

## Operating Instructions

# Basic Ejector SLP/SBP

### Note

The Operating instructions were originally written in German. Store in a safe place for future reference. Subject to technical changes without notice. No responsibility is taken for printing or other types of errors.

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J. Schmalz GmbH · Johannes-Schmalz-Str. 1 · 72293 Glatten, Germany · T: +49 7443 2403-0  
schmalz@schmalz.de

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# 1 Important Information

## 1.1 Note on Using this Document

J. Schmalz GmbH is generally referred to as Schmalz in this document.

The document contains important notes and information about the different operating phases of the product:

- Transport, storage, start of operations and decommissioning
- Safe operation, required maintenance, rectification of any faults

The document describes the product at the time of delivery by Schmalz and is aimed at:

- Installers who are trained in handling the product and can operate and install it
- Technically trained service personnel performing the maintenance work
- Technically trained persons who work on electrical equipment

## 1.2 The technical documentation is part of the product

1. For problem-free and safe operation, follow the instructions in the documents.
2. Keep the technical documentation in close proximity to the product. The documentation must be accessible to personnel at all times.
3. Pass on the technical documentation to subsequent users.
  - ⇒ Failure to follow the instructions in these Operating instructions may result in injuries!
  - ⇒ Schmalz is not liable for damage or malfunctions that result from failure to heed these instructions.

If you still have questions after reading the technical documentation, contact Schmalz Service at:

[www.schmalz.com/services](http://www.schmalz.com/services)

## 1.3 Symbols



This symbol indicates useful and important information.

- ✓ This symbol represents a prerequisite that must be met before an action is performed.
- ▶ This symbol represents an action to be performed.
- ⇒ This symbol represents the result of an action.

Actions that consist of more than one step are numbered:

1. First action to be performed.
2. Second action to be performed.

# 2 Fundamental Safety Instructions

## 2.1 Intended Use

The ejector is used for vacuum generation, i.e. for evacuating suction cups for holding payloads or for evacuating other volumes.

The vacuum generated should be monitored in order to detect any issues with vacuum generation.

Neutral gases are approved as evacuation media. Neutral gases include air, nitrogen and inert gases (e.g. argon, xenon and neon).

The product is built in accordance with the latest standards of technology and is delivered in a safe operating condition; however, hazards may arise during use.

The product is intended for industrial use.

Intended use includes observing the technical data and the installation and operating instructions in this manual.

## 2.2 Non-Intended Use

Schmalz accepts no liability for damages caused by non-intended usage of the ejector.

In particular, the following are considered non-intended use:

- In potentially explosive atmospheres
- Use for medical applications
- Filling pressurized containers, driving cylinders, valves or other pressure-operated functional elements

## 2.3 Personnel Qualification

Unqualified personnel cannot recognize dangers and are therefore exposed to higher risks!

The operating company must ensure the following points:



- The personnel must be commissioned for the activities described in these operating instructions.
- The staff must be at least 18 years of age and physically and mentally capable.
- The operating staff have been instructed in the operation of the product and have read and understood the operating instructions.
- Installation, maintenance, and repairs must be carried out only by specialists or by persons who can prove that they have undergone appropriate training.

Applicable for Germany:

A qualified employee is defined as an employee who has received technical training and has the knowledge and experience – including knowledge of applicable regulations – necessary to enable him or her to recognize possible dangers and implement the appropriate safety measures while performing tasks. Qualified employees must observe the relevant industry-specific rules and regulations.

## 2.4 Warnings in This Document

Warnings warn against hazards that may occur when handling the product. The signal word indicates the level of danger.

Signal word	Meaning
 <b>WARNING</b>	Indicates a medium-risk hazard that could result in death or serious injury if not avoided.
 <b>CAUTION</b>	Indicates a low-risk hazard that could result in minor or moderate injury if not avoided.

## 2.5 Residual Risks



### **WARNING**

#### **Noise pollution due to the escape of compressed air**

Hearing damage!

- ▶ Wear ear protectors.
- ▶ The ejector must only be operated with a silencer.



### **WARNING**

#### **Extraction of hazardous media, liquids or bulk material**

Personal injury or damage to property!

- ▶ Do not extract harmful media such as dust, oil mists, vapors, aerosols etc.
- ▶ Do not extract aggressive gases or media such as acids, acid fumes, bases, biocides, disinfectants or detergents.
- ▶ Do not extract liquids or bulk materials, e.g. granulates.



## ⚠ CAUTION

Depending on the purity of the ambient air, the exhaust air can contain particles, which escape from the exhaust air outlet at high speed.

Eye injuries!

- ▶ Do not look into the exhaust air flow.
- ▶ Wear eye protection.



## ⚠ CAUTION

**Vacuum close to the eye**

Severe eye injury!

- ▶ Wear eye protection.
- ▶ Do not look into vacuum openings such as suction lines and hoses.

## 2.6 Modifications to the Product

Schmalz assumes no liability for consequences of modifications over which it has no control:

1. The product must be operated only in its original condition as delivered.
2. Use only original spare parts from Schmalz.
3. The product must be operated only in perfect condition.

## 3 Operating Principle

The ejector is supplied with compressed air via the connector (1). The compressed air flowing through generates a vacuum at the connector (2) and is vented into the environment via the connector (3) (silencer or exhaust pipe).

## 4 Technical Data

### 4.1 General Parameters

Parameter	Description
Material	PA6 GF30, aluminum, brass, POM, NBR, PE
Temperature range	0 to 50° C
Media	Compressed air, oiled or unoled in accordance with ISO 8573-1:2001, class 7 <sup>1</sup> -4-4 <sup>2</sup>

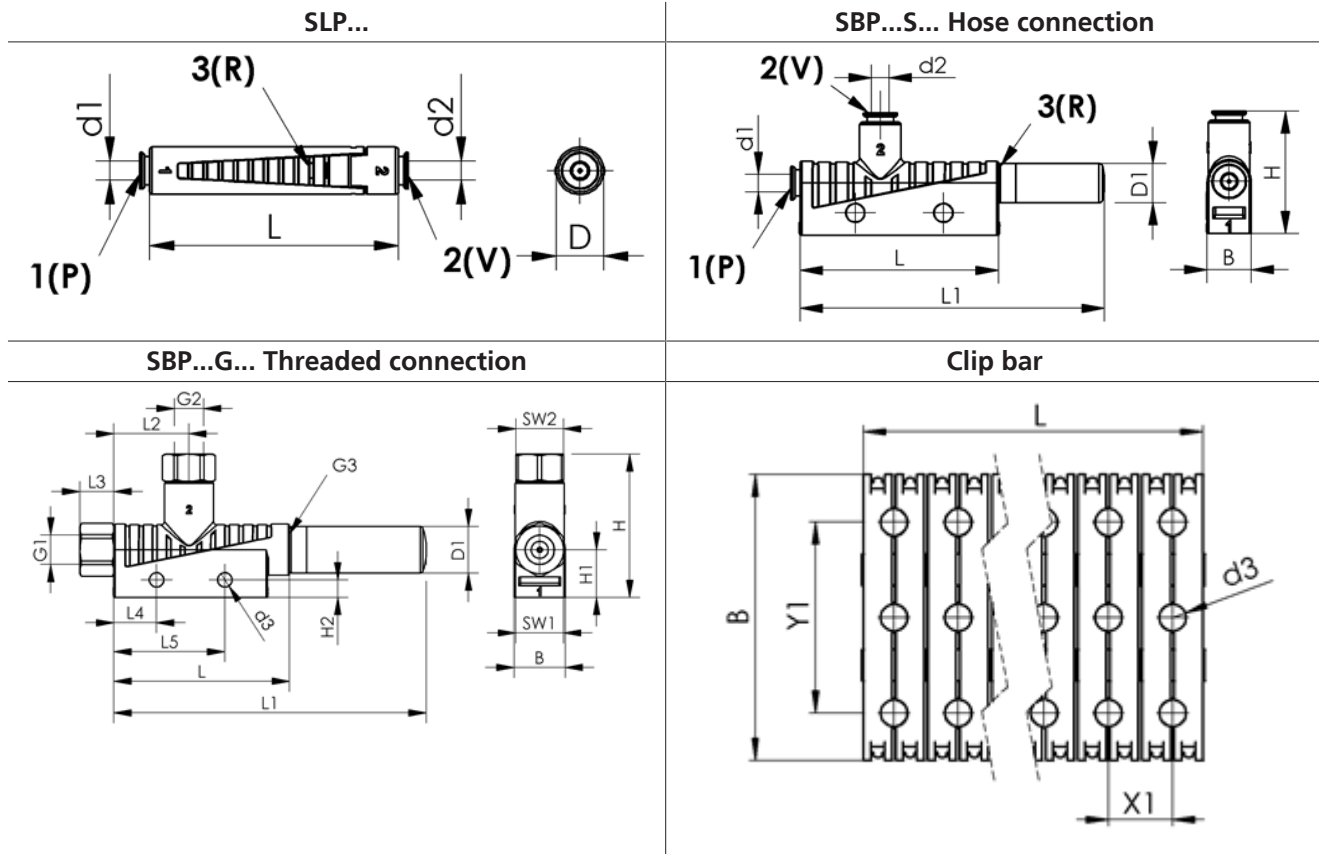
<sup>1</sup> Recommendation class 6 (5 µm)

<sup>2</sup> Max 30 mg/m<sup>3</sup> (2 drops) at a nominal flow rate of qv = 1000 l/min

### 4.2 Performance Data

Type	Nozzle Ø [mm]	Suction rate [NI/min]	Max. vacuum [mbar]	Air consumption [NI/min]	Operating pressure [bar]	Operating pressure [bar]	Weight [kg]	Ejectors per clip bar
SLP 05	0.5	8	830	13	3–6	4.5	5	-
SLP 07	0.7	15	850	25	3–6	4.5	5	-
SBP 05	0.5	7	840	13	3–6	4.5	8	11
SBP 07	0.7	16	850	25	3–6	4.5	8	11
SBP 10	1.0	37	850	48	3–6	4.5	22	7
SBP 15	1.5	70	850	105	3–6	4.5	22	7
SBP 20	2.0	124	850	186	3–6	4.5	50	5
SBP 25	2.5	215	850	311	3–6	4.5	50	5

### 4.3 Dimensions



Type	B	D	D1	d1	d2	d3	G1	G2	G3	H	H1
SLP 05/07...	-	10	-	4	4	-	-	-	-	-	-
SBP 05/07...S...	10	-	9	4	4	4.2	-	-	-	28	12
SBP 05/07...G...	10	-	9	-	-	4.2	M5	M5	M5	31	23
SBP 10/15...S...	15	-	13.5	6	8	4.2	-	-	-	40	14
SBP 10/15...G...	15	-	13.5	-	-	4.2	G1/8"	G1/8"	G1/8"	42	14
SBP 20/25...S...	20	-	-	8	10	4.2	-	-	-	-	-
SBP 20/25...G...	20	-	-	-	-	4.2	G1/4"	G3/8"	G3/8"	-	-
Bar	45	-	-	-	-	2.1	-	-	-	-	-

Type	H2	L	L1	L2	L3	L4	L5	SW1	SW2	X1	Y1
SLP 05/07...	-	57	-	-	-	-	-	-	-	-	-
SBP 05/07...S...	5.2	45	69	18.2	-	12.5	32.5	-	-	-	-
SBP 05/07...G...	5.2	45	69	18.2	5	12.5	32.5	8	8	-	-
SBP 10/15...S...	5.2	51.5	91.5	22	-	12.5	32.5	-	-	-	-
SBP 10/15...G...	5.2	51.5	91.5	22	10	12.5	32.5	14	14	-	-
SBP 20/25...S...	5.2	-	-	-	-	12.5	32.5	-	-	-	-
SBP 20/25...G...	5.2	-	-	-	-	12.5	32.5	-	-	-	-
Bar	-	111.1	-	-	-	-	-	-	-	10.1	30

All specifications are in mm

# 5 Transportation and Storage

## 5.1 Checking the Delivery

The scope of delivery can be found in the order confirmation. The weights and dimensions are listed in the delivery notes.

1. Compare the entire delivery with the supplied delivery notes to make sure nothing is missing.
2. Damage caused by defective packaging or occurring in transit must be reported immediately to the carrier and J. Schmalz GmbH.

# 6 Installation

## 6.1 Installation Instructions

For safe installation, the following instructions must be observed:

- Use only the connectors, mounting holes and attachment materials that have been provided.
- Carry out mounting or removal only when the device is depressurized.
- Pneumatic line connections must be securely connected and attached to the product.
- Ensure that you make all connections correctly and never close them off – danger of bursting!
- When using hose connectors (plug-in couplings and plug-in screw unions), make sure that they are suitable for a vacuum and that the hose engages into the coupling correctly to ensure a vacuum-tight connection.
- In the case of severe contamination, use a suitable filter.
- The ejector should be protected from vibrations and impacts.
- Cut the optional clip bar according to the number of ejectors.

## 6.2 Mechanical Attachment

It may be installed in any position.

### Mounting the ejector SBP onto the clip bar

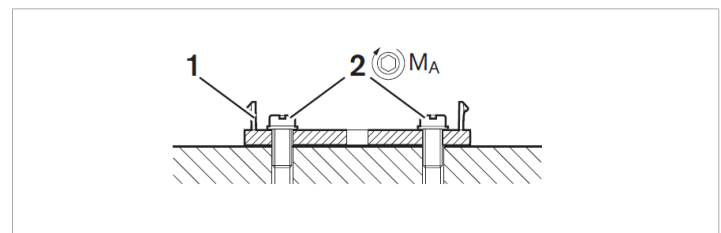
The clip bar (see "accessories") allows quick and easy mounting regardless of size. The number of ejectors that can be installed depends on the size:

Nozzle Ø	05/07	10/15	20/25
Width B [mm]	10	15	20
Number of ejectors	11	7	5

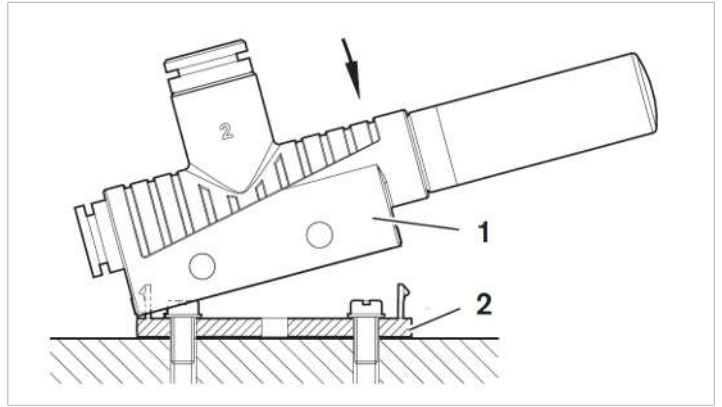
Individual elements can be separated as required.

- ✓ The clip bar, which is shortened according to the number of ejectors, is ready

1. Secure the clip bar (1) to the base with at least 2 fastening screws (2) M4, torque = 0.6 Nm and the corresponding washers.



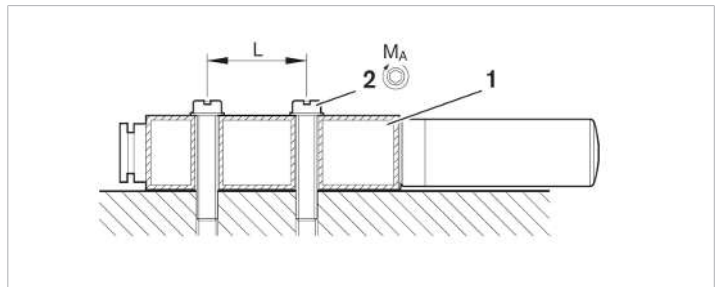
2. Push the ejector (1) onto the clip bar (2) so that it audibly engages.



### Mounting the ejector on a base

- ✓ Ensure that the ejector is completely resting on the base during mounting and is fastened without distortion and tension.

- ▶ Secure the ejector (1) to the base with at least 2 fastening screws (2) (M4, torque = 0.7 Nm) and the corresponding washers.



## 6.3 Pneumatic Connection



### ⚠ CAUTION

#### Compressed air or vacuum in direct contact with the eye

Severe eye injury

- ▶ Wear eye protection
- ▶ Do not look into compressed air openings
- ▶ Do not look into the silencer air stream
- ▶ Do not look into vacuum openings, e.g. suction cups



### ⚠ CAUTION

#### Noise pollution due to incorrect installation of the pressure and vacuum connections

Hearing damage

- ▶ Correct installation.
- ▶ Wear ear protectors.



### 6.3.1 Connecting the Compressed Air and Vacuum

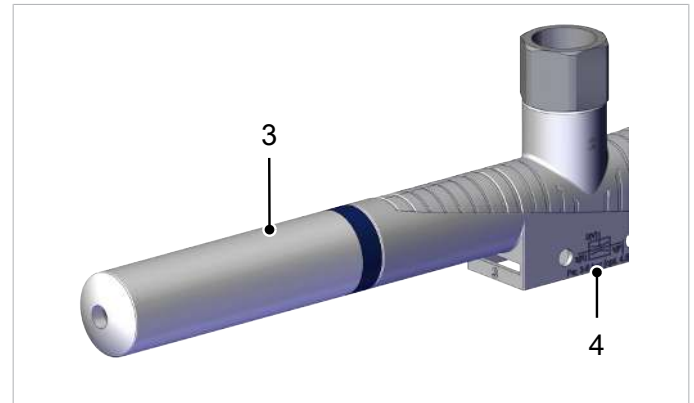
To correspond with the imprint (4), the compressed air connection P is marked with the number 1 on the ejector.

- ▶ Connect the compressed air hose. The max. tightening torque is 0.7 Nm.

To correspond with the imprint (4), the vacuum connection V is marked with the number 2 on the ejector.

- ▶ Connect the vacuum hose. The max. tightening torque is 0.7 Nm.

Do not close silencer R (3).



### 6.3.2 Instructions for the Pneumatic Connection

To ensure problem-free operation and a long service life of the ejector, only use adequately maintained compressed air and consider the following requirements:

- Use of air or neutral gas in accordance with EN 983, filtered 5 µm, oiled or unoled.
  - Dirt particles or foreign bodies in the ejector connections, hoses or pipelines can lead to partial or complete ejector malfunction.
1. Shorten the hoses and pipelines as much as possible.
  2. Keep hose lines free of bends and crimps.
  3. Only use a hose or pipe with the recommended internal diameter to connect the ejector, otherwise use the next largest diameter.
    - On the compressed air side, ensure that the internal diameter has the dimensions required for the ejector to achieve its performance data.
    - On the vacuum side, ensure that the internal diameters have the necessary dimensions for preventing high flow resistance. If the selected internal diameter is too small, the flow resistance and the evacuation times increase and the blow off times are extended.

The following table shows the recommended line cross-sections (internal diameter):

Performance class	Line cross-section (internal diameter) in mm <sup>1)</sup>	
	Pressure side	Vacuum side
05	2	2
07	2	2
10	4	6
15	4	6
20	6	8
25	6	8

<sup>1)</sup> Based on a maximum hose length of 2 m.

- ▶ For longer hose lengths, the cross-sections must also be larger.

## 7 Maintenance

### 7.1 Safety Instructions

Maintenance work may only be carried out by qualified personnel.

- ▶ Create atmospheric pressure in the ejector's compressed air circuit before working on the system!



#### **WARNING**

**Failure to follow the instructions in these Operating instructions may result in injuries!**

- ▶ Read the Operating instructions carefully and observe the contents.

### 7.2 Cleaning the Ejector

1. For cleaning, do not use aggressive cleaning agents such as industrial alcohol, white spirit or thinners. Only use cleaning agents with pH 7–12.
2. Remove dirt on the exterior of the device with a soft cloth and soap suds at a maximum temperature of 60° C. Make sure that the silencer is not soaked in soapy water.

### 7.3 Replacing the Silencer

When the silencer is open, a heavy infiltration of dust, oil, and so on, may contaminate it and reduce the suction capacity. We do not recommend cleaning the silencer because of capillary action in the porous material.

- ▶ If the suction capacity decreases, replace the silencer.

## 8 Warranty

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.

The exclusive use of original spare parts is a prerequisite for the proper functioning of the ejector and for the validity of the warranty.

Wearing parts are not covered by the warranty.

Opening the ejector will damage the "tested" labels. This voids the warranty.

## 9 Spare Parts and Accessories

Type	SBP 05/07...	SBP 10/15...	SBP 20/25...	
Silencer	10.02.01.00539	10.02.01.00540	10.02.01.00719	Spare part
Vacuum filter	10.07.01.00241	10.07.01.00245	10.07.01.00122	Accessories
Vacuum filter	10.07.01.00329	10.07.01.00328	10.07.01.00123	Accessories
Vacuum filter	—	10.07.01.00116	—	Accessories
Clip bar	10.02.01.00511			Accessories
Vacuum/pressure switch	10.06.02.00680			Accessories

## 10 Disposing of the Product

Recover the disassembled parts for recycling or reuse (provided no agreement on return or disposal has been made).

1. Dispose of the product properly after replacement or decommissioning.

2. Observe the country-specific guidelines and legal obligations for waste prevention and disposal.