	6	60 ... 77	-10 ... 60	0,94

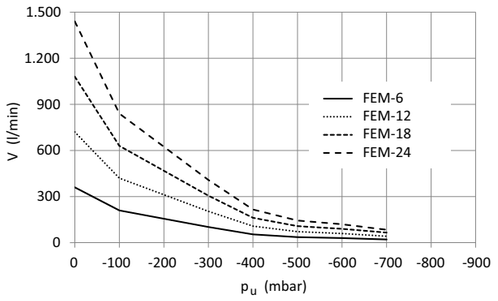
* *at optimum pressure,*
** *dry, filtered, oil-free compressed air*

Evacuation and ventilation time (s) for 1l volume

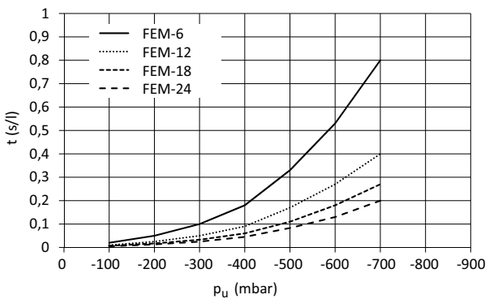
Type	Vacuum level (mbar) -100	-200	-300	-400	-500	-600	-700	-800	Ventilation time at max. vacuum level
FEM-6	0,02	0,05	0,10	0,20	0,30	0,50	0,80	---	0,48
FEM-12	0,01	0,03	0,05	0,09	0,20	0,30	0,40	---	0,25
FEM-18	0,01	0,02	0,03	0,06	0,10	0,20	0,30	---	0,18
FEM-24	0,01	0,01	0,02	0,04	0,08	0,10	0,20	---	0,10

Ejectors

Multi-stage ejector FEM



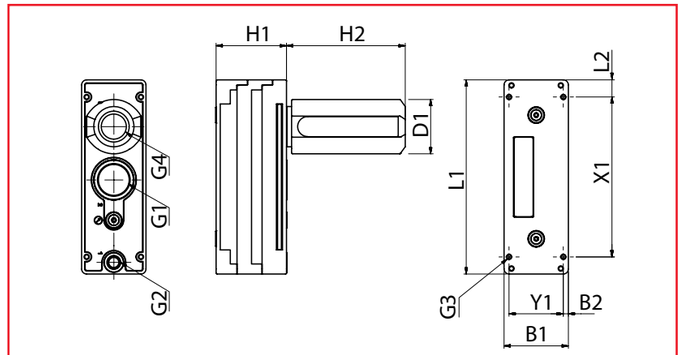
Suction volume FEM- at different grades of evacuation



Evacuation time FEM- at different grades of evacuation

Ejectors

Multi-stage ejector FEM



FEM-6 ... FEM-24

Dimensions

Type	L1	L2	B1	B2	H1	H2	X1	Y1	G1	G2	G3	G4
FEM-6	198	17	64	5	46	118	159	49	G1/8	G3/4	4	G1
FEM-12	198	17	64	5	46	118	159	49	G1/8	G3/4	4	G1
FEM-18	198	17	64	5	70	118	159	49	G1/8	G3/4	4	G1
FEM-24	198	17	64	5	70	118	159	49	G1/8	G3/4	4	G1

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Simply move more.

Ejectors

Multi-stage ejector with air saving automatic FEMR

Description

Robust and powerful multi-stage ejector in modular design. Depending on the power requirements this ejector can be upgraded with up to 6 three-stage nozzles. The modular design allows to configure the ejector at any time and adjust it to altered requirements. By the integrated air saving automatic the ejector regulates automatically the creation of the vacuum which decreases the compressed air consumption considerably. The ejector consists of a low-weight plastic housing and is supplied with a silencer.

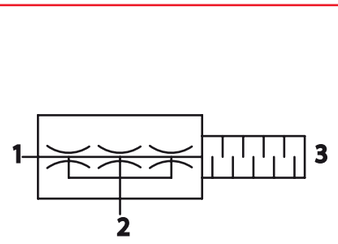
Application

- evacuation of large volumes
- handling of porous materials
- any mounting position

FEMR-6 ... FEMR-36

Article number

Type		Silencer
FEMR-6	1.44.2.0019	2.44.2.0003
FEMR-12	1.44.2.0020	2.44.2.0003
FEMR-18	1.44.2.0021	2.44.2.0003
FEMR-24	1.44.2.0022	2.44.2.0003



Switching diagram FIM

1 Compressed air connection
2 Vacuum connection
3 Exhaust

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Ejectors

Multi-stage ejector with air saving automatic FEMR

Technical data

Type	Vacuum*	Suction volume*		Air consumption*		Pressure** (bar)		Noise level*	Temperature	Weight
	(mbar)	(m^3/h)	(l/s)	(m^3/h)	(l/s)	max.	opt.	dB (A)	(°C)	(kg)
FEMR-6	-750	21,6	6	0,49	1,75	7	6	60 ... 77	-10 ... 60	0,67
FEMR-12	-750	43,2	12	0,97	3,50	7	6	60 ... 77	-10 ... 60	0,72
FEMR-18	-750	64,8	18	1,46	5,25	7	6	60 ... 77	-10 ... 60	0,89
FEMR-24	-750	86,4	24	1,94	7,00	7	6	60 ... 77	-10 ... 60	0,94

* *at optimum pressure,*
** *dry, filtered, oil-free compressed air*

Evacuation and ventilation time (s) for 1l volume

Type	Vacuum level (mbar)								Ventilation time at
	-100	-200	-300	-400	-500	-600	-700	-800	max. vacuum level
FEMR-6	0,02	0,05	0,10	0,20	0,30	0,50	0,80	---	0,48
FEMR-12	0,01	0,03	0,05	0,09	0,20	0,30	0,40	---	0,25
FEMR-18	0,07	0,02	0,03	0,06	0,10	0,20	0,30	---	0,18
FEMR-24	0,01	0,01	0,02	0,04	0,08	0,10	0,20	---	0,10

Ejectors

Multi-stage ejector with air saving automatic FEMR

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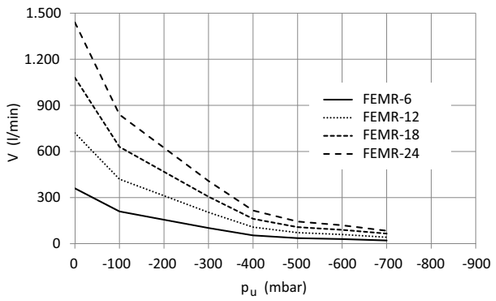
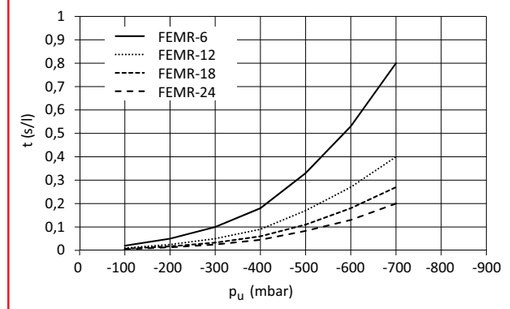


Suction capacity FEMR- at different grades of evacuation



Evacuation time FEMR- at different grades of evacuation

Ejectors

Multi-stage ejector with air saving automatic FEMR

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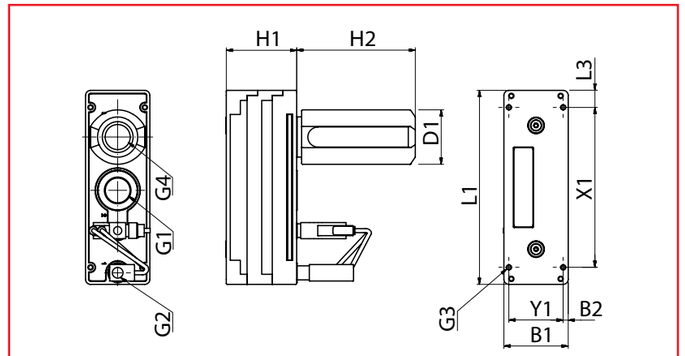

FEMR-6 ... FEMR-36

Dimensions

Type	L1	L2	B1	B2	H1	H2	X1	Y1	G1	G2	G3	G4
FEM-6	198	17	64	5	46	118	159	49	G1/8	G3/4	4	G1
FEM-12	198	17	64	5	46	118	159	49	G1/8	G3/4	4	G1
FEM-18	198	17	64	5	70	118	159	49	G1/8	G3/4	4	G1
FEM-24	198	17	64	5	70	118	159	49	G1/8	G3/4	4	G1

1. Basics
2. Suction Pads
3. Mounting Elements
4. Vacuum Generators
5. Valve Technology
6. Vakcuum Supervision
7. Filter Elements
8. Connection Elements
9. System Technology

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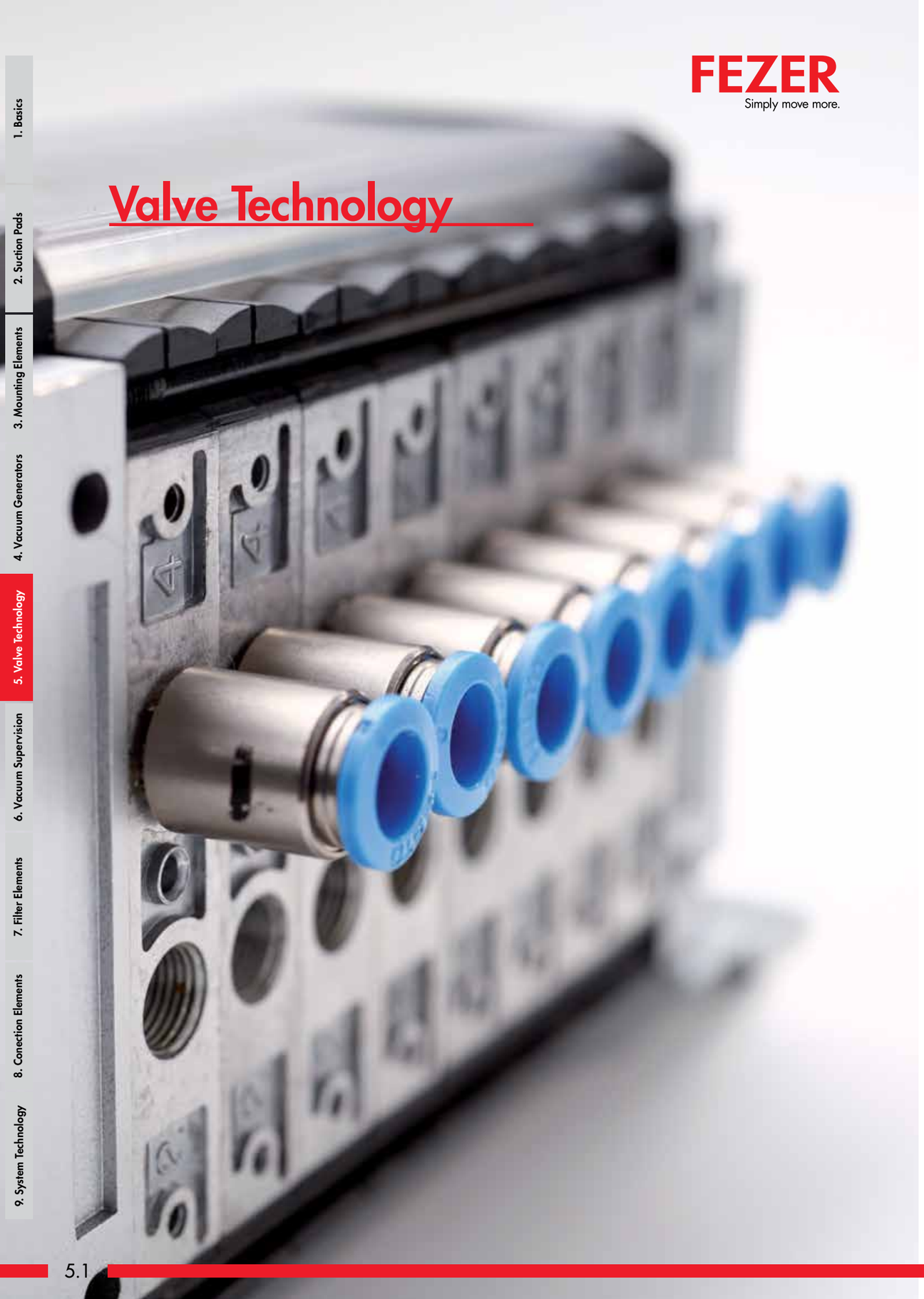
Valve Technology



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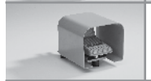
Vacuum Valves

Overview

Electro-Pneumatic Valves		Technical Data		Description	Page
	Solenoid Valve PEVM	Nom. width (mm) Flow rate (l/min) Control		pneumatically controlled vacuum valvel to control a suction circuit	5.3
	Valve Islands VI	Nom. width (mm) Flow rate (l/min) Control	6 800 Profi-Bus	simultaneous vacuum control of several suction circuits	5.5

Solenoid Valves		Technical Data		Application	Page
	Solenoid Valve EMVK	Nom. width (mm) Flow rate (l/min) Control	2 ... 4 200 ... 400 24 V DC	directly controlled pneumatic valve for control suction circuits or ejectors	5.11
	Solenoid Valve EMV	Nom. width (mm) Flow rate (l/min) Control	10 ... 25 430 ... 1200 24 V DC / 230 V	directly controlled vacuum valve to control suction circuits	5.13
	Impulse Valve IMV	Nominal width (mm) Flow rate (l/min) Control	10 ... 25 350 ... 1350 24 V DC / 230 V	directly controlled, bistable vacuum valve to control individual circuits on systems with several suction circuits	5.15
	Reversing Valve UV	Nom. width (mm) Flow rate (l/min) Control	10 ... 25 24 V DC	directly controlled vacuum valve to control suction circuits when using vacuum blowers	5.17

Manually controlled Valves		Technical Data		Application	Page
	Handslide Valve HSV	Nom. width (mm) Flow rate (l/min)	9 ... 23 200 ... 880	manual control suction circuits	5.19
	2/2-Ways-Ball valve KV	Nom. width (mm) Flow rate (l/min)	12 ... 30 430 ... 1450	manual switching on and off of individual suction pads	5.21
	3/2-Ways Ball valve KV	Nom. width (mm) Flow rate (l/min)	19 ... 30 550 ... 1550	manual switching on and off of individual suction pads with simultaneous ventilation (large volumes)	5.23
	Foot Interruptor FUB	Nom. width (mm) Flow rate (l/min)	7 100	manual control of suction circuits via foot control	5.25
	Vacuum Regulation Valve VRV	Nom. width (mm) Flow rate (l/min)	0 ... 24 135 ... 300	adjustment of the operational vacuum	5.27
	Pressure Regulation Valve DRV	Nom. width (mm) Flow rate (l/min)			5.29

Automatic Valves		Technical Data		Application	Page
	Non-return Valve RSV	Nom. width (mm) Flow rate (l/min)	8 ... 22 150 ... 1400	safety valve between vacuum generator and safety tank.	5.31
	Flow Valve SV	Nom. width (mm) Flow rate (l/min)		valve that closes automatically any unoccup-ied suction pad	5.33
	Flow Valve SVE	Nom. width (mm) Flow rate (l/min)		adjustable valve that closes automatically any unoccupied suction pad	5.35
	Flow Resistance SW	Nom. width (mm) Flow rate (l/min)		liwiths the flow rate of unoccupied suction pads	5.37
	Touch Valve TV	Nom. width (mm) Flow rate (l/min)		automatic opening of suction pads when being set down on workpieces	5.39

Electro-Pneumatic Valves

3/2-ways pneumatic valve PEMV

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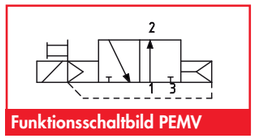
Description

Robust 3/2-ways valve, pneumatically controlled with spring return for vacuum and compressed air applications. The valves are generally supplied in NO design (currentless open); in case of a sudden power failure the valve remains in the condition „suction“. Due to the pneumatic control the valve have a low electrical power consumption with a simultaneous high flow rate.

Application

- for „suction“ and „release“ control
- control of ejectors and pneumatic parts
- any mounting position



Funktionsschaltbild PEMV


PEMV-1/8 ... PEMV-3/4

Article number

Type		Replacement magnet coil	Replacement connection plug	suitable Ventilation filter		suitable Vacuum filter	
PEMV-3/2-1/8-24V	1.51.2.0084	2.51.2.0072	2.51.2.0071	BFS-1/8	1.53.1.0012	VFK-1/8	1.53.2.0020
PEMV-3/2-1/4-24V	1.51.2.0085	2.51.2.0072	2.51.2.0071	BFS-1/4	1.53.1.0013	VFK-1/4	1.53.2.0018
PEMV-3/2-1/2-24V	1.51.2.0086	2.51.2.0072	2.51.2.0071	BFS-1/2	1.53.1.0014	VFK-1/2	1.53.2.0021
PEMV-3/2-3/4-24V	1.51.2.0087	2.51.2.0072	2.51.2.0071	BFS-3/4	1.53.1.0016	VFK-3/4	1.53.2.0022

Technical data

Type	Pressure range (bar)	Nominal width (mm)	Flow rate (m^3/h)	(l/s)	Switch. cycles (1/min)	Switching time (ms)	Temperature (°C)	Weight (kg)
PEMV-3/2-1/8-24V	-0,95 ... 8	5	9,0	2,5	1200	30	-5 ... +45	0,30
PEMV-3/2-1/4-24V	-0,95 ... 8	7	13,3	3,7	1200	45	-5 ... +45	0,40
PEMV-3/2-1/2-24V	-0,95 ... 8	14	53,3	14,8	800	90	-5 ... +45	1,25
PEMV-3/2-3/4-24V	-0,95 ... 8	19	84,6	23,5	800	40	-5 ... +45	1,45

Electrical data

Type	Voltage (V)	Power (W)	Safety class	Isolation class	On-time	Connection
PEMV-3/2-1/8-24V	24	4,5	IP 65	H	100 %	MSSD-F, 3S
PEMV-3/2-1/4-24V	24	4,5	IP 65	H	100 %	MSSD-F, 3S
PEMV-3/2-1/2-24V	24	4,5	IP 65	H	100 %	MSSD-F, 3S
PEMV-3/2-3/4-24V	24	4,5	IP 65	H	100 %	MSSD-F, 3S

Electro-Pneumatic Valves

3/2-ways pneumatic valve PEMV

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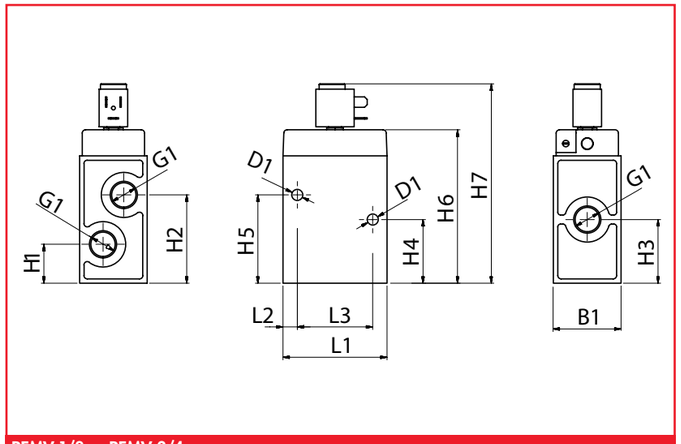

PEMV-1/8 ... PEMV-3/4

Dimensions

Type	L1	L2	L3	B1	H1	H2	H3	H4	H5	H6	H7	D1	G1
PEMV-3/2-1/8-24V	45	6	40	26	12,5	31,5	22	12,5	12,5	65	97	5,5	G1/8
PEMV-3/2-1/4-24V	50	6	45	30	17	41	29	12,5	22,5	80	112	6,5	G1/4
PEMV-3/2-1/2-24V	80	11	58	52	30	68	49	49	68	118	165	8,5	G1/2
PEMV-3/2-3/4-24V	92	10	72	68	34	78	56	56	78	138	171	8,5	G3/4

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Electro-Pneumatic Valves

Valve island VI

Description
Compact valve island with bistable vacuum valves for control of several independantly working suction circuits. The valve islands require compressed air (4 - 8 bar) and have a central vacuum connection.

The vacuum supply can be achieved by vacuum pumps or ejectors. The valve islands are controlled by a Profi-Bus-DP system and can thus be easily integrated in a higher control.

Via an internal Bus connection two valve islands can be integrated as Bus participants. The bistable valve design also guarantees adequate safety in case of a power failure as the valves keep their switch position and engaged workpieces are kept safely suspended.

Application
- Single control of suction pads
- control of several independantly working suction circuits
- any mounting position

Control
- connection of higher field bus knots or on control blocks
- standard design for Profibus-DP, 12MBd
- connection possibility of up to 32 entrances
- valve island is treated as exit module with up to 8 exits
- connection of two valve islands as „Master-Slave" possible

Designs
- Basic design with fixing brackets and 8 mm plug connector
- control of 3-6 suction circuits with integrated blow-off impulse
- control of 7-8 suction circuits w/o integrated blow-off impulse. Blow-off impulse can be realised via a separate pneumatic valve

Accessories
To complement and connect the systems there are various accessories available.
- Entrance modules for the connection of sensors
- BUS connection cable for valve islands and entrance modules
- connection cable for entrance modules to the sensors

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Electro-Pneumatic Valves

Valve island VI

VI-14-4I-1A ... VI-14-8I

Application example

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Electro-Pneumatic Valves

Valve island VI

Article number

Type	w/o blow-off function	with blow-off function -1A
VI-14-3I-(1A)-PROFI	1.51.3.0054	1.51.3.0011
VI-14-4I-(1A)-PROFI	1.51.3.0042	1.51.3.0019
VI-14-5I-(1A)-PROFI	1.51.3.0055	1.51.3.0053
VI-14-6I-(1A)-PROFI	1.51.3.0043	1.51.3.0012
VI-14-7I-PROFI*	1.51.3.0056	---
VI-14-8I-PROFI*	1.51.3.0007	---
VI-14-3I-(1A)-INTERN	1.51.3.0049	1.51.3.0052
VI-14-4I-(1A)-INTERN	1.51.3.0048	1.51.3.0051
VI-14-5I-(1A)-INTERN	1.51.3.0047	1.51.3.0050
VI-14-6I-(1A)-INTERN	1.51.3.0046	1.51.3.0017
VI-14-7I-INTERN*	1.51.3.0045	---
VI-14-8I-INTERN*	1.51.3.0008	---

** blow-off function possible via separate pneumatic valve!*

Technical data

Pressure range:	(bar)	-1 ... 8
Control pressure:	(bar)	3 ... 8
Nominal width:	(mm)	6
Flow rate at vacuum (-1bar):	(m^3/h)	0,6
	(l/s)	2,2
Flow rate at compressed air (6bar):	(m^3/h)	1,8
	(l/s)	6,6
Switching time on:	(ms)	25
Switching time off:	(ms)	35
Temperature:	(°C)	-5 ... +50
Weight:	(kg)	0,460

Electrical data

Operating voltage:	(V)	20,4 ... 26,4
electrical power consumption:	(W)	0,9
Safety class:		IP65
Isolation class:		H
On-time:		100%
Electrical connection:		M9

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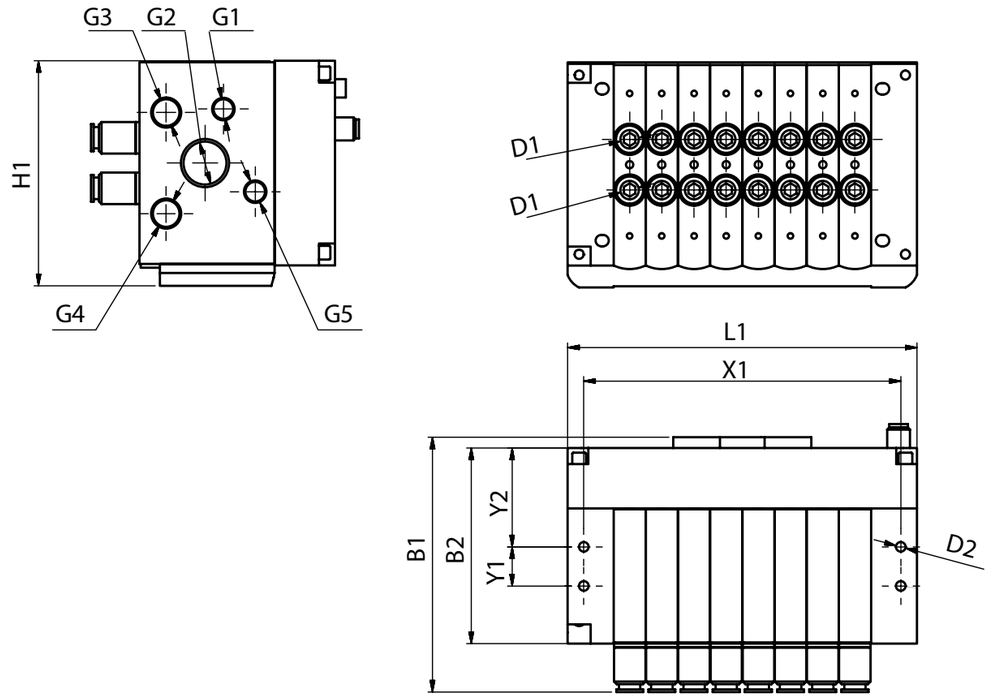
Electro-Pneumatic Valves

Valve island VI



VI-14-4I-1A ... VI-14-8I

Dimensions:

Type	L1	B1	B2	H1	D1	D2	G1	G2	G3	G4	G5	X1	Y1	Y2
VI-14-4I-1A-PROFI	124	111	85	98	8	4,2	G1/8	G1/2	G1/4	G1/4	G1/8	138	17	85
VI-146I-1A-PROFI	152	111	85	98	8	4,2	G1/8	G1/2	G1/4	G1/4	G1/8	138	17	85
VI-14-8I-PROFI	152	111	85	98	8	4,2	G1/8	G1/2	G1/4	G1/4	G1/8	138	17	85
VI-14-4I-1A-INTERN	152	111	85	98	8	4,2	G1/8	G1/2	G1/4	G1/4	G1/8	138	17	85
VI-146I-1A-INTERN	152	111	85	98	8	4,2	G1/8	G1/2	G1/4	G1/4	G1/8	138	17	85
VI-14-8I-INTERN	152	111	85	98	8	4,2	G1/8	G1/2	G1/4	G1/4	G1/8	138	17	85

Electro-Pneumatic Valves

Accessories for valve islands

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Voltage plug BSS-
Connection plug to supply the valve islands with voltage. The plugs are available with PG7- and PG9-screw connections.


BSS- ...

Article numbern

Type	
BSS-PG7	2.51.3.0014
BSS-PG9	2.51.3.0015

Connection cable for DP-Bus VBK-DP
The cables connect the valve islands (Master/Slave) to the entrance modules on BUS systems. Up to 4 units can be connected, which can work as BUS participants.


VBK-DP- ...

Article number

Type	
VBK-DP-M9B90-5P-M9S90-5P-0,5M	2.51.3.0017
VBK-DP-M9B90-5P-M9S90-5P-1M	2.51.3.0016
VBK-DP-M9B90-5P-M9S90-5P-2,5M	2.51.3.0005

Electro-Pneumatic Valves

Accessories for valve islands

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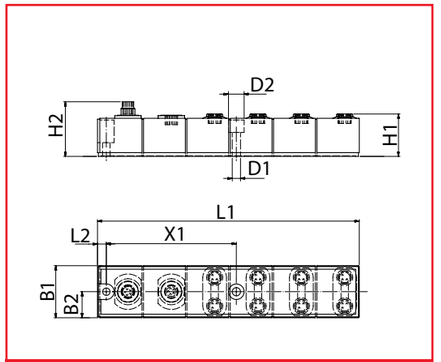
Entrance module EM-
Entrance modules are used for connection of sensoric elements like vacuum switches, initiators, etc. There are two modules with 8 or 16 singly occupied entrances. Each with an M8 connection and 3 pins. The 16-entrance module has additional LED condition displays. The connection cables for the sensor technology can be found in chapter „Connection Elements“

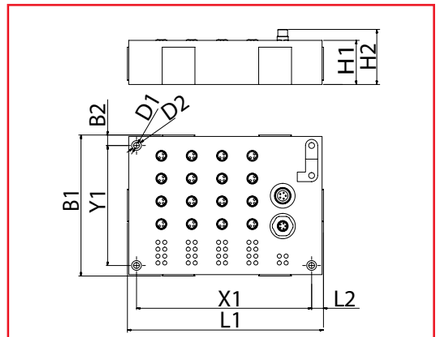

EM-8-M8-3P ... EM-16-M8-3P

Entrance modules

Type	
EM-8-M8-3P	6.35.4.0280
EM-16-M8-3P-LED	6.35.4.0279



EM-8-M8-3P



EM-16-M8-3P

Dimensions

Type	L1	L2	B1	B2	H1	H2	X1	Y1	D1	D2
EM-8-M8-3P	151	5,1	30	15	24,5	31,5	75	---	7	4,3
EM-16-M8-3P	142	8,5	102	7,5	32	40	127	87	7	4,3

Electro-Pneumatic Valve

3/2-ways solenoid valve EMVK

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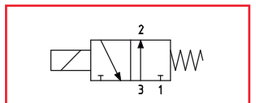
Description
Robust 3/2-ways valve, directly controlled with spring return for vacuum and compressed air applications. The valves are generally in NO design (currentless open), which keeps the valve in the „suction"-condition in case of a sudden power failure. The valves are equipped with a thread connection for installation.

Application
- for „suction" and „release" control
- control of ejectors and pneumatic parts
- separate blow-off impulse with max. 8 bar
- any mounting position



Function diagram EMVK

EMVK-1/8" ... EMVK-1/4"

Article number

Type		suitable ventilation filter		suitable vacuum filter	
EMVK-3/2-1/8-24V	1.51.2.0093	BFS-1/8	1.53.1.0012	VFK-1/8	1.53.2.0020
EMVK-3/2-1/4-24V	1.51.2.0067	BFS-1/4	1.53.1.0013	VFK-1/4	1.53.2.0018

Technical data

Type	Pressure range (bar)	Nominal width (mm)	Flow rate (m^3/h)	Flow rate (l/s)	Switch.cycles (1/min)	Switching time (ms)	Temperature (°C)	Weight (kg)
EMVK-3/2-1/8-24V	-0,95 ... 8	3	3,3	0,9	1200	8	-5 ... +45	0,12
EMVK-3/2-1/4-24V	-0,95 ... 8	4	4,7	1,3	800	10	-5 ... +45	0,27

Electrical data

Type	Voltage (V)	Power (W)	Safety class	Isolation class	On-time	Connection
EMVK-3/2-1/8-24V	24	3,7	IP 65	H	100 %	Stecker 2S
EMVK-3/2-1/4-24V	24	8,5	IP 65	H	100 %	Stecker 2S

Electro-Pneumatic Valves

3/2-ways solenoid valve EMVK

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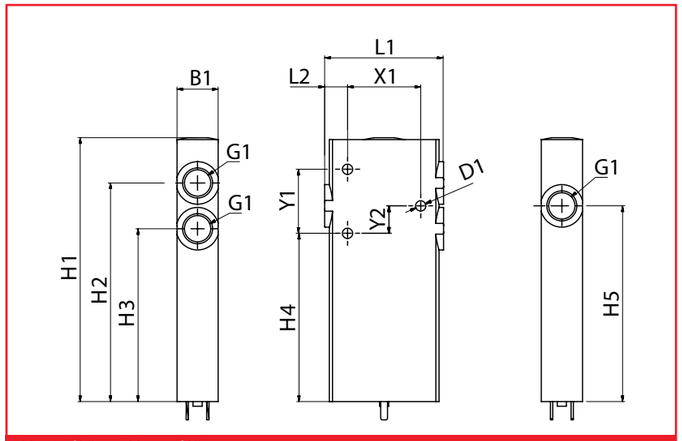


EMVK-1/8" ... EMVK-1/4"

Dimensions

Type	L1	L2	B1	H1	H2	H3	H4	H5	D1	G1	X1	Y1	Y2
EMVK-3/2-1/8-24V	45	10	14	95	79,5	63,5	61,5	71,5	4,5	G1/8	25	20	10
EMVK-3/2-1/4-24V	52	10	18	115	95,5	75,5	73,5	85,5	4,5	G1/4	32	28	12

Connection cable

Type		Electrical connection	Switching condition display	Material	Length
AK-EMVK-2,5M-PUR-LED	6.35.3.1328	Stecker - 90°	LED	PUR	2,5 m
AK-EMVK-5M-PUR-LED	6.35.3.1329	Stecker - 90°	LED	PUR	5 m
AK-EMVK-10M-PUR-LED	6.35.3.1330	Stecker - 90°	LED	PUR	10 m

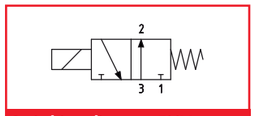
Solenoid Valves

3/2-Ways-Solenoid Valve EMV

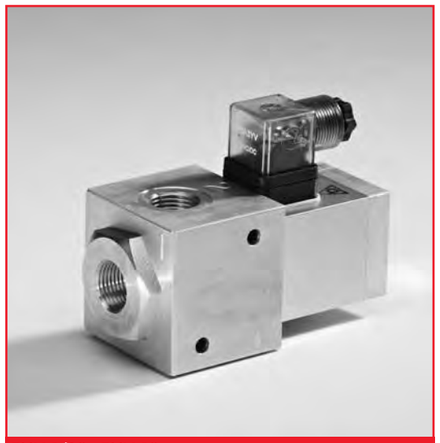
FEZER
Simply move more.

Description
Robust 3/2-ways valve, directly controlled with spring return. The valves are generally in NO design (currentless open), which keeps the valve in the „suction"-condition in case of a sudden power failure.

Application
- for „suction" and „release" control
- any mounting position
- separate blow-off impulse with max.2 bar



Switching diagram EMV


EMV 1/2" - EMV 1"

Article number

Type	Valve	Valve complete *	Replacement plug	suitable ventilation filter		suitable vacuum filter	
EMV-3/2-R1/2-24V	1.51.2.0016	1.51.2.0015	2.51.2.0015	BFS-1/2	1.53.1.0014	VF-1/2	1.53.2.0002
EMV-3/2-R1/2-230V	1.51.2.0014	1.51.2.0013	2.51.2.0014	BFS-1/2	1.53.1.0014	VF-1/2	1.53.2.0002
EMV-3/2-R3/4-24V	1.51.2.0020	1.51.2.0019	2.51.2.0020	BFS-3/4	1.53.1.0015	VF-3/4	1.53.2.0006
EMV-3/2-R3/4-230V	1.51.2.0018	1.51.2.0017	2.51.2.0019	BFS-3/4	1.53.1.0015	VF-3/4	1.53.2.0006
EMV-3/2-R1-24V	1.51.2.0024	1.51.2.0023	2.51.2.0020	BFS-1	1.53.1.0016	VF-11/4	1.53.2.0003
EMV-3/2-R1-230V	1.51.2.0022	1.51.2.0021	2.51.2.0019	BFS-1	1.53.1.0016	VF-11/4	1.53.2.0003

** incl. ventilation filter and 2 hose nipples*

Technical data

Type	Pressure range (bar)	Nominal width (mm)	Flow rate (m³/h)	(l/s)	Switch.cycles (1/min)	Switching time (ms)	Temperature (°C)	Weight (kg)
EMV-3/2-R1/2-24V	-1 ... +1	12	36	10,0	70	30	-5 ... +45	1,0
EMV-3/2-R1/2-230V	-1 ... +1	12	36	10,0	70	30	-5 ... +45	1,0
EMV-3/2-R3/4-24V	-1 ... +1	20	70	19,4	70	130	-5 ... +45	5,6
EMV-3/2-R3/4-230V	-1 ... +1	20	70	19,4	70	130	-5 ... +45	5,6
EMV-3/2-R1-24V	-1 ... +1	25	73	20,3	70	130	-5 ... +45	5,4
EMV-3/2-R1-230V	-1 ... +1	25	73	20,3	70	130	-5 ... +45	5,4

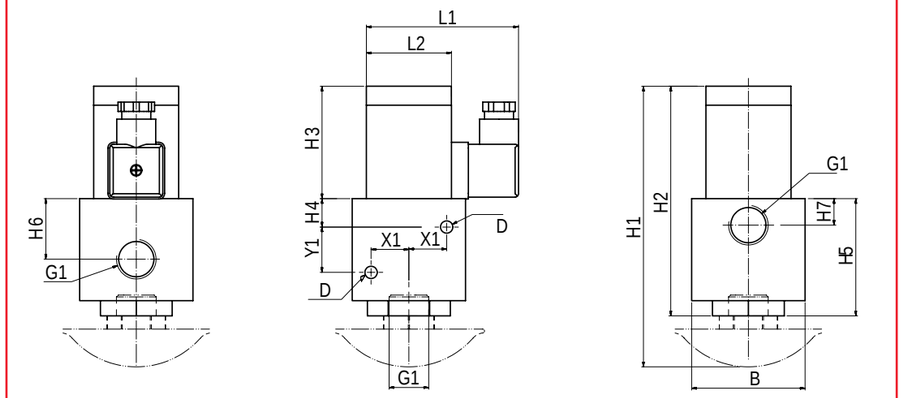
Electrical data

Type	Voltage (V)	Current consump. (A)	Safety class	Isolation class	On-time	Connection
EMV-3/2-R1/2-24V	24	0,76	IP 65	F	100 %	DIN 43650, Form A
EMV-3/2-R1/2-230V	230, 50Hz	0,16	IP 65	F	100 %	DIN 43650, Form A
EMV-3/2-R3/4-24V	24	1,70	IP 65	F	100 %	DIN 43650, Form A
EMV-3/2-R3/4-230V	230, 50Hz	0,16	IP 65	F	100 %	DIN 43650, Form A
EMV-3/2-R1-24V	24	1,70	IP 65	F	100 %	DIN 43650, Form A
EMV-3/2-R1/4-230V	230, 50Hz	0,16	IP 65	F	100 %	DIN 43650, Form A

Solenoid Valves

3/2-ways solenoid valve EMV

FEZER
Simply move more.



EMV 1/2" - EMV 1"

Dimensions

Type	L1	L2	B1	B2	H1	H2	H3	H4	H5	H6	H7	D1	G1	X1	Y1
EMV-3/2-R1/2-24V	88	45	60	80	162	121	60	14	62	32	14	6,5	G1/2	20	25
EMV-3/2-R1/2-230V	88	45	60	80	162	121	60	14	62	32	14	6,5	G1/2	20	25
EMV-3/2-R3/4-24V	130	80	100	80	257	206	80	30	118	75	30	9	G3/4	40	45
EMV-3/2-R3/4-230V	130	80	100	80	257	206	80	30	118	75	30	9	G3/4	40	45
EMV-3/2-R1-24V	130	80	100	80	257	206	80	30	118	75	30	9	G1	40	45
EMV-3/2-R1-230V	130	80	100	80	257	206	80	30	118	75	30	9	G1	40	45

Connections and control

Type	Hose connections			Electrical control for „suction" - „release"				
	1	2	3	Function:	Terminal 1	Terminal 2	Terminal 3	Description
EMV-3/2-R1/2	Ventilation	Suction Pad	Vacuum	Suction:		-		
				Release:		-	+	positive switching
EMV-3/2-R3/4	Ventilation	Suction Pad	Vacuum	Suction:		-		
				Release:		-	+	positive switching
EMV-3/2-R1	Ventilation	Suction Pad	Vacuum	Suction:		-		
				Release:		-	+	positive switching

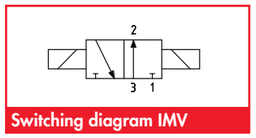
Solenoid Valves

3/2-ways impulse valve IMV

FEZER
Simply move more.

Description
Robust 3/2-ways valve, directly controlled in bistable design (with permanent magnet). The valves are only controlled via a current impulse and keep their position in case of a sudden power failure.

Application
- „suction" and „release" control for several, different suction circuits
- any mounting position
- separate blow-off impulse with max.2 bar overpressure



Switching diagram IMV


IMV 1/2" - IMV 1"

Article number

Type	Valve	Valve complete *	Replacement plug	Suitable ventilation filter		Suitable vacuum filter	
IMV-3/2-R1/2-24V	1.51.2.0047	1.51.2.0048	2.51.2.0015	BFS-1/2	1.53.1.0014	VF-1/2	1.53.2.0002
IMV-3/2-R3/4-24V	1.51.2.0036	1.51.2.0035	---	BFS-3/4	1.53.1.0015	VF-3/4	1.53.2.0006
IMV-3/2-R3/4-230V	1.51.2.0058	1.51.2.0057	---	BFS-3/4	1.53.1.0015	VF-3/4	1.53.2.0006
IMV-3/2-R1-24V	1.51.2.0034	1.51.2.0033	---	BFS-1	1.53.1.0016	VF-11/4	1.53.2.0003
IMV-3/2-R1/4-230V	1.51.2.0060	1.51.2.0032	---	BFS-1	1.53.1.0016	VF-11/4	1.53.2.0003

* incl. ventilation filter and 2 hose nipples

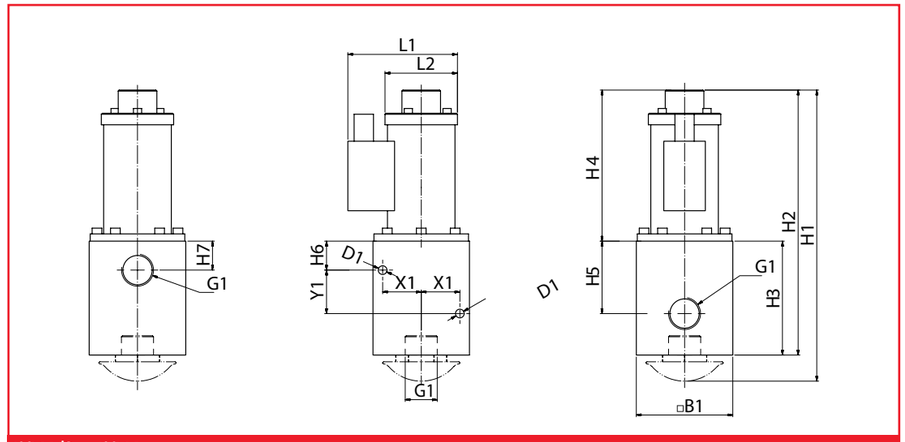
Technical data

Type	Pressure range (bar)	Nominal width (mm)	Flow rate (m^3/h)	(l/s)	Switch.cycles (1/min)	Switching time (ms)	Temperature (°C)	Weight (kg)
IMV-3/2-R1/2-24V	-1 ... +1	10	36	10,0	30	30	0 ... +45	1,0
IMV-3/2-R3/4-24V	-1 ... +1	20	70	19,4	20	45	0 ... +45	5,6
IMV-3/2-R3/4-230V	-1 ... +1	20	70	19,4	20	45	0 ... +45	5,6
IMV-3/2-R1-24V	-1 ... +1	25	73	20,3	20	45	0 ... +45	5,4
IMV-3/2-R1-230V	-1 ... +1	25	73	20,3	20	45	0 ... +45	5,4

Electrical data

Type	Voltage (v)	Current consump. (A)	Safety class	Isolation class	On-time	Connection
IMV-3/2-R1/2-24V	24	1,20	IP43	E	40 %	DIN 43650, Form A
IMV-3/2-R3/4-24V	24	4,50	IP43	E	40 %	Terminal box
IMV-3/2-R3/4-230V	230, 50Hz	0,47	IP43	E	40 %	Terminal box
IMV-3/2-R1-24V	24	4,50	IP43	E	40 %	Terminal box
IMV-3/2-R1-230V	230, 50Hz	0,47	IP43	E	40 %	Terminal box

Solenoid Valves
3/2-ways impulse valve IMV
FEZER
Simply move more.



IMV-1/2 ... IMV-1

Dimensions

Type	L1	L2	B1	H1	H2	H3	H4	H5	H6	H7	D1	G1	X1	Y1
IMV-3/2-R1/2-24V	52	40	60	181	142	65	77	16,5	15	20	6,5	G1/2	20	25
IMV-3/2-R3/4-24V	106	40	100	315	273	118	155	43	30	41	9	G3/4	40	45
IMV-3/2-R3/4-230V	106	40	100	315	273	118	155	43	30	41	9	G3/4	40	45
IMV-3/2-R1-24V	113	75	100	315	273	118	155	43	30	41	9	G1	40	45
IMV-3/2-R1-230V	113	75	100	315	273	118	155	43	30	41	9	G1	40	45

Connections and control

Type	Hose connections			elektrical control for „suction" - „release"				
	1	2	3	Function:	Terminal 1	Terminal 2	Terminal 3	Description
IMV-3/2-R1/2	Ventilat.	Suction Pad	Vacuum	Suction:	-	+		negative switching
				Release:		+	-	
IMV-3/2-R3/4	Ventilat.	Suction Pad	Vacuum	Suction:	+		-	polarity reversal
				Release:	-		+	
IMV-3/2-R1	Ventilat.	Suction Pad	Vacuum	Suction:	+		-	polarity reversal
				Release:	-		+	

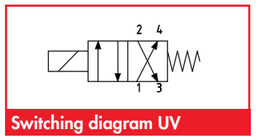
Solenoid Valves

4/2-ways reversing valve UV

FEZER
Simply move more.

Description
Robust 4/2-ways valve, directly controlled with spring return. The reversing valves are designed for vacuum blowers. The valves generally in NO design (currentless open), which keeps the valve in the „suction" position in case of a sudden power failure. Delivery with electrical connection plug.

Application
- „suction" and „release" control on applications with blowers
- applications that require a high flow rate
- any mounting position



Switching diagram UV

UV-11/2 ... UV-2

Article number

Type	Valve	Replacement connection plug	suitable ventilation filter		suitable vacuum filter	
UV-R11/2-24V	1.51.2.0039	2.51.2.0015	BF-11/2	1.53.1.0010	VF-11/4B	1.53.2.0004
UV-R11/2-230V	1.51.2.0038	2.51.2.0014	BF-11/2	1.53.1.0010	VF-11/4B	1.53.2.0004
UV-R2-24V	1.51.2.0069	2.51.2.0015	BF-11/2	1.53.1.0010	VF-21/2	1.53.2.0005
UV-R2-230V	1.51.2.0070	2.51.2.0014	BF-11/2	1.53.1.0010	VF-21/2	1.53.2.0005

Technical data

Type	Pressure range (bar)	Nominal width (mm)	Flow rate (m^3/h)	Flow rate (l/S)	Switch.cycles (1/min)	Switching time (ms)	Temperature (°C)	Weight (kg)
UV-R11/2-24V	-0,5 ... +0,5	45	360	100	120	90	0 ... +45	4,0
UV-R11/2-230V	-0,5 ... +0,5	45	360	100	120	90	0 ... +45	4,0
UV-R2-24V	-0,5 ... +0,5	57	420	116	100	110	0 ... +45	6,0
UV-R2-230V	-0,5 ... +0,5	57	420	116	100	110	0 ... +45	6,0

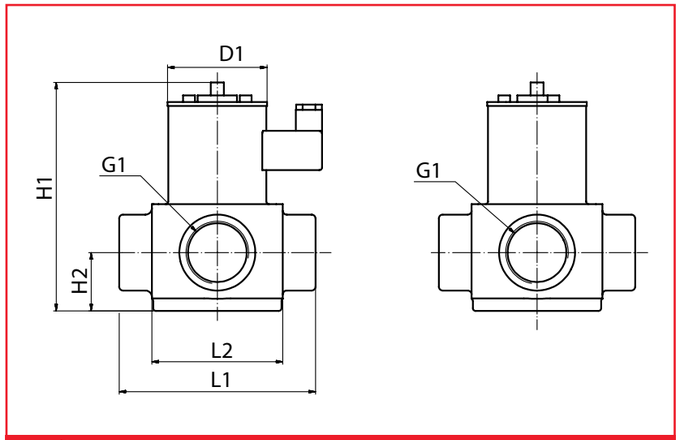
Electrical data

Type	Voltage (v)	Current consump. (A)	Safety class	Isolation class	On-time	Connection
UV-R11/2-24V	24	1,55	IP55	F	100%	DIN 43650, Form A
UV-R11/2-230V	230, 50Hz	0,19	IP55	F	100%	DIN 43650, Form A
UV-R2-24V	24	1,70	IP55	F	100%	DIN 43650, Form A
UV-R2-230V	230, 50 Hz	0,23	IP55	F	100%	DIN 43650, Form A

Solenoid Valves

4/2-ways reversing valve UV

FEZER
Simply move more.



UV-11/2 ... UV-2

Dimensions

Type	L1	L2	H1	H2	D1	G1
UV-R11/2-24V	150	100	174,5	44,5	76	G11/2
UV-R11/2-230V	150	100	174,5	44,5	76	G11/2
UV-R2-24V	150	100	240,5	62,5	102	G2
UV-R2-230V	150	100	240,5	62,5	102	G2

Connections and control

Type	Hose connections 1	2	3	4	elektrical control for „suction" - „release" Function:	Terminal 1	Terminal 2	Terminal 3	Description
UV-R11/2	Suct. side	Ventilation	Press. side	Suction Pad	Suction:	+	-		negative swtiching
	Blower		Blower		Release:		-		
UV-R2	Suct. side	Ventilation	Press. side	Suction Pad	Suction:	+	-		negative switching
	Blower		Blower		Release:		-		

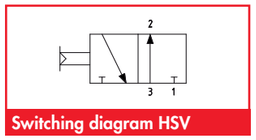
Manually controlled Valves

3/2-ways handslide valve HSV

FEZER
Simply move more.

Description
3/2-ways valve for manually-operated valves with two positions for „suction“ and „release“. The design SK is equipped with a safety button which prevents the valves from accidental operation.

Application
- vacuum control on manual lifters
- single control of suction plates
- any mounting position



Switching diagram HSV


HSV 1/4 ... HSV-3/4-SK

Article number

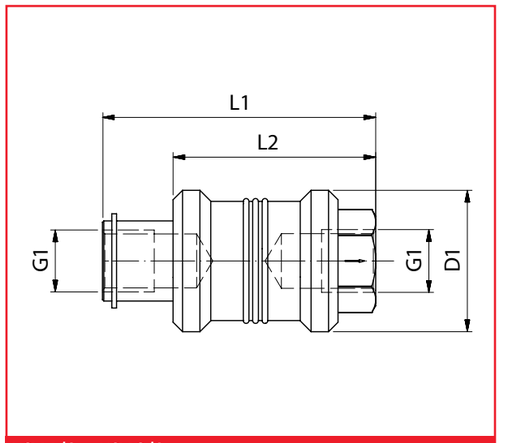
Type	
HSV-3/2-1/4	1.51.1.0004
HSV-3/2-3/8	1.51.1.0007
HSV-3/2-1/2	1.51.1.0002
HSV-3/2-1/2-SK*	1.51.1.0024
HSV-3/2-3/4	1.51.1.0005
HSV-3/2-3/4-SK*	1.51.1.0025

** Design with safety button*

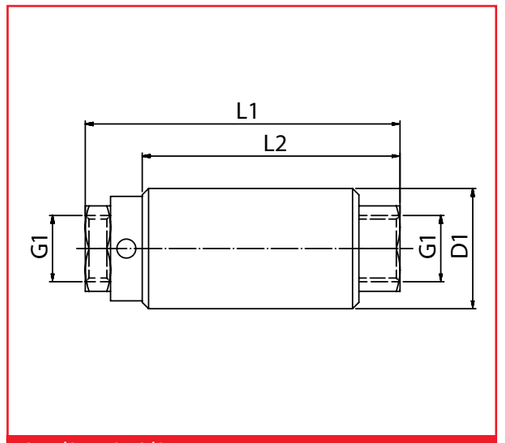
Technical data

Type	Pressure range (bar)	Nominal width (mm)	Flow rate (m^3/h)	Flow rate (l/s)	Temperature (°C)	Weight (kg)
HSV-3/2-1/4	-1 ... 0	9	12	3,3	-10 ... +60	0,05
HSV-3/2-3/8	-1 ... 0	13	21	5,8	-10 ... +60	0,07
HSV-3/2-1/2	-1 ... 0	19	33	9,2	-10 ... +60	0,07
HSV-3/2-1/2-SK	-1 ... 0	16	29	8,1	-10 ... +60	0,07
HSV-3/2-3/4	-1 ... 0	26	59	16,4	-10 ... +60	0,12
HSV-3/2-3/4-SK	-1 ... 0	23	53	14,7	-10 ... +60	0,12

Manually controlled Valves
3/2-ways handslide valve HSV
FEZER
Simply move more.



HSV 1/4 ... HSV-3/4



HSV 1/4 ... HSV-3/4

Dimensions

Type	L1	L2	D1	G1
HSV-3/2-1/4	58	43	30	G1/4
HSV-3/2-3/8	70	52	35	G3/8
HSV-3/2-1/2	80	59	40	G1/2
HSV-3/2-1/2-SK	100	73	38	G1/2
HSV-3/2-3/4	100	70	50	G3/4
HSV-3/2-3/4-SK	125	85	52	G3/4

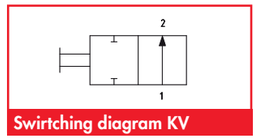
Manually controlled Valves

2/2-ways ball valve KV

FEZER
Simply move more.

Description
2/2-ways valve as ball valve in robust grey cast iron design with hand lever

Application
- manual switching on and off of single suction pads
- any mounting position



Swirtching diagram KV


KV-2/2-1/4 - KV-2/2-1

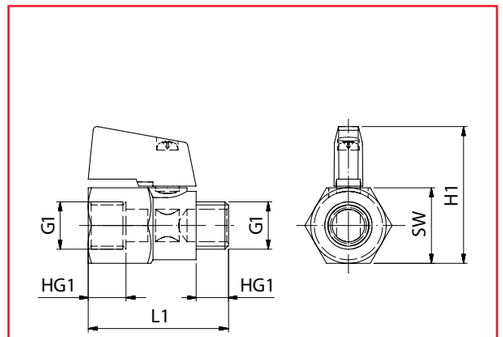
Article number

Type		Replacement lever
KV-2/2-1/4	1.51.1.0011	2.51.1.0025
KV-2/2-3/8	1.51.1.0008	2.51.1.0025
KV-2/2-1/2	1.51.1.0009	2.51.1.0025
KV-2/2-3/4	1.51.1.0014	2.51.1.0026
KV-2/2-R1	1.51.1.0012	2.51.1.0026
KV-2/2-R11/4	1.51.1.0013	2.51.1.0026

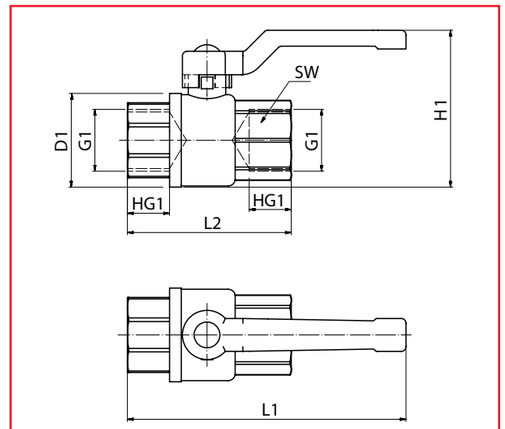
Technical data

Type	Pressure range (bar)	Nominal width (mm)	Flow rate (m^3/h)	Flow rate (l/s)	Temperature (°C)	Weight (kg)
KV-2/2-1/4	-1 ... 0	12	25	6,9	-10 ... +60	0,07
KV-2/2-3/8	-1 ... 0	14	26	7,2	-10 ... +60	0,07
KV-2/2-1/2	-1 ... 0	19	60	16,6	-10 ... +60	0,10
KV-2/2-3/4	-1 ... 0	24	110	30,6	-10 ... +60	0,34
KV-2/2-R1	-1 ... 0	30	150	41,7	-10 ... +60	0,60
KV-2/2-R11/4	-1 ... 0	36	180	50,0	-10 ... +60	0,80

Manually controlled Valves
2/2-ways ball valve KV
FEZER
Simply move more.



KV-2/2-1/4 - KV-2/2-1/2



KV-2/2-3/4 - KV-2/2-1

Dimensions

Type	L1	L2	H1	D1	G1	HG1	SW
KV-2/2-1/4	39	---	37	---	G1/4	8	21
KV-2/2-3/8	41	---	37	---	G3/8	8	21
KV-2/2-1/2	45	---	42	---	G1/2	10	25
KV-2/2-3/4	120	72	67	38	G3/4	18	32
KV-2/2-R1	136	85	90	48	G1	21	40
KV-2/2-R11/4	158	97	98	59	G11/4	23	48

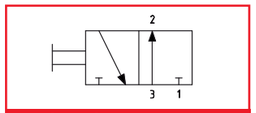
Manually controlled Valves

3/2-ways ball valve KV

FEZER
Simply move more.

Description
3/2-ways valve as ball valve in robust grey die-cast design with hand lever. For the ventilation channel appropriate ventilation filters are available.

Application
- manual switching on and off of individual suction pads
- additional ventilation channels
- any mounting position



Switching diagram KV


KV-2/2-1/4 - KV-2/2-1

Article number

Type		Replacement lever	suitable ventilation filter	
KV-3/2-1/2	1.51.1.0018	2.51.1.0004	BFS-R1/2	1.53.1.0014
KV-3/2-3/4	1.51.1.0021	2.51.1.0005	BFS-R3/4	1.53.1.0015
KV-3/2-1	1.51.1.0016	2.51.1.0003	BFS-R1	1.53.1.0016
KV-3/2-11/4	1.51.1.0020	2.51.1.0020	BF-R11/4	1.53.1.0007

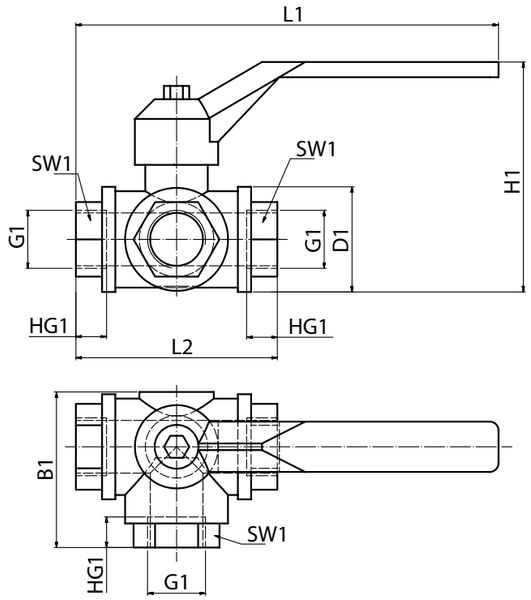
Technical data

Type	Pressure range (bar)	Nominal width (mm)	Flow rate (m^3/h)	Flow rate (l/s)	Temperature (°C)	Weight (kg)
KV-3/2-1/2	-1 ... 0	19	60	16,6	0 ... +60	0,75
KV-3/2-3/4	-1 ... 0	24	110	30,6	0 ... +60	1,25
KV-3/2-1	-1 ... 0	30	150	41,7	0 ... +60	1,90
KV-3/2-11/4	-1 ... 0	36	180	50,0	0 ... +60	2,25

Manually controlled Valves

3/2-ways ball valve KV

FEZER
Simply move more.



KV-2/2-1/4 - KV-2/2-1/2

Dimensions

Type	L1	L2	B1	H1	D1	G1	HG1	SW1
KV-3/2-1/2	166	78	60	89	39	G1/2	19	27
KV-3/2-3/4	193	92	70	105	47	G3/4	23	34
KV-3/2-1	224	105	81	125	55	G1	25	41
KV-3/2-11/4	228	120	92	137	65	G11/4	28	50

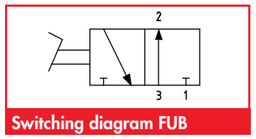
Manually controlled Valves

3/2-ways foot interruptor FUB

FEZER
Simply move more.

Description
3/2-ways valve with spring return as foot interruptor. As precaution against accidental operation the foot interruptor is equipped with a safety hood. In the initial position the valve is set on „suction“ and ventilates on actuation.

Application
- vacuum working stands
- stationary vacuum clamping devices



Switching diagram FUB


FUB-R1/4

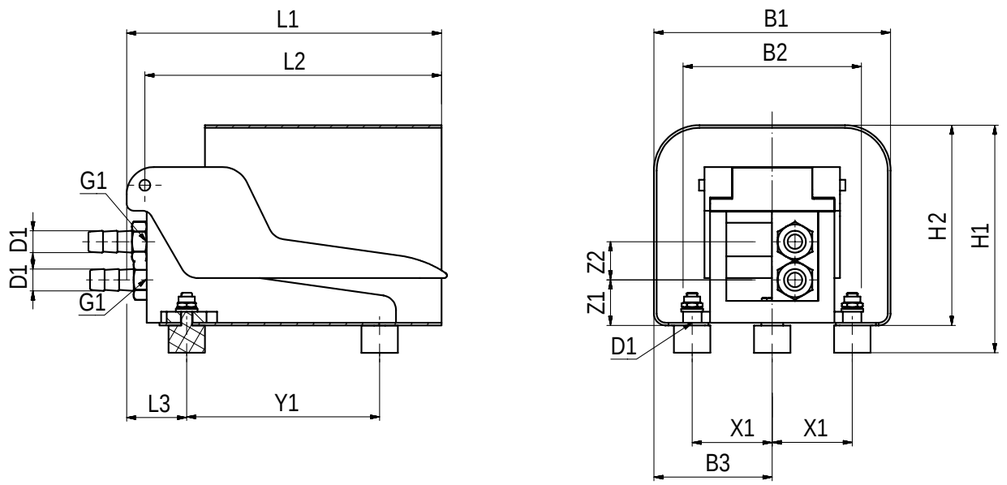
Article number

Type		suitable ventilation filter	
FUB-1/4	1.51.1.0001	BFS-R1/4	1.53.1.0013

Technical data

Type	Pressure range (bar)	Nominal width (mm)	Flow rate (m^3/h)	(l/s)	Temperature (°C)	Weight (kg)
FUB-1/4	-1 ... 0	7	6	1,67	0 ... +60	2,5

Manually controlled Valves
3/2-ways foot interruptor FUB
FEZER
Simply move more.



FUB-R1/4

Dimensions

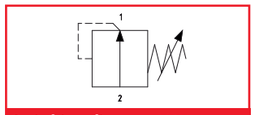
Type	L1	L2	L3	B1	B2	B3	H1	H2	D1	G1	X1	Y1	Z1	Z2
FUB-1/4	181	171	33	130	98	65	125	114	12	G1/4	44	106	23	21

Manually controlled Valves

Vacuum regulation valves VRV

Description
Robust regulation valve in brass design with adjustment screw. This valve allows to adjust the vacuum level independant of the used vacuum generator.

Application
- adjustment of pressure variations
- applications with different vacuum levels
- steplessly adjustable
- any mounting position



Switching diagram VRV


VRV-1/2 - VRV-3/4

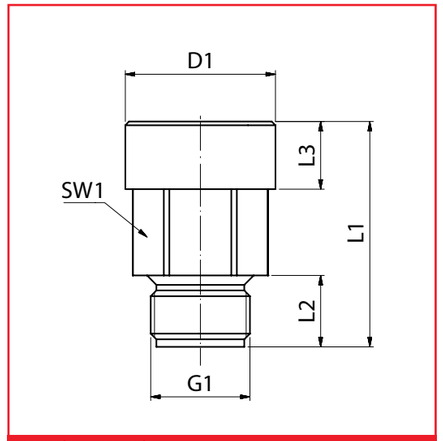
Article number

Type	
VRV-1/2	1.51.7.0001
VRV-3/4	1.51.7.0002

Technical data

Type	Range (bar)	Exactness (%)	Nominal width (mm)	Flow rate (m^3/h)	Flow rate (l/s)	Temperature (°C)	Weight (kg)
VRV-1/2	-0,98 ... 0	+/- 2,5	18	8	2,2	0 ... +60	0,12
VRV-3/4	-0,98 ... 0	+/- 2,5	24	18	5,0	0 ... +60	0,21

Manually controlled Valves
Vacuum regulation valves VRV



VRV-1/2 - VRV-3/4

Dimensions

Type	L1	L2	L3	D1	G1	SW1
VRV-1/2	51	18	16	30	G1/2	27
VRV-3/4	54	18	16	40	G3/4	32

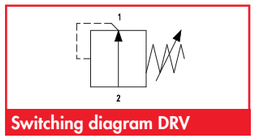
FEZER
Simply move more.

Manually controlled Valves

Pressure regulation valve DRV

Description
Pressure regulation valve with stable aluminum die-cast housing with manometer and rotary knob with arrest.

Application
- adjustment of required operating pressures
- supply of valves and ejectors with fixed operating pressures
- any mounting position



Switching diagram DRV


DRV-1/4 ... DRV-3/4

Article number

Type	
DRV-1/8	1.51.2.0066
DRV-1/4	1.51.2.0055
DRV-3/8	1.51.2.0089
DRV-1/2	1.51.2.0030
DRV-3/4	1.51.2.0091

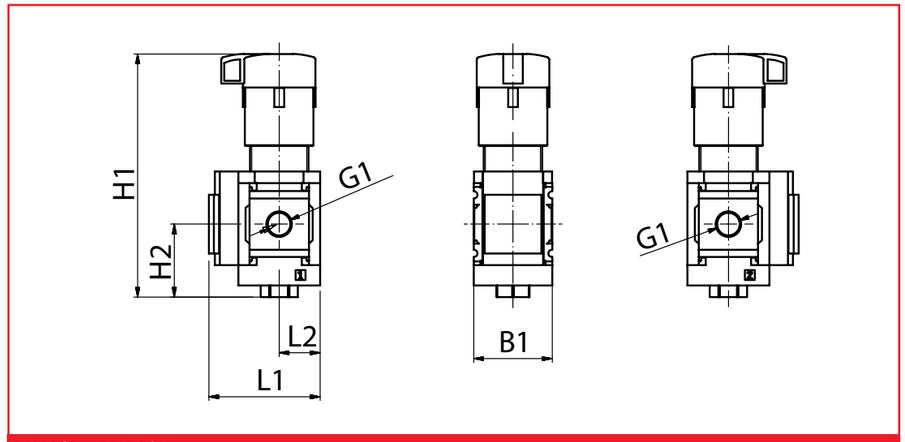
Technical data

Type	Pressure range (bar)	Flow rate (m^3/h)	Flow rate (l/s)	Temperature (°C)	Weight (kg)
DRV-1/8	-0,5 ... +12	56	15,5	+10 ... +60	0,73
DRV-1/4	-0,5 ... +12	102	28,3	+10 ... +60	0,73
DRV-3/8	-0,5 ... +12	270	75	+10 ... +60	0,73
DRV-1/2	-0,5 ... +12	330	62	+10 ... +60	0,73
DRV-3/4	-0,5 ... +12	1440	400	+10 ... +60	1,40

FEZER
Simply move more.

Manually controlled Valves

Pressure regulation valve DRV



DRV-1/4 ... DRV-3/4

Dimensions

Type	L1	L2	B1	H1	H2	G1
DRV-1/8	77	31	67	188	54	G1/8
DRV-1/4	77	31	67	188	54	G1/4
DRV-3/8	77	31	67	188	54	G3/8
DRV-1/2	77	31	67	188	54	G1/2
DRV-3/4	109	45	90	225	58	G3/4

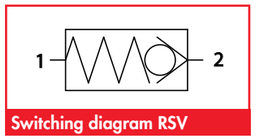
Automatic Valves

Non-return valves RSV

FEZER
Simply move more.

Description
Spring-loaded non-return valve in robust brass design. Available with inside and outside thread and in compact design.

Application
- Precaution of the vacuum system in case of power outage or failure of the vacuum generator
- used for ECO-modules (energy saving systems)
- any mounting position



Switching diagram RSV


RSV-K-1/4 ... RSV-1

Article number

Type	
RSV-K-1/4	1.51.4.0009
RSV-1/4	1.51.4.0004
RSV-3/8	1.51.4.0008
RSV-K-1/2	1.51.4.0001
RSV-1/2	1.51.4.0003
RSV-3/4	1.51.4.0007
RSV-1	1.51.4.0006

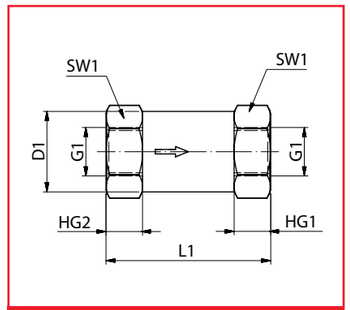
Technical data

Type	Pressure range (bar)	Nominal width (mm)	Flow rate (m^3/h)	Flow rate (l/s)	Temperature (°C)	Weight (kg)
RSV-K-1/4	-1 ... +16	8	9	2,5	0 ... +80	0,04
RSV-1/4	-1 ... +16	8	14	3,9	0 ... +80	0,10
RSV-3/8	-1 ... +16	8	24	6,7	0 ... +80	0,18
RSV-K-1/2	-1 ... +16	12	32	8,9	0 ... +80	0,06
RSV-1/2	-1 ... +16	12	41	11,4	0 ... +80	0,19
RSV-3/4	-1 ... +16	16	52	14,4	0 ... +80	0,28
RSV-1	-1 ... +16	22	85	23,6	0 ... +80	0,41

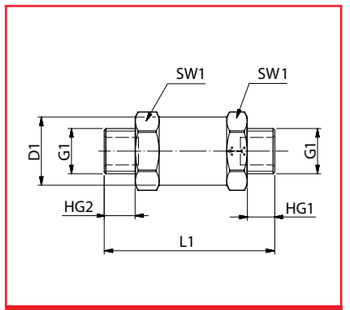
Automatic Valves

Non-return valves RSV

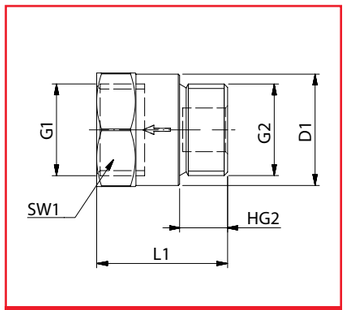
FEZER
Simply move more.



RSV-1/4 ... 1



RSV-K-1/4



RSV-K-1/2

Dimensions

Type	L1	D1	G1	HG1	HG2	SW1
RSV-K-1/4	38	20	G1/4	7	10	20
RSV-1/4	45	22	G1/4	12	12	22
RSV-3/8	54	34,5	G3/8	10	10	23
RSV-K-1/2	30	25	G1/2	11	12	26
RSV-1/2	57	34,5	G1/2	10	10	27
RSV-3/4	64	41,5	G3/4	12	12	33
RSV-1	75	48	G1	14,5	14,5	40

Automatic Valves

Flow valves SV

FEZER
Simply move more.

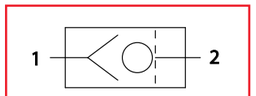
Description

Robust flow valve in galvanized steel design. When a pad is not occupied the ball inside the valve closes automatically and prevents a decrease of the vacuum. The valves are available in 3 assembly designs.

- on suspension bolt
- on suction plate retainers with central vacuum feed
- on suction pad with basic body and separate vacuum feed (required adapter ASV-M12 or M16)

Application

- on different grades of occupancy of the suction pads (workpieces with changing dimensions)
- any mounting position



Switching diagram SV

SV-M12x1-1/8 ... SV-M16

Article number

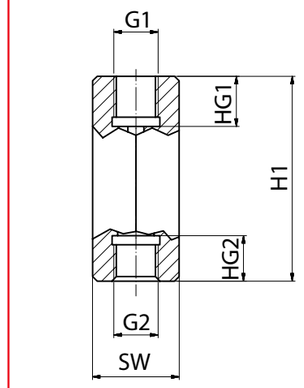
Type		Adapter ASV- ...
SV-M12x1-1/8	1.51.6.0053	---
SV-M12x1-1/4	1.51.6.0061	---
SV-M12x1-3/8	1.51.6.0054	---
SV-M16x1,5-1/4	1.51.6.0062	---
SV-M16x1,5-3/8	1.51.6.0102	---
SV-M16	1.51.6.0059	1.31.3.0023

Technical data

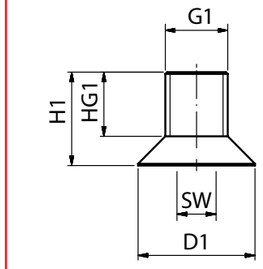
Type	Pressure range	Suction power* at pB = -0,6 bar		Suction power* at pB = -0,3 bar		Flow rate on ventilation**		Temperature	Weight
	(bar)	(m^3/h)	(l/s)	(m^3/h)	(l/s)	(m^3/h)	(l/s)	(°C)	(kg)
SV-M12x1-1/8	-1 ... -0,3	1,5	0,41	2,0	0,55	15	4,16	0 ... +60	0,09
SV-M12x1-1/4	-1 ... -0,3	2,0	0,55	2,5	0,69	15	4,16	0 ... +60	0,09
SV-M12x1-3/8	-1 ... -0,3	2,5	0,69	3,0	0,83	20	5,55	0 ... +60	0,08
SV-M16x1,5-1/4	-1 ... -0,3	4,0	1,11	4,5	1,25	20	5,55	0 ... +60	0,08
SV-M16x1,5-3/8	-1 ... -0,3	4,0	1,11	4,5	1,25	20	5,55	0 ... +60	0,07
SV-M16	-1 ... -0,3	4,5	1,25	5,5	1,52	20	5,55	0 ... +60	0,04

* *required suction power to close the flow valve*
** *against atmospheric pressure*

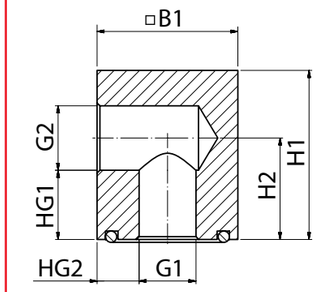
Automatic Valves
Flow valves SV
FEZER
Simply move more.



SV-M12x1- ... SV-M16x1,5



SV-M16



Adapter ASV-M16

Dimensions

Type	H1	H2	B1	D1	G1	G2	HG1	HG2	SW
SV-M12x1-1/8	45	---	---	---	M12x1	G1/8	11	10	19
SV-M12x1-1/4	45	---	---	---	M12x1	G1/4	11	10	19
SV-M12x1-3/8	45	---	---	---	M12x1	G3/8	11	10	19
SV-M16x1,5-1/4	45	---	---	---	M16x1,5	G1/4	11	10	19
SV-M16x1,5-3/8	45	---	---	---	M16x1,5	G3/8	11	10	19
SV-M16	24	---	---	33	M16	---	16,5	---	10
ASV-M16	30	18	25	---	M16	3/8	11	5	---

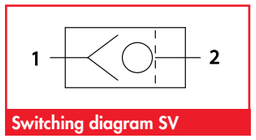
Automatic Valves

Flow valves SVE

FEZER
Simply move more.

Description
Robust flow valve with internal, adjustable flow body. If the suction pad is not occupied the flow body closes automatically and prevents a decrease of the vacuum. The sensitivity of the flow valve can be adjusted to the used suction pads and the existing flow conditions.

Application
- on different grades of occupancy of the suction pads (workpieces with changing dimensions)
- on suction pads with high own volume
- any mounting position



Switching diagram SV


SVE-1/2 ... SVE-3/4

Article number

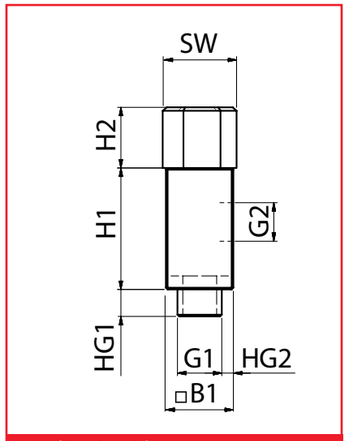
Type	
SVE-1/2	1.51.6.0106
SVE-3/4	1.51.6.0001

Technical data

Type	Pressure range (bar)	Suction power* at pB = -0,6 bar (m^3/h)	Suction power* at pB = -0,6 bar (l/s)	Suction power* at pB = -0,3 bar (m^3/h)	Suction power* at pB = -0,3 bar (l/s)	Flow rate on ventilation** (m^3/h)	Flow rate on ventilation** (l/s)	Temperature (°C)	Weight (kg)
SVE-1/2	-1 ... -0,3	4 ... 15	1,11 ... 4,16	5 ... 20	1,38 ... 5,55	25	6,94	0 ... +60	0,15
SVE-3/4	-1 ... -0,3	7 ... 20	1,94 ... 5,55	7 ... 25	1,94 ... 6,94	35	9,72	0 ... +60	0,20

* *required suction power to close the flow valve*
** *against atmospheric pressure*

Automatic Valves
Flow valves SVE
FEZER
Simply move more.



SVE-1/2 ... SVE-3/4

Dimensions

Type	H1	H2	B1	G1	G2	HG1	HG2	SW
SVE-1/2	40	18	25	G1/2	G1/2	10	10	19
SVE-3/4	48	18	30	G3/4	G1/2	12	10	19

Automatic Valves

Flow resistances SW

FEZER
Simply move more.

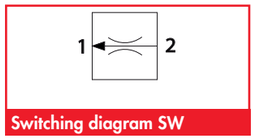
Description

Valve body in robust, galvanized steel design. The reduction of the cross sections is done by nozzle inserts which can be exchanged at any time; thus the valve can be adjusted to different flow conditions. The valves are available in 3 different assembly designs.

- on suspension bolt
- on suction plate retainer with central vacuum feed
- on suction pad with basic body and separate vacuum feed (necessary adapter ASV-M12 or M16)

Application

- on porous workpieces
- different grades of occupancy of the suction pads (workpieces with changing dimensions)
- any mounting position



Switching diagram SW


SW-M8x1- ... SW-M16x1,5-

Article number

Type	0,25	0,50	0,75	1,00	1,25	1,50	1,75	2,00	Adapter ASV- ...
SW-M8x1-M5	1.51.6.0116	1.51.6.0117	1.51.6.0118	1.51.6.0119	1.51.6.0120	1.51.6.0121	1.51.6.0122	1.51.6.0123	---
SW-M8x1-1/8	1.51.6.0124	1.51.6.0125	1.51.6.0126	1.51.6.0127	1.51.6.0128	1.51.6.0129	1.51.6.0130	1.51.6.0131	---
SW-M12x1-1/8-	1.51.6.0063	1.51.6.0065	1.51.6.0056	1.51.6.0067	1.51.6.0069	1.51.6.0071	1.51.6.0073	1.51.6.0075	---
SW-M12x1-1/4-	1.51.6.0064	1.51.6.0066	1.51.6.0055	1.51.6.0068	1.51.6.0070	1.51.6.0072	1.51.6.0074	1.51.6.0076	---
SW-M12x1-3/8-	1.51.6.0132	1.51.6.0133	1.51.6.0057	1.51.6.0134	1.51.6.0135	1.51.6.0136	1.51.6.0137	1.51.6.0138	---
SW-M16x1,5-1/4-	1.51.6.0077	1.51.6.0078	1.51.6.0079	1.51.6.0080	1.51.6.0081	1.51.6.0082	1.51.6.0083	1.51.6.0084	---
SW-M16x1,5-3/8-	1.51.6.0107	1.51.6.0108	1.51.6.0109	1.51.6.0110	1.51.6.0111	1.51.6.0112	1.51.6.0113	1.51.6.0114	---
SW-M12-	1.51.6.0085	1.51.6.0086	1.51.6.0087	1.51.6.0088	1.51.6.0089	1.51.6.0090	1.51.6.0091	1.51.6.0092	1.31.3.0022
SW-M16-	1.51.6.0093	1.51.6.0094	1.51.6.0095	1.51.6.0096	1.51.6.0097	1.51.6.0098	1.51.6.0099	1.51.6.0100	1.31.3.0023

Technical data

Type	Pressure range	Suction power* at p_B = -0,6 bar		Suction power* at p_B = -0,3 bar		Flow rate on ventilation**		Temperature	Weight
	(bar)	(m^3/h)	(l/s)	(m^3/h)	(l/s)	(m^3/h)	(l/min)	(°C)	(kg)
SW...-0,25	-1 ... 0	0,01	0,003	0,01	0,003	0,01	0,003	0 ... +60	0,04 ... 0,10
SW...-0,50	-1 ... 0	0,16	0,044	0,15	0,042	0,16	0,044	0 ... +60	0,04 ... 0,10
SW...-0,75	-1 ... 0	0,31	0,086	0,29	0,081	0,31	0,086	0 ... +60	0,04 ... 0,10
SW...-1,00	-1 ... 0	0,52	0,144	0,50	0,139	0,52	0,144	0 ... +60	0,04 ... 0,10
SW...-1,25	-1 ... 0	0,96	0,266	0,93	0,258	0,96	0,266	0 ... +60	0,04 ... 0,10
SW...-1,50	-1 ... 0	1,35	0,375	1,30	0,361	1,35	0,375	0 ... +60	0,04 ... 0,10
SW...-1,75	-1 ... 0	1,82	0,505	1,74	0,483	1,82	0,505	0 ... +60	0,04 ... 0,10
SW...-2,00	-1 ... 0	2,21	0,614	2,10	0,583	2,21	0,614	0 ... +60	0,04 ... 0,10

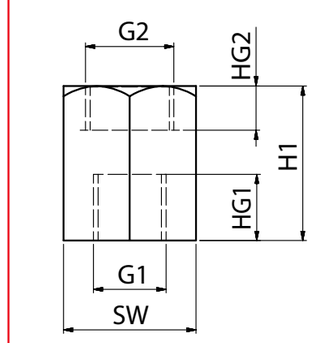
* *required suction power to keep up the requested operational vacuum on several suction pads the suction power must be multiplied with quantity of the suction pads*

** *against atmospheric pressure*

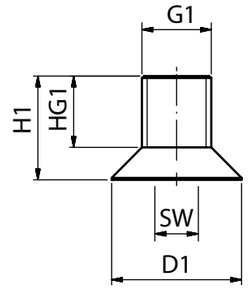
Automatic Valves

Flow resistances SW

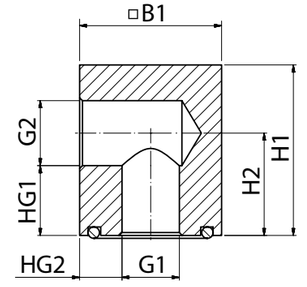
FEZER
Simply move more.



SW-M12x1- ... SW-M16x1,5-



SW-M12- ... SW-M16-



Adapter ASV-M12 ... ASV-M16

Dimensions

Type	H1	H2	B1	D1	G1	G2	HG1	HG2	SW
SW-M8x1-M5	28	---	---	---	M8x1	M5	12	10	13
SW-M8x1-1/8	28	---	---	---	M8x1	G1/8	12	10	13
SW-M12x1-1/8-	28	---	---	---	M12x1	G1/8	12	10	15
SW-M12x1-1/4-	28	---	---	---	M12x1	G1/4	12	10	24
SW-M12x1-3/8-	28	---	---	---	M12x1	G3/8	12	10	24
SW-M16x1,5-1/4-	28	---	---	---	M16x1,5	G1/4	12	10	24
SW-M16x1,5-3/8-	28	---	---	---	M16x1,5	G3/8	12	10	24
SW-M12-	22	---	---	27	M12	---	12,5	---	8
SW-M16-	23	---	---	33	M16	---	14,2	---	10
ASV-M12	30	18	25	---	M12	1/4	11	5	--
ASV-M16	30	18	25	---	M16	3/8	11	5	--

Automatic Valves

Touch valves TV

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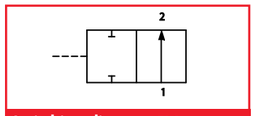
Description

Robust touch valve in galvanized steel design. The suction pad engages only when it is placed on the workpiece. Otherwise it stays closed. The valves are available in 2 assembly designs.
- on suction plate retainers with central vacuum feed (disc ZS-TV-M16 necessary when an articulated suction plate retainer SAK-M16-M16x1,5 is used)
- on suction pads with base bodies and separate vacuum feed (necessary adapter ASV-M12 or M16)

Application

- different grade of occupancy of the suction pads (workpieces with changing dimensions)
- any mounting position



Switching diagram TV


TV-M12 ... TV-M16

Article number

Type		Intermediate disc ZS-TV- ...		Adapter ASV- ...	
TV-M12	1.51.5.0002	---	---	ASV-M12-1/4	1.31.3.0022
TV-M16	1.51.5.0009	ZS-TV-M16	2.31.1.0059	ASV-M16-3/8	1.31.3.0023

Technical data

Type	Pressure range (bar)	Flow rate (m³/h)	(l/s)	max.own stroke (HW) suction pad (mm)	Temperature (°C)	Weight (kg)
TV-M12	-1 ... 0	2,9	0,8	8	0 ... +60	0,017
TV-M16	-1 ... 0	5,5	1,5	9	0 ... +60	0,035

NB

- When pads with touch valves are being used they must always fully sit on the workpiece as they will cause leakage when placed half on/half off.

- The own stroke of the pad (HW) must be smaller than the stroke of the touch valve, otherwise no full ventilation is possible.

Automatic Valves

Touch valves TV

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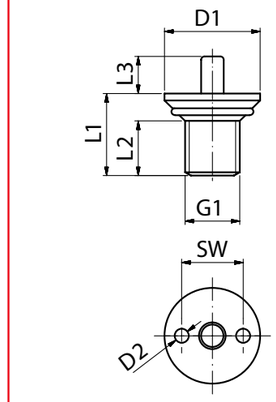
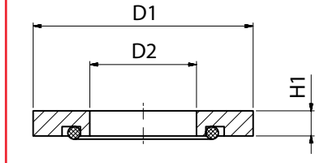
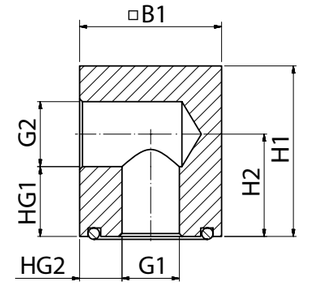


TV-M12 ... TV-M16



ZS-TV- ...



Adapter ASV-M12 ... ASV-M16

Dimensions

Type	L1	L2	L3	B1	H1	H2	D1	D2	G1	G2	HG1	HG2	SW
TV-M12	18	10	10	---	---	---	26	4,1	M12	---	---	---	15
TV-M16	24	16	10,9	---	---	---	30	4,1	M16	---	---	---	18
ZS-TV-M16	---	---	---	---	4	---	35	17	---	---	---	---	---
ASV-M12-1/4	---	---	---	25	30	18	---	---	M12	G1/4	11	5	---
ASV-M16-3/8				25	30	18	---	---	M16	G3/8	11	5	---

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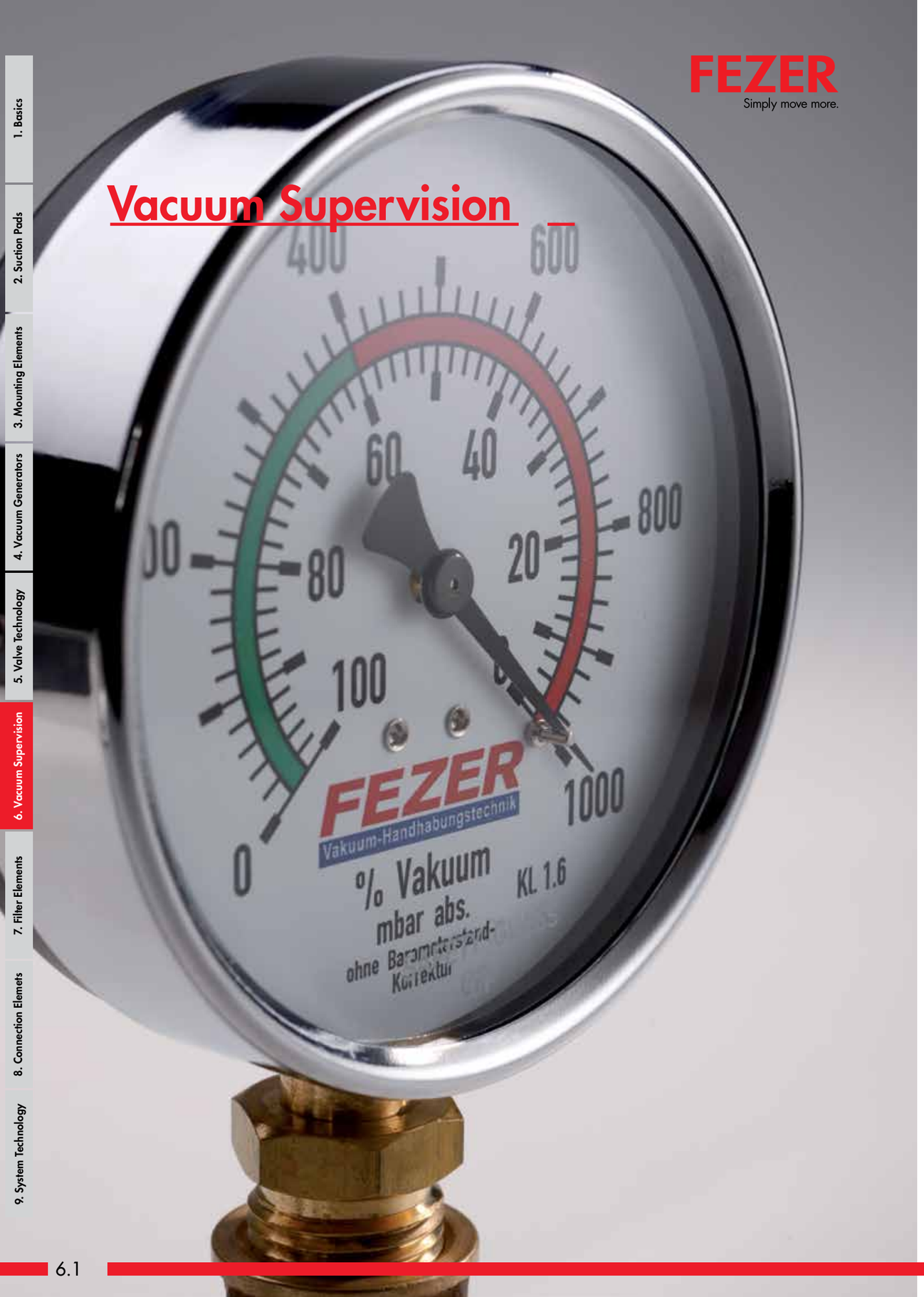
Vacuum Supervision



1. Basics
2. Suction Pads
3. Mounting Elements
4. Vacuum Generators
5. Valve Technology
6. Vacuum Supervision
7. Filter Elements
8. Connection Elemets
9. System Technology

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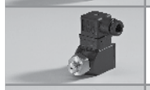
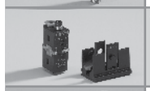
Vacuum Supervision

Overview

Mechanical Vacuum Switch		Technical data		Description	Page
	Vacuum switch VSM-1/4	Meas.range Switching exit Connections	-0,95 ... 0 bar 1 x digital G1/4	mechanical vacuum switch with preset switching point	6.3
	Vacuum switch VSMH-1/4	Meas.range Switching exit Connections	-0,85 ... -0,35 bar 1 x digital, hysteresis 20% G1/4	mechanical vacuum switch with preset switching point and a hysteresis of 20%	6.5
	Vacuum switch VSP-1/8	Meas.range Switching exit Connections	-0,85 ... -0,35 bar 1 x digital G1/8	pneumatical vacuum switch with adjustable switching point	6.7

Electronical Vacuum Switch		Technical data		Description	Page
	Vacuum switch VSE	Meas.range Switching exit Connections	-1 ... 1 bar 1 x digital G1/8	electronical vacuum switch with preset switching points	6.9
	Vacuum switch VSET	Meas.range Switching exit Connections	-1 ... 1 bar 1 x digital G1/8	electronical vacuum switch with adjustable switching points via teach function	6.11
	Vacuum switch VSEI	Meas.range Switching exit Connections	-1 ... 1 bar 1 x digital G1/8	electronical inline vacuum switch with adjustable switching points	6.13
	Vacuum switch VSD-1/8	Meas.range Switching exit Connections	-1 ... 1 bar 2 x digital G1/8	electronical vacuum switch with digtal display and adjustable switching points	6.15
	Vacuum switch VSD-1/8-I	Meas.range Switching exit Connections	-1 ... 1 bar 1 x digital G1/4	electronical vacuum switch with digtal display and adjustable switching points	6.17
	Vacuum switch VSA-1/4-I	Meas.range Switching exit Connections	-1 ... 0 bar analogousous G1/4	electronical vacuum switch with analogousous exit signal	6.19

Measuring and Warning Units		Technical data		Description	Page
	Vacuum gauge VM	Meas.range Connections	-1 ... 0 bar G1/4 ... G1/2	visual supervision of the vacuum with „red-green“ area	6.21
	Warning unit EW0	Meas.range Voltage	-1 ... 0 bar 230 ... 400 V	acoustic warning unit with howler and power failure supervision	6.23
	Warning unit EWIII	Meas.range Voltage	-1 ... 0 bar 400 V	optical and acoustic warning unit with howler, lamps and power failure supervision	6.25
	Warning unit PW0	Meas.range Voltage	-1 ... 0 bar 400 V	acoustic warning unit with pneumatical whistle	6.27

Mechanical Vacuum Switch

electro-mechanical VSM-1/4

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Description

Robust, mechanical vacuum switch with membrane technology in stable aluminum housing. The switch has a preset, digital switching exit and a changeover contact and can both be used as an opener (NC) or closer (NO). The preset switching points can be adjusted if required. Supplied with connecting plug.

Application

- Supervision of vacuum circuits
- in vacuum load lifting devices
- compact design, any mounting position

VSM-1/4

Article number

Type	
VSM-1/4-0,1	1.52.1.0009
VSM-1/4-0,25	1.52.1.0011
VSM-1/4-0,35	1.52.1.0012
VSM-1/4-0,6	1.52.1.0001
VSM-1/4-0,7	1.52.1.0008
VSM-1/4-0,8	1.52.1.0002

Technical data

Type		VSM-1/4- ...
Measure medium		dry, oilless unaggressive gases
Media resistance		air, oil, petrol
Measuring range	(bar)	-1 ... 1
Overpressure safety	(bar)	10
Fluid connection		G1/4
Switching exit digital		1x
Switching logic		changeover switch NO / NC
Switching range		5 ... 95% adjustable
Switching point, preset		10%, 25%, 35%, 60%, 70%, 80%
Switching exit analogous	(V)	---
Condition display		---
Repeat precision		+/- 5 %
Reaction time	(ms)	< 400
Voltage	(V)	12 ... 250
Current consumption	(A)	---
max. current	(A)	2
Electrical connection		DIN 43650, Pg 9
Protection class		IP55
Temperature range	(°C)	-10 ... +50
Weight	(kg)	

Mechanical Vacuum Switch

electro-mechanical VSM-1/4

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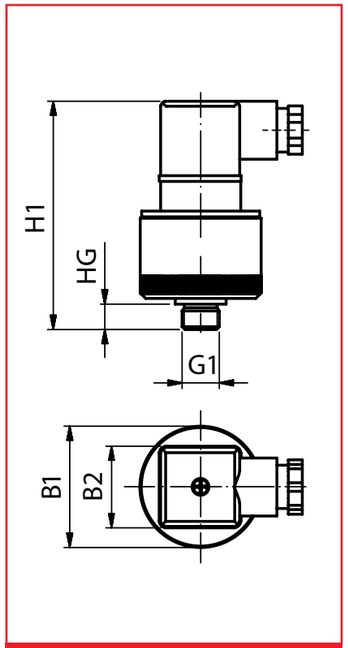
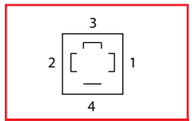


VSM-1/4



Contact configuration

1 Voltage entrance
2 Switching exit NO
3 Switching exit NC
4 PE

Dimensions

Type	B1	B2	H1	G1	HG1
VSM-1/4	45	27	84	G1/4	9

Mechanical Vacuum Switch

electro-mechanical VSMH-1/4

FEZER
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Description

Robust, mechanical vacuum switch with membrane technology in stable aluminum housing. The switch has a preset, digital switching exit and a be used both as opener (NC) or closer (NO) via a changeover contact. The preset switching points can be adjusted if required. Supplied with connection plug.

Application

- supervision of vacuum circuits
- in vacuum load lifting devices
- compact design, any mounting position

VSM-1/4

Article number

Type	
VSM-1/4-0,6	1.52.1.0010

Technical data

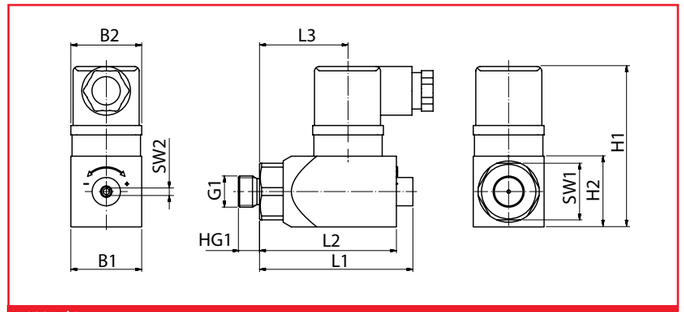
Type		VSMH-1/4-0,6-20%
Measure medium		dry, oilless unaggressive gases
Media resistance		air, oil, petrol
Meas.range	(bar)	-1 ... 1
Overpressure safety	(bar)	10
Fluid connection		G1/4
Switching exit digital		1x
Switching logic		changeover switch NO/NC
Switching range		5 ... 95% adjustable
Switching point, preset		60%
Hysteresis		20%
Switching exit analogous	(V)	---
Condition display		---
Repeat precision		+/- 5 %
Reaction time	(ms)	< 400
Voltage	(V)	12 ... 250
Current consumption	(A)	---
max. Current	(A)	5
electrical Connection		DIN 43650, Pg 9
Protection class		IP55
Temperature range	(°C)	-20 ... 80
Weight	(kg)	

1. Basics
2. Suction Pads
3. Mounting Elements
4. Vacuum Generators
5. Valve Technology
6. Vacuum Supervision
7. Filter Elements
8. Connection Elemets
9. System Technology

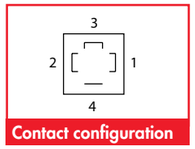
Mechanical Vacuum Switch

electro-mechanical VSM-1/4

FEZER
Simply move more.



VSM-1/4



Contact configuration

1 Voltage entrance
2 Switching exit NO
3 Switching exit NC
4 PE

Dimensions

Type	L1	L2	L3	B1	B2	H1	H2	G1	HG	SW1	SW2
VSM-1/4	65	58	37,5	30	29	84	30	G1/4	9	24	2,5

Mechanical Vacuum switch

pneumatical VSP-1/8

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Description
Robuster, pneumaticaler Vacuum switch with Membran-Technik in stable Plastic housing. Die Switch sind in Ausführung NO othe NC erhältlich. The Switching point kann über die Einstell-schraube beliebig eingestellt werden.

Application
- Überwachung von Vacuumkreisen
- in Vacuum-Handhabungsgeräten with pneumaticaler Vacuumerzeugung und -steuerung
- for pneumtische Warning uniten
- compacte Bauweise with beliebiger Einbaulage

VSP-1/8

Article number

Type	
VSP-1/8-NO	1.52.2.0002
VSP-1/8-NC	1.52.2.0001

Technical data

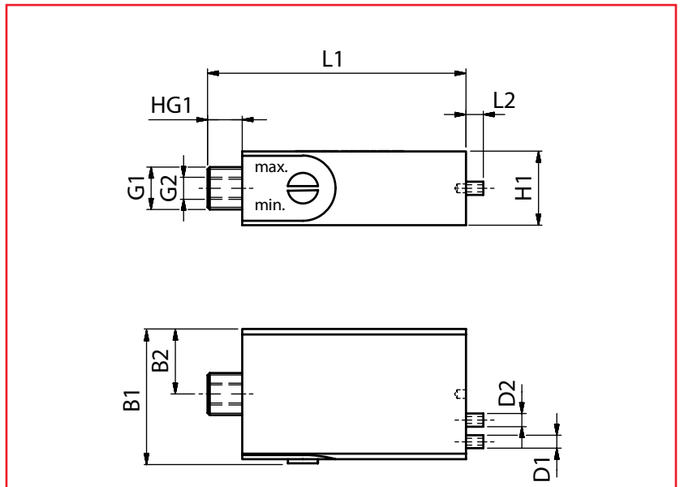
Type		VSP-1/8-NO	VSP-1/8-NC
Measure medium		dry, oilless unaggressive Gases	
Meas.range	(bar)	-1 ... 1	
Overpressure safety	(bar)	2	
Fluid connection		G1/8	
Switching exit digital		1xNO	1xNC
Switching range		35 ... 85% adjustable	
Hysteresis setting		0,08 ... 0,1	
Condition display		---	
Repeat precision		+/- 3 %	
Schalthäufigkeit	(1/s)	2	
Druckairversorgung	(bar)	2 ... 6	
Durchfluß	(l/min)	55	
Air consumption	(l/min)	4	
pneumacal Connection		3	
Temperature range	(°C)	0 ... +60	
Weight	(kg)	0,070	

1. Basics
2. Suction Pads
3. Mounting Elements
4. Vacuum Generators
5. Va
6. Vacuum Supervision
7. Filter Elements
8. Connection Elements
9. System Technology

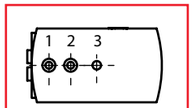
Mechanical Vacuum switch

pneumatical VSP-1/8

FEZER
Simply move more.



VSP-1/8



Contact configuration

1 Compressed air connection
2 Exit NC or NO
3 Ventilation

Dimensions

Type	L1	L2	B1	B2	H1	D1	D2	G1	G2	HG1
VSP-1/8	60	8	31	15	17	3	3	G1/8	M5	8

Electronic Vacuum Switch

VSE-1/8

FEZER
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Description
Electronic vacuum switch with Piezo-Quarz technology in stable plastic housing with 1/8 thread connection. The switch has an analogous and a digital switching exit and an adjustable hysteresis function.

Application:
- control and adjustment of vacuum circuits
- supervision of vacuum circuits
- small design, any mounting position

VSE-1/8

Article number

Type	
VSE-1/8-0,6-M8	1.52.3.0044
VSE-1/8-0,7-M8	1.52.3.0045
VSE-1/8-0,8-M8	1.52.3.0046

Technical data

Type		VSE-1/8
Measure medium		dry, oilless unaggressive Gases
Meas.range	(bar)	-1 ... 0
Overpressure safety	(bar)	5
Fluid connection		G1/8
Switching exit digital	(mA/V)	1x(125/30)
Switching logic		NO/NC adjustable
Switching range		0 ... 100% adjustable
Switching exit analogous	(V)	1 ... 5
Hysteresis setting		0 ... 100% adjustable
Condition display		LED im Tastenfeld
Repeat precision		+/- 0,2 %
Reaction time	(ms)	< 2,5
Voltage	(V)	10,8 ... 30 DC
Current consumption	(mA)	< 30
max. Current	(mA)	250
electrical Connection		Plug M8 - 4 polig
Protection class		IP65
Temperature range	(°C)	-10 ... +60
Weight	(kg)	0,012

Electronic Vacuum Switch

VSE-1/8

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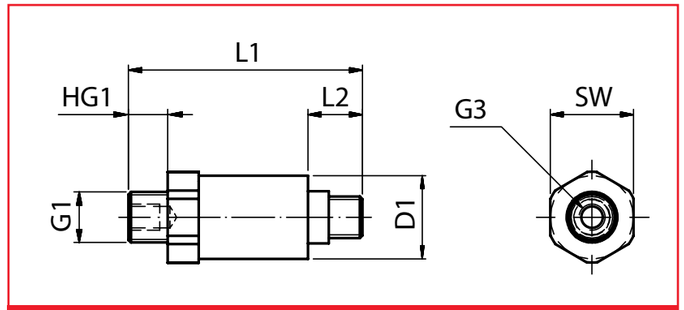
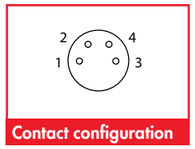


VSE-1/8



Contact configuration

1	(brown)	V +
2	(white)	Programming
3	(blue)	V -
4	(black)	Switching exit 1 digital

Dimensions

Type	L1	L2	D1	G1	G2	HG1	SW
VSET-1/8	45	10,5	16	G1/8	M8	6	16

Electronic Vacuum Switch

VSET - teachable

FEZER
Simply move more.

Description
Electronic vacuum switch with Piezo-Quarz technology in compact plastic housing with 1/8 connection. The switch has 2 adjustable switching exits, with self-learning adjustment by teach buttons. The vacuum switch excels by its compact design and its very precise technology. The vacuum switch has LED displays for switching point and programming operation.

Application
- supervision of vacuum circuits
- optimizing of cycle and switching times
- compact design, any mounting position

VSET-1/8

Article number

Type	
VSET-1/8-M8	1.52.3.0047

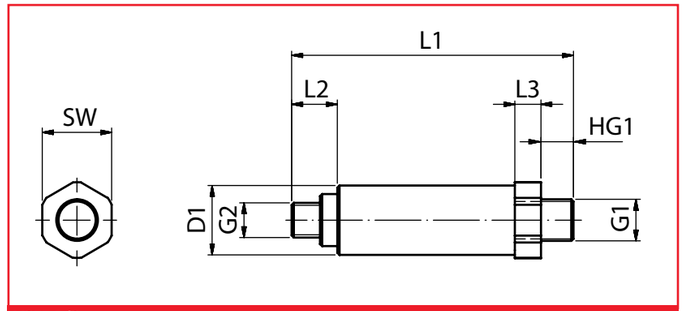
Technical data

Type		VSET-1/8
Measure medium		dry, oilless unaggressive gases
Meas.range	(bar)	-1 ... 0
Overpressure safety	(bar)	5
Fluid connection		G1/8
Switching exit digital	(mA/V)	1x(125/30)
Switching logic		NO/NC adjustable
Switching range		0 ... 100% adjustable
Switching exit analogous	(V)	1 ... 5
Hysteresis setting		0 ... 100% adjustable
Condition display		LED im Tastenfeld
Repeat precision		+/- 0,2 %
Reaction time	(ms)	< 2,5
Voltage	(V)	10,8 ... 30 DC
Current consumption	(mA)	< 30
max. Current	(mA)	250
electrical Connection		Plug M8 - 4 polig
Protection class		IP65
Temperature range	(°C)	-10 ... +50
Weight	(kg)	0,020

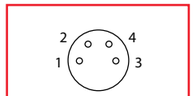
Electronic Vacuum Switch

VSET - teachable

FEZER
Simply move more.



VSET-1/8



Contact configuration

1	(brown)	V +
2	(white)	Switching exit analogous
3	(blue)	V -
4	(black)	Switching exit 1 digital

Dimensions

Type	L1	L2	L3	D1	G1	G2	HG1	SW
VSET-1/8	65	10,5	6	16	G1/8	M8	7,5	16

Electronic Vacuum Switch

VSEI - Inline design

FEZER
Simply move more.

Description

Electronical vacuum switch with Piezo-Quarz technology in compact design for inline installation. The switch has 1 adjustable switching exit and anadjustable hysteresis function. The switching exit and the hysteresis are programmed by teach operation. The vacuum switch has also an LED switching point display and plug-in cable connections. Supplied with a holder for the vacuum switch.

Application

- supervision of vacuum circuits
- Mounted by „inline"-installation in hose
- extremely compact design, any mounting position

VSEI

Article number

Type	
VSEI-4-PNP-NO	1.52.3.0036
VSEI-4-PNP-NC	1.52.3.0037
VSEI-6-PNP-NO	1.52.3.0038
VSEI-6-PNP-NC	1.52.3.0039

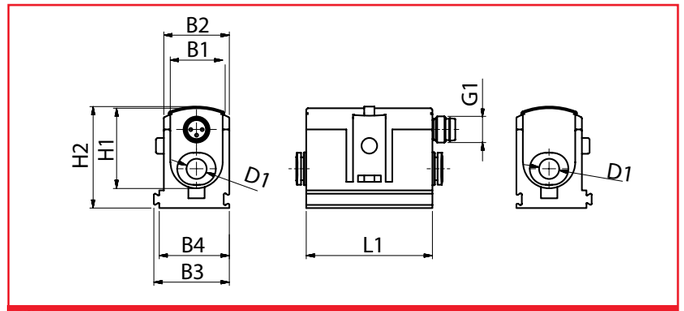
Technical data

Type		VSEI
Measure medium		dry, oilless unaggressive gases
Meas.range	(bar)	-1 ... 0
Overpressure safety	(bar)	2
Fluid connection		Schlauch-Ø 4 othe 6 mm
Switching exit digital	(mA/V)	1xPNP
Switching logic		NO/NC
Switching range		0 ... 100% adjustable
Switching exit analogous	(V)	---
Hysteresis setting		max. 2% FS (fixed)
Condition display		LED in housing
Repeat precision		+/- 0,3 % FS
Reaction time	(ms)	< 10
Voltage	(V)	15 ... 30 DC
Current consumption	(mA)	< 30
max. Current	(mA)	100
electrical Connection		Plug M8 - 3 cores
Protection class		IP40
Temperature range	(°C)	0 ... +50
Weight	(kg)	0,020

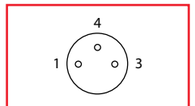
Electronic Vacuum Switch

VSEI - Inline design

FEZER
Simply move more.



VSEI



Contact configuration

1	(brown)	V +
3	(blue)	V -
4	(black)	Switching exit 1 digital

Dimensions

Type	L1	B1	B2	B3	B4	H1	H2	D1	G1
VSEI-4 ...	38,5	16	20	23	21,4	24,5	31	4	M8
VSEI-6 ...	38,5	16	20	23	21,4	24,5	31	6	M8

Electronic Vacuum Switch

with digital display VSD-1/8

FEZER
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Description
Electronical vacuum switch with Piezo-Quarz technology in stable plastic housing and display. The switch has 2 digital switching exits and adjustable hysteresis- and switching delay function. All functions can, independant from the applied system pressure, be programmed and arrested against alteration by code. Design in oval or compact form.

Application
- control of vacuum circuits
- supervision of vacuum circuits
- small design and any mounting position

VSD-1/8 und VSDK-1/8

Article number

Type	
VSD-1/8-4PNP-M8	1.52.3.0028
VSDK-1/8-4PNP-M8	1.52.3.0029

Technical data

Type		VSD-1/8
Measure medium		dry, oilless unaggressive gases
Meas.range	(bar)	-1 ... 0
Overpressure safety	(bar)	5
Fluid connection		G1/8
Switching exit digital	(mA/V)	2x(250/30)
Switching logic		NO/NC adjustable
Switching range		0 ... 100% adjustable
Switching delay	(s)	0 ... 180 adjustable
Switching exit analogous	(V)	---
Hysteresis setting		0 ... 100% adjustable
Condition display		2 x LED in display
Repeat precision		+/- 0,2 %
Reaction time	(ms)	< 2,5
Voltage	(V)	10,8 ... 30 DC
Current consumption	(mA)	< 30
max. Current	(mA)	250
electrical Connection		Plug M8 - 4 cores
Protection class		IP40
Temperature range	(°C)	-10 ... +50
Weight	(kg)	0,025

Electronic Vacuum Switch

with digital display VSD-1/8

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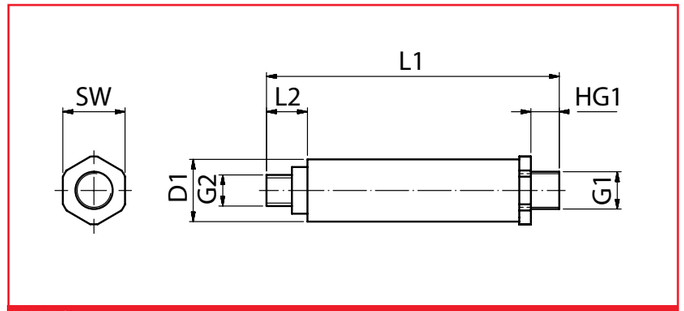
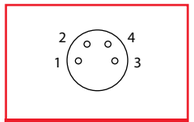
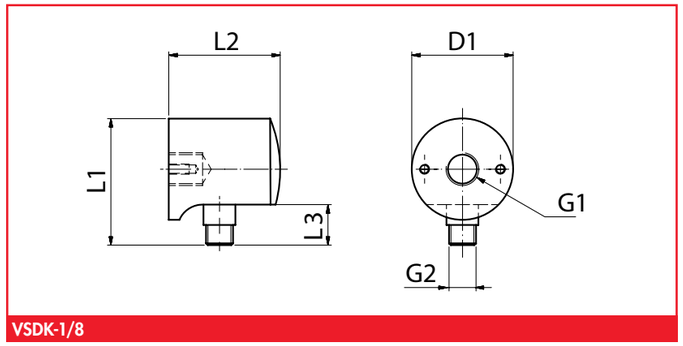


VSD-1/8



Contact configuration

1	(brown)	V +
2	(white)	Switching exit 2 digital
3	(blue)	V -
4	(black)	Switching exit 1 digital



VSDK-1/8

Dimensions

Type	L1	L2	L3	D1	G1	G2	HG1	SW
VSD-1/8	68	10,5	---	16	G1/8	M8	7,3	16
VSDK-1/8	38	33	10,5	30	G1/8	M8	---	---

Electronic Vacuum Switch

with digital display VSD-1/8-I

FEZER
Simply move more.

Description
Highly precise and very robust electronical vacuum switch with Piezo-Quarz technology with stable plastic housing and display. The switch has 2 digital switching exits or 1 digital switching exit and 1 diagnosis exit an adjustable hysteresis and switching delay functions. By a mounting set the vacuum switch can be installed on a cap rail and connected to the vacuum generator by plug-in connections and a vacuum hose.

Application
- control and adjustment of vacuum circuits
- supervision of vacuum circuits
- small design, any mounting position

VSD-1/8-I

Article number

Type	
VSD-1/8-I-4PNP-M8	1.52.3.0034
Adapter for outer thread G1/8	6.21.5.0833
Mounting set for cap rail	1.52.3.0048

Technical data

Type		VSD-1/8
Measure medium		dry, oilless unaggressive gases
Meas.range	(bar)	-1 ... 1
Overpressure safety	(bar)	20
Fluid connection		G1/8I
Switching exit digital	(mA/V)	2x(100/16 ... 30)
Switching logic		NO/NC adjustable
Switching range		0 ... 100% adjustable
Switching delay	(s)	0 ... 180 adjustable
Switching exit analogous	(V)	---
Hysteresis setting		0 ... 100% adjustable
Condition display		2 x LED in display
Repeat precision		+/- 0,1 %
Reaction time	(ms)	< 2,5
Voltage	(V)	18 ... 32 DC
Current consumption	(mA)	< 50
max. Current	(mA)	250
electrical Connection		Plug M8 - 4 cores
Protection class		IP40
Temperature range	(°C)	0 ... +60
Weight	(kg)	0,1

Electronic Vacuum Switch
with digital display VSD-1/8-I
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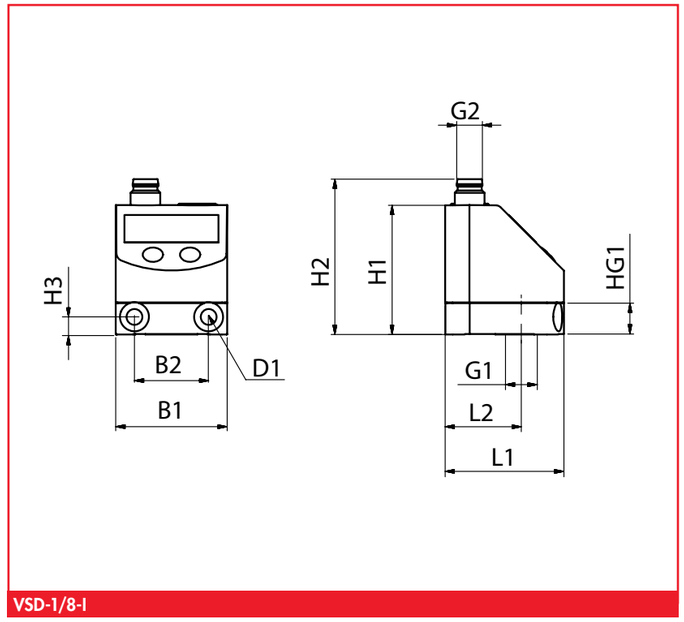
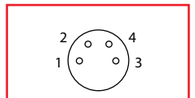


VSD-1/8-I



Contact configuration

1	(brown)	V +
2	(white)	Switching exit 2 digital
3	(blue)	V -
4	(black)	Switching exit 1 digital

Dimensions

Type	L1	L2	B1	B2	H1	H2	H3	D1	G1	G2	HG1
VSD-1/8-I	32	20,7	30	20	42	35	4,75	4,2	G1/8	M8	10

electronice Vacuum switch

VSA-1/4 - analogous design

FEZER
Simply move more.

Description
Electronical Vacuum switch with Piezo-Quarz-Technik in robusten Plastic housing und Anzeigedisplay. The Switch verfügt über 1 analogousen Switching exit sowie verschiedenste Einstellmöglichkeiten. Durch das analogouse Ausgangssingnal können nicht nur Switching pointe definiert werden, sonthen es besteht die Möglichkeit, Vacuumsysteme auszuwerten, und zu diagnostizieren.

Application
- Diagnosesystem von Vacuumkreisen
- Definieren von mehreren Switching pointen
- einfache Anbindung an übergeordnete Steuerungen
- Compacte Bauweise with beliebiger Einbaulage

VSA-1/4-I

Article number

Type	
VSA-1/4-I	1.52.3.0033

Technical data

Type		VSD-1/4
Measure medium		dry, oilless unaggressive gases
Meas.range	(bar)	-1 ... 1
Overpressure safety	(bar)	10
Fluid connection		G1/4
Switching exit digital	(mA/V)	---
Switching logic		---
Switching range		---
Switching delay	(s)	0 ... 50 adjustable
Switching exit analogous		0 ... 10V / 4 ... 20mA
Setting possibilities		Hysteresis, window, NO/NC, delays
		dampening, display units
Condition display		1 x LED im Display
Repeat precision		+/- 0,1
Reaction time	(ms)	< 10
Voltage	(V)	18 ... 36 DC
Current consumption	(mA)	< 50
max. Current	(mA)	250
electrical Connection		Plug M12x1 - 4 cores
Protection class		IP65
Temperature range	(°C)	-25 ... +80
Weight	(kg)	0,260

Electronic Vacuum Switch

VSA-1/4 - analogous design

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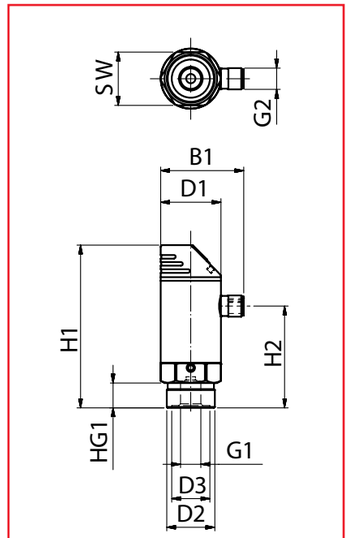
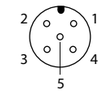


VSA-1/4-I



Contact configuration

1 (brown) V +
2 (white) Switching exit 2 analogous
3 (blue) V -
4 (black) Switching exit 1 digital
5 not occupied

Dimensions

Type	D1	D2	D3	B1	H1	H2	HG1	G1	G2	SW
VSD-1/4-I	34	27	21,5	47	91,6	57,3	14	G1/4	M12x1	30

Measuring and Warning Units

FEZER
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Vacuum gauge VM

Description
Control vacuum gauge in metal sheet housing for the visual display of the operational vacuum. The „red/green-area“ shows readiness for operation. In different designs and connection versions.

Application
- visual control of the vacuum
- readiness display by „red/green-area“
- for manual vacuum lifters

VM-63-1/4 - VM-100-1/2

Article number

Type	Connection bottom	Connection back
VM-63-1/4-RG60	1.52.5.0010	1.52.5.0008
VM-63-1/4-RG70	1.52.5.0014	1.52.5.0017
VM-63-1/4-RG80	1.52.5.0011	1.52.5.0009
VM-100-1/2-RG10	1.52.5.0003	---
VM-100-1/2-RG20	1.52.5.0004	---
VM-100-1/2-RG30	1.52.5.0013	---
VM-100-1/2-RG60	1.52.5.0005	1.52.5.0001
VM-100-1/2-RG80	1.52.5.0006	1.52.5.0002

Technical data

Type	Meas.range (mbar)	Scale unit	Red/green area (mbar)	Weight (kg)
VM-63-1/4-RG60	-1000 ... 0	(mbar) und (%Vak.)	-600	0,135
VM-63-1/4-RG70	-1000 ... 0	(mbar) und (%Vak.)	-700	0,135
VM-63-1/4-RG80	-1000 ... 0	(mbar) und (%Vak.)	-800	0,135
VM-100-1/2-RG10	-160 ... 0	(mbar) und (%Vak.)	-100	0,540
VM-100-1/2-RG20	-250 ... 0	(mbar) und (%Vak.)	-200	0,540
VM-100-1/2-RG30	-400 ... 0	(mbar) und (%Vak.)	-300	0,540
VM-100-1/2-RG60	-1000 ... 0	(mbar) und (%Vak.)	-600	0,300
VM-100-1/2-RG80	-1000 ... 0	(mbar) und (%Vak.)	-800	0,300

Measuring and Warning Units

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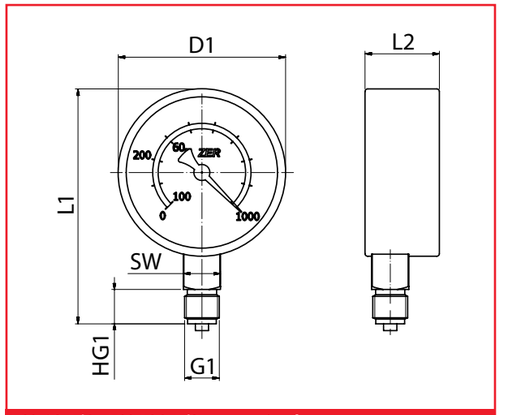
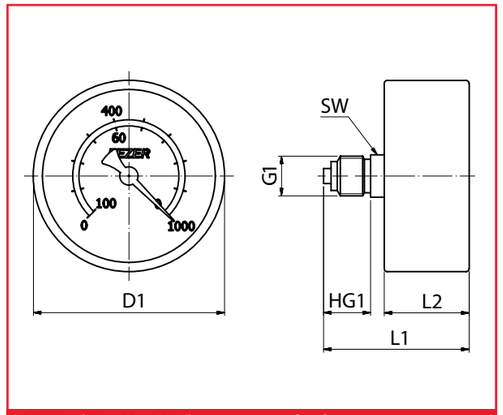
Vacuum gauge VM



VM-63-1/4 - VM-100-1/2, connection bottom



VM-63-1/4 - VM-100-1/2, connection back

Dimensions

Type	Connection	L1	L2	D1	G1	HG1	SW
VM-63-1/4U-RG60-RG80	bottom	86	28	63	G 1/4“	12	14
VM-63-1/4H-RG60-RG80	back	49	30	63	G 1/4“	12	14
VM-100-1/2U-RG10-RG30	bottom	137	31	100	G 1/2“	20	22
VM-100-1/2H-RG60-RG80	back	51	32	100	G 1/2“	12	14
VM-100-1/2U-RG60-RG80	bottom	142	49	100	G 1/2“	19	22

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Measuring and Warning Units

Acoustic warning unit EW0

Description
Electronic, universal warning unit with acoustic howler (90dB(A)) in stable metal sheet housing. The howler warns when the vacuum drops or in case of a power failure. The warning unit is ready for connection with a supply cable, connection cable (5m) toward the vacuum switch (5m) and a ground wire (0,5m). Please order the vacuum switch separately based on the required warning level.

Application
- reliable supervision of vacuum circuits
- with acoustic warning signal
- for manual vacuum lifters


EW0

Article number

Type	
EW0-200-600VAC	6.35.4.0122

Article number of required vacuum switch

Type	Switching point 60%	Switching point 70%	Switching point 80%
VSM-1/4- ...	1.52.1.0001	1.52.1.0008	1.52.1.0002

Technical data

Type		
Operational voltage	(V AC)	200 ... 600
Frequency:	(Hz)	50 ... 60
Measure medium		dry, oilless unaggressive gases
Media resistance		air, oil, petrol
Meas.range	(bar)	-1 ... 1
Overpressure safety	(bar)	10
Fluid connection		G1/4
Switching range		60%, 70%, 80%
Switching point, preset		60%, 70%, 80%
Repeat precision		+/- 5 %
Reaction time	(ms)	< 400
Protection class		IP55
Temperature range	(°C)	+10 ... +50
Weight	(kg)	2,0

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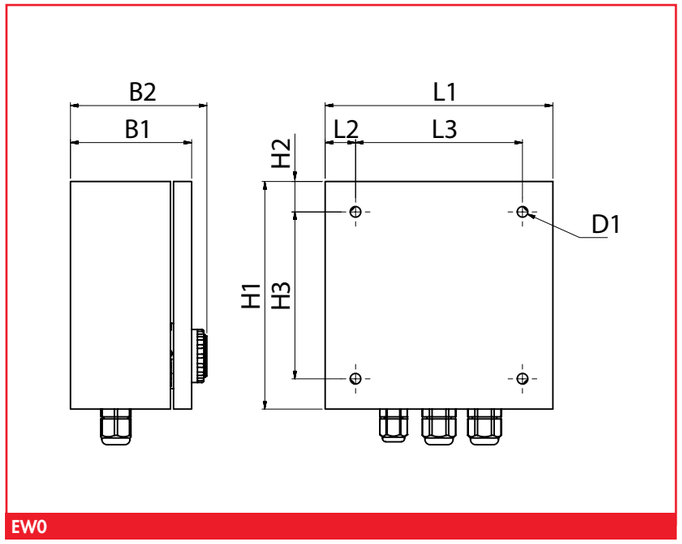
Measuring and Warning Units

Acoustic warning unit EW0



EW0

Dimensions

Type	L1	L2	L3	B1	B2	H1	H2	H3	D1
EW0	150	20	110	80	90	150	20	110	7

Measuring and Warning Units

Acoustic and optical warning unit EWIII

FEZER
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Description
Electronic warning unit with acoustic howler (100dB(A)), optical warning lamps and power failure detector.
- lights up green on sufficient vacuum,
- lights up red on insufficient vacuum
- howler on power failure and insufficient vacuum

Scope of delivery
Terminal box with mounted motor protection switch, mains unit (24V DC), contactor and terminal block, supply cable (5m), connection cable to vacuum pump (5m), connection cable for vacuum switch VSM-1/4 (5m) and grounding cable (0,5m). Please order the vacuum switch separately. The installation of the vacuum switch depends on the vacuum control:
- manual: installation in vacuum safety tank
- electrical: installation in suction circuit (after the valve)

Application
- on large lifters
- central vacuum energy units
- surroundings with high noise level

EWIII

Article number

EWIII for oilless vacuum pumps			EWIII for oil-lubricated vacuum pumps		
Vacuum control:	manual	electrical	Vacuum control:	manual	elektrical
VP-T4.8-230V	6.35.4.0191	6.35.4.0223	VP-010.1-230/400V	6.35.4.0209	6.35.4.0241
VP-T4.8-230/400V	6.35.4.0193	6.35.4.0225	VP-016.1-230/400V	6.35.4.0213	6.35.4.0245
VP-T4.16-230V	6.35.4.0195	6.35.4.0227	VP-025.3EURO-230/400V	6.35.4.0217	6.35.4.0249
VP-T4.16-230/400V	6.35.4.0197	6.35.4.0229	VP-025.3MULTI-230/400V	6.35.4.0377	6.35.4.0401
VP-T4.25-230/400V	6.35.4.0200	6.35.4.0233	VP-040.3EURO-230/400V	6.35.4.0221	6.35.4.0253
VP-T4.40-230/400V	6.35.4.0205	6.35.4.0237	VP-040.3MULTI-230/400V	6.35.4.0381	6.35.4.0405
VP-T4.50-230/400V	6.35.4.0297	6.35.4.0321	VP-063.3EURO-230/400V	6.35.4.0345	6.35.4.0361
VP-T4.60-EURO-230/400V	6.35.4.0301	6.35.4.0325	VP-063.3MULTI-230/400V	6.35.4.0385	6.35.4.0409
VP-T4.80-EURO-230/400V	6.35.4.0305	6.35.4.0329	VP-0100.3EURO-230/400V	6.35.4.0349	6.35.4.0365
VP-T4.100-EURO-230/400V	6.35.4.0309	6.35.4.0333	VP-0100.3MULTI-230/400V	6.35.4.0389	6.35.4.0413
VP-T4.140-EURO-230/400V	6.35.4.0313	6.35.4.0337	VP-0160.3EURO-230/400V	6.35.4.0353	6.35.4.0369
VP-T4.250-EURO-400/690V	6.35.4.0317	6.35.4.0341	VP-0160.3MULTI-230/400V	6.35.4.0393	6.35.4.0417
			VP-0250.3EURO-230/400V	6.35.4.0357	6.35.4.0373
			VP-0250.3MULTI-230/400V	6.35.4.0397	6.35.4.0421

Article number of required vacuum switch

Type	Vacuum switch VSM Switching point 60%	Vacuum switch VSM Switching point 70%	Vacuum switch VSM Switching point 80%
VSM-1/4- ...	1.52.1.0001	1.52.1.0008	1.52.1.0002

Measuring and Warning Units
Acoustic and optical warning unit EWIII
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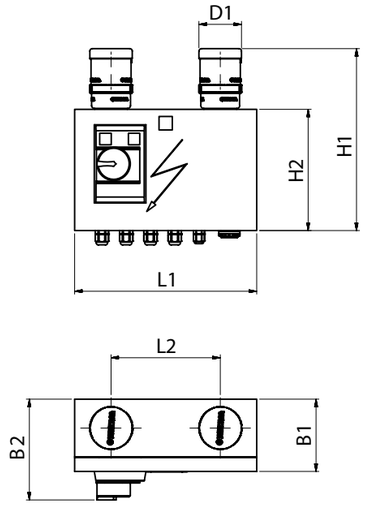
Technical data

Type		
Voltage	(V)	230 (AC1), 400 (AC3)
Frequency	(Hz)	50/60
Measure medium		dry, oilless unaggressive gases
Media resistance		air, oil, petrol
Meas.range	(bar)	-1 ... 0
Overpressure safety	(bar)	10
Fluid connection		G1/4
Switching exit digital		1x
Switching logic		changeover switch NO/NC
Switching range		5% ... 95% adjustable
Switching point, preset		60%, 70%, 80%
Repeat precision		+/- 5 %
Reaction time	(ms)	< 400
Protection class		IP55
Temperature range	(°C)	+10 ... +50
Weight	(kg)	6,2



EWIII

Dimensions

Type	L1	L2	B1	B2	H1	H2	D1
EWIII	300	180	119	166	300	200	70

Measuring and Warning Units

Pneumatic warning unit EWP

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Description
Pneumatic warning unit with acoustic whistle (ca. 80dB(A)) in stable plastic housing. The whistle blows when the operational vacuum is insufficient. Both the sound volume and the switching point are adjustable. With plug-in connection for hose Ø 6mm for compressed air supply and vacuum line.

Application
- reliable supervision of vacuum circuits with acoustic warning signal
- installation on manual lifters
- any mounting position

EWP

Article number

Type	
EWP-NC	6.35.4.0261
EWP-NO	6.35.4.0294

Technical data

Type		EWP-NO	EWP-NC
Measure medium		dry, oilless unaggressive gases	
Meas.range	(bar)	-1 ... 1	
Overpressure safety	(bar)	2	
Fluid connection	(mm)	6	
Switching exit digital		1xNO	1xNC
Switching range		35 ... 85% adjustable	
Hysteresis setting		0,08 ... 0,1	
Condition display		---	
Repeat precision		+/- 3 %	
Switching frequency	(1/s)	2	
Compressed air supply	(bar)	2 ... 6	
Flow	(l/min)	55	
Air consumption	(l/min)	4	
Pneumatic onnection		3	
Temperature range	(°C)	0 ... 60	
Weight	(kg)	0,070	

Measuring and Warning Units
Pneumatic warning unit EWP
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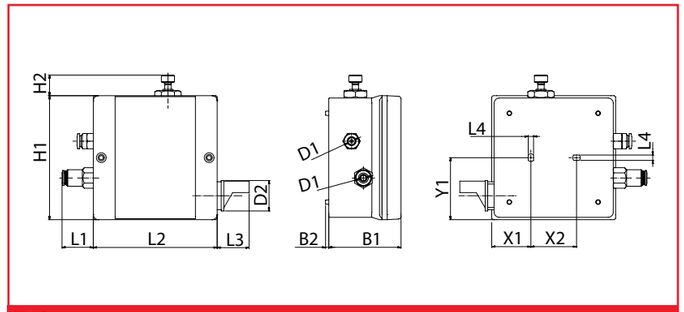

EWP

Dimensions

Type	L1	L2	L3	L4	B1	B2	H1	H2	D1	X1	X2	Y1
EW0	24,7	97,7	25,5	4,2	57	2,5	97,7	25	6	24	30,85	48,85

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Filter Elements

1. Basics
2. Suction Pads
3. Mounting Elements
4. Vacuum Generators
5. Valve Technology
6. Vacuum Supervision
7. Filter Elements
8. Connection Elements
9. System Technology

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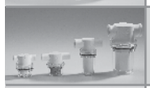
Filter Elements

Overview

Filter elements		Technical details		Description	Page
	Vacuum filter VF	Size	G3/8 ... G21/2	Vacuum filter with metal sheet housing for vacuum pumps and small vacuum blowers	7.3
	Vacuum filter SFS	Size	Hose-Ø 50 ... 60	Vacuum filter with plastic housing for vacuum blowers with high flow rate	7.5
	Vacuum filter VFK	Size	G1/8 ... G1/2	Vacuum filter made of plastic with transparent glass lid for ejectors and small vacuum pumps	7.7
	Vacuum filter VFI	Size	Hose-Ø 4 .. 6	Inline vacuum filter for direct installation in hose lines	7.9
	Ventilation filter BFS	Size	G1/8 ... G1	Ventilation filter for installation on vacuum valves on the ventilation side	7.11
	Ventilation filter BF	Size	G1/2 ... G11/2	Ventilation filter for installation on vacuum valves on the ventilation side	7.13
	Water separator WA	Size	G1/2 ... G11/2	Applications with wet or moist surfaces	7.15

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Filter Elements

Vacuum filter VF

Description
Vacuum filter in stable metal sheet housing with exchangeable filter cartridge. The filter cartridge is made of micro fibre which reaches a precipitator efficiency of almost 100%.

Application:
- dirty surfaces and dusty surroundings
- to protect the vacuum generators and valves
- mounting position vertical

VF-3/8 ... VF-21/2

Article number

Type		Filter insert
VF-1/2	1.53.2.0002	2.53.2.0009
VF-3/4	1.53.2.0006	2.53.2.0014
VF-1	1.53.2.0014	2.53.2.0005
VF-11/4A	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

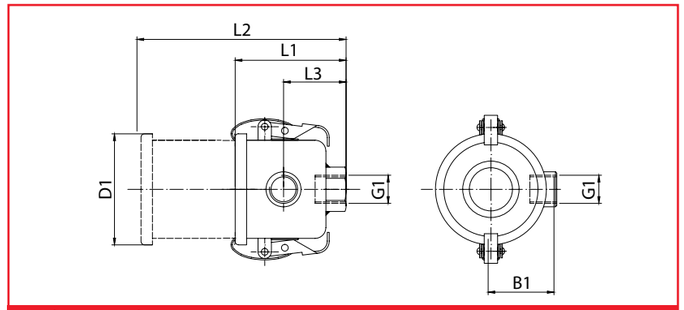
Technical data

Type	Pressure range (bar)	Flow rate (m^3/h)	Flow rate (l/s)	Filter grain size (µm)	Temperature (°C)	Weight (kg)
VF-1/2	-1 ... 0	12	3,3	5	-10 ... +60	0,12
VF-3/4	-1 ... 0	42	11,6	5	-10 ... +60	0,60
VF-1	-1 ... 0	85	23,6	5	-10 ... +60	0,85
VF-11/4A	-1 ... 0	96	26,6	5	-10 ... +60	1,06
VF-11/4B	-1 ... 0	108	30,0	5	-10 ... +60	1,25
VF-21/2	-1 ... 0	360	100	5	-10 ... +60	1,88

FEZER
Simply move more.

Filter Elements

Vacuum filter VF



VF-3/8 ... VF-21/2

Dimensions

Type	D1	B1	L1	L2	L3	G1
VF-1/2	82,5	49	82,5	155	46,5	G 1/2
VF-3/4	97	59	89,5	165	45	G3/4
VF-1	133	76	97	175	51	G1
VF-11/4A	136	81	116	195	68	G11/4
VF-11/4B	172	98	170	310	108	G11/4
VF-21/2	194	123	247	470	119	G21/2

FEZER
Simply move more.

Filter Elements

Vacuum filter SFS

Description
Very large dust filter consisting of a stable plastic housin and an internal vacuum filter insert. The filter can be fastened by an appropriate bracket. The filter cartridge can be easily and quickly exchanged or cleaned. The filter is equipped with reductions for hose diameter 50 mm. By removing the reduction the filter can be used for hose diameter 60 mm.

Application:
- for extreme grades of pollution and simultaneously high flow rates (vacuum blowers)
- vertical mounting position

SFS-50

Article number

Type		Filter insert	Bracket
SFS-50	4.26.4.0121	5.26.4.0007	4.26.4.0057

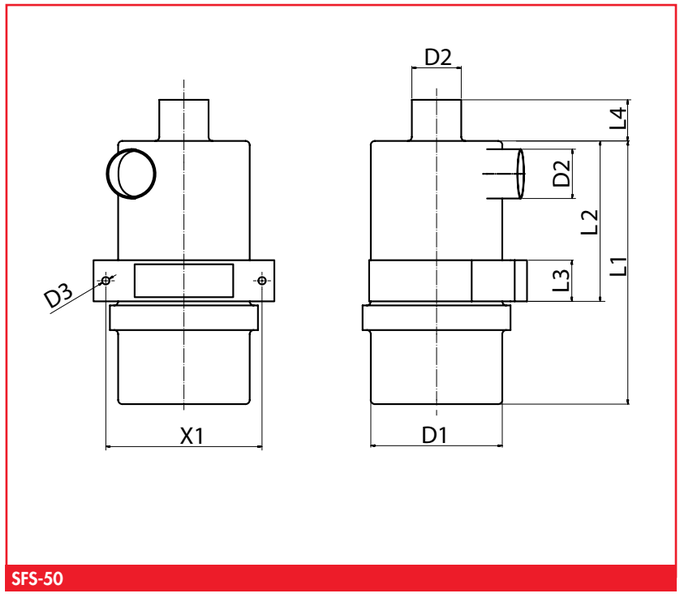
Technical data

Type	Pressure range (bar)	Flow rate (m^3/h)	Flow rate (l/s)	Filter grain size (µm)	Temperature (°C)	Weight (kg)
SFS-50	-1 ... 0	260	72	5	-5 ... +50	2,05

FEZER
Simply move more.

Filter Elements

Vacuum filter SFS



SFS-50

Dimensions

Type	L1	L2	L3	L4	D1	D2	D3	X1
SFS-50	320	195	50	60	160	50	9	190

Filter Elements

FEZER
Simply move more.

Vacuum filter VFT

Description
Vacuum filter with stable and transparent plastic housing.
This allows to verify the grade of pollution at any time.
The filter cartridge is easily and quickly exchangeable.

Application:
- for medium to high grades of pollution
- to protect vacuum generators and sensitive valves
- horizontal mounting position

VFT-1/8 ... VFT-1/2

Article number

Type		Filter insert	Holding plate
VFT-1/8	1.53.2.0020	2.53.2.0032	2.53.2.0038
VFT-1/4	1.53.2.0018	2.53.2.0032	2.53.2.0038
VFT-3/8	1.53.2.0028	2.53.2.0032	2.53.2.0038
VFT-1/2	1.53.2.0021	2.53.2.0032	2.53.2.0038
VFT-3/4	1.53.2.0022	2.53.2.0033	2.53.2.0039

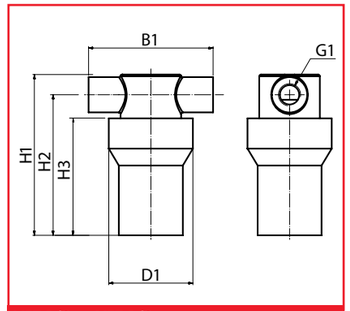
Technical data

Type	Pressure range (bar)	Flow rate (m^3/h)	Flow rate (l/s)	Filter grain size (µm)	Temperature (°C)	Weight (kg)
VFT-1/8	-1 ... +5	30	8,3	80	-5 ... +50	0,05
VFT-1/4	-1 ... +5	40	11,1	80	-5 ... +50	0,05
VFT-3/8	-1 ... +5	45	12,5	80	-5 ... +50	0,08
VFT-1/2	-1 ... +5	80	22,2	80	-5 ... +50	0,08
VFT-3/4	-1 ... +5	108	30,0	80	-5 ... +50	0,15

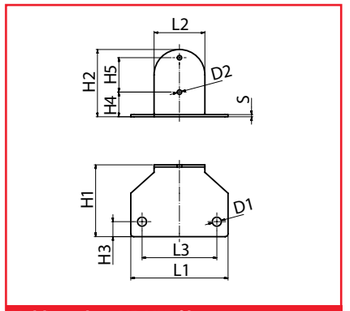
Filter Elements

FEZER
Simply move more.

Vacuum filter VFT



VFT-1/8 ... VFT-1/2



Holding plate HB-VFT-filter

Dimensions filter

Type	H1	H2	H3	B1	B2	D1	G1
VFT-1/8	92,5	83	69,5	58	29	50	G1/8
VFT-1/4	95,5	85	69,5	74	37	50	G1/4
VFT-3/8	98,5	86	69,5	74	37	50	G3/8
VFT-1/2	102,5	88	69,5	74	37	50	G1/2
VFT-3/4	134	117	92	90	48	76	G3/4

Dimensions holding plate

Type	L1	L2	L3	H1	H2	H3	H4	H5	D1	D2	S
HB-VFT-1/8	65	34	50	48	45	10	16,5	23	6	3	1,5
HB-VFT-1/4	65	34	50	48	45	10	16,5	23	6	3	1,5
HB-VFT-3/8	65	34	50	48	45	10	16,5	23	6	3	1,5
HB-VFT-1/2	65	34	50	48	45	10	16,5	23	6	3	1,5
HBVFT-3/4	85	51	70	52	70	10	26,5	33	6	3	1,5

FEZER
Simply move more.

Filter Elements

Vacuum filter inline VFI

Description
Compact vacuum filter for in-line-installation, straight into the hose lines. The transparent housing shows the grade of pollution at all times. The filter inserts can be exchanged easily and quickly.

Application:
- on applications with slight to medium grade of pollution
- straight installation into the hose lines
- any mounting position

VFI-4 ... VFI 8

Article number

Type	
VFI-4	1.53.2.0029
VFI-6	1.53.2.0013
VFI-8	1.53.2.0015

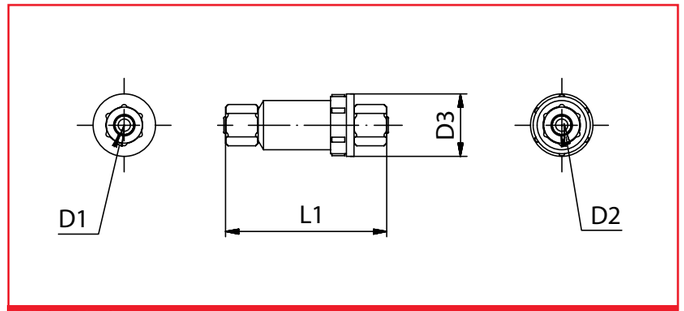
Technical data

Type	Pressure range (bar)	Flow rate (m^3/h)	Flow rate (l/s)	Filter grain size (µm)	Temperature (°C)	Weight (kg)
VFI-4	-1 ... +7	1,6	0,45	50	-5 ... +50	0,004
VFI-6	-1 ... +7	4,2	1,2	50	-5 ... +50	0,006
VFI-8	-1 ... +7	7,5	2,1	50	-5 ... +50	0,010

FEZER
Simply move more.

Filter Elements

Vacuum filter inline VFI



VFI-4 ... VFI 8

Dimensions

Type	L1	D1	D2	D3
VFI-4	50	4	4	16
VFI-6	56	6	6	16
VFI-8	62	8	8	24

FEZER
Simply move more.

Filter Elements

Ventilation filter BFS

Description
Robust ventilation filter in sintered metal design. Its small size allows to use the filter in cramped spaces. To clean them the ventilation filters can be blown out with compressed air contrary to the suction direction.

Application:
- to protect vacuum valves on the ventilation side
- any mounting position

BFS-1/4 ... BFS-3/4

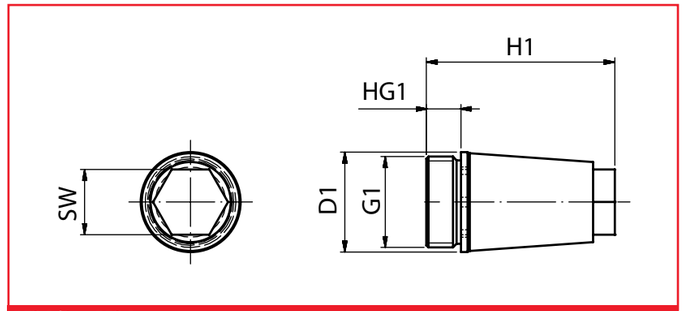
Article number

Type	
BFS-1/8	1.53.1.0012
BFS-1/4	1.53.1.0013
BFS-1/2	1.53.1.0014
BFS-3/4	1.53.1.0015
BFS-1	1.53.1.0016

Technical data

Type	Pressure range (bar)	Flow rate (m^3/h)	Flow rate (l/s)	Filter grain size (µm)	Temperature (°C)	Weight (kg)
BFS-1/8	-1 ... +10	10	2,8	93	-10 ... +60	0,006
BFS-1/4	-1 ... +10	16,5	4,5	145	-10 ... +60	0,012
BFS-1/2	-1 ... +10	30	8,3	407	-10 ... +60	0,041
BFS-3/4	-1 ... +10	60	16,6	762	-10 ... +60	0,083
BFS-1	-1 ... +10	90	25	900	-10 ... +60	0,144

FEZER
Simply move more.



BFS-1/4 ... BFS-1

Dimensions

Type	D1	H1	G1	HG1	SW
BFS-1/8	11,5	21,5	G1/8	4,5	8
BFS-1/4	15	28	G1/4	6	10
BFS-1/2	23	43,5	G1/2	8	15
BFS-3/4	30	56	G3/4	9	19
BFS-1	37	68,5	G1	11	24

FEZER
Simply move more.

Filter Elements

Ventilation filter BF

Description
Robust ventilation filter in stable sheet metal housing. The large surface provides a high grade of separation of dirt particles. To clean them the ventilation filters can be blown out with compressed air contrary to the suction direction.

Application:
- to protect vacuum valves on the ventilation side
- any mounting position

BF-1/2 ... BF 11/2

Article number

Type	
BF-1/2	1.53.1.0003
BF-3/4	1.53.1.0008
BF-1	1.53.1.0009
BF-11/2	1.53.1.0010

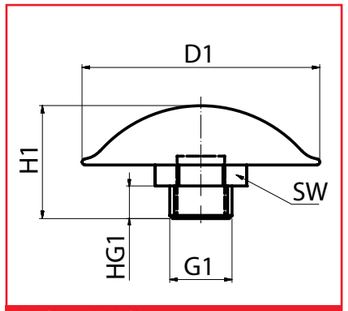
Technical data

Type	Pressure range (bar)	Flow rate (m^3/h)	Flow rate (l/s)	Filter grain size (µm)	Temperature (°C)	Weight (kg)
BF-1/2	-1 ... +8	90	25	60	-10 ... +60	0,10
BF-3/4	-1 ... +8	110	30,7	60	-10 ... +60	0,12
BF-1	-1 ... +8	160	44,4	60	-10 ... +60	0,16
BF-11/2	-1 ... +8	240	66,6	60	-10 ... +60	0,33

FEZER
Simply move more.

Filter Elements

Ventilation filter BF



BF-1/2 ... BF 11/2

Dimensions

Type	D1	H1	G1	HG1	SW
BF-1/2	80	27	G1/2	11	27
BF-3/4	80	45	G3/4	20	36
BF-1	80	47	G1	20	46
BF-11/2	80	58	G11/2	22	46

Filter Elements

Water separator WAS

FEZER
Simply move more.

Description
Water separator with manual drainage screw and inspection window for visual control. Holding fixture made of stable brass die-cast. The water separator is used to protect valves and pumps from moisture. The drainage screw allows to drain the condensate manually.

Application:
- handling of moist to wet workpieces
- on water spray machines and out-door applications
- mounting position horizontal

WAS-1/2 ... WAS-1

Article number

Type		Spare glass	Drainage screw
WAS-1/2	1.53.4.0001	2.53.4.0003	2.53.4.0005
WAS-3/4	1.53.4.0002	2.53.4.0001	2.53.4.0005
WAS-1	1.53.4.0006	2.53.4.0001	2.53.4.0005
WAS-11/4	1.53.4.0004	2.53.4.0001	2.53.4.0005
WAS-11/2	1.53.4.0005	2.53.4.0001	2.53.4.0005

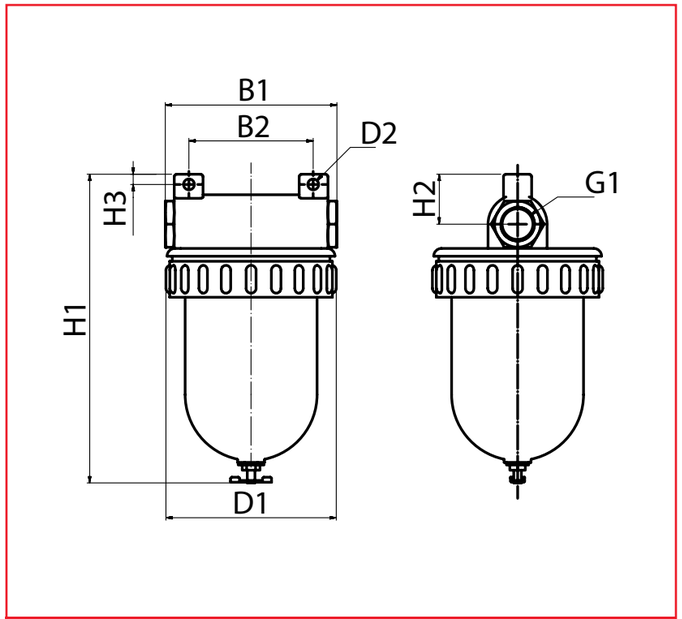
Technical data

Type	Pressure range (bar)	Flow rate (m^3/h)	Flow rate (l/s)	Filter grain size (µm)	Volume (l)	Temperature (°C)	Weight (kg)
WAS-1/2	-1 ... +8	60	16,6	40	0,080	+10 ... +50	1,2
WAS-3/4	-1 ... +8	288	80	40	0,260	+10 ... +50	1,9
WAS-1	-1 ... +8	306	85	40	0,260	+10 ... +50	1,9
WAS-11/4	-1 ... +8	378	105	40	0,260	+10 ... +50	1,9
WAS-11/2	-1 ... +8	396	110	40	0,260	+10 ... +50	1,9

Filter Elements

Water separator WAS

FEZER
Simply move more.



WAS-1/2 ... WAS-11/2

Dimensions

Type	D1	D2	B1	B2	H1	H2	H3	G1
WAS-1/2	87	6	80	50	196	24	6	G1/2
WAS-3/4	133	8,4	120	97	241	36	8	G3/4
WAS-1	133	8,4	134	97	241	36	8	G1
WAS-11/4	133	8,4	134	97	241	45	8	G11/4
WAS-11/2	133	8,4	134	97	241	45	8	G11/2

FEZER
Simply move more.

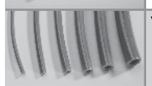
Connection Elements

1. Basics
2. Suction Pads
3. Mounting Elements
4. Vacuum Generators
5. Valve Technology
6. Vacuum Supervision
7. Filter Elements
8. Connection Elements
9. System Technology

FEZER
Simply move more.

Fastening Elements

Overview

Vacuum hose		Technical Data		Description	Page
	Vacuum hose VS	Hose-Ø	10 ... 38	For vacuum generators	8.5
	Vacuum hose VS	Hose-Ø	22 ... 60	For vacuum blowers	8.7
	Vacuum hose VS	Hose-Ø	4 ... 16	For ejectors and pneumatic elements	8.9
	Hose clamps SK	For hose-Ø	10 ... 60	To secure hose connections	8.11

Connections		Technical Data		Description	Page
	Hose nipple SN	Thread connection Hose-Ø	1/8 ... 11/2 10 ... 38		8.13
	Sealing rings DR	for threads	M5 ... 11/2		8.15
	Flat sealing band FDB	Material:	Teflon		8.16
	Plug-in connections				8.17
	Threaded union straight SVS-G	Thread connection Hose-Ø	M5 ... G1/2 4 ... 16		8.18
	Threaded union angular SVS-W	Thread connection Hose-Ø	M5 ... G1/2 4 ... 16		8.19
	Threaded union in T form SVS-T	Thread connection Hose-Ø	M5 ... G1/2 4 ... 16		8.20
	Threaded union T angular SVS-TW	Thread connection Hose-Ø	M5 ... G1/2 4 ... 16		8.21
	Threaded union in Y form SVS-Y	Thread connection Hose-Ø	M5 ... G1/2 4 ... 16		8.22
	Plug-in connector straight SVB-G	Hose-Ø	4 ... 16		8.23
	Plug-in connector angular SVB-W	Hose-Ø	4 ... 16		8.24
	Plug-in connector in T form SVB-T	Hose-Ø	4 ... 16		8.25

Fastening Elements

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Overview

Connections		Technical Data		Description	Page
	Plug-in connector in Y form SVB-Y	Hose-Ø	4 ... 16		8.26
	Plug-in connector in X form SVB-X	Hose-Ø	4 ... 16		8.27
	Plug-in connector straight reducing SVB-GR	Hose-Ø	4 ... 16		8.28
	Plug-in connector in T form reducing SVB-TR	Hose-Ø	4 ... 16		8.29
	Plug-in connector in Y form reducing SVB-YR	Hose-Ø	4 ... 16		8.30
	Thread union straight, GVS-G	Thread connection	G1/8 ... G1		8.31
	Thread union angular, GVS-W	Thread connection	G1/8 ... G1		8.32
	Thread union in T form, GVS-T	Thread connection	G1/8 ... G1		8.33
	Thread union in TF form, GVS-TF	Thread connection	G1/8 ... G1		8.34
	Thread union in Y form, GVS-Y	Thread connection	G1/8 ... G1		8.35
	Thread union in X form, GVS-X	Thread connection	G1/8 ... G1		8.36
	Thread union reduction bushing, GVS-RM	Thread connection	G1/8 ... G1		8.37
	Thread union reduction nipple, GVS-RN	Thread connection	G1/8 ... G1		8.38
	Thread union angular turnable, GVS-WD	Thread connection	G1/8 ... G1		8.39
	Thread union sealing plug, GVS-VS	Thread connection	G1/8 ... G1		8.40

1. Basics
2. Suction Pads
3. Mounting Elements
4. Vacuum Generators
5. Valve Technology
6. Vacuum Supervision
7. Filter Elements
8. Connection Elements
9. System Technology

Fastening Elements

FEZER
Simply move more.

Overview

Distribution elements		Technical Data		Description	Page
	Quick-change coupling SWK-	Thread connection	G1/8 ... G1	Self-closing, for vacuum connections, that are being used variably	8.41
	Distribution block VTB	Connections Number of exits	1/4 ... 1/2 4 ... 8	Distribution of hose lines	8.43
	Distribution block with cut-off cock VTB-AH	Connections Number of exits	1/4 ... 1/2 4 ... 8	Distribution of hose lines with additional possibility to switch individual lines on and off	8.45
	Revolving vacuum feeder DVZ-	Sizes R.p.m. (1/min)	G1/8 ... G1 250 ... 3000	Use on rotation movements with vacuum distribution	8.47

Electrical connections		Technical Data		Description	Page
	Junction cable ASK-	Connections Terminals Lengths	M8, M12 3 ... 5 2 ... 10	Junction cable for sensors and valves	8.49
	Connection cable VBK-	Connections Terminals Lengths	M8, M12 3 ... 5 2 ... 10	Connection cable for sensors and valves on entry module	8.51

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Simply move more.

Vacuum Hose

VS for hose nipple

Description
Robust vacuum hose with wire insert which prevents a compression of the hose - even on high vacuum. The vacuum hoses are available in various materials and suitable for vacuum pumps.

Applicationon
- on vacuum systems
- for vacuum lifters
- for robust applications
- suitable for cable drag chains (PU)

VS-1/2-S ... VS-1-S

Article number

Type	Material sold by metre	Coil	Length of Coil (m)	Suitable hose clamps	
VS-10-T-PVC	1.54.1.0025	1.54.1.0026	30	SK-10	6.21.1.0657
VS-1/2-T-PVC	1.54.1.0020	1.54.1.0021	30	SK-1/2	6.21.1.0656
VS-1/2-T-PU	1.54.1.0086	1.54.1.00127	30	SK-1/2	6.21.1.0656
VS-1/2-S	1.54.1.0018	1.54.1.0019	25	SK-1/2	6.21.1.0656
VS-3/4-T-PVC	1.54.1.0033	1.54.1.0034	30	SK-3/4	6.21.1.0658
VS-3/4-T-PU	1.54.1.0066	1.54.1.00128	30	SK-3/4	6.21.1.0658
VS-3/4-S	1.54.1.0031	1.54.1.0032	25	SK-3/4	6.21.1.0658
VS-1-T-PVC	1.54.1.0029	1.54.1.0030	30	SK-1	6.21.1.0655
VS-1-T-PU	1.54.1.0126	1.54.1.00129	30	SK-1	6.21.1.0655
VS-1-S	1.54.1.0027	1.54.1.0028	25	SK-1	6.21.1.0655
VS-38-T-PVC	1.54.1.0035	1.54.1.0036	30	SK-38	6.21.1.0659

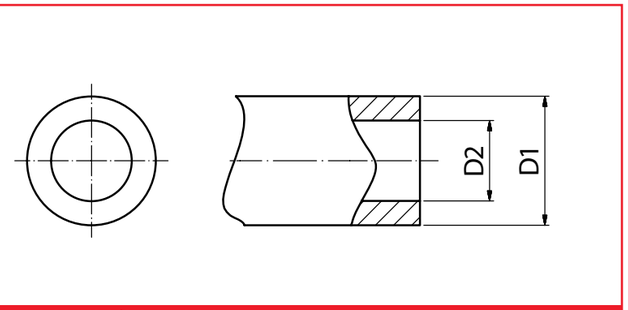
Technical data

Type	Pressure range (bar)	Material	Bend radius (mm)	Volume (l/m)	Temperature (°C)	Weight (kg/m)
VS-10-T-PVC	-1 ... 0	PVC	22	0,080	- 10 ... + 70 °C	0,16
VS-1/2-T-PVC	-1 ... 0	PVC	32	0,015	- 10 ... + 70 °C	0,34
VS-1/2-T-PU	-1 ... 0	PU	25	0,015	- 20 ... + 90 °C	0,34
VS-1/2-S	-1 ... 0	SBR+CR	70	0,015	- 10 ... + 70 °C	0,35
VS-3/4-T-PVC	-1 ... 0	PVC	52	0,031	- 10 ... + 70 °C	0,38
VS-3/4-T-PU	-1 ... 0	PU	35	0,031	- 20 ... + 90 °C	0,38
VS-3/4-S	-1 ... 0	SBR+CR	100	0,031	- 10 ... + 70 °C	0,43
VS-1-T-PVC	-1 ... 0	PVC	62	0,050	- 10 ... + 70 °C	0,51
VS-1-T-PU	-1 ... 0	PU	40	0,050	- 20 ... + 90 °C	0,51
VS-1-S	-1 ... 0	SBR+CR	180	0,050	- 10 ... + 70 °C	0,74
VS-38-T-PVC	-1 ... 0	PVC	92	0,113	- 10 ... + 70 °C	0,95

FEZER
Simply move more.

Vacuum Hose

VS for hose nipple



VS-10 ... VS-38, VS-1/2-S ... VS-1-S

Dimensions

Type	D1	D2
VS-10-T-PVC	16	10
VS-1/2-T-PVC	20	14
VS-1/2-T-PU	21,5	14
VS-1/2-S	21,5	14
VS-3/4-T-PVC	26,5	20
VS-3/4-T-PU	26,5	20
VS-3/4-S	28	20
VS-1-T-PVC	34	25
VS-1-T-PU	34	25
VS-1-S	33	25
VS-38-T-PVC	50	38

Material characteristics

Criteria	PVC	PU	S
Material	Polyvinylchloride	Polyurethane	SBR+CR
Oil resistance	+	+++	+++
Weather resistance	+	+++	+++
Wear resistance	++	+++	+++
Cable drag suitability	+	+++	+
Tensile strength	20 N/mm²	50 N/mm²	30 N/mm²

not suitable	-
limited suitability	+
well suitable	++
very well suitable	+++

FEZER
Simply move more.

Vacuum hose

VS for tube socket

Description
Robust vacuum hoses in spiral design with large flow cross sections and wire insert. The vacuum hoses are available in various materials and designed for vacuum blowers.

Application
- on vacuum systems with blowers
- for robust applications
- suitable for cable drag chains (PU)

VS-22 ... VS-60

Article number

Type	Material sold by the metre	Coil 20m	Suitable hose clamp	
VS-22-PVC	5.26.4.0400	5.26.4.0402	SK-22	5.26.4.0004
VS-22-PU	5.26.4.0012	5.26.4.0401	SK-22	5.26.4.0004
VS-32-PVC	5.26.4.0013	5.26.4.0403	SK-32	5.26.4.0003
VS-32-PU	5.26.4.0014	5.26.4.0404	SK-32	5.26.4.0003
VS-40-PVC	5.26.4.0399	5.26.4.0405	SK-40	5.26.4.0268
VS-40-PU	5.26.4.0073	5.26.4.0406	SK-40	5.26.4.0268
VS-45-PVC	5.26.4.0386	5.26.4.0407	SK-46	5.26.4.0020
VS-45-PU	5.26.4.0019	5.26.4.0408	SK-46	5.26.4.0020
VS-50-PVC	5.26.4.0015	5.26.4.0409	SK-50	5.26.4.0005
VS-50-PU	5.26.4.0016	5.26.4.0410	SK-50	5.26.4.0005
VS-60-PVC	5.26.4.0072	5.26.4.0411	SK-60	5.26.4.0276
VS-60-PU	5.26.4.0071	5.26.4.0412	SK-60	5.26.4.0276

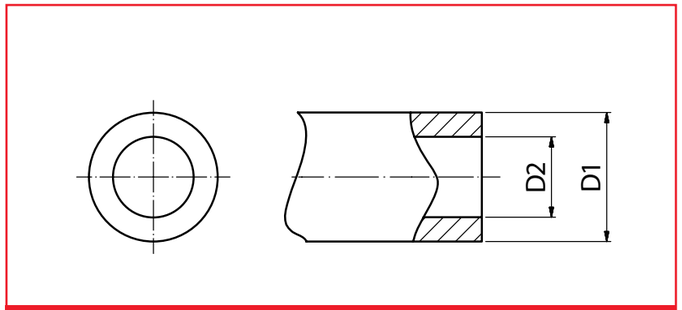
Technical data

Type	Pressure range (bar)	Material	Bend radius (mm)	Volume (l/m)	Temperature (°C)	Weight (kg/m)
VS-22-PVC	-1 ... 0	PVC	30	0,038	-10 ... +60	0,12
VS-22-PU	-1 ... 0	PU	25	0,038	-20 ... +80	0,12
VS-32-PVC	-1 ... 0	PVC	40	0,080	-10 ... +60	0,18
VS-32-PU	-1 ... 0	PU	35	0,080	-20 ... +80	0,18
VS-40-PVC	-1 ... 0	PVC	50	0,126	-10 ... +60	0,22
VS-40-PU	-1 ... 0	PU	45	0,126	-20 ... +80	0,22
VS-45-PVC	-1 ... 0	PVC	60	0,159	-10 ... +60	0,27
VS-45-PU	-1 ... 0	PU	55	0,159	-20 ... +80	0,27
VS-50-PVC	-1 ... 0	PVC	90	0,196	-10 ... +60	0,76
VS-50-PU	-1 ... 0	PU	85	0,196	-20 ... +80	0,76
VS-60-PVC	-1 ... 0	PVC	120	0,283	-10 ... +60	0,88
VS-60-PU	-1 ... 0	PU	110	0,283	-20 ... +80	0,88

FEZER
Simply move more.

Vacuum Hose

VS for tube socket



VS-22 ... VS-60

Dimensions

Type	D1	D2
VS-22-PVC	25	22
VS-22-PU	25	22
VS-32-PVC	36	32
VS-32-PU	36	32
VS-40-PVC	44	40
VS-40-PU	44	40
VS-45-PVC	49	45
VS-45-PU	49	45
VS-50-PVC	55	50
VS-50-PU	55	50
VS-60-PVC	66	60
VS-60-PU	66	60

Material characteristics

Criteria	PVC	PU
Material	Polyvinylchloride	Polyurethane
Oil resistance	+	+++
Weather resistance	+	+++
Wear resistance	++	+++
Cable drag suitability	+	+++
Tensile strength	15 N/mm²	40 N/mm²

not suitable	-
limited suitability	+
well suitable	++
very well suitable	+++

FEZER
Simply move more.

Vacuum hose

VS for plug connections

Description
Robust hose connections suitable both for vacuum and compressed air. Large range of diameters and materials. All hoses are calibrated on the outside and available in colours nature (vacuum supply) and blue (compressed air).

Application
- vacuum systems
- vacuum suction spiders
- robots and automation

VS-4 ... VS-16

Article number

Type	Material sold by the metre colouir nature	Coil 50m colour nature	Material sold by the metre colour blue	Coil 50m colour blue
VS-4-PE	1.54.1.0096	1.54.1.0120	1.54.1.0145	1.54.1.0146
VS-4-PU	1.54.1.0112	1.54.1.0121	1.54.1.0037	1.54.1.0136
VS-6-PE	1.54.1.0097	1.54.1.0039	1.54.1.0147	1.54.1.0148
VS-6-PU	1.54.1.0113	1.54.1.0122	1.54.1.0039	1.54.1.0135
VS-8-PE	1.54.1.0059	1.54.1.0123	1.54.1.0149	1.54.1.0150
VS-8-PU	1.54.1.0114	1.54.1.0124	1.54.1.0057	1.54.1.0134
VS-10-PE	1.54.1.0067	1.54.1.0115	1.54.1.0080	1.54.1.0140
VS-10-PU	1.54.1.0109	1.54.1.0116	1.54.1.0131	1.54.1.0139
VS-12-PE	1.54.1.0060	1.54.1.0125	1.54.1.0141	1.54.1.0142
VS-12-PU	1.54.1.0110	1.54.1.0117	1.54.1.0132	1.54.1.0138
VS-16-PE	1.54.1.0061	1.54.1.0118	1.54.1.0143	1.54.1.0144
VS-16-PU	1.54.1.0111	1.54.1.0119	1.54.1.0133	1.54.1.0137

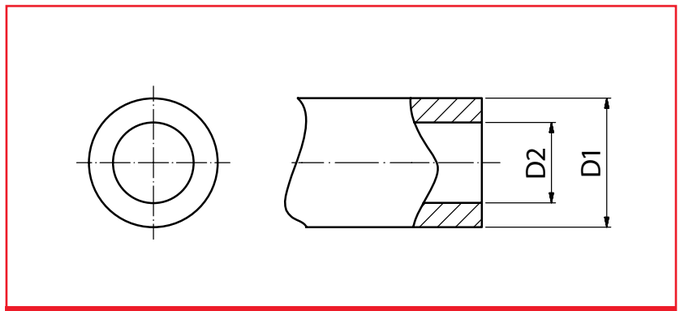
Technical data

Type	Pressure range (bar)	Bend radius (mm)	Volume (l/m)	Temperature (°C)	Weight (kg/m)
VS-4-PE	-1 ... 10	15	0,001	-20 ... +60	0,006
VS-4-PU	-1 ... 10	12	0,001	-30 ... +80	0,008
VS-6-PE	-1 ... 10	20	0,001	-20 ... +60	0,015
VS-6-PU	-1 ... 10	15	0,001	-30 ... +80	0,018
VS-8-PE	-1 ... 10	30	0,003	-20 ... +60	0,025
VS-8-PU	-1 ... 10	25	0,003	-30 ... +80	0,029
VS-10-PE	-1 ... 10	40	0,004	-20 ... +60	0,038
VS-10-PU	-1 ... 10	30	0,004	-30 ... +80	0,047
VS-12-PE	-1 ... 10	50	0,006	-20 ... +60	0,054
VS-12-PU	-1 ... 10	40	0,006	-30 ... +80	0,073
VS-16-PE	-1 ... 10	80	0,011	-20 ... +60	0,103
VS-16-PU	-1 ... 10	60	0,011	-30 ... +80	0,123

FEZER
Simply move more.

Vacuum hose

VS for plug connections



VS-4 ... VS-16

Dimensions

Type	D1	D2
VS-4-PE	4	2,7
VS-4-PU	4	2,6
VS-6-PE	6	4,0
VS-6-PU	6	4,0
VS-8-PE	8	5,7
VS-8-PU	8	5,7
VS-10-PE	10	7,0
VS-10-PU	10	7,0
VS-12-PE	12	8,4
VS-12-PU	12	8,0
VS-16-PE	16	10,8
VS-16-PU	16	11,0

Material characteristics

Criteria	PE	PU
Material	Polyethylene	Polyurethane
Oil resistance	++	+++
Lebensmittelzulassung	-	+++
Weather resistance	+	+++
Wear resistance	++	+++
Cable drag suitability	+	+++
Tensile strength	20 N/mm²	50 N/mm²

not suitable	-
limited suitability	+
well suitable	++
very well suitable	+++

FEZER
Simply move more.

Vacuum Hose

Hose clamps SK

Description
Hose clamps made of galvanized steel to fasten vacuum hoses to hose nipples or tube ends. The hose clamps can be used a number of times.

Application
- to secure vacuum hoses against accidental pull-off
- on vacuum lifters
- for automation and robotics

SK-6 ... SK-60

Article number

Type	
SK-6	6.21.1.0660
SK-10	6.21.1.0657
SK-1/2	6.21.1.0656
SK-3/4	6.21.1.0658
SK-1	6.21.1.0655
SK-38	6.21.1.0659
SK-22	5.26.4.0004
SK-32	5.26.4.0003
SK-40	5.26.4.0268
SK-46	5.26.4.0020
SK-50	5.26.4.0005
SK-60	5.26.4.0276

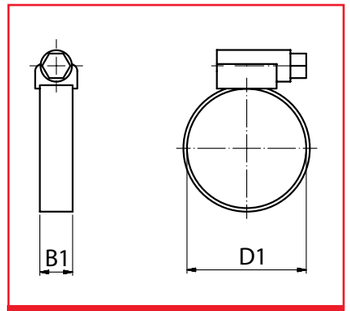
Technical data

Type	Clamping range (mm)	Weight (kg)
SK-6	8 ... 16	0,011
SK-10	12 ... 22	0,013
SK-1/2	14 ... 30	0,014
SK-3/4	20 ... 35	0,015
SK-1	26 ... 40	0,017
SK-38	38 ... 53	0,018
SK-22	21 ... 23	0,015
SK-32	32 ... 35	0,021
SK-40	38 ... 43	0,024
SK-46	43 ... 48	0,025
SK-50	48 ... 53	0,025
SK-60	58 ... 65	0,026

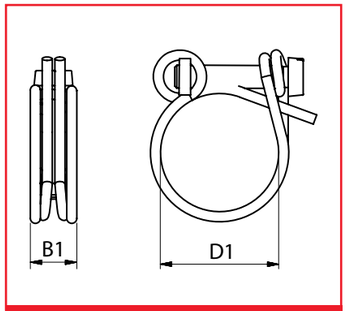
FEZER
Simply move more.

Vacuum Hose

Hose clamps SK



SK-6 ... SK-38



SK-22 ... SK-60

Dimensions

Type	B1	D1
SK-6	9	8 ... 16
SK-10	9	12 ... 22
SK-1/2	9	14 ... 30
SK-3/4	9	20 ... 35
SK-1	9	26 ... 40
SK-38	13	38 ... 53
SK-22	11	21 ... 23
SK-32	11	32 ... 35
SK-40	13	38 ... 43
SK-46	13	43 ... 48
SK-50	15	48 ... 53
SK-60	15	58 ... 65

Connections

Hose nipple SN

FEZER
Simply move more.

Description
Robust hose nipples made of galvanized steel. Available for the hose nipples are both suitable sealing rings made of vulcane fibre and a sealing band.

Application
- connection of vacuum hoses
- sealing rings and sealing band to seal the hose nipples

SN-1/8-6 ... SN-11/2-38

Article number

Type	
SN-1/8-6	1.54.1.0011
SN-1/4-6	1.54.1.0008
SN-1/4-10	1.54.1.0007
SN-1/4-1/2	1.54.1.0006
SN-3/8-10	1.54.1.0017
SN-3/8-1/2	1.54.1.0016
SN-1/2-1/2	1.54.1.0005
SN-3/4-1/2	1.54.1.0003
SN-3/4-3/4	1.54.1.0015
SN-1-1	1.54.1.0012
SN-11/4-38	1.54.1.0014
SN-11/2-38	1.54.1.0013

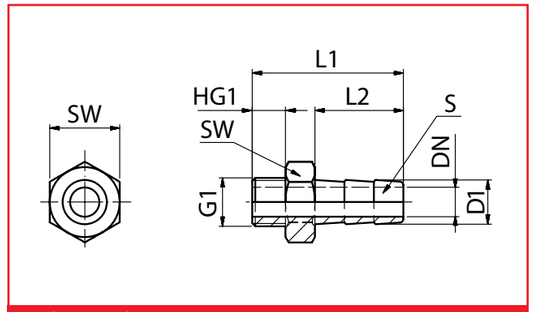
Technical data

Type	Pressure range (bar)	Hose type	Temperature (°C)	Weight (kg)
SN-1/8-6	-1 ... +10	VS-6	-10 ... +80	0,012
SN-1/4-6	-1 ... +10	VS-6	-10 ... +80	0,018
SN-1/4-10	-1 ... +10	VS-10	-10 ... +80	0,030
SN-1/4-1/2	-1 ... +10	VS-1/2	-10 ... +80	0,038
SN-3/8-10	-1 ... +10	VS-10	-10 ... +80	0,042
SN-3/8-1/2	-1 ... +10	VS-1/2	-10 ... +80	0,048
SN-1/2-1/2	-1 ... +10	VS-1/2	-10 ... +80	0,070
SN-3/4-1/2	-1 ... +10	VS-1/2	-10 ... +80	0,123
SN-3/4-3/4	-1 ... +10	VS-3/4	-10 ... +80	0,107
SN-1-1	-1 ... +10	VS-1	-10 ... +80	0,212
SN-11/4-38	-1 ... +10	VS-38	-10 ... +80	0,385
SN-11/2-38	-1 ... +10	VS-38	-10 ... +80	0,452

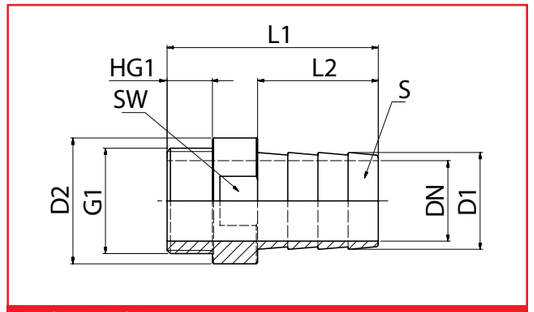
Connections

Hose nipple SN

FEZER
Simply move more.



SN-1/8 ... SN-1/2



SN-3/4 ... SN-1/2-38

Dimensions

Type	D1	D2	S	DN	L1	L2	G1	HG1	SW
SN-1/8-6	9	---	6	6	25	20	G1/8	9	14
SN-1/4-6	9	---	6	6	25	20	G1/4	9	17
SN-1/4-10	12	---	10	8	32	24	G1/4	9	19
SN-1/4-1/2	15	---	1/2"	8	32	24	G1/4	9	19
SN-3/8-10	12	---	10	8	32	24	G3/8	9	22
SN-3/8-1/2	15	---	1/2"	11	32	24	G3/8	9	22
SN-1/2-1/2	15	---	1/2"	11	40	30	G1/2	10	27
SN-3/4-1/2	15	---	1/2"	11	42	30	G3/4	12	32
SN-3/4-3/4	21	---	3/4"	17	52	40	G3/4	12	32
SN-1-1	26,5	42	1"	22	63	48	G1	16	36
SN-11/4-38	38,5	50	38	32	66	48	G11/4	18	46
SN-11/2-38	38,5	55	38	32	66	48	G11/2	18	50

Connections

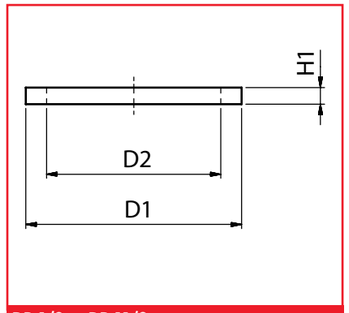
FEZER
Simply move more.

Sealing rings DR

Description
Sealing rings made of high-quality polyamide with a large range of diametres.

Application
- sealing of hose nipples and connection elements

DR-1/8 ... DR-11/2



DR-1/8 ... DR-11/2

Article number

Type	
DR-1/8	6.21.5.0029
DR-1/4	6.21.5.0472
DR-3/8	6.21.5.0033
DR-1/2	6.21.5.0027
DR-3/4	6.21.5.0032
DR-1	6.21.5.0026
DR-11/4	6.21.5.0031
DR-11/2	6.21.5.0030

Dimensions

Type	D1	D2	H1
DR-1/8	16	10	1,5
DR-1/4	18	13	2
DR-3/8	23	17	2
DR-1/2	26	21	2
DR-3/4	32	26,5	2,5
DR-1	39	33	2,5
DR-11/4	49	42	2,5
DR-11/2	55	48	2,5

Connections

FEZER
Simply move more.

Flat sealing band FDB

Description
flexible sealing band made of white teflon.

Application
- sealing of thread connections (winding contrary to thread direction)

Flat sealing band FDB

Article number

Type	Roll ca. 12 m
Flat sealing band FDB	2.54.1.0001

FEZER
Simply move more.

Connections

Plug and thread connections

Plug-in connections
Absolutely vacuum-dense plug-in connections made of plastic with outer thread and plug connection to connect tubes. The plug-in connections and connectors have an inner locking ring and can be used without additional hose clamps.

Application
- to screw in and connect vacuum and compressed air lines.

Plug-in connectionsen and - Verbindungen SVS- ... SVB-

Thread connections
Robust connections with conical inch-thread made of die-cast. The connections can be wrapped with silicone band for an absolutely vacuum-dense connection. The thread connections serve mainly to reduce, connect or extend thread drillings on connection drillings.

Application:
- connecting and distributing vacuum lines of all kinds

Thread connections GVS

Technical data

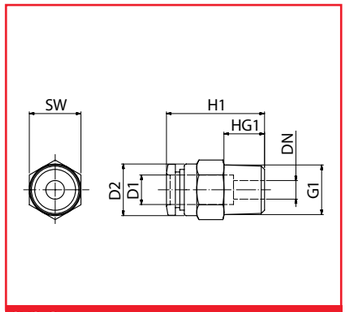
Type	Pressure range (bar)	Hose type	Temperature (°C)
SVS- ...	-1 ... +10	VS-4 ... 16	-10 ... +60
SVB- ...	-1 ... +10	VS-4 ... 16	-10 ... +60
GVS- ...	-1 ... +6	G1/8 ... G3/4	-10 ... +80

FEZER
Simply move more.

Connections

Plug-in connections straight SVS-G

SVS-G



SVS-G

Article number

Type		Hose-Ø (mm)	Weight (kg)
SVS-G-M5-4	6.21.5.0801	4	0,003
SVS-G-M5-6	6.21.5.0802	6	0,004
SVS-G-1/8-4	6.21.5.0594	4	0,008
SVS-G-1/8-6	6.21.5.0493	6	0,009
SVS-G-1/8-8	6.21.5.0701	8	0,016
SVS-G-1/4-6	6.21.5.0494	6	0,018
SVS-G-1/4-8	6.21.5.0702	8	0,016
SVS-G-1/4-10	6.21.5.0703	10	0,020
SVS-G-1/4-12	6.21.5.0704	12	0,044
SVS-G-3/8-6	6.21.5.0705	6	0,028
SVS-G-3/8-8	6.21.5.0480	8	0,024
SVS-G-3/8-10	6.21.5.0590	10	0,027
SVS-G-3/8-12	6.21.5.0706	12	0,035
SVS-G-1/2-10	6.21.5.0707	10	0,050
SVS-G-1/2-12	6.21.5.0481	12	0,050
SVS-G-1/2-16	6.21.5.0708	16	0,067

Dimensions

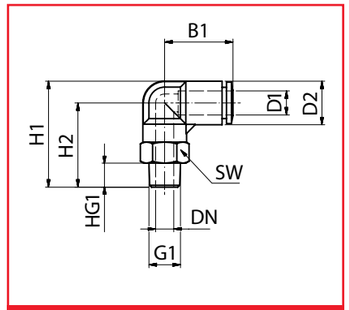
Type	D1	D2	DN	H1	HG1	G1	SW
SVS-G-M5-4	4	8	1,8	16,2	3	M5	8
SVS-G-M5-6	6	10	1,7	17,3	3	M5	10
SVS-G-1/8-4	4	10	2,6	21	8	G1/8	10
SVS-G-1/8-6	6	12	5,6	22,6	8	G1/8	12
SVS-G-1/8-8	8	14	5	27,9	8	G1/8	14
SVS-G-1/4-6	6	12	6	24,6	11	G1/4	14
SVS-G-1/4-8	8	14	5	26,6	11	G1/4	14
SVS-G-1/4-10	10	17	6,7	30	11	G1/4	17
SVS-G-1/4-12	12	21	8,7	36	11	G1/4	21
SVS-G-3/8-6	6	71	4	23,6	12	G3/8	17
SVS-G-3/8-8	8	14	8	23,9	12	G3/8	17
SVS-G-3/8-10	10	17	6,7	29,3	12	G3/8	17
SVS-G-3/8-12	12	21	8,7	32	12	G3/8	21
SVS-G1/2-10	10	21	6,7	30,3	15	G1/2	21
SVS-G-1/2-12	12	20	12	33,9	15	G1/2	21
SVS-G-1/2-16	16	24	12	41,5	15	G1/2	24

FEZER
Simply move more.

Connections

Plug-in connections angular, endlessly turnable SVS-W

SVS-W



SVS-W

Article number

Type		Hose-Ø (mm)	Weight (kg)
SVS-W-M5-4	6.21.5.0803	4	0,003
SVS-W-M5-6	6.21.5.0804	6	0,004
SVS-W-1/8-4	6.21.5.0710	4	0,007
SVS-W-1/8-6	6.21.5.0487	6	0,008
SVS-W-1/8-8	6.21.5.0406	8	0,010
SVS-W-1/4-6	6.21.5.0495	6	0,020
SVS-W-1/4-8	6.21.5.0444	8	0,020
SVS-W-1/4-10	6.21.5.0711	10	0,020
SVS-W-1/4-12	6.21.5.0675	12	0,020
SVS-W-3/8-6	6.21.5.0709	6	0,020
SVS-W-3/8-8	6.21.5.0511	8	0,020
SVS-W-3/8-10	6.21.5.0712	10	0,030
SVS-W-3/8-12	6.21.5.0713	12	0,030
SVS-W-1/2-10	6.21.5.0526	10	0,040
SVS-W-1/2-12	6.21.5.0479	12	0,050
SVS-W-1/2-16	6.21.5.0483	16	0,080

Dimensions

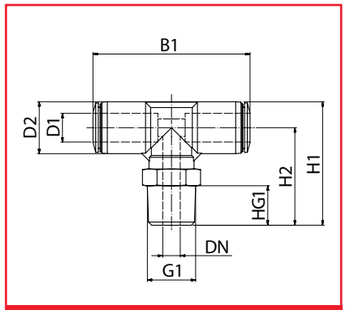
Type	D1	D2	DN	B1	H1	H2	HG1	G1	SW
SVS-W-M5-4	4	8	1,7	15,7	17,5	13,5	3	M5	8
SVS-W-M5-6	6	10,5	2,1	16,3	19,75	14,5	3	M5	8
SVS-W-1/8-4	4	10	2,2	16,8	23,9	18,9	8	G1/8	10
SVS-W-1/8-6	6	12,5	3,2	19,8	31,25	25	8	G1/8	12
SVS-W-1/8-8	8	14,5	4,6	22,7	35,3	28	8	G1/8	14
SVS-W-1/4-6	6	12,5	3,4	19,8	34,25	28	11	G1/4	14
SVS-W-1/4-8	8	14,5	4,8	22,7	38,25	31	11	G1/4	14
SVS-W-1/4-10	10	17,5	6	25	36,85	28,1	11	G1/4	14
SVS-W-1/4-12	12	21	5,8	29,2	40,3	29,8	11	G1/4	14
SVS-W-3/8-6	6	12,5	3,3	20,12	32,75	26,5	12	G3/8	17
SVS-W-3/8-8	8	14,5	4,8	23	40,25	33	12	G3/8	17
SVS-W-3/8-10	10	17,5	6,4	25	38,35	29,6	12	G3/8	17
SVS-W-3/8-12	12	21	6,6	29,5	41,8	31,3	12	G3/8	17
SVS-W-3/8-10	10	17,5	6,2	26,2	48,75	40	15	G1/2	21
SVS-W-1/2-12	12	21	7,1	29,5	43,5	33	15	G1/2	21
SVS-W-1/2-16	16	25	10,9	33,1	63,44	51	15	G1/2	22

FEZER
Simply move more.

Connections

Plug-in connections in T form SVS-T

SVS-T



SVS-T

Article numbern

Type		Hose-Ø (mm)	Weight (kg)
SVS-T-M5-4	6.21.5.0805	4	0,0040
SVS-T-M5-6	6.21.5.0806	6	0,0060
SVS-T-1/8-4	6.21.5.0714	4	0,0100
SVS-T-1/8-6	6.21.5.0715	6	0,0100
SVS-T-1/8-8	6.21.5.0578	8	0,0200
SVS-T-1/4-6	6.21.5.0716	6	0,0200
SVS-T-1/4-8	6.21.5.0482	8	0,0200
SVS-T-1/4-10	6.21.5.0717	10	0,0300
SVS-T-1/4-12	6.21.5.0718	12	0,0300
SVS-T-3/8-6	6.21.5.0719	6	0,0300
SVS-T-3/8-8	6.21.5.0720	8	0,0300
SVS-T-3/8-10	6.21.5.0721	10	0,0300
SVS-T-3/8-12	6.21.5.0697	12	0,0400
SVS-T-1/2-10	6.21.5.0722	10	0,0500
SVS-T-1/2-12	6.21.5.0723	12	0,0600
SVS-T-1/2-16	6.21.5.0724	16	0,1000

Dimensions

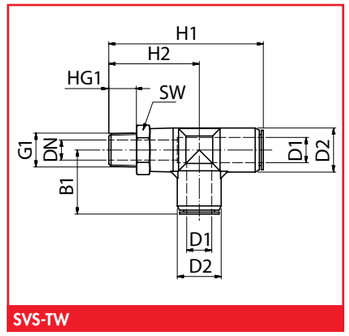
Type	D1	D2	DN	B1	H1	H2	HG1	G1	SW
SVS-T-M5-4	4	8	2,2	26	19	15	8	M5	8
SVS-T-M5-6	6	10,5	2,1	28,5	21,5	16	8	M5	8
SVS-T-1/8-4	4	10	2,1	34	28,5	23,5	8	G1/8	12
SVS-T-1/8-6	6	12,5	3,2	41	32,5	26	8	G1/8	12
SVS-T-1/8-8	8	15	4,6	45	34	33	8	G1/8	14
SVS-T-1/4-6	6	13	3,3	41	29	35,5	11	G1/4	14
SVS-T-1/4-8	8	15	4,9	45	30	37,5	11	G1/4	14
SVS-T-1/4-10	10	17,5	5,9	51	36	44	11	G1/4	14
SVS-T-1/4-12	12	21	5,9	57	38	48,5	11	G1/4	14
SVS-T-3/8-6	6	13	3,3	40	37,5	31	12	G3/8	17
SVS-T-3/8-8	8	15	4,8	45	39	31,5	12	G3/8	17
SVS-T-3/8-10	10	17,5	6,2	51	46	37	12	G3/8	17
SVS-T-3/8-12	12	21	6,7	56	49,5	39	12	G3/8	21
SVS-T-1/2-10	10	17,5	6,3	50,5	49	40	15	G1/2	21
SVS-T-1/2-12	12	21	7,1	56	52,5	42	15	G1/2	21
SVS-T-1/2-16	16	25	10,8	67	63,5	51	15	G1/2	21

FEZER
Simply move more.

Connections

Plug-in connections in TW form SVS-TW

SVS-TW



SVS-TW

Article number

Type		Hose-Ø (mm)	Weight (kg)
SVS-TW-1/8-4	6.21.5.0728	4	0,010
SVS-TW-1/8-6	6.21.5.0727	6	0,010
SVS-TW-1/8-8	6.21.5.0726	8	0,020
SVS-TW-1/4-6	6.21.5.0725	6	0,020
SVS-TW-1/4-8	6.21.5.0659	8	0,020
SVS-TW-1/4-10	6.21.5.0747	10	0,040
SVS-TW-3/8-6	6.21.5.0729	6	0,020
SVS-TW-3/8-8	6.21.5.0730	8	0,030
SVS-TW-3/8-10	6.21.5.0731	10	0,050
SVS-TW-3/8-12	6.21.5.0732	12	0,040
SVS-TW-1/2-10	6.21.5.0733	10	0,050
SVS-TW-1/2-12	6.21.5.0734	12	0,060
SVS-TW-1/2-16	6.21.5.0735	16	0,100

Dimensions

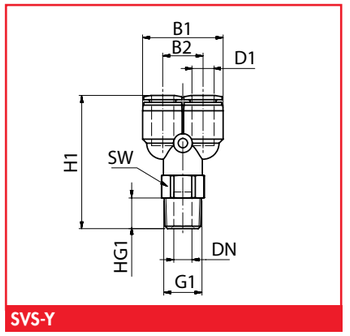
Type	D1	D2	DN	B1	H1	H2	HG1	G1	SW
SVS-TW-1/8-4	4	10	2,2	16,9	40,2	23,3	8	G1/8	10
SVS-TW-1/8-6	6	13	3,4	20,1	46,2	26,1	8	G1/8	12
SVS-TW-1/8-8	8	15	4,7	22,1	50,4	28,2	8	G1/8	14
SVS-TW-1/4-6	6	13	3,4	20,1	49,2	29,1	11	G1/4	14
SVS-TW-1/4-8	8	15	4,7	22,2	53,4	31,2	11	G1/4	14
SVS-TW-1/4-10	10	17,5	6,7	25,5	61,5	36	11	G1/4	17
SVS-TW-3/8-6	6	13	3,4	20,1	51	30,9	12	G3/8	17
SVS-TW-3/8-8	8	15	4,7	22,2	55,2	33	12	G3/8	17
SVS-TW-3/8-10	10	17,5	6,7	25,2	62,3	37	12	G3/8	17
SVS-TW-3/8-12	12	21	6,5	28,2	67	38,8	12	G3/8	21
SVS-TW-1/2-10	10	17,5	5,9	25,2	65,2	40	15	G1/2	21
SVS-TW-1/2-12	12	21	6,8	28,2	70,6	42,4	15	G1/2	21
SVS-TW-1/2-16	16	25	10,9	33,5	84,5	51	15	G1/2	22

FEZER
Simply move more.

Connections

Plug-in connections in Y form SVS-Y

SVS-Y



SVS-Y

Article numbern

Type		Hose-Ø (mm)	Weight (kg)
SVS-Y-1/8-4	6.21.5.0736	4	0,010
SVS-Y-1/8-6	6.21.5.0737	6	0,010
SVS-Y-1/8-8	6.21.5.0738	8	0,020
SVS-Y-1/4-6	6.21.5.0739	6	0,020
SVS-Y-1/4-8	6.21.5.0740	8	0,020
SVS-Y-1/4-10	6.21.5.0746	10	0,030
SVS-Y-3/8-6	6.21.5.0741	6	0,030
SVS-Y-3/8-8	6.21.5.0742	8	0,030
SVS-Y-3/8-10	6.21.5.0743	10	0,030
SVS-Y-3/8-12	6.21.5.0824	12	0,040
SVS-Y-1/2-10	6.21.5.0744	10	0,050
SVS-Y-1/2-12	6.21.5.0745	12	0,060

Dimensions

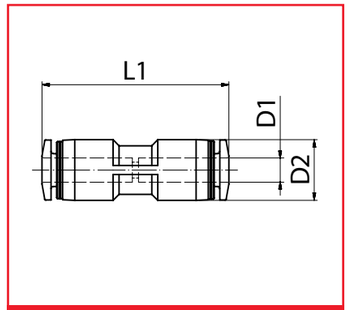
Type	D1	DN	B1	B2	H1	HG1	G1	SW
SVS-Y-1/8-4	4	2,1	20,3	10,3	36,1	8	G1/8	10
SVS-Y-1/8-6	6	3,5	25	12,5	42,1	8	G1/8	12
SVS-Y-1/8-8	8	4,4	29	14,5	46	8	G1/8	12
SVS-Y-1/4-6	6	3,6	25	12,5	44,1	11	G1/4	14
SVS-Y-1/4-8	8	4,9	29	14,5	48	11	G1/4	14
SVS-Y-1/4-10	10	5,7	36	18	58,5	11	G1/4	17
SVS-Y-3/8-6	6	3,6	25	12,5	44,6	11	G3/8	17
SVS-Y-3/8-8	8	4,9	29	14,5	48,5	12	G3/8	17
SVS-Y-3/8-10	10	5,7	35	17,5	51,7	12	G3/8	17
SVS-Y-3/8-12	12	6,4	41	20	64,5	12	G3/8	21
SVS-Y-1/2-10	10	5,7	35	17,5	54,7	15	G1/2	21
SVS-Y-1/2-12	12	6,5	42	21	59,9	15	G1/2	21

FEZER
Simply move more.

Connections

Plug-in connector straight SVB-G

SVB-G



SVB-G

Article number

Type		Hose-Ø (mm)	Weight (kg)
SVB-G-4	6.21.5.0748	4	0,0050
SVB-G-6	6.21.5.0749	6	0,0060
SVB-G-8	6.21.5.0750	8	0,0090
SVB-G-10	6.21.5.0510	10	0,0150
SVB-G-12	6.21.5.0751	12	0,0200
SVB-G-16	6.21.5.0752	16	0,0250

Dimensions

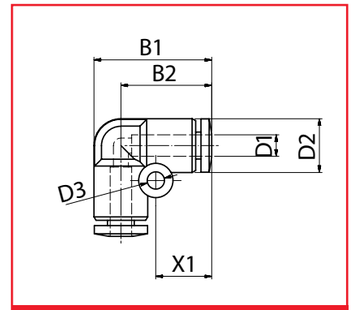
Type	D1	D2	L1
SVB-G-4	4	10	30,8
SVB-G-6	6	12,5	34,9
SVB-G-8	8	14,5	37,8
SVB-G-10	10	17,5	44
SVB-G-12	12	21	47,8
SVB-G-16	16	25	49,4

FEZER
Simply move more.

Connections

Plug-in connector angular SVB-W

SVB-W



SVB-W

Article number

Type		Hose-Ø (mm)	Weight (kg)
SVB-W-4	6.21.5.0753	4	0,0050
SVB-W-6	6.21.5.0754	6	0,0070
SVB-W-8	6.21.5.0755	8	0,0100
SVB-W-10	6.21.5.0756	10	0,0200
SVB-W-12	6.21.5.0757	12	0,0250
SVB-W-16	6.21.5.0758	16	0,0300

Dimensions

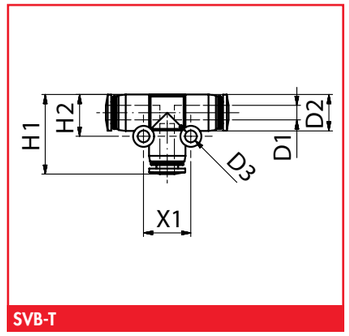
Type	D1	D2	D3	B1	B2	X1
SVB-W-4	4	10	3,2	21,9	16,9	10,4
SVB-W-6	6	12,5	3,2	26,4	20,1	12,1
SVB-W-8	8	15	4,2	29,9	22,4	12,4
SVB-W-10	10	17,5	4,2	34,95	26,2	14,2
SVB-W-12	12	21	4,2	39,5	29,4	15,4
SVB-W-16	16	25	4,2	45,5	33	21

FEZER
Simply move more.

Connections

Plug-in connector in T form SVB-T

SVB-T



SVB-T

Article number

Type		Hose-Ø (mm)	Weight (kg)
SVB-T-4	6.21.5.0759	4	0,0070
SVB-T-6	6.21.5.0760	6	0,0100
SVB-T-8	6.21.5.0761	8	0,0150
SVB-T-10	6.21.5.0534	10	0,0250
SVB-T-12	6.21.5.0762	12	0,0350
SVB-T-16	6.21.5.0763	16	0,0400

Dimensions

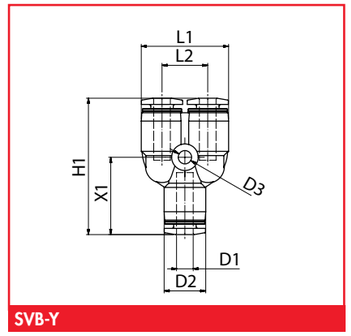
Type	D1	D2	D3	H1	H2	X1
SVB-T-4	4	10	3,2	21,9	16,9	13
SVB-T-6	6	13	3,5	26,6	20,1	16
SVB-T-8	8	15	3,5	29,7	22,2	18
SVB-T-10	10	17,5	4,2	33,95	25,2	24
SVB-T-12	12	21	4,2	38,7	28,2	28
SVB-T-16	16	25	4,2	45,6	33,1	24

FEZER
Simply move more.

Connections

Plug-in connector in Y form SVB-Y

SVB-Y



SVB-Y

Article number

Type		Hose-Ø (mm)	Weight (kg)
SVB-Y-4	6.21.5.0764	4	0,0070
SVB-Y-6	6.21.5.0765	6	0,0098
SVB-Y-8	6.21.5.0683	8	0,0150
SVB-Y-10	6.21.5.0766	10	0,0250
SVB-Y-12	6.21.5.0767	12	0,0350
SVB-Y-16	6.21.5.0768	16	0,0450

Dimensions

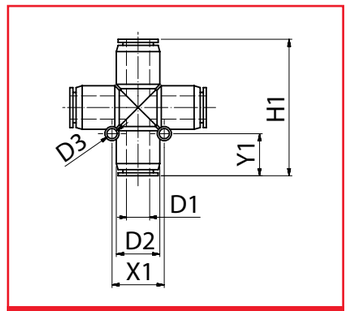
Type	D1	D2	D3	L1	L2	H1	X1
SVB-Y-4	4	10	3,2	21	11	32,8	18,6
SVB-Y-6	6	12,5	3,2	24,5	12	37,7	21,9
SVB-Y-8	8	14,5	3,2	28,5	14	42,4	25,2
SVB-Y-10	10	17,5	4,2	35,5	18	48,4	28,9
SVB-Y-12	12	21	4,2	41	20	54,8	32,6
SVB-Y-16	16	25	4,5	49	24	62,2	40,1

FEZER
Simply move more.

Connections

Plug-in connector in X form SVB-X

SVB-X



SVB-X

Article number

Type		Hose-Ø (mm)	Weight (kg)
SVB-X-4	6.21.5.0792	4	0,0050
SVB-X-6	6.21.5.0793	6	0,0050
SVB-X-8	6.21.5.0794	8	0,0200
SVB-X-10	6.21.5.0795	10	0,0300
SVB-X-12	6.21.5.0796	12	0,0450

Dimensions

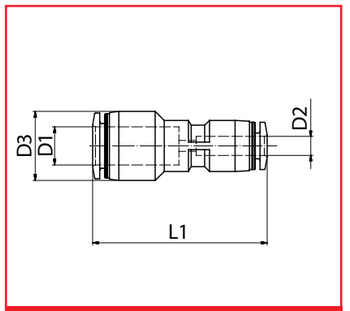
Type	D1	D2	D3	H1	X1
SVB-X-4	4	8	3,2	27	11
SVB-X-6	6	10,5	3,2	31	13
SVB-X-8	8	15	3,5	47	18
SVB-X-10	10	17,5	4,5	55	22
SVB-X-12	12	21	4,5	62	24

FEZER
Simply move more.

Connections

Plug-in connector straight, reducing SVB-GR

SVB-GR



SVB-GR

Article number

Type	1 piece	Hose-Ø (mm)	Weight (kg)
SVB-GR-6-4	6.21.5.0777	6 - 4	0,0060
SVB-GR-8-4	6.21.5.0778	8 - 4	0,0070
SVB-GR-8-6	6.21.5.0779	8 - 6	0,0080
SVB-GR-10-6	6.21.5.0780	10 - 6	0,0100
SVB-GR-10-8	6.21.5.0781	10 - 8	0,0150
SVB-GR-12-8	6.21.5.0782	12 - 8	0,0150
SVB-GR-12-10	6.21.5.0783	12 - 10	0,0200

Dimensions

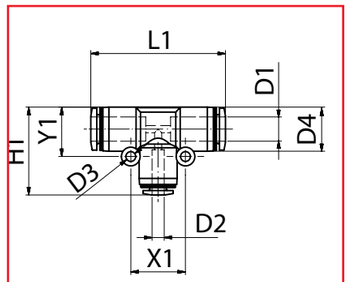
Type	D1	D2	D3	L1
SVB-GR-6-4	6	4	12,5	34,4
SVB-GR-8-4	8	4	14,5	36,6
SVB-GR-8-6	8	6	14,5	37,9
SVB-GR-10-6	10	6	17,5	39,8
SVB-GR-10-8	10	8	17,5	41,2
SVB-GR-12-8	12	8	21	44
SVB-GR-12-10	12	10	21	47,6

FEZER
Simply move more.

Connections

Plug-in connector in T-Form, reducing SVB-TR

SVB-TR



SVB-TR

Article number

Type		Hose-Ø (mm)	Weight (kg)
SVB-TR-6-4	6.21.5.0784	6 - 4	0,010
SVB-TR-8-4	6.21.5.0785	8 - 4	0,015
SVB-TR-8-6	6.21.5.0786	8 - 6	0,015
SVB-TR-10-6	6.21.5.0787	10 - 6	0,020
SVB-TR-10-8	6.21.5.0788	10 - 8	0,020
SVB-TR-12-8	6.21.5.0789	12 - 8	0,030
SVB-TR-12-10	6.21.5.0790	12 - 10	0,020
SVB-TR-16-12	6.21.5.0791	16 - 12	0,040

Dimensions

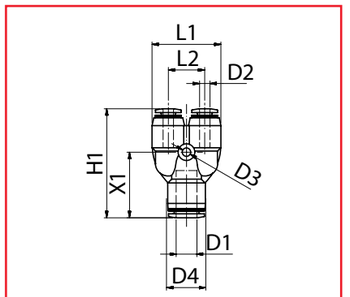
Type	D1	D2	D3	D4	L1	H1	H2	X1
SVB-TR-6-4	6	4	3,2	13	40,1	26	14,5	16
SVB-TR-8-4	8	4	3,2	15,1	44,4	29	16,25	18
SVB-TR-8-6	8	6	3,2	15,1	44,4	29,5	16,25	18
SVB-TR-10-6	10	6	4,2	18,2	50,4	33,74	20,75	24
SVB-TR-10-8	10	8	4,2	18,2	50,4	33,64	20,75	24
SVB-TR-12-8	12	8	4,2	21,7	56,8	38,19	20,75	28
SVB-TR-12-10	12	10	4,2	21,7	56,8	38,49	24,5	28
SVB-TR-16-12	16	12	4,2	25,6	66,2	45,69	24,5	24

FEZER
Simply move more.

Connections

Plug-in connector in Y form, reducing SVB-YR

SVB-YR



SVB-YR

Article number

Type		Hose-Ø (mm)	Weight (kg)
SVB-YR-6-4	6.21.5.0769	6 - 4	0,010
SVB-YR-8-4	6.21.5.0770	8 - 4	0,010
SVB-YR-8-6	6.21.5.0771	8 - 6	0,010
SVB-YR-10-6	6.21.5.0772	10 - 6	0,020
SVB-YR-10-8	6.21.5.0773	10 - 8	0,020
SVB-YR-12-8	6.21.5.0774	12 - 8	0,030
SVB-YR-12-10	6.21.5.0775	12 - 10	0,030
SVB-YR-16-12	6.21.5.0776	16 - 12	0,050

Dimensions

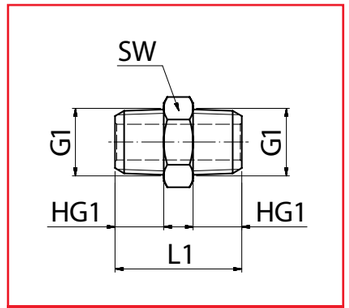
Type	D1	D2	D3	D4	L1	L2	H1	X1
SVB-YR-6-4	6	4	3,2	12,9	24,5	12	37,2	22
SVB-YR-8-4	8	4	3,2	15,1	26,5	14	41,9	25,2
SVB-YR-8-6	8	6	3,2	15,1	26,5	14	42,5	25,2
SVB-YR-10-6	10	6	4,2	18,2	32,5	18	48,2	30,9
SVB-YR-10-8	10	8	4,2	18,2	32,5	18	48,1	28,9
SVB-YR-12-8	12	8	4,2	21,7	37,5	20	54,3	32,6
SVB-YR-12-10	12	10	4,2	21,7	37,5	20	54,6	32,6
SVB-YR-16-12	16	12	4,2	25	49	24	62,3	40,1

Connections

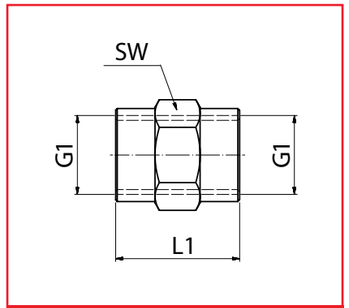
FEZER
Simply move more.

Thread union straight, GVS-G

GVS-G



GVS-G- ... A



GVS-G- ... I

Article number

Type		Weight (kg)
GVS-G-1/8A	6.21.5.0833	0,010
GVS-G-1/8I	6.21.5.0835	0,010
GVS-G-1/4A	6.21.5.0641	0,015
GVS-G-1/4I	6.21.5.0426	0,020
GVS-G-3/8A	6.21.5.0834	0,020
GVS-G-3/8I	6.21.5.0836	0,020
GVS-G-1/2A	6.21.5.0661	0,040
GVS-G-1/2I	6.21.5.0640	0,030

Dimensions

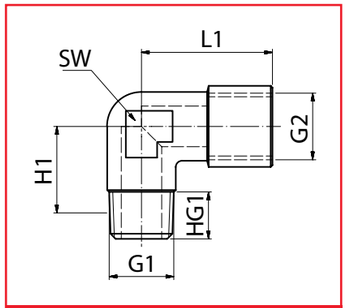
Type	L1	L2	G1	HG1	SW
GVS-G-1/8A	19,5	7,5	G1/8	7,5	12
GVS-G-1/8I	15	7,5	G1/8	7,5	13
GVS-G-1/4A	27	11	G1/4	11	14
GVS-G-1/4I	22	11	G1/4	11	17
GVS-G-3/8A	28	11,5	G3/8	11	17
GVS-G-3/8I	23	11,5	G3/8	11	20
GVS-G-1/2A	33,5	14	G1/2	11	22
GVS-G-1/2I	28	14	G1/2	11	24

Connections

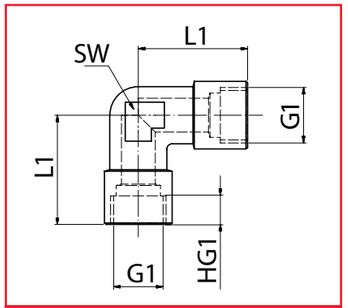
FEZER
Simply move more.

Thread union angular, GVS-W

GVS-W



GVS-W- ... A



GVS-W- ... I

Article number

Type		Weight (kg)
GVS-W-1/8I	6.21.5.0825	0,015
GVS-W-1/8A-1/8I	6.21.5.0827	0,015
GVS-W-1/4I	6.21.5.0427	0,030
GVS-W-1/4A-1/4I	6.21.5.0584	0,030
GVS-W-3/8I	6.21.5.0826	0,040
GVS-W-3/8A-3/8I	6.21.5.0580	0,030
GVS-W-1/2I	6.21.5.0639	0,070
GVS-W-1/2A-1/2I	6.21.5.0525	0,060

Dimensions

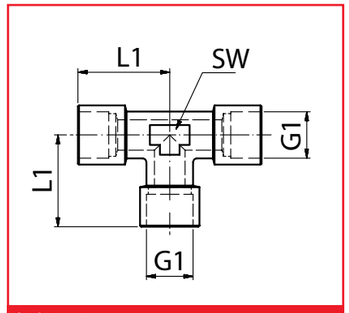
Type	L1	H1	G1	G2	HG1	SW
GVS-W-1/8I	19	11,5	G1/8	G1/8	8,5	11
GVS-W-1/8A-1/8I	19	11,5	G1/8	G1/8	8,5	11
GVS-W-1/4I	23	15	G1/4	G1/4	11	14
GVS-W-1/4A-1/4I	23	15	G1/4	G1/4	11	13
GVS-W-3/8I	25	15	G3/8	G3/8	11,5	16
GVS-W-3/8A-3/8I	25	15	G3/8	G3/8	11,5	15
GVS-W-1/2I	31,5	17,5	G1/2	G1/2	14	20
GVS-W-1/2A-1/2I	31,5	17,5	G1/2	G1/2	14	20

Connections

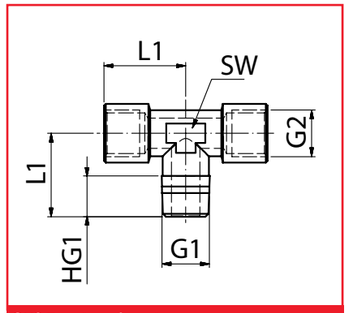
FEZER
Simply move more.

Thread union in T form, GVS-T

GVS-T



GVS-T- ... I



GVS-T- ... I- ... A- ... I

Article number

Type		Weight (kg)
GVS-T-1/8I	6.21.5.0828	0,020
GVS-T-1/8I-1/8A-1/8I	6.21.5.0830	0,030
GVS-T-1/4I	6.21.5.0416	0,040
GVS-T-1/4I-1/4A-1/4I	6.21.5.0657	0,040
GVS-T-3/8I	6.21.5.0829	0,050
GVS-T-3/8A-3/8A-3/8I	6.21.5.0831	0,050
GVS-T-1/2I	6.21.5.0636	0,100
GVS-T-1/2A-1/2A-1/2I	6.21.5.0832	0,070

Dimensions

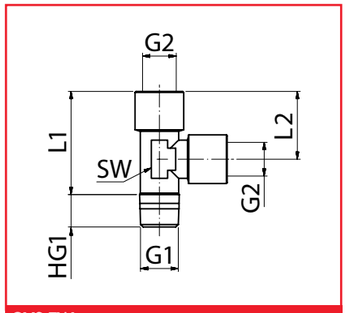
Type	L1	G1	G2	HG1	SW
GVS-T-1/8I	19	G1/8	G1/8	8,5	12
GVS-T-1/8I-1/8A-1/8I	19	G1/8	G1/8	8,5	12
GVS-T-1/4I	23	G1/4	G1/4	11	13
GVS-T-1/4I-1/4A-1/4I	23	G1/4	G1/4	11	13
GVS-T-3/8I	25	G3/8	G3/8	11,5	16
GVS-T-3/8A-3/8A-3/8I	25	G3/8	G3/8	11,5	16
GVS-T-1/2I	31,5	G1/2	G1/2	14	20
GVS-T-1/2A-1/2A-1/2I	31,5	G1/2	G1/2	14	20

Connections

FEZER
Simply move more.

Thread union in TW form, GVS-TW

GVS-TW



GVS-TW- ...

Article number

Type		Weight (kg)
GVS-TW-1/8I-1/8I-1/8A	6.21.5.0860	0,022
GVS-TW-1/4I-1/4I-1/4A	6.21.5.0861	0,037
GVS-TW-3/8I-3/8I-3/8A	6.21.5.0862	0,049
GVS-TW-1/2I-1/2I-1/2A	6.21.5.0863	0,089

Dimensions

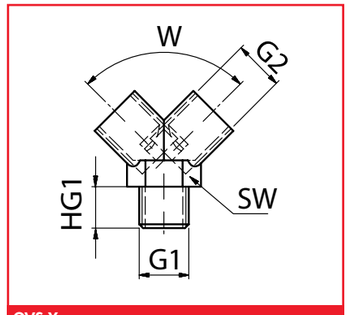
Type	L1	L2	G1	G2	HG1	SW
GVS-TW-1/8A-1/8I	28,5	19	G1/8	G1/8	8,5	12
GVS-TW-1/4A-1/4I	35	23	G1/4	G1/4	11	13
GVS-TW-3/8A-3/8I	37	25	G3/8	G3/8	11,5	16
GVS-TW-1/2A-1/2I	45,5	31,5	G1/2	G1/2	14	20

FEZER
Simply move more.

Connections

Thread union in Y form, GVS-Y

GVS-Y



GVS-Y

Article number

Type		Weight (kg)
GVS-Y-1/8I-1/8A-1/8I	6.21.5.0837	0,020
GVS-Y-1/4I-1/4A-1/4I	6.21.5.0434	0,040
GVS-Y-3/8I-3/8A-3/8I	6.21.5.0838	0,050
GVS-Y-1/2I-1/2A-1/2I	6.21.5.0617	0,100

Dimensions

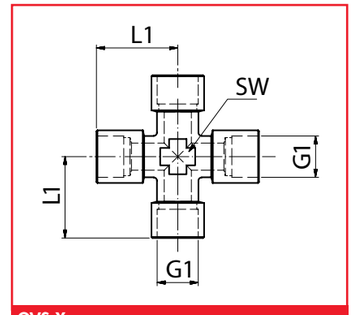
Type	G1	G2	HG1	W	SW
GVS-Y-1/8I	G1/8	G1/8	8	90°	13
GVS-Y-1/4I	G1/4	G1/4	11	90°	17
GVS-Y-3/8I	G3/8	G3/8	11,5	90°	20
GVS-Y-1/2I	G1/2	G1/2	14	90°	25

FEZER
Simply move more.

Connections

Thread union in X form, GVS-X

GVS-X



GVS-X

Article number

Type		Weight (kg)
GVS-X-1/8I	6.21.5.0839	0,030
GVS-X-1/4I	6.21.5.0411	0,050
GVS-X-3/8I	6.21.5.0840	0,070

Dimensions

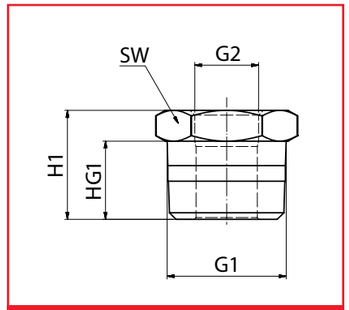
Type	L1	G1	SW
GVS-X-1/8I	19	G1/8	12
GVS-X-1/4I	23	G1/4	14
GVS-X-3/8I	25	G3/8	16

FEZER
Simply move more.

Connections

Thread union reduction bushing, GVS-RM

GVS-RM



GVS-RM

Article number

Type		Weight (kg)
GVS-RM-1/4A-1/8I	6.21.5.0634	0,010
GVS-RM-3/8A-1/8I	6.21.5.0854	0,015
GVS-RM-3/8A-1/4I	6.21.5.0662	0,030
GVS-RM-1/2A-1/8I	6.21.5.0855	0,015
GVS-RM-1/2A-1/4I	6.21.5.0629	0,030
GVS-RM-1/2A-3/8I	6.21.5.0856	0,020

Dimensions

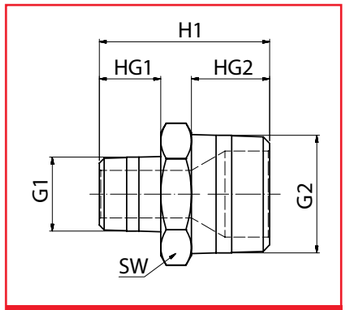
Type	H1	G1	G2	HG1	SW
GVS-RM-1/4A-1/8I	16	R1/4	R1/8	11	16
GVS-RM-3/8A-1/8I	16,5	R3/8	R1/8	11,5	17
GVS-RM-3/8A-1/4I	16,5	R3/8	R1/4	11,5	17
GVS-RM-1/2A-1/8I	19,5	R1/2	R1/8	14	22
GVS-RM-1/2A-1/4I	19,5	R1/2	R1/4	14	22
GVS-RM-1/2A-3/8I	19,5	R1/2	R3/8	14	22

FEZER
Simply move more.

Connections

Thread union reduction nipple, GVS-RN

GVS-RN



GVS-RN

Article number

Type		Weight (kg)
GVS-RN-1/8-1/4	6.21.5.0841	0,015
GVS-RN-1/8-3/8	6.21.5.0686	0,019
GVS-RN-1/4-3/8	6.21.5.0842	0,020
GVS-RN-1/4-1/2	6.21.5.0682	0,032
GVS-RN-3/8-1/2	6.21.5.0843	0,034

Dimensions

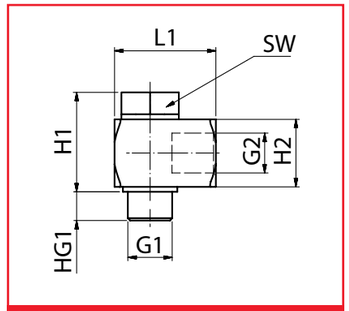
Type	H1	G1	G2	HG1	HG2	SW
GVS-RN-1/8-1/4	23,5	R1/8	R1/4	7,5	11	14
GVS-RN-1/8-3/8	24	R1/8	R3/8	7,5	11,5	17
GVS-RN-1/4-3/8	27,5	R1/4	R3/8	11	11,5	17
GVS-RN-1/4-1/2	30,5	R1/4	R1/2	11	14	22
GVS-RN-3/8-1/2	31	R3/8	R1/2	11,5	14	22

FEZER
Simply move more.

Connections

Thread union angular turnable, GVS-WD

GVS-WD



GVS-WD

Article number

Type		Weight (kg)
GVS-WD-1/8A-1/8I	1.54.2.0055	0,010
GVS-WD-1/4A-1/4I	1.54.2.0084	0,025
GVS-WD-3/8A-3/8I	1.54.2.0085	0,040
GVS-WD-1/2A-1/2I	1.54.2.0086	0,055

Dimensions

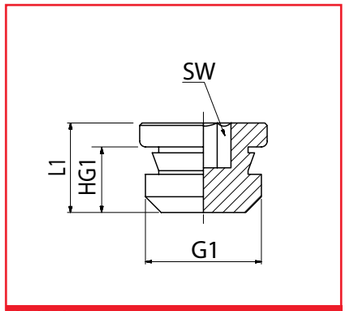
Type	L1	H1	H2	G1	G2	HG1	SW
GVS-WD-1/8A-1/8I	22	20,2	15	G1/8	G1/8	7,8	14
GVS-WD-1/4A-1/4I	29	26,8	20	G1/4	G1/4	10	17
GVS-WD-3/8A-3/8I	34	29,2	22	G3/8	G3/8	6,85	22
GVS-WD-1/2A-1/2I	42	35,7	28	G1/2	G1/2	8,85	27

FEZER
Simply move more.

Connections

Thread union sealing plug, GVS-VS

GVS-VS



GVS-VS

Article number

Type		Weight (kg)
GVS-VS-1/8	6.21.5.0844	0,005
GVS-VS-1/4	6.21.5.0845	0,005
GVS-VS-3/8	6.21.5.0846	0,010
GVS-VS-1/2	6.21.5.0847	0,020

Dimensions

Type	L1	G1	SW
GVS-VS-1/8	7,5	G1/8	4
GVS-VS-1/4	9	G1/4	6
GVS-VS-3/8	10	G3/8	8
GVS-VS-1/2	11	G1/2	10

Connections

Quick-change coupling SWK

FEZER
Simply move more.

Description
Quick-change coupling with inside thread and one-sided shut-off. I.e. when loosening the plug the holder stays closed and the vacuum is conserved in the system.

Application:
- when using several suction pads
- on variable lifters (extensions, etc.)
- any mounting position

SWK-1/4 - SWK-1

Article number

Type	Complete set	Holder (F)	Plug (S)
SWK-1/4I	1.54.2.0080	6.21.5.0497	6.21.5.0496
SWK-3/8I	1.54.2.0081	6.21.5.0850	6.21.5.0848
SWK-1/2I	1.54.2.0082	6.21.5.0851	6.21.5.0849
SWK-3/4I	1.54.2.0052	1.54.2.0048	1.54.2.0044
SWK-1I	1.54.2.0053	1.54.2.0049	1.54.2.0045

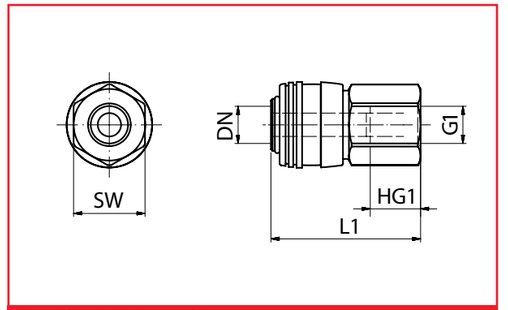
Technical data

Type	Pressure range (bar)	Temperature (°C)	Weight (kg)
SWK-1/4	-1 ... +1	+5 ... +80	0,120
SWK-1/4-F	-1 ... +1	+5 ... +80	0,090
SWK-1/4-S	-1 ... +1	+5 ... +80	0,030
SWK-3/8	-1 ... +1	+5 ... +80	0,110
SWK-3/8-F	-1 ... +1	+5 ... +80	0,080
SWK-3/8-S	-1 ... +1	+5 ... +80	0,030
SWK-1/2	-1 ... +1	+5 ... +80	0,150
SWK-1/2-F	-1 ... +1	+5 ... +80	0,090
SWK-1/2-S	-1 ... +1	+5 ... +80	0,060
SWK-3/4	-1 ... +1	+5 ... +80	0,20
SWK-3/4-F	-1 ... +1	+5 ... +80	0,12
SWK-3/4-S	-1 ... +1	+5 ... +80	0,08
SWK-1	-1 ... +1	+5 ... +80	0,30
SWK-1-F	-1 ... +1	+5 ... +80	0,20
SWK-1-S	-1 ... +1	+5 ... +80	0,10

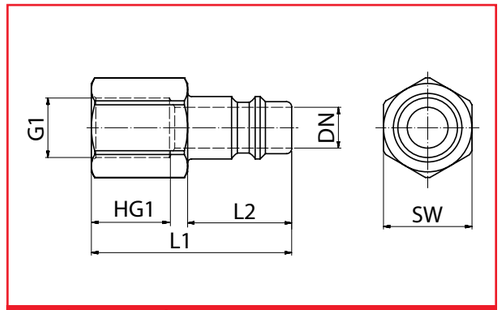
Connections

Quick-change coupling SWK

FEZER
Simply move more.



SWK-1/4 - SWK-1 (coupling)



SWK-1/4 - SWK-1 (plug)

Dimensions

Type	L1	L2	DN	G1	HG1	SW
SWK-1/4-F	46	---	7,2	G1/4	12	22
SWK-1/4-S	38,5	20	7,85	G1/4	12	17
SWK-3/8-F	47,5	---	7,2	G3/8	12	22
SWK-3/8-S	39,5	20	7,85	G3/8	12	19
SWK-1/2-F	50,5	---	7,2	G1/2	12	24
SWK-1/2-S	44	20	7,85	G1/2	12	24
SWK-3/4-F	94	---	19	G3/4	17	46
SWK-3/4-S	57,5	32,5	19	G3/4	19	36
SWK-1-F	98	---	21	G1	20	46
SWK-1-S	61,5	32,5	21	G1	23	41

Distribution Elements

Distribution block VTB

Description
Robust distribution housing made of aluminum for distributing vacuum/compressed air. The distribution blocks have 2 central connections and are available with 4, 8 or 12 exits.

Application:
- distribution of vacuum lines for several suction pads
- many connection possibilities of hose nipples and plug-in connections, cut-off cocks, etc.
- any mounting position

VTB-1/2 ... VBT-3/4

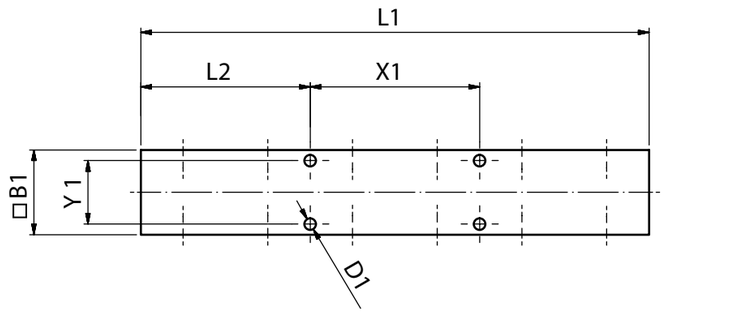
Article number

Type	
VTB-1/2-4x1/4	2.54.2.0015
VTB-1/2-8x1/4	2.54.2.0016
VTB-1/2-12x1/4	2.54.2.0017
VTB-3/4-4x1/4	2.54.2.0018
VTB-3/4-8x1/4	2.54.2.0019
VTB-3/4-12x1/4	2.54.2.0020

Technical data

Type	Pressure range (bar)	Feed line	Exits	Weight (kg)
VTB-1/2-4x1/4	-1 ... +10	2 x G1/2	4 x G1/8	0,800
VTB-1/2-8x1/4	-1 ... +10	2 x G1/2	8 x G1/8	1,600
VTB-1/2-12x1/4	-1 ... +10	2 x G1/2	12 x G1/8	2,400
VTB-3/4-4x1/4	-1 ... +10	2 x G3/4	4 x G1/4	0,700
VTB-3/4-8x1/4	-1 ... +10	2 x G3/4	8 x G1/4	1,400
VTB-3/4-12x1/4	-1 ... +10	2 x G3/4	12 x G1/4	2,100

Distribution Elements
Distribution block VTB



VTB-1/2 ... VBT-3/4

Dimensions

Type	L1	L2	L3	L4	B1	D1	G1	G2	X1	Y1
VTB-1/2-4x1/8	80	40	20	40	40	5,5	G1/2	G1/4	---	30
VTB-1/2-8x1/8	160	80	20	40	40	5,5	G1/2	G1/4	---	30
VTB-1/2-12x1/8	240	80	20	40	40	5,5	G1/2	G1/4	80	30
VTB-3/4-4x1/4	80	40	20	40	40	5,5	G3/4	G1/4	---	30
VTB-3/4-8x1/4	160	80	20	40	40	5,5	G3/4	G1/4	---	30
VTB-3/4-12x1/4	240	80	20	40	40	5,5	G3/4	G1/4	80	30

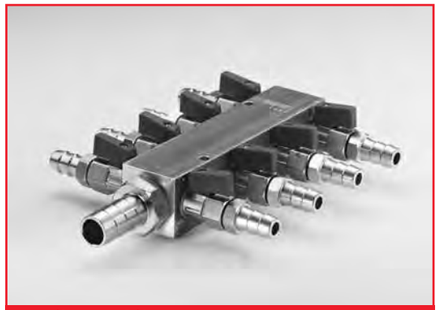
FEZER
Simply move more.

Distribution Elements

Distribution block with cut-off cock VTB

Description
Robust distribution housing made of aluminum for the distribution of vacuum/compressed air. The distribution blocks have 2 central connections and are available with 4, 8 or 12 exits. Each exit is equipped with a cut-off cock and a hose nipple.

Application:
- distribution of vacuum lines for several suction pads
- ready-for-connection design
- any mounting position



VTB-1/2 ... VBT-3/4

Article number

Type	
VTB-1/2-4x6	1.54.2.0073
VTB-1/2-8x6	1.54.2.0074
VTB-1/2-12x6	1.54.2.0075
VTB-3/4-4x10	1.54.2.0076
VTB-3/4-8x10	1.54.2.0077
VTB-3/4-12x10	1.54.2.0078

Technical data

Type	Pressure range (bar)	Feed line	Exits for vacuum hose	Weight (kg)
VTB-1/2-4x6	-1 ... +10	1 x VS-1/2	4 x VS-6	1,000
VTB-1/2-8x6	-1 ... +10	1 x VS-1/2	8 x VS-6	1,800
VTB-1/2-12x6	-1 ... +10	1 x VS-1/2	12 x VS-6	2,600
VTB-3/4-4x10	-1 ... +10	1 x VS-3/4	4 x VS-10	1,100
VTB-3/4-8x10	-1 ... +10	1 x VS-3/4	8 x VS-10	2,000
VTB-3/4-12x10	-1 ... +10	1 x VS-3/4	12 x VS-10	3,000

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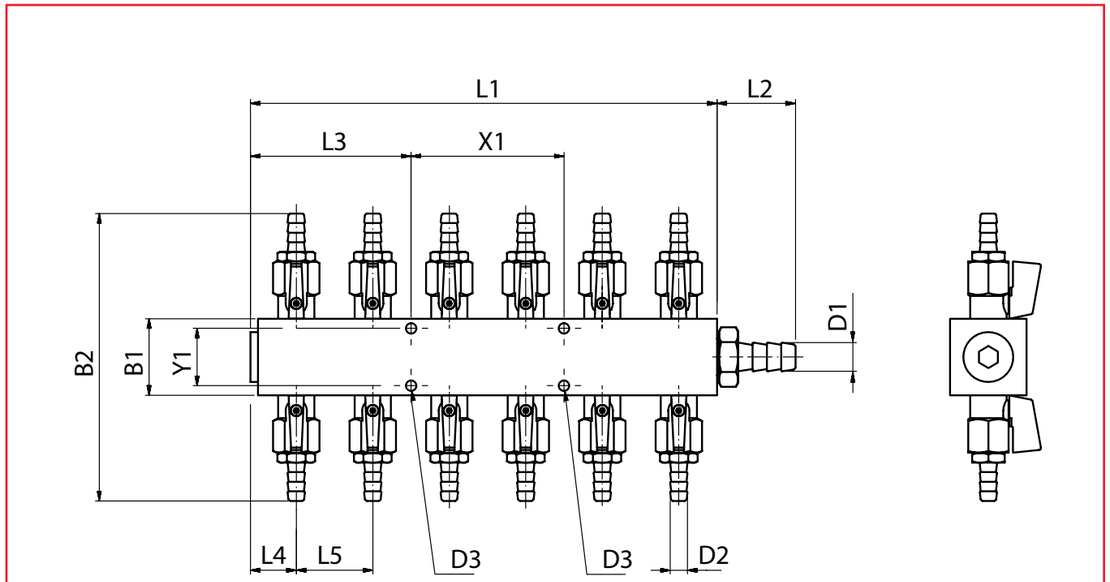
Distribution Elements

Distribution block with cut-off cock VTB



VTB-1/2 ... VBT-3/4

Dimensions

Type	L1	L2	L3	L4	L5	B1	B2	D1	D2	D3	X1	Y1
VTB-1/2-4x6	84	41	44	24	40	40	150,2	15	9	5,5	---	30
VTB-1/2-8x6	164	41	84	24	40	40	150,2	15	9	5,5	---	30
VTB-1/2-12x6	244	41	84	24	40	40	150,2	15	9	5,5	80	30
VTB-3/4-4x10	84	53	44	24	40	40	164,2	21	12	5,5	---	30
VTB-3/4-8x10	164	53	84	24	40	40	164,2	21	12	5,5	---	30
VTB-3/4-12x10	244	53	84	24	40	40	164,2	21	12	5,5	80	30

Distribution Elements

Revolving vacuum feeder DVZ

FEZER
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Description
Very robust revolving vacuum feeder in steel design with high-quality ball bearings for medium and high revolution speeds. Design DVZ-1/4-4 with 4 exits on the outlet side.

Application:
- vacuum feed on highly rotating machine parts

DVZ-1/4-4 ... DVZ-1

Article number

Type	
DVZ-1/4-4-300	1.54.2.0079
DVZ-3/8-4-300	1.54.2.0058
DVZ-1/4-250	1.54.2.0005
DVZ-1/4-3500	1.54.2.0001
DVZ-1/2-250	1.54.2.0006
DVZ-1/2-3500	1.54.2.0003
DVZ-3/4-3500	1.54.2.0009
DVZ-1-3000	1.54.2.0007

Technical data

Type	Pressure range (bar)	max. Rev.speed (1/min)	Airflow (m^3/h)	Airflow (l/s)	Temperature (°C)	Weight (kg)
DVZ-1/4-4-300	-1 ... +10	300	25	6,9	-10 ... +60	0,27
DVZ-3/8-4-300	-1 ... +10	300	30	8,3	-10 ... +60	0,29
DVZ-1/4-250	-1 ... +1	250	26	7,2	+5 ... +120	0,30
DVZ-1/4-3500	-1 ... +1	3500	26	7,2	+5 ... +120	0,40
DVZ-1/2-250	-1 ... +1	250	48	13,3	+5 ... +120	1,20
DVZ-1/2-3500	-1 ... +1	3500	48	13,3	+5 ... +120	0,70
DVZ-3/4-3500	-1 ... +1	3500	68	18,9	+5 ... +120	1,60
DVZ-1-3000	-1 ... +1	3000	86	23,9	+5 ... +120	2,10

Distribution Elements
Revolving vacuum feeder DVZ
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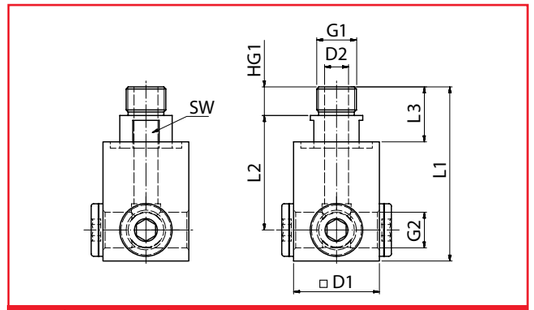
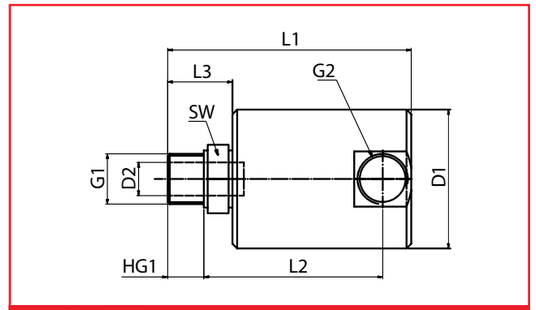


DVZ-1/4-4 ... DVZ-3/8-4



DVZ-1/4 ... DVZ-1

Dimensions

Type	D1	D2	L1	L2	L3	G1	G2	HG1	SW
DVZ-1/4-300-4	36	8	70,5	45,5	20,5	G1/4	G1/4	12	17
DVZ-3/8-300-4	36	10	73	48	23	G3/8	G3/8	12	19
DVZ-1/4-250	38	8	83,3	40	28,5	G3/8	G1/4	16	22
DVZ-1/2-250	70	16	116	59	38	G3/4	G1/2	19	36
DVZ-1/4-3500	41,2	6,4	81	60	29	G1/4	G1/4	11,5	22
DVZ-1/2-3500	57,1	12,7	113	78	34	G1/2	G1/2	17,5	30
DVZ-3/4-3500	73	17,5	128	94	34	G3/4	G3/4	19	36
DVZ-1-3000	82,6	22,2	150	108	42	G 1	G1	22	36

Electrical Connections

FEZER
Simply move more.

Junction cable ASK

Description
Junction cable with open end for connection to terminal strips. The cables are available in different lengths, with straight or angular connection. The cables are made of high-quality PUR and suitable for highly dynamic requirements.

Application:
- electrical connetion of vacuum switches and valves
- suitable for cable drag chains

ASK-

Article number

Type	2 m	5 m	10m
ASK-M8B-3P	6.35.3.1228	6.35.3.1239	6.35.3.1245
ASK-M8B90-3P	6.35.3.1229	6.35.3.1240	6.35.3.1246
ASK-M8S-3P	6.35.3.1230	---	---
ASK-M8S90-3P	6.35.3.1231	6.35.3.1241	---
ASK-M8B-4P	6.35.3.1232	6.35.3.1242	6.35.3.1247
ASK-M8B90-4P	6.35.3.1132	6.35.3.1124	6.35.3.1056
ASK-M8S-4P	6.35.3.1233	---	---
ASK-M8S90-4P	6.35.3.1234	---	---
ASK-M12B-5P	6.35.3.1235	6.35.3.1243	6.35.3.1248
ASK-M12B90-5P	6.35.3.1236	6.35.3.1244	6.35.3.1055
ASK-M12S-5P	6.35.3.1237	---	---
ASK-M12S90-5P	6.35.3.1238	---	---

Electrical Connections

FEZER
Simply move more.

Junction cable ASK

Technical data

		ASK-M8	ASK-M12
Voltage:	(V)	50AC/60DC	30AC/36DC
Current-carrying capacity:	(A)	3	3
Ambient temperature:	(°C)	-25 ... +90	-25 ... +90
Safety type:		IP67	IP67
Cable cross section:	(mm^2)	0,25	0,34
Diametre:	(mm)	3,7	4,3
Drag chain terms		yes	yes
Bend radius	(mm)	37	45
Movement speed:	(m/s)	3,3	3,3
Acceleration:	(m/s2)	5,0	5,0
Bending cycles:		> 5 Mio	> 5 Mio
Torsional stress:	(°/m)	180	180

Electrical Connections

FEZER
Simply move more.

Connection cable VBK

Description
Connection cable with connection plugs on both ends.
The cables are available in different lenghts, with straight or angular connection form.
The connection cables are made of high-quality PUR and suitable for highly dynamic requirements.

Application:
- electrical connection of vacuum switches and valves

VBK-

Article number

Type	0,6 m	2 m	5 m
VBK-M8B-3P-M8S-3P	6.35.3.1249	6.35.3.1265	6.35.3.1281
VBK-M8B90-3P-M8S-3P	6.35.3.1250	6.35.3.1266	6.35.3.1282
VBK-M8B-3P-M8S-4P	6.35.3.1251	6.35.3.1267	6.35.3.1283
VBK-M8B90-3P-M8S-4P	6.35.3.1252	6.35.3.1268	6.35.3.1284
VBK-M8B-4P-M8S-4P	6.35.3.1253	6.35.3.1269	6.35.3.1285
VBK-M8B90-4P-M8S-4P	6.35.3.1254	6.35.3.1270	6.35.3.1286
VBK-M8B-3P-M12S-3P	6.35.3.1255	6.35.3.1271	6.35.3.1287
VBK-M8B90-3P-M12S-3P	6.35.3.1256	6.35.3.1272	6.35.3.1288
VBK-M12B-5P-M8S-3P	6.35.3.1257	6.35.3.1273	6.35.3.1289
VBK-M12B90-5P-M8S-4P	6.35.3.1258	6.35.3.1274	6.35.3.1290
VBK-M8B-4P-M12S-4P	6.35.3.1259	6.35.3.1275	6.35.3.1291
VBK-M8B90-4P-M12S-4P	6.35.3.1260	6.35.3.1276	6.35.3.1292
VBK-M12B90-5P-M8S-4P	6.35.3.1262	6.35.3.1278	6.35.3.1156
VBK-M12B-5P-M12S-5P	6.35.3.1263	6.35.3.1279	6.35.3.1294
VBK-M12B90-5P-M12S-5P	6.35.3.1264	6.35.3.1280	6.35.3.1295

Electrical Connections

FEZER
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Connection cable VBK

Technical data

		VBK-M8-M8	VBK-M8(M12)-M12(M8), VBK-M12-M12
Voltage:	(V)	50AC/60DC	30AC/36DC
Current-carrying capacity:	(A)	3	3
Ambient temperature:	(°C)	-25 ... +90	-25 ... +90
Safety type:		IP67	IP67
Cable cross section:	(mm^2)	0,25	0,34
Diametre:	(mm)	3,7	4,3
Drag chain terms:		yes	yes
Bend radius	(mm)	37	45
Movement speed:	(m/s)	3,3	3,3
Acceleration:	(m/s2)	5,0	5,0
Bending cycles:		> 5 Mio	> 5 Mio
Torsional stress:	(°/m)	180	180

System Technology

System Technology

FEZER
Simply move more.

Next to individual vacuum components FEZER offers you also complete system solutions to flange to robot axes or linear guides.

These system solutions are customized productions with individual requirements and specifications. The systems can be designed conventionally or controlled with sophisticated bus technology.

To give you an anderstanding of this system technology on the following pages you will find a brief overview of the System Technology by FEZER.

1. Basics
2. Suction Pads
3. Mounting Elements
4. Vacuum Generators
5. Valve Technology
6. Vacuum Supervision
7. Filter Elements
8. Connection Elements
9. System Technology

System Technology

FEZER
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Application:
Suction frame on 16 linear axes for stacking steel sheets with a total weight of 5.500 kg. Depending on the stacking lengths the linear axes are run individually or alternately while the cycle time can be cut in half.

Design:
- suction frame in combined aluminum and steel design
- both-sided cushioned suction pad assembly with increased stroke
- central vacuum generation for all linear axes
- switching automatic for suction and release
- valve island technology for control of different suction circuits
- electrical wiring on entrance module
- central bus control of all functions (Profi-Bus DP)

1. Basics
2. Suction Pads
3. Mounting Elements
4. Vacuum Generators
5. Valve Technology
6. Vacuum Supervision
7. Filter Elements
8. Connection Elements
9. System Technology

System Technology

FEZER
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Application:
Suction frame on a linear axis for stacking exposure sheets with a min. thickness of 0,1 mm and paper interlayers.
A cylinder is used to separate the sheets. Another cylinder with pneumatic gripper is used to remove the paper interlayers.

Design:
- suction frame in all aluminum profile construction
- combined vacuum generation made of electrical pump and pneumatic ejectors
- pneumatic suction pad adjustment for sheet separation
- pneumatic suction pad adjustment with gripper for removing the interlayers
- pneumatic suction frame adjustment for excess length sheets
- valve island technology for control of different suction circuits
- electrical wiring on entrance module
- eentral bus control of all functions (Profi-Bus DP)

System Technology

FEZER
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Application:
Two suction frames on two portal axes that feed sheets on alternate operation. Due to this alternate operation the total height of the frames must not exceed 100 mm.

Design:
- suction frame in all aluminum design
- vacuum generation separate on the portal's axis
- control by solenoid valve
- suction pads with flow resistances for handling different sheet dimensions
- suction pad with cushioned suspension bolt

System Technology

FEZER
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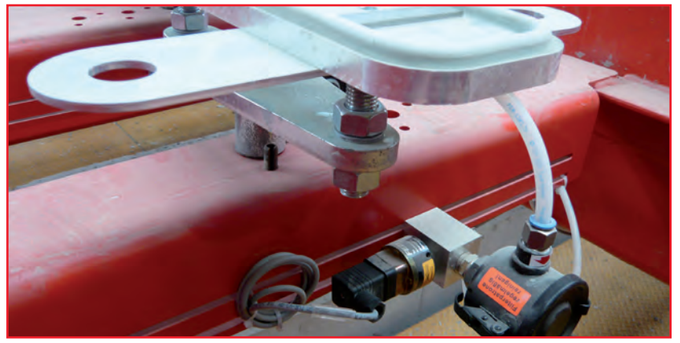
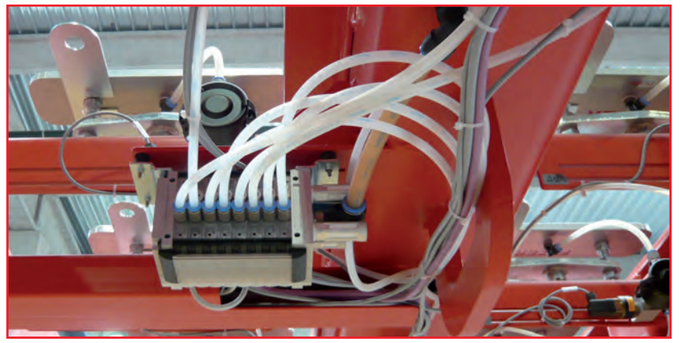
Application:
System components to enclude in a turning frame, to flip over concrete elements with a weight of up to 5.600 kg.

Design:
- suction pad assembly with 90° turnable suction pad, vacuum filter and vacuum switch
- individual control of each suction pad by valve island technology
- central vacuum control of the vacuum tank by analogous vacuum switch
- entrance module for vacuum switch of each suction pad
- control by ProfiBus system





System Technology

FEZER
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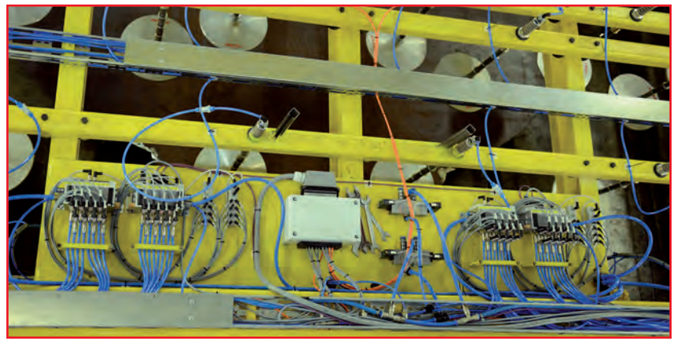
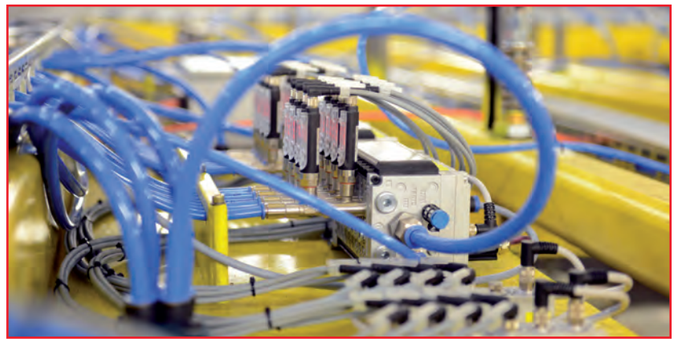
Application:
System components to enclude in a fully automatic transport device to deform and place concrete parts. Max. weight per concrete part 2.500 kg, deform forces up to 5.000 kg

Design:
- suction pad with extended, both-sided cushioned suspension bolt
- robust brass bearings for guiding the suspension bolt
- individual control of each suction pad by valve island technology
- individual supervision of each suction circuit by digital vacuum switches
- entrance module for vacuum switch
- separatly placed vacuum energy unit
- control by ProfiBus system





Notes

FEZER
Einfach mehr bewegen.

Notes

FEZER
Einfach mehr bewegen.

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FEZER
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Vacuum Components Catalogue, Issue 08/2012

Albert Fezer Maschinenfabrik GmbH
Hauptstrasse 37-39, 73730 Esslingen
Germany

General Terms of Business 2012

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1.General/Area of application
The terms of business apply to all current and future business transactions. Contrasting, conflicting, or supplementary terms of business of the buyer's are, even with full knowledge, no integral part of the contract unless explicitly approved of in writing. Fezer's general terms of business are also valid if delivery to the buyer is done with full knowledge of conflicting or contrary terms of the buyer.

2. Offers/Offer documents
Offers are subject to change and non-binding. Technical alterations and changes of form, colour and/or weight are within reasons reserved. If the order is classifiably as a tender in accordance with § 145 BGB, Fezer can accept it within 4 weeks. The acceptance shall either be declared in writing or by supplying the goods. Fezer reserves the right of title and copyright to all figures, pictures, drawings, calculations and other paperwork; they must not be passed on to third parties. Forwarding them to third parties requires the written permission by Fezer.

3. Scope of delivery
The supplier's order confirmation in writing will be prevailing for the scope of delivery. This holds true in case of an offer with commitment in terms of time and acceptance of the said offer as long as no confirmation of order has been submitted within the given time period. Side-agreements and changes require the written confirmation by Fezer.

4. Prices/Payment terms
In the absence of a special agreement all prices are „ex works", encluding loading in the company, but without packing. A deduction of discounts required written approval. If no other terms are stated in the confirmation/offer the sales price is to be paid net (without any discounts) within 30 days of invoice date. In case of delayed payment Fezer is allowed to claim late interest to the amount of 8 % p.a. above the basic interest rate of the European Central Bank. If higher damages caused by delay can be proved Fezer is allowed to claim this. The buyer has the right to prove that the damages are lower than stated. The buyer's right of offsetting are only allowed if their counter claims have been legally determined, are beyond dispute or accepted by Fezer. The retaining lien is only allowed as long as the counter claim refers to the same contract.

5. Delivery time
The start of the confirmed delivery time implies that all technical questions have been clarified and the buyer's obligations have been fulfilled in time and correctly. The delivery date is met if the delivered product has left the premises or else the readiness for shipment has been confirmed to the buyer by the end of the week that has been stated in the Fezer confirmation. The delivery time is increase in case of inevitable occurrences, force majeure, strikes or other events unless these have been strictly ruled out in the contract. This is also true for occurrences at supplier's sites. Do these events take place during a delivery delay in course this delivery delay is not prolonged. If the buyer is buyer delays the acceptance or violates other obligations to co-operate Fezer is allowed to claim the caused damages encluding possible additional expenses. In this case the risk of accidental perishing or accidental decline of the goods is passed on to the buyer. Is the delivery of the goods delayed on demand of the buyer Fezer reserves the right to charge expenses for storage with a minmimum of 0,5 % of the invoice amount per any started month. Additionally Fezer is entitled to withdraw from the contract at the end of an appropriate time-limit or dispose of the goods at their will and supply at a later date. If the buyer unjustified withdraws from the given order Fezer is entitled to demand 10% of the sales price for expenses caused and loss of profit. The buyer is entitled to prove lower expenses.

6. Transfer of risk, despatch
If the contract does not state differently, delivery is „ex works". The risk is transferred to the buyer at the lates once the goods are loaded onto the transport means (e.g. truck). This applies as well if Fezer covers the transport costs and installation of the goods.Is the despatch of the goods delayed due to circumstances for which the buyer is responsible the risk is transferred to them on the day that the goods are ready for despatch. Fezer is obligated to procure insurance if desired and paid for by the buyer. Delivered goods have to be accepted even if showing defects if those defects are immaterial. Partial deliveries are allowed.

7. Warranty
The warranty period is 12 months and begins with the risk transfer. For the rest the warranty and liability of Fezer is limited to supplementary perfomance, at Fezer's own choice either by rectification or replacement. If the supplementary performance fails the buy is authorized to withdraw from the contract. On minor infringement of contract, especially on insignificant defects, the buyer has no right to withdraw. The buyer's right of abatement is excluded. Chooses the buyer to withdraw from the contract due to failed supplementary performance of a defect of title or material he has no right of compensation for damages. Chooses the buyer compensation after a failed supplementary performance the goods rest with the buyer as long as this is reasonable. The compensation is limited to the difference between the sales price and value of the defective goods. This does not apply if Fezer has violated the contract in a faudulent way. The product descriptions of Fezer are only to be considered as condition descriptions. Public comments, advertisements or promotion do not count as contractual condition descriptions. Also the production description of a manufacturer whose services are used by Fezer count only as condition descriptions. If the buyer receives an inadequate installation instructions manual Fezer is only obligated to supply an adequate one and only so if the defect of the manual is contrary to a proper installation. The buyer can only enforce compensation due to nonfulfillment or withdraw from the contract if Fezer has neither rectified nor replaced the faulty goods or if a rectification or replacement is not reasonable for the buyer. Warranty claims require that the buyer informs Fezer in writing on obvious defects within 2 weeks, calculated from the day of receipt of the goods, and hidden defects within 2 weeks after detection. The buyer does not get any guaranties from Fezer in the juristic sense. Manufacturer's warranties of third parties are not touched by this.

8. Liability limitation
Fezer's liability is limited to negligent breach of duty of type of goods's predictable, contract typical, direct average damage. This applies also for negligent violation of duty of employees, representatives and agents of Fezer's. On slightly negligent violation of immaterial contract obligations liability is excluded. Fezer is not liable for damages that were not caused on the supplied goods, especially not for loss of profit or damages the buyer's assets. The warranty disclaimer does not apply on damages caused to lives, body or health or, if the cause of damage is based on intent or gross negligence or if Fezer is in breach of an essential obligation (material contractual obligation). It does not apply as well if the buyer is justified to claim damages due to a written guarantee by Fezer to pay damages for nonfulfillment. If Fezer violates an essential obligation without negligence the duty to compensate for material and financial damages is limited to the amount insured by the product liability insurance. On request Fezer offers insight into the policy of insurance. For buyer's claims as per §§ 1 and 4 of the German Product Liability Act the forementioned limitations of liability do not apply.

9. Reservation of ownership
Until satisfaction of all accounts receivable (including all claims from the current account), to which Fezer is entitled to based on any legal grounds against the buyer from the business relationship which will be release to Fezer according to their chioce, if and insofar as their value exceeds their total claim from the business relationship by more than 20 %. The goods remain their property until complete payment of all receivables. Processing or reshaping will always be performed for Fezer, but without any obilgations to him. If the ownership of the seller expires through combination, it is now agreed that the buyer's ownership of the unitary object is transferred to Fezer. The buyer stores Fezer's property free of charge. Goods, for which Fezer is entitled to ownership shall be referred to as conditional goods hereafter. The customer has the right to process and resell the goods in the ordinary course of business provided that he is not in default. Pawnings or the transfer of ownership to third parties are not allowed. Any debts arising out of the resaly or any other legal ground of the goods, encluding all receivables from current account, shall be assigned by the buyer to the seller already now for security reasons to the full extent. Fezer authorizes the customer revocably to collect the demands transferred to Fezer under his name on Fezer's account. The authorization to collect can only be revoked if the Buyer is not fulfilling his obligation to pay. With the access of a third party to the conditional goods the buyer will refer to the property of Fezer and notify them instantly. If the customer acts in a way contrary to the contract, in particular default in payment, Fezer is entitled to withdraw from the contract and demand the return of the goods.

10. Installation
Fezer is only obliged to install supplied materials based on an independant installation contract. The herein specific agreements apply. Warranty, liability and warranty disclaimer are based, if nothing else was agreed upon, on the forementioned terms of business.

11. Place of performance/court of jurisdiction
Germany law applies. The terms of the UN purchasing right do not apply. Place of performance on delivery contracts is Esslingen a. N., court of jurisdiction, depending on practical competence, either Esslingen or Stuttgart. Should individual provistions of these terms of business be invalid or become invalid, the validity of the remaining provisions remain untouched.