



**Operating instructions**  
**30.30.01.00664**

**EN**  
**SCPSb-2**  
**Eco-Nozzle Technology**

# CONTENTS

<b>1</b>	<b>Safety Instructions</b> .....	<b>1-3</b>
	Important symbols .....	1-3
	General safety instructions .....	1-3
	Intended use .....	1-4
	Installation and operation .....	1-5
<b>2</b>	<b>Product Overview</b> .....	<b>2-6</b>
	<b>General description of functions</b> .....	<b>2-6</b>
	Vacuum generation (picking up the workpiece) .....	2-6
	Blow-off (depositing the workpiece) .....	2-6
	<b>Versions</b> .....	<b>2-6</b>
	Electrical connection .....	2-6
	<b>Ejector design</b> .....	<b>2-7</b>
<b>3</b>	<b>Description of Functions</b> .....	<b>3-8</b>
	<b>General functions</b> .....	<b>3-8</b>
	Setting the blow-off volume flow .....	3-8
<b>4</b>	<b>Operating Mode</b> .....	<b>4-9</b>
	Mounting .....	4-9
	Pneumatic connection .....	4-10
	Electrical connection .....	4-10
<b>5</b>	<b>Maintenance</b> .....	<b>5-11</b>
	<b>General maintenance</b> .....	<b>5-11</b>
	Exterior soiling .....	5-11
	Silencer .....	5-11
	<b>Warranty, spare parts and wearing parts</b> .....	<b>5-11</b>
	Spare and wearing parts .....	5-11
	<b>Troubleshooting</b> .....	<b>5-12</b>
	<b>Accessories</b> .....	<b>5-12</b>
<b>6</b>	<b>Technical Data</b> .....	<b>6-13</b>
	<b>Electrical parameters</b> .....	<b>6-13</b>
	<b>Mechanical data</b> .....	<b>6-13</b>
	General parameters .....	6-13
	Materials used .....	6-14
	Mechanische Parameter .....	6-14
	Dimensions .....	6-15
	Pneumatic circuit diagrams .....	6-16
<b>7</b>	<b>Conformity Declaration</b> .....	<b>7-17</b>

# 1 SAFETY INSTRUCTIONS

## IMPORTANT SYMBOLS



This symbol indicates informations and instructions.



**Caution!**

This symbol indicates a potentially dangerous situation. If it is not avoided, slight or minor injuries may result.



**Danger!**

This symbol indicates an immediate hazard. If it is not avoided, death or serious injuries may result.

## GENERAL SAFETY INSTRUCTIONS



- These operating instructions contain important information on using the ejector. Please read the operating instructions thoroughly and keep them for later reference.



**Never look into any open or closed vacuum vents (e.g. vacuum connections or suction pads). Serious injuries could occur as a result. Eyes can be sucked in.**

- Compressed air can cause closed containers to explode. A vacuum can cause closed containers to implode.
- The ejector may only be operated with a silencer. Never look into the exhaust air jet of the silencer.
- The ejector emits noise. We recommend wearing ear protection.
- This device is not intended for use with hazardous dust, oil mist, vapors or aerosols, etc. If drawn in, these materials will enter the exhaust air and may result in poisoning.
- Use only the connections, mounting holes and attachment materials that have been provided.
- Carry out mounting and removal only when the device is in an idle, depressurized state.
- No person may sit or stand in the area in which the load is to be transported.
- No person may sit or stand in the danger zone while the machine or system is in automatic mode.
- Components may be installed by trained specialist personnel only.

- Specialist personnel must be familiar with current safety rules and requirements. For example, these apply to the use of components such as solenoid valves and pressure switches as well as to controllers used in devices, machines and systems.
- Specialist personnel must also be familiar with the system's control concept. In particular, they must be familiar with the system's redundant control components and feedback signals.

## INTENDED USE

The ejector is designed to generate a vacuum for gripping and transporting objects when used in conjunction with suction pads. Neutral gases in accordance with EN 983 are approved as evacuation media. Neutral gases include air, nitrogen and inert gases (e.g. argon, helium and neon). Aggressive gases or media such as acids, acid fumes, bases, biocides, disinfectants or detergents are not permitted.



The ejector is **not** suitable for transporting or sucking through liquids or bulk material such as granulates.  
Personal injury or damage to the ejector may occur.

**INSTALLATION AND OPERATION**

For safe installation and trouble-free operation, please observe and comply with the following points:



**The ejector may only be operated using power supply units with protected extra-low voltage (PELV). The system must incorporate safe electrical cut-off of the power supply in compliance with EN60204.**



**Do not operate the ejector in environments where there is a risk of explosion.  
Risk of fire and explosion.**



The device may not be operated outside its specified performance limits. Doing so may cause it to malfunction or be destroyed.



During installation and maintenance, make sure that the ejector is disconnected and depressurized and that it cannot be switched on again without authorization. Personal injury or damage to the ejector may occur.

- Protect the ejector from damage at all times.
- No modifications may be made to the ejector.
- Opening the ejector will damage the “tested” labels. This voids the warranty.
- Connection symbols and labels are located on the ejector. These must be observed.
- Only the intended connections may be used.
- Pneumatic and electrical line connections must be securely connected and attached to the ejector.
- The ejector may be installed in any position.
- If these instructions are not observed, malfunctions, material damage and serious injury – including fatal injury – may result.
- If the ejector is no longer operative, the components must be disposed of in an ecologically sound manner.

## 2 PRODUCT OVERVIEW

### GENERAL DESCRIPTION OF FUNCTIONS

#### VACUUM GENERATION (PICKING UP THE WORKPIECE)

The ejector is designed for vacuum handling of parts in combination with suction systems. The venturi nozzle is activated and deactivated using the “suction” pilot valve. In the NO version, the venturi nozzle is deactivated when voltage is applied. In the NC version, the venturi nozzle is activated when voltage is applied.

When objects with dense surfaces are picked up, the integrated non-return valve prevents the vacuum from dropping.

#### BLOW-OFF (DEPOSITING THE WORKPIECE)

The vacuum circuit of the ejector is supplied with compressed air using the “blow off” pilot valve. This ensures that the vacuum drops quickly, depositing the workpiece quickly as well.

### VERSIONS

Each ejector has a specific item designation (e.g. SCPSb-2-07-S4-NO).

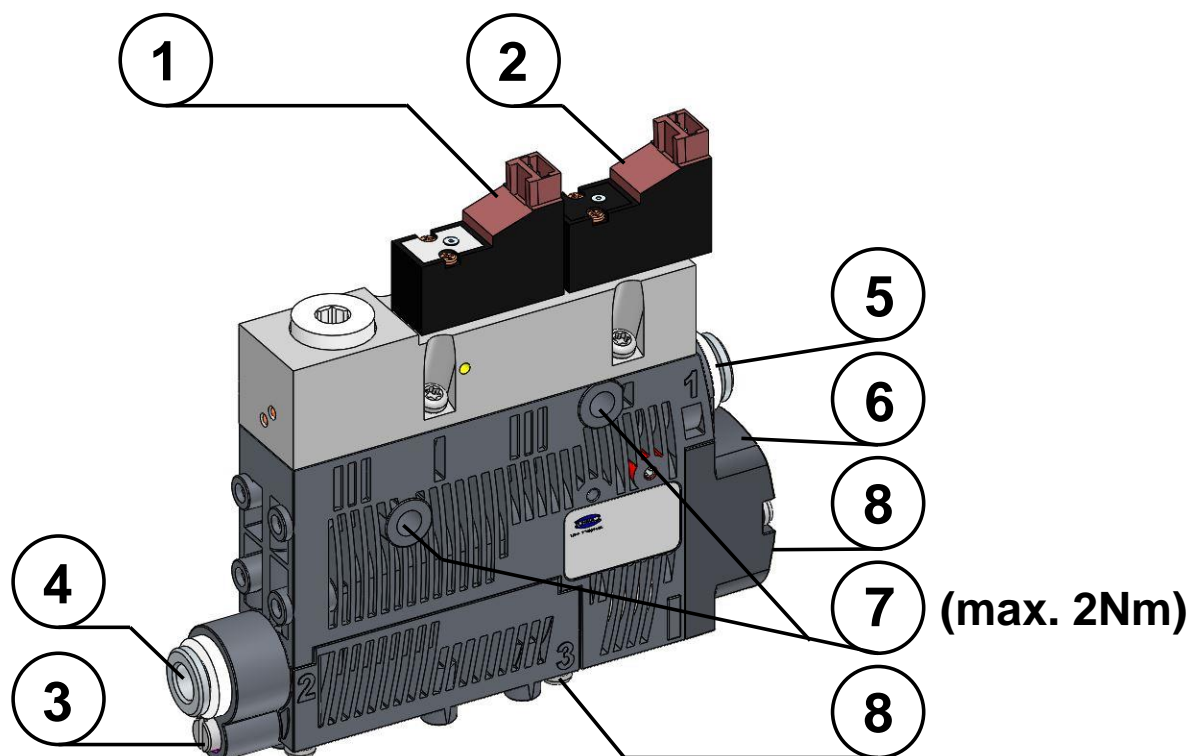
The item designation can be broken down as follows:

Type	Performance class	Pneumatic connection	Electrical connection	Idle position
SCPSb	<b>2-07</b>	<b>S4</b> (2x D6)	Using the plug connection of the pilot valves	<b>NO</b>
	<b>2-09</b>	<b>S4</b> (2x D6)		Normally open
	<b>2-14</b>	<b>S2</b> (D6 at 1, D8 at 2)		<b>NC</b> Normally closed

#### ELECTRICAL CONNECTION

Plugs for magnetic valves are inserted until they lock into place. Press the lock lever to remove the plugs.

## EJECTOR DESIGN



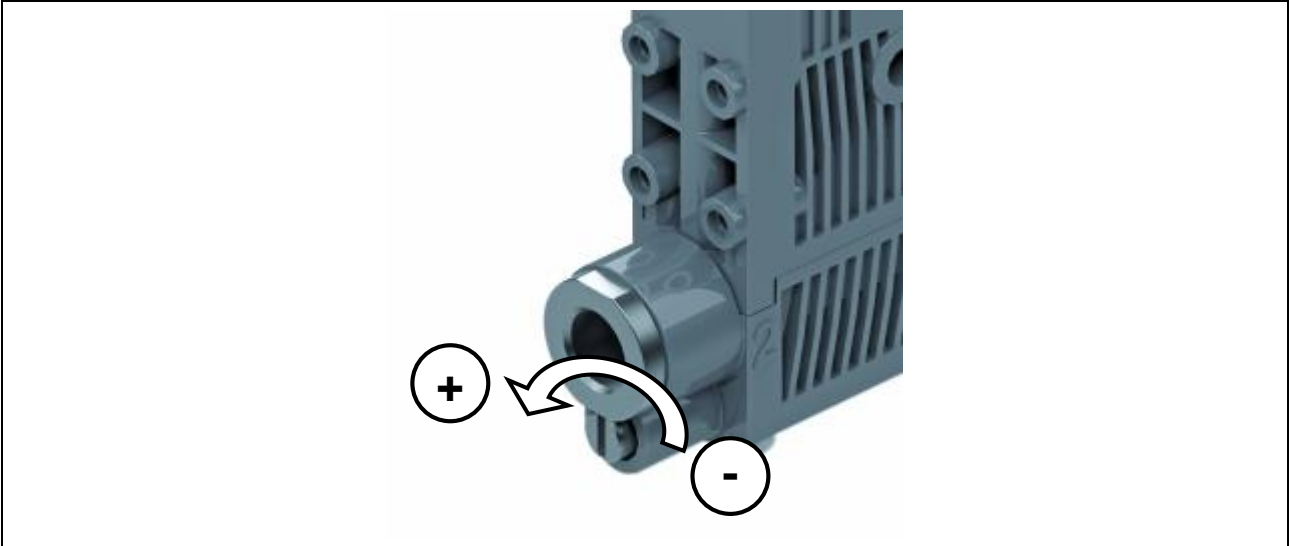
We recommend using washers on the mounting holes.  
Do not look into the exhaust outlet (compressed air) during operation

Position	Description	Max. tightening torque
1	Pilot valve „Suction“	0,2 Nm
2	Pilot valve „Blow-Off“	0,2 Nm
3	Blow-off valve screw	
4	Vacuum connection (label: 2 [V])	D6 – SCPSb – 07/10 D8 – SCPSb – 15
5	Compressed air connection D6	
6	Silencer cover	0,5 Nm
7	Mounting holes	2 Nm
8	Exhaust outlet (label 3 and silencer cover)	

### 3 DESCRIPTION OF FUNCTIONS

#### GENERAL FUNCTIONS

##### SETTING THE BLOW-OFF VOLUME FLOW



There is a valve screw below the vacuum connection (2). This valve screw can be used to set the blow-off volume flow.

Turning the screw clockwise reduces the volume flow. Turning the screw counterclockwise increases the volume flow.

The valve screw is equipped with a stop on both sides.



Do not turn the valve screw past the stops. A minimum volume flow of approx. 10% is always necessary for technical reasons.

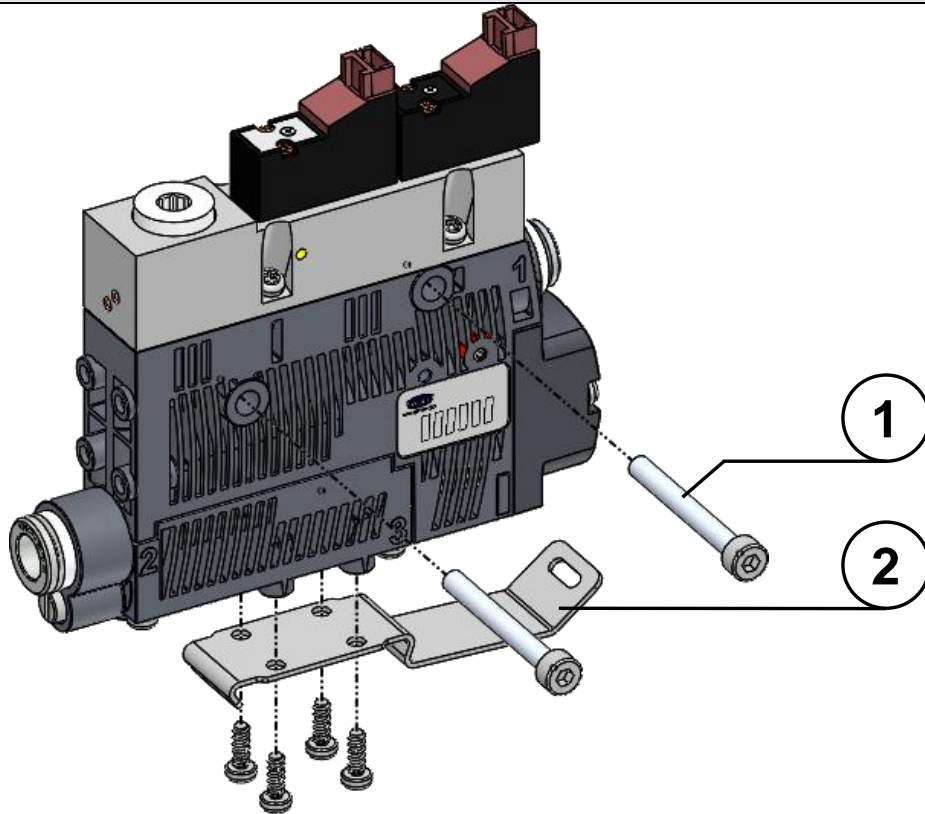
The blow-off volume flow can be set between 10% and 100%.



## 4 OPERATING MODE

### MOUNTING

SCPSb-2 ...



We recommend using washers when mounting the securing screws.

Position	Description	Max. tightening torque
1	M4 securing screw	2 Nm
2	Top-hat rail clamp for TS35 top-hat rail, incl. plastic tapping screws (optional)	0,5 Nm

## PNEUMATIC CONNECTION

- Use only well-maintained compressed air (air or neutral gas according to EN 983, filtered to 20 µm, oiled or unoled).
- High-quality compressed air is important to ensure a long service life for the ejector.
- If there are heavy accumulations of dirt on the suction-side, we recommended you use additional filters, e.g. VFI 6/4 for SCPSb 07/10 or VFI 8/6 for SCPSb 15
- Dirt particles or foreign bodies in the ejector connections, hoses or pipelines can lead to partial or complete ejector malfunction.
- Hoses and pipelines should be laid such that distances are minimized.
- If the internal diameter on the compressed air side is too small, insufficient compressed air will be supplied. This prevents the ejector from performing as specified in the performance data.
- Excessive flow resistance occurs if the internal diameter on the vacuum side is too small. This leads to both a reduction in suction capacity and increased evacuation times. Blow-off times are also lengthened.
- Hose lines must be laid without bends or crimps.
- Only use hoses or pipes with the internal diameters recommended for the ejector. If this is not possible, use the next largest internal diameter.

### RECOMMENDED LINE CROSS-SECTIONS (INTERNAL DIAMETERS)

SCPSb performance class	Line cross-section (internal diameter) [mm] <sup>1)</sup>	
	Compressed air side	Vacuum side
2-07	4	4
2-09	4	4
2-14	4	6

<sup>1)</sup> Based on a maximum hose length of 2 m. For longer hose lengths, the cross sections must also be larger and you must use corresponding adapters!

## ELECTRICAL CONNECTION

- The ejector may only be operated using power supply units with protected extra-low voltage (PELV). The system must incorporate safe electrical cut-off of the power supply in compliance with EN60204.

Schmalz connection lines may be used to connect the ejector directly to the controller, e.g. Art.-no. 21.04.06.00086, 3m



When you connect the valves, you don't need to check the polarity.

## 5 MAINTENANCE

### GENERAL MAINTENANCE

#### EXTERIOR SOILING

Remove dirt on the exterior of the device with a soft cloth and soap suds (max. 60°C). Ensure that the silencer and the controller are not soaked with soap suds.

#### SILENCER

Because it is open, the silencer may be exposed to high levels of dust, oil, etc., which may dirty the silencer to the point of reducing the suction capacity. If this happens, it must be replaced. Cleaning is not recommended due to the capillary effect of the porous material.

### WARRANTY, SPARE PARTS AND WEARING PARTS

This system is guaranteed in accordance with our general terms of trade and delivery. The same applies to spare parts, provided that these are original parts supplied by us.

We are not liable for any damage resulting from the use of non-original spare parts or accessories.

Wearing parts are not covered by the warranty.

The following list contains the primary spare and wearing parts.

#### SPARE AND WEARING PARTS

Type	Designation	Article no.	Legend	Max. tightening torque
	Silencer insert	10.02.02.04141	W	
NO/NC	Pilot valve „Blow-Off“	10.05.01.00104	S	0,2 Nm
NC	Pilot valve „Suction“	10.05.01.00104	S	0,2 Nm
NO	Pilot valve „Suction“	10.05.01.00103	S	0,2 Nm

Legend: Spare part= S Wearing part= W



When tightening the securing screws on the silencer module, observe the maximum tightening torque of 0,5 Nm.

## TROUBLESHOOTING

Fault	Possible cause	Solution
Vacuum level is not reach or vacuum is created too slowly	Silencer is dirty	Replace silencer
	Leakage in hose line	Check hose connections
	Leakage at suction pad	Check suction pad
	Operating pressure too low	Increase operating pressure (observe max. limits)
	Internal diameter of hose lines too small	See recommended hose diameters
Payload cannot be held securely	Vacuum level too low	Increase operating pressure (observe max. limits)
	Suction pad too small	Select a larger suction pad

## ACCESSORIES

Designation	Article no.
Connection cable for Pilot valves	21.04.06.00086
Top-hat rail clamp for TS35 top-hat rail, incl. plastic tapping screws (optional)	10.02.02.04149

## 6 TECHNICAL DATA



Operating the ejector system outside of the specified values can result in damage to the system and attached components.

### ELECTRICAL PARAMETERS

Parameter	Symbol	Limit values			Unit	Comment
		Min.	Typ	Max.		
Supply voltage	$U_A$	22,8	24	26,4	$V_{DC}$	PELV <sup>1)</sup>
<b>SCPSb-2 – xx – xx - NO</b>						
Rated current from $U_A$ <sup>2)</sup>	$I_A$	—	—	110	mA	$U_A = 24,0V$
<b>SCPSb-2 – xx – xx - NC</b>						
Rated current from $U_A$ <sup>3)</sup>	$I_A$	—	—	55	mA	$U_A = 24,0V$

<sup>1)</sup> The power supply must comply with the requirements of EN60204 (protective extra-low voltage).

<sup>2)</sup> Parallel control of the “suction” and “blow off” valves

<sup>3)</sup> Separate control of the “suction” and “blow off” valves

### MECHANICAL DATA

#### GENERAL PARAMETERS

Parameter	Symbol	Limit values			Unit	Comment
		Min.	Typ	Max.		
Ambient temperature	$T_{amb}$	0	—	50	°C	
Storage temperature	$T_{Sto}$	-10	—	60	°C	
Humidity	$H_{rel}$	10	—	90	%rf	Free from condensation
Degree of protection		—	—	IP65		
Operating pressure	P	2	4	6	bar	
Operating medium	Air or neutral gas, filtered to 20 $\mu m$ , oiled or unoled, compressed air w/ quality class 3-3-3 acc. to ISO 8573-1					

## MATERIALS USED

Component	Material
Basic body	PA6-GF, Anodized aluminum alloy
Inner components	Anodized aluminum, Anodized aluminum alloy, brass, galvanized steel, stainless steel, PU, POM
Silencer insert	Porous PE
Seals	NBR
Lubricants	Silicone-free
Screws	Galvanized steel

## MECHANISCHE PARAMETER

Type	Nozzle size	Max. vacuum <sup>2</sup>	Suction rate <sup>1</sup>	Max. blow-off capacity <sup>1</sup>	Air consumption <sup>1</sup>	Sound level <sup>1</sup>		Weight
						Free sucking	sucked	
	mm	mbar	l/min	l/min	l/min	dBA	dBA	kg
SCPSb-2-07	0,7	870	32	130	24	67	58	0,195
SCPSb-2-09	0,9	870	45	130	40	72	59	0,195
SCPSb-2-14	1,4	870	67	130	82	78,5	70	0,195

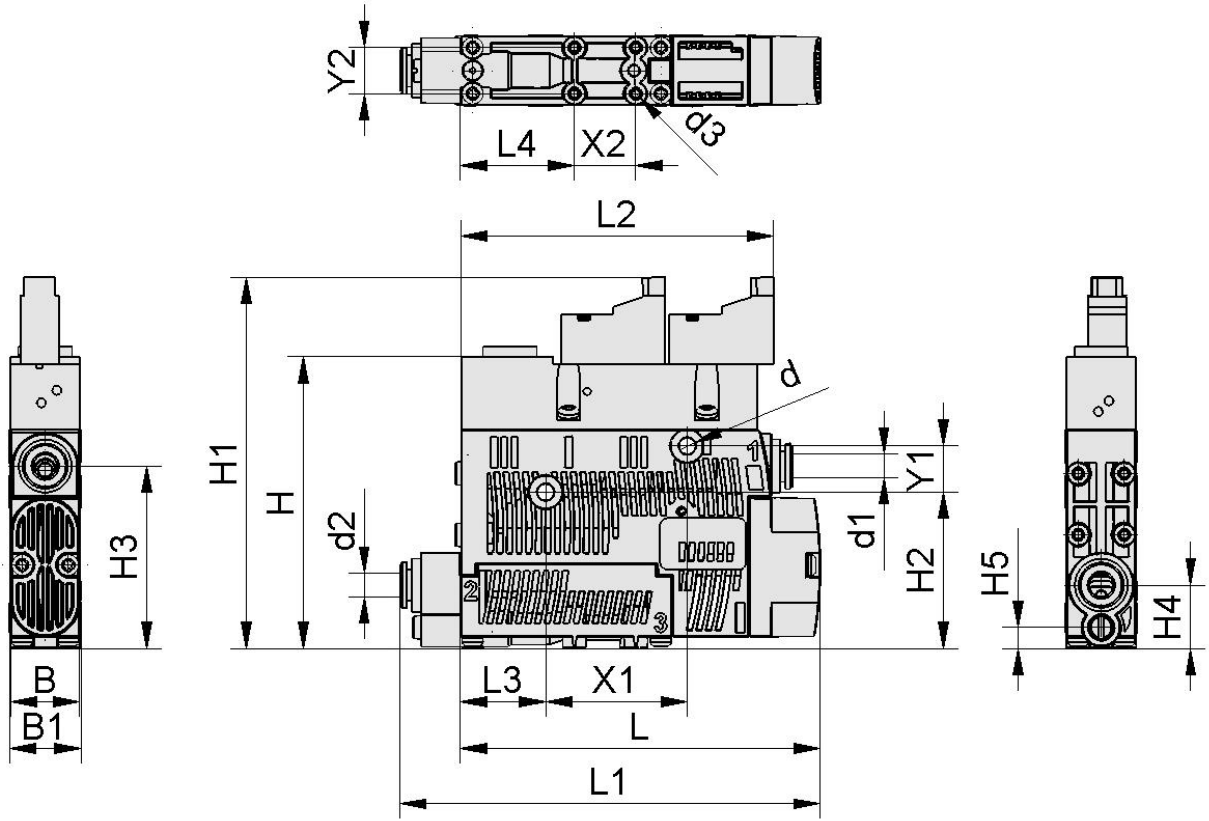
<sup>1)</sup> at 4 bar

<sup>2)</sup> at optimum pressure

**DIMENSIONS**

SCPSb 2...

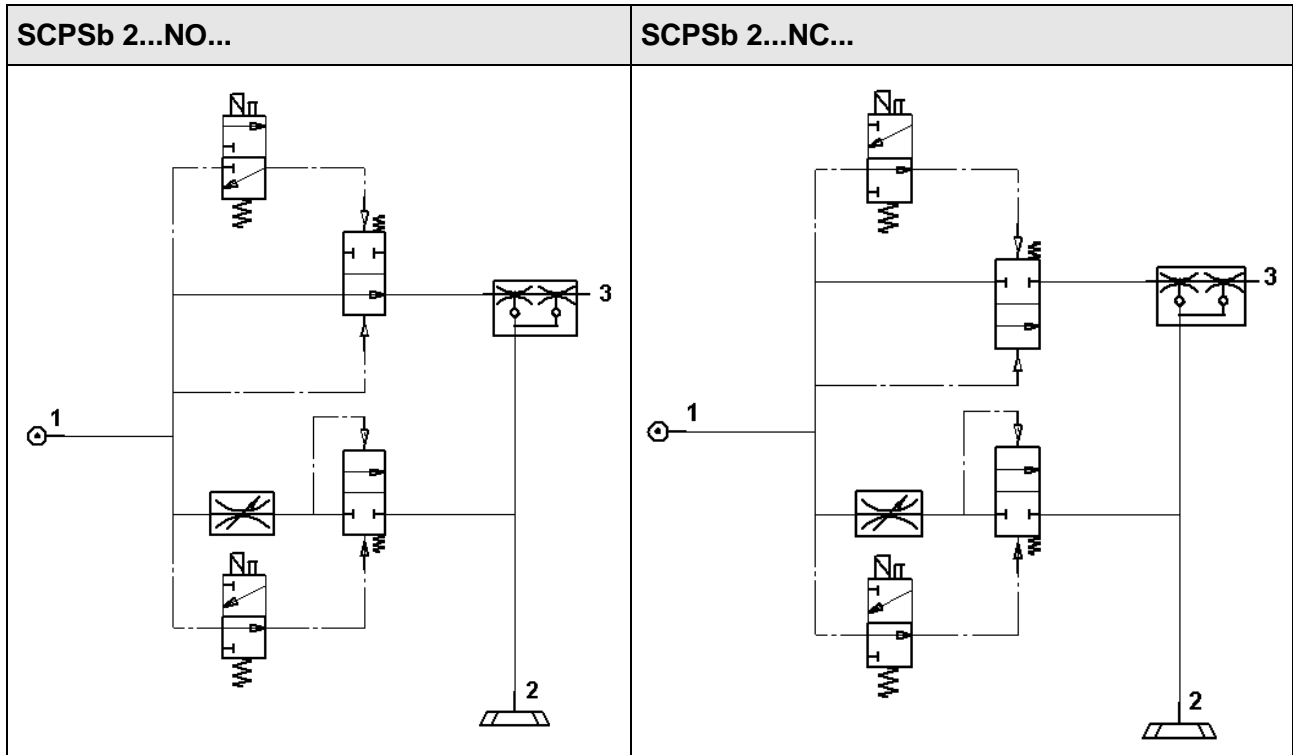
SCPSb-2..



L	L1	L2	L3	L4	B	B1	H	H1	H2	H3	H4
93,8	107,1	81,4	22	29,5	18	18,6	77,5	97	40,8	47,5	16,5

H5	d	d1	d2	d3	X1	X2	Y1	Y2			
5,5	4,4	6	6	2,6	36,9	16	12	12			

**PNEUMATIC CIRCUIT DIAGRAMS**





# 7 CONFORMITY DECLARATION

DE EG-Konformitätserklärung  
 EN EC- Declaration of Conformity  
 FR CE-Déclaration de conformité  
 ES Certificado de conformidad CE  
 IT Dichiarazione di conformità CE  
 NL CE Conformiteitsverklaring



Hersteller / Manufacturer / Fabricant / Fabricante / Produttore / Fabrikant

J. Schmalz GmbH, Aacher-Str. 29, D - 72293 Glatten

Produktbezeichnung / Product name / Designation du produit /  
 Denominación del producto / Denominazione del prodotto / Beschrijving van de machine

Ejektoren der Serie / Ejectors series / Ejecteurs de la série / Eyectores de la serie / Eiettori de la serie / Ejector Serie **SCPSb**

Erfüllte einschlägige EG-Richtlinien / Applicable EC directives met / Directives CE applicables respectées /  
 Directivas vigentes de la CE cumplidas / Direttive CE applicate ed osservate / Nagekomen betreffende EG-richtlijnen

2006/42/EG Maschinenrichtlinie / Machinery Directive / Directive sur les machines /  
 Directiva para máquinas / Direttiva macchine / Machinerichtlijn

2004/108/EG Elektromagnetische Verträglichkeit / Electromagnetic Compatibility / Compatibilité électromagnétique /  
 Compatibilidad electromagnética / Compatibilità elettromagnetica / Elektromagnetische compatibiliteit

Angewendete harmonisierte Normen / Harmonised standards applied / Normes d'harmonisation appliquées /  
 Normas armonizadas aplicadas / Norme armonizzate adottate / Toegepaste geharmoniseerde normen

EN ISO 12100 Sicherheit von Maschinen - Allgemeine Gestaltungsleitsätze - Risikobeurteilung und Risikominderung / Safety of Machinery -  
 General principles for design - Risk assessment and risk reduction / Sécurité des machines - Principes généraux de conception -  
 Appréciation du risque et réduction du risque / Seguridad de máquinas - Principios generales de diseño - Evaluación del riesgo y  
 reducción del riesgo / Sicurezza delle macchine - Principi generali di progettazione - Valutazione del rischio e riduzione del rischio  
 / Veiligheid van machines - Algemene beginselen voor ontwerp - Risicobeoordeling en de risicoreductie

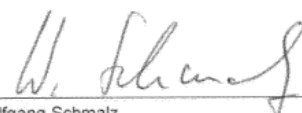
EN 61000-6-3 Elektromagnetische Verträglichkeit - Störaussendung / Electromagnetic Compatibility - Emission /  
 Compatibilité électromagnétique - Norme sur l'émission / Compatibilidad electromagnética - Emisión de interferencias /  
 Compatibilità elettromagnetica - Norma generica sull'emissione / Elektromagnetische compatibiliteit - emissie

EN 61000-6-2 Elektromagnetische Verträglichkeit - Störfestigkeit / Electromagnetic Compatibility - Immunity /  
 Compatibilité électromagnétique - Immunité / Compatibilidad electromagnética - Resistencia a interferencias /  
 Compatibilità elettromagnetica - Immunità / Elektromagnetische compatibiliteit - immunitet

Dokumentationsverantwortlicher / Person responsible for documentation / Responsable de la documentation /  
 Responsable de documentación / Responsabile della documentazione / Verantwoordelijk voor de documentatie

Klaus-Dieter Fanta / J. Schmalz GmbH, Aacher-Str. 29, D - 72293 Glatten

Unterschrift, Angaben zum Unterzeichner / Signature, details of signatory / Signature, indications sur le soussigné /  
 Firma y datos del firmante / Firma, dati concernenti il firmatario / Handtekening, omschrijving van de ondertekenaar

Glatten, 11.07.2013 /   
 Wolfgang Schmalz  
 Geschäftsführer / Managing Director / Directeur / Director Gerente / Direttore responsabile / Directeur



Visit us online:

**Schmalz online – [www.schmalz.com](http://www.schmalz.com)**

These operating instructions were originally written in German and have been translated into English.

We reserve the right to make technical changes. No responsibility is taken for print errors or other types of errors.

All information and specifications are subject to change without notice.

© J. Schmalz GmbH. All rights reserved.



## Schmalz worldwide

### Canada

Tel.+1 905 569 9520  
Fax+1 905 569 8256  
schmalz@schmalz.ca

### China

Tel.+86 21 5109 9933  
Fax+86 21 5039 8882  
schmalz@schmalz.net.cn

### Finland

Tel.+358 9 85746 92  
Fax+358 9 85746 94  
schmalz@schmalz.fi

### France

Tel.+33 (0) 1 6473 1730  
Fax+33 (0) 1 6006 6371  
schmalz@schmalz.fr

### India

Tel.+91 (0) 20 4072 5500  
Fax+91 (0) 20 4072 5588  
[schmalz@schmalz.co.in](mailto:schmalz@schmalz.co.in)

### Italy

Tel.+39 0321 621510  
Fax+39 0321 621714  
schmalz@schmalz.it

### Japan

Tel.+81 45 308 9940  
Fax+81 45 308 9941  
schmalz@schmalz.co.jp

### Netherlands

Tel.+31 (0)74 255 5757  
Fax+31 (0)74 255 5758  
schmalz@schmalz.nl

### Poland

Tel.+48 (0)22 46 04970  
Fax+48 (0)22 87 40062  
schmalz@schmalz.pl

### Russia

Tel.+7 495 9671248  
Fax+7 495 9671249  
schmalz@schmalz.ru

### Spain

Tel.+34 94 4805585  
Fax+34 94 4807264  
schmalz@schmalz.es

### South Korea

Tel.+82 31 8162403  
Fax+82 31 8162404  
schmalz@schmalz.co.kr

### Switzerland

Tel.+41 44 88875 25  
Fax+41 44 88875 29  
schmalz@schmalz.ch

### Turkey

Tel.+90 216 3400121  
Fax+90 216 3400124  
schmalz@schmalz.com.tr

### USA

Tel.+1 919 7130880  
Fax+1 919 7130883  
schmalz@schmalz.us