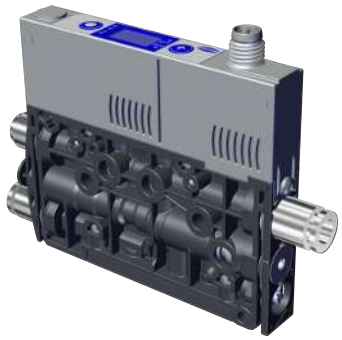

Operating instructions

Mini Compact Valve SCPMi,c,b EV

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.

Published by

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Contents

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

1.3 Other Applicable Documents

Important:

This manual covers all of the differences arising from the use of an external vacuum supply for ejectors.

Depending on the variant, the following operating instructions must also be observed when using a mini compact valve:

- 30.30.01.01961 for the ejector SCPMi
- 30.30.01.01963 for the ejector SCPMc
- 30.30.01.02039 for the ejector SCPMb

1.4 Symbol

This symbol indicates useful and important information.

✓ This symbol represents a prerequisite that must be met prior to an operational step.

‣ 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 valve is designed to monitor and control the externally supplied compressed air and vacuum media for gripping and transporting objects when used in conjunction with suction cups. Depending on the design, the control signals are transmitted directly or via appropriate communication lines.

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

⚠ 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.

NOTE

The vacuum connection is closed

An impermissible pressure rise in the device can lead to damage.

- Do not close the vacuum connection.

Schmalz accepts no liability for damages resulting from non-intended use of Valve. In particular, the following are considered non-intended use:

- Use in potentially explosive atmospheres
- Use in medical applications
- Lifting people or animals
- Evacuation of objects that are in danger of imploding

2.3 Personnel Qualifications

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

1. Task only qualified personnel to perform the tasks described in these Operating instructions.
2. The product must be operated only by persons who have undergone appropriate training.

These Operating instructions are intended for fitters who are trained in handling the product and who can operate and install it.

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
⚠ WARNING	Indicates a medium-risk hazard that could result in death or serious injury if not avoided.
⚠ CAUTION	Indicates a low-risk hazard that could result in minor or moderate injury if not avoided.
NOTE	Indicates a danger that leads to property damage.

2.5 Residual Risks

The mini compact valve emits noise due to the operation of the vacuum and compressed air.

⚠ WARNING

Noise pollution due to the escape of compressed air

Hearing damage!

- Wear ear protectors.

⚠ WARNING

Uncontrolled movements of system components or falling objects caused by incorrect activation and switching of the while persons are in the plant (safety door opened and actuator circuit switched off)

Serious injury

- Ensure that the components are enabled via the actuator voltage by installing a potential separation between the sensor and actuator voltage.
- Wear the required personal protective equipment (PPE) when working in the danger zone.

⚠ 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.

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 Product Description

3.1 Applying Suction to the Workpiece/Part

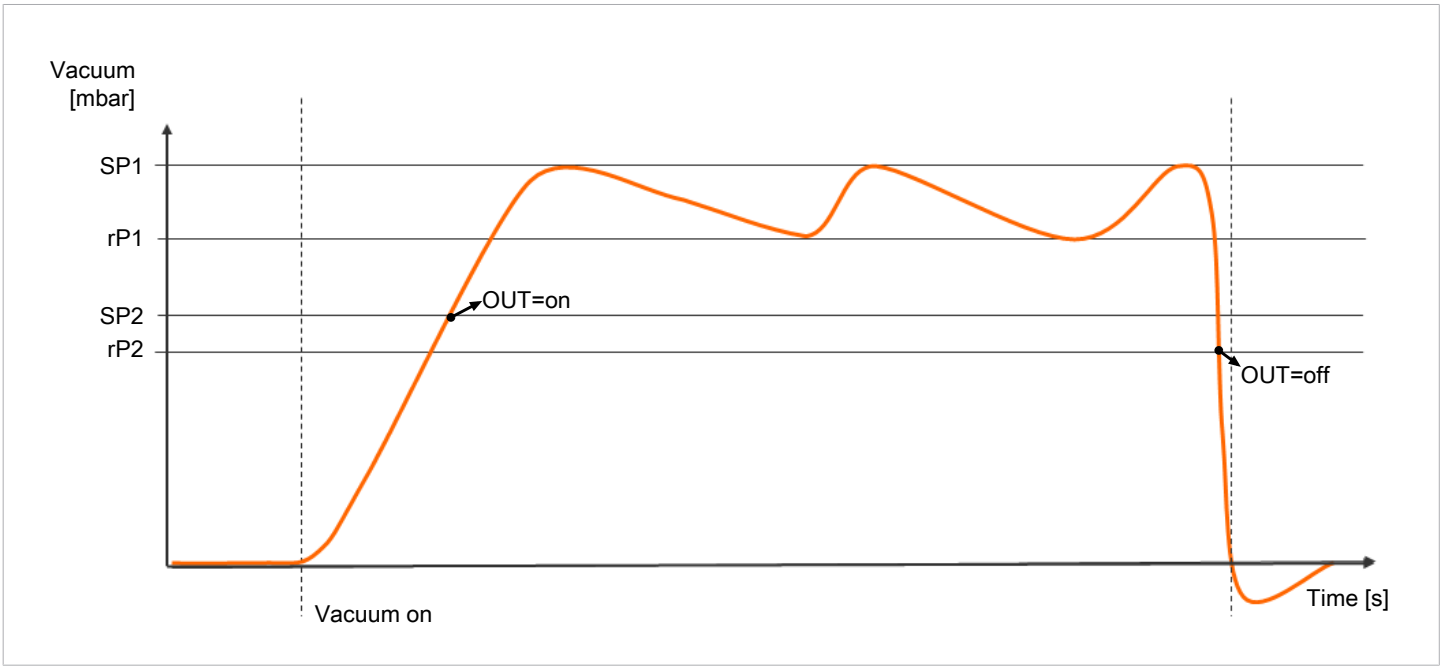
The valve is designed for vacuum handling of airtight parts in combination with suction systems. The vacuum is supplied externally and the air is sucked in through the vacuum connection.

The vacuum valve is opened or closed using the suction command:

- In the NO (normally open) variant, the valve is closed when the suction signal is received.
- In the NC (normally closed) variant, the valve is opened when the suction signal is received.

A sensor integrated in types "i" and "c" detects the vacuum present. The exact vacuum level is shown on the display and can be read from the IO-Link process data for the "i" variant.

The diagram below shows the vacuum curve when the air control function is activated:



The valve has an integrated control function and automatically regulates the vacuum in suction mode:

- The electronics switch the vacuum transmission off as soon as the vacuum limit value set for switching point SP1 is reached.
- When objects with airtight surfaces are picked up, the integrated non-return valve prevents the vacuum from dropping quickly.
- If leaks cause the system vacuum to drop below the limit value configured for the switching point rP1, the vacuum transmission is switched back on.
- The OUT output is set once a workpiece is picked up securely, based on the vacuum value. This enables the further handling process.

3.2 Depositing the Workpiece/Part (Blowing Off)

In blow off mode, the vacuum circuit of the valve is supplied with compressed air. This ensures that the vacuum drops quickly, allowing the workpiece to be quickly deposited.

During blow off, [-FF] is shown for versions with a display.

The valve provides three blow-off modes for selection:

- Externally controlled blow off
- Internally time-controlled blow off
- Externally time-controlled blow-off

3.3 Operating Modes

If the valve is connected to the supply voltage, it is ready for operation. This is the normal operating mode, in which the valve is operated by the system controller.

The options for parameterizing the valve are very different depending on the version.

During the setup process, the user can:

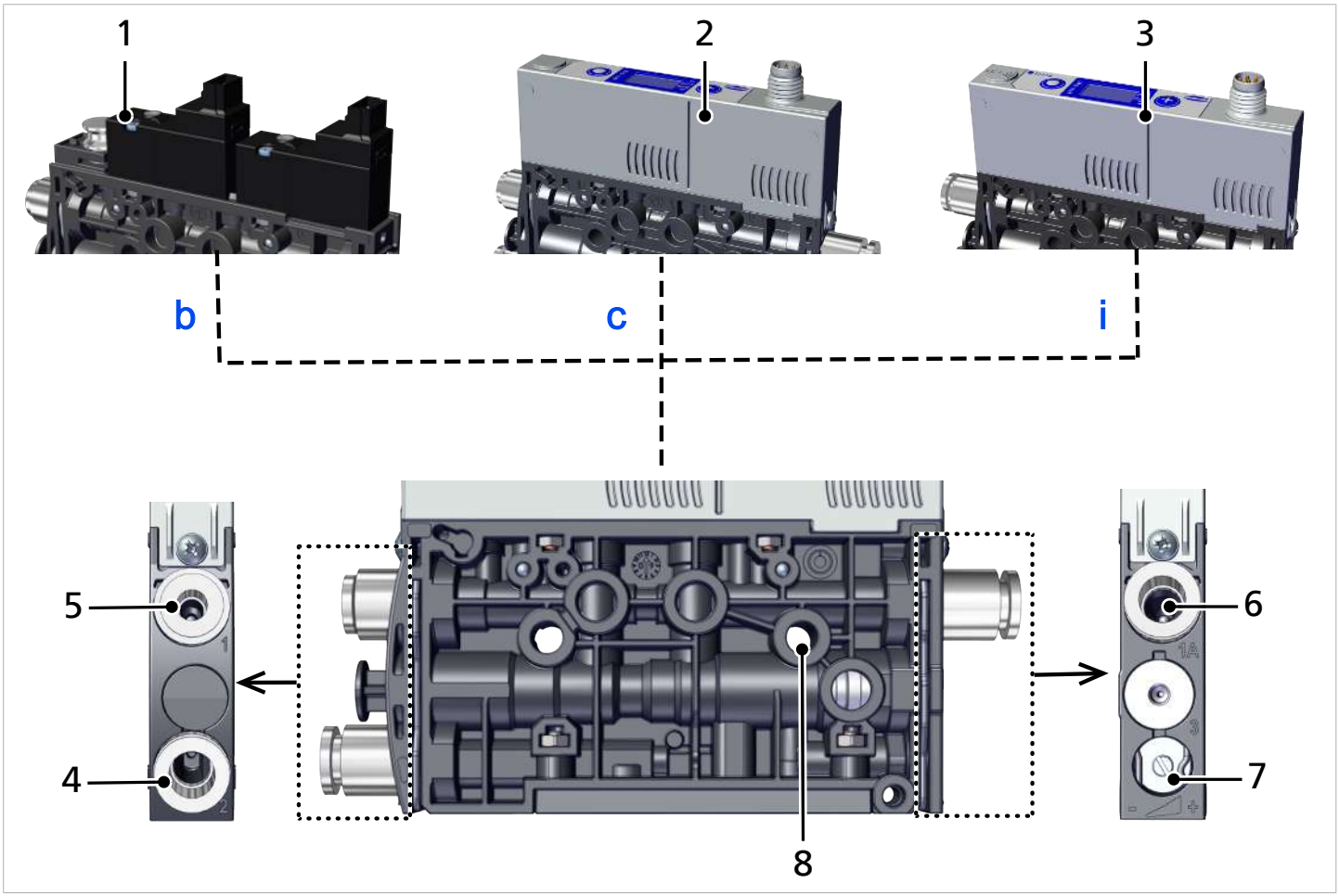
- Control the valves manually using the manual auxiliary actuation for type "b"
- Use "Manual operation" mode for type "c"
- Use "Setup" mode (only via IO-Link) and "Manual operation" for type "i"

3.4 Valve Designation

The breakdown of the item designation (e.g. SCPMc EV S09 NC M8-6 PNP ABA) is as follows:

Feature	Variants	
Type	SCPM	
Version	Basic: b Controlled: c Intelligent: i	
External vacuum supply	EV	
Fluid connector	S09 (push-in, 4/2, 6/4 2x)	G09 (M5 female, M7 female 2x)
Suction valve control	NO (normally open), sucks when no voltage is applied NC (normally closed), does not suck when no voltage is applied	
Electrical connector	M8 plug, 6-pole	
Switch function	PNP (switches to plus) NPN (switches to minus)	
Individual configuration code	The 3-digit code "AAA" uniquely describes a mini compact valve.	

3.5 Valve Structure



1	Type “b” control unit	5	Compressed air connector (marking 1)
2	Type “c” control unit	6	External vacuum connector (marking 1A)
3	Type “i” control unit	7	Valve screw for blow off flow rate
4	Vacuum connection (marking 2)	8	2x mounting hole

4 Technical Data

4.1 Performance Data

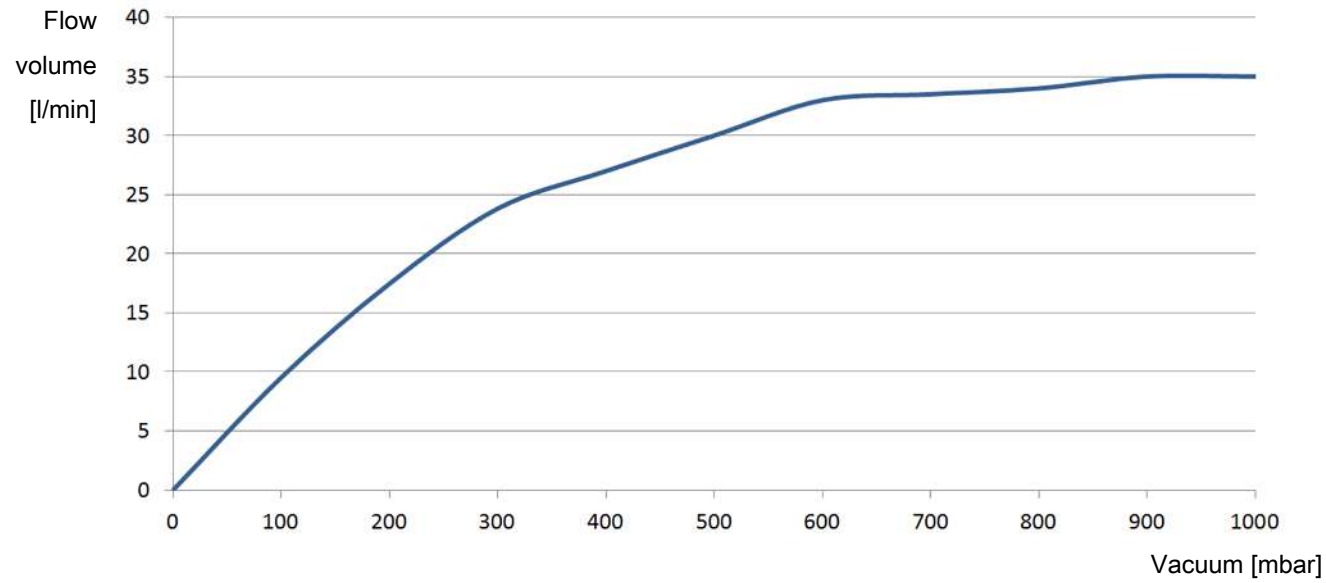
Parameter	Value with external vacuum generation
Degree of evacuation [%]	Depending on the external vacuum generation
Air consumption for blow off [l/min]	10
Pressure range [bar]	4 to 6
Recommended internal diameter of compressed air hose [mm] [1)]	2
Recommended internal diameter of vacuum hose [mm] [1)]	4

[1)] For max. length of 2 m

4.2 Maximum Flow Capacity

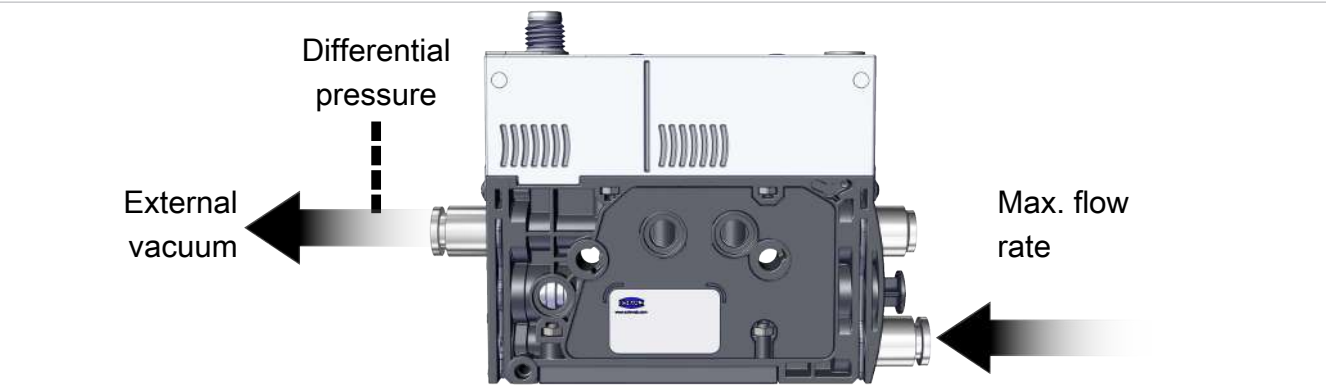
The max. flow volume of the mini compact valve depends on:

- The rated power of the externally connected vacuum generator
- The number of valves to be supplied when used in the terminal



Required differential pressure	Maximum flow volume
-600 mbar	33 l/min [1)]

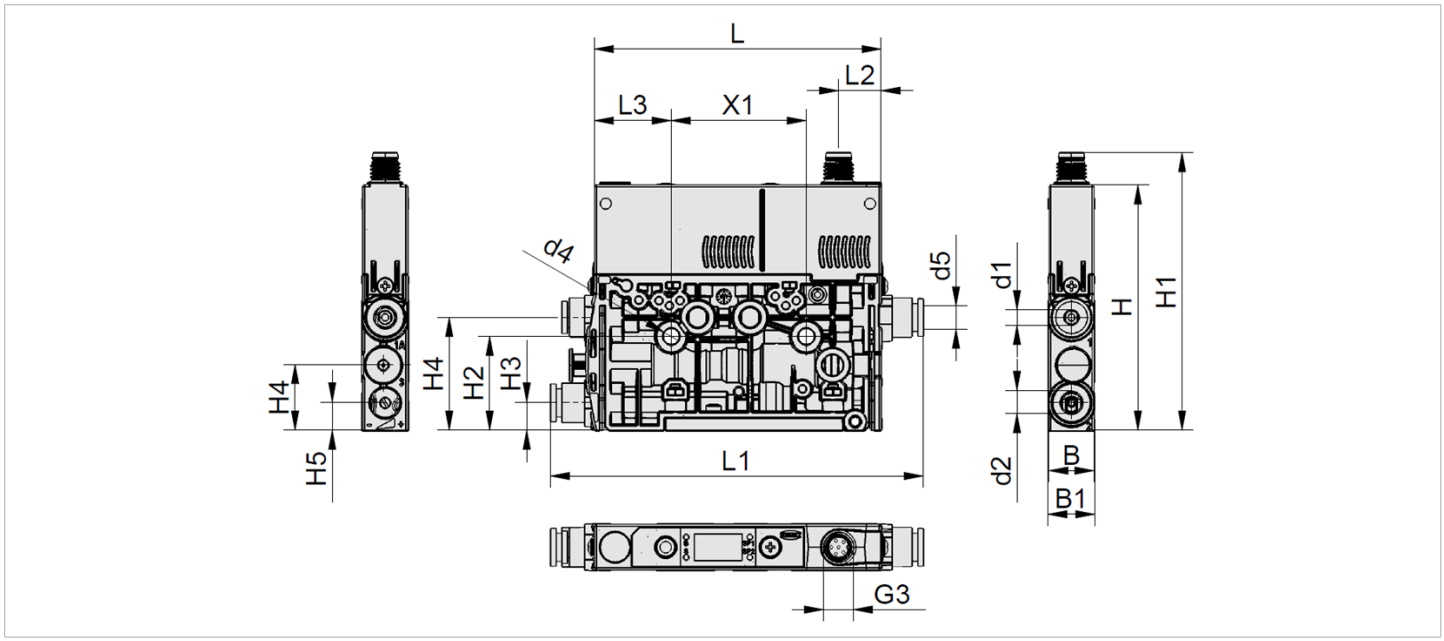
[1)] If several mini compact valves are used in the terminal, the maximum flow volume per additional open suction circuit is reduced by approx. 5%. With five mini compact valves or more, both sides of the terminal must be supplied.



The recommended rated power of the external vacuum generator is 125 l/min per open suction circuit or per mini compact valve (max 8 units).

4.3 Dimensions

Illustration showing the SCPMc EV as an example



G3	L	B	H	L1	L2	L3	X1	H1	H2
M8x1 male thread	76.5	12	65.3	99.4	11.4	20.5	36	73.9	24.95

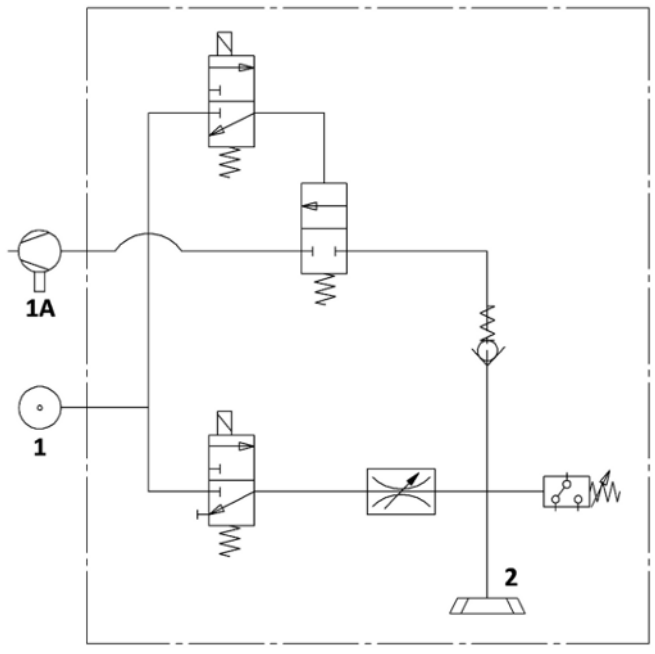
H3	H4	H5	H6	d1	d2	d5	d3	d4	B1
7.5	30	7.5	17.5	Depending on the particular valve, see chapter 3.3			9	4.3	12.5

All specifications are in mm

4.4 Pneumatic Circuit Diagram

Legend:	
NC	Normally closed
1	Compressed air connection
2	Vacuum connection
1 A	Connection to external vacuum generation

Circuit diagram



5 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

⚠ CAUTION

Improper installation or maintenance

Personal injury or damage to property

- During installation and maintenance, make sure that the product is disconnected and depressurized and that it cannot be switched on again without authorization.

For safe installation, the following instructions must be observed:

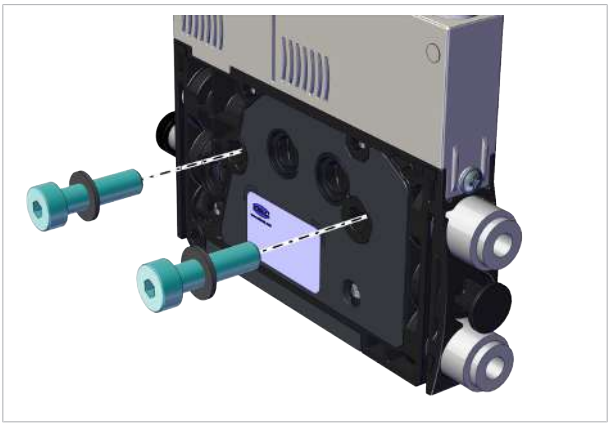
- Use only the connectors, mounting holes and attachment materials that have been provided.
- Mounting and removal must be performed only when the device is unpressurized and disconnected from the mains.
- Pneumatic and electrical line connections must be securely connected and attached to the product.

6.2 Mounting

The valve may be installed in any position.

The valve is usually mounted using the holes on the side. Alternatively, it can be mounted using a DIN rail or a mounting bracket Accessories:

- There are two 4.4 mm through-holes for mounting the valve. Use screws at least 20 mm in length. Use washers if you are using fastening screws M4 for the mounting process. The valve is to be fixed with at least 2 screws, the maximum tightening torque is 1 Nm.

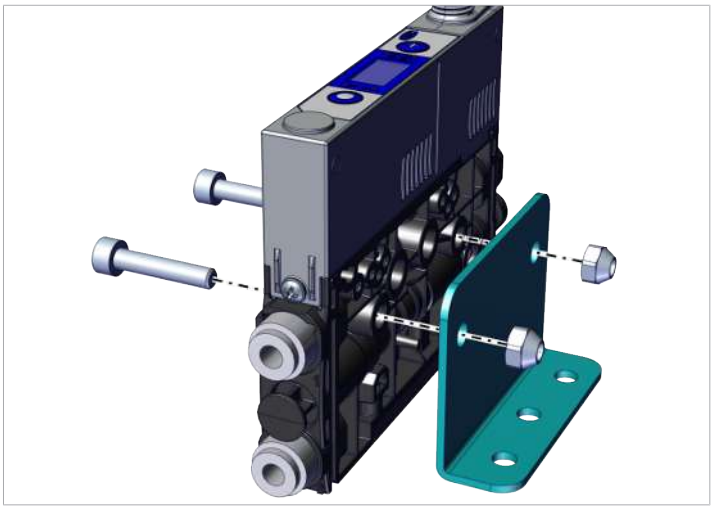


6.2.1 Mounting on a DIN Rail (Optional)

The product can also be mounted on a TS 35-type DIN rail using the mounting kit.

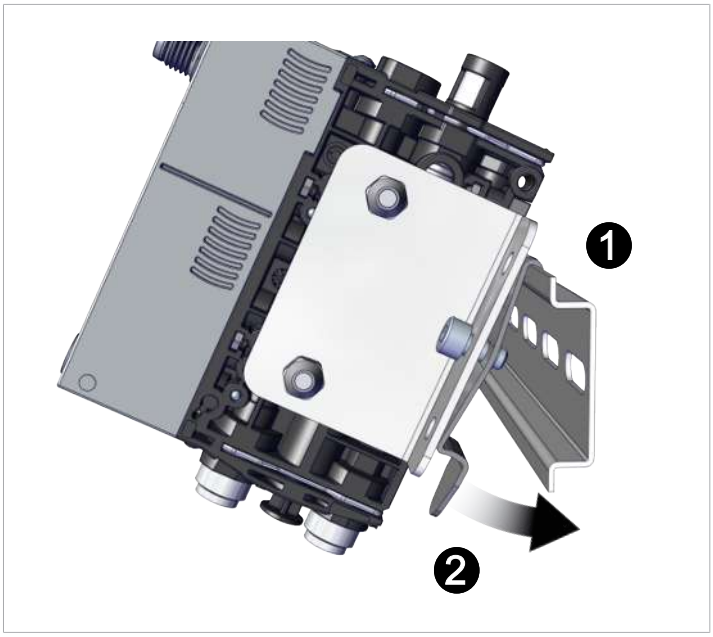
✓ The mounting kit is on-hand.

1. Attach the bracket in the correct position on the product with a tightening torque of 1 Nm.



2. Loosely screw the clamps onto the bracket in the correct position.

3. Attach the assembly with the bracket onto the DIN rail ❶ and press it onto it ❷.



4. Tighten the screw to tighten the clamp so that the assembly is fastened on the DIN rail.

The figures shown for the product may deviate from the customer's version because they serve as examples of different versions of the mini compact ejectors or valves here.

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 vacuum openings, e.g. suction cups

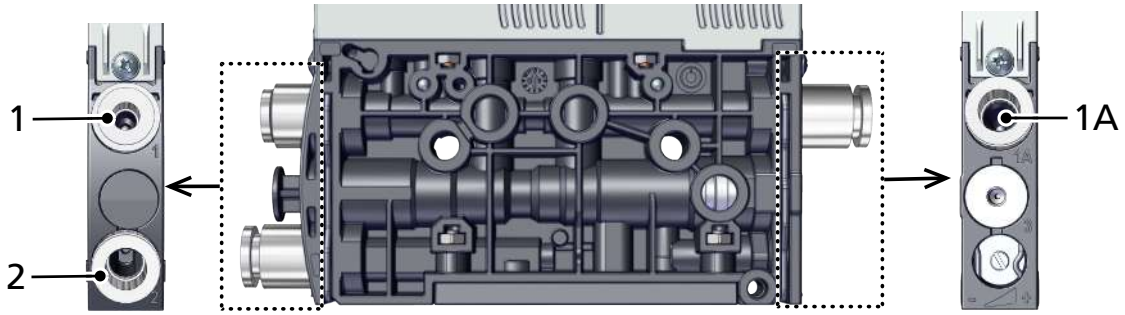
⚠ CAUTION

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



- Connect the compressed air hose to the plug connector marked with number 1 or to the thread.
- Connect the vacuum hose (suction cup) to the plug connector marked with number 2 or to the thread.

The valve has an additional vacuum connection for external vacuum generation (EV).

The hose size or the thread on the connector has the following dimensions:

- Push-in: 6/4 or
- Female thread M7

▸ Connect the compressed air hose for external vacuum generation to the plug connector marked 1A or to the thread.

For threaded connectors, the maximum tightening torque is 1 Nm.

6.3.2 Instructions for the Pneumatic Connection

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

- Use air or neutral gas in accordance with EN 983, filtered to 5 µm, unoiled.
- Dirt particles or foreign bodies in the valve connections, hoses or pipelines can lead to partial or complete malfunction.

1. Shorten the hoses and pipelines as much as possible.
2. Keep hose lines free of bends and crimps.
3. Use only pipes or hoses with the recommended inner diameter to connect the valve:

Use hoses with sufficient internal diameter...	
on the compressed air side to ensure that the valve achieves its performance data.	2 mm
on the vacuum side to avoid high flow resistance. If the internal diameter is too small, the flow resistance and the evacuation times increase and the blow off times are extended.	4 mm

Internal diameters are based on a maximum hose length of 2 m.

6.4 Electrical Connection

NOTE

Change of output signals when product is switched on or plug is connected

Personal injury or damage to property

▸ Electrical connection may be performed only by specialists who can evaluate the effects of signal changes on the overall system.

NOTE

Incorrect power supply

Destruction of the integrated electronics

▸ Operate the product using a power supply unit with protected extra-low voltage (PELV).

▸ The system must incorporate safe electrical cut-off of the power supply in compliance with EN60204.

▸ Do not connect or disconnect the connector under tension and/or when voltage is applied.

The electrical connection supplies the valve with power and communicates with the controller of the higher-level machine using defined outputs for types "c" and "i."

The connection is established in accordance with the explanations in the applicable operating instructions (> See ch. 1.3 Other Applicable Documents, p. 3).

7 Operation

7.1 General Preparations

⚠ 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.

Always carry out the following tasks before activating the system:

1. Before each start of operations, ensure that the safety features are in perfect condition and fully functional.
2. Check the device for visible damage and deal with any problems immediately (or notify the supervisor).
3. Ensure that only authorized persons are present in the working area of the machine or system in order to prevent any hazard from switching on the machine.

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 system and for the validity of the warranty.

Wearing parts are not covered by the warranty.

9 Spare Parts

Maintenance work may only be carried out by qualified personnel.

⚠ WARNING

Risk of injury due to incorrect maintenance or troubleshooting

- Check the proper functioning of the product, especially the safety features, after every maintenance or troubleshooting operation.

The following list contains the primary spare parts.

Designation	Part no.
NO variant suction valve for "c" and "i"	10.05.01.00394
NO variant suction valve for "b"	10.05.01.00396
NC variant suction valve for "c" and "i"	10.05.01.00382
NC variant suction valve for "b"	10.05.01.00395
NC variant blow-off valve for "c" and "i"	10.05.01.00382
NC variant blow-off valve for "b"	10.05.01.00395

When tightening the fastening screws on the valves, observe the maximum tightening torque of 0.1 Nm.

10 Accessories

Designation	Part no.	Note
Connection cable, ASK WB-M8-6 2000 K-6P	21.04.05.00488	M8 socket, 6-pole; length: 2000 mm; open cable end, 6-pole; 90° angle
Connection cable, ASK WB-M8-6 2000 S-M12-5	21.04.05.00489	M8 socket, 6-pole; cable length: 2000 mm; M12 plug, 5-pole; 90° angle
Connection cable, ASK B-MIC10 3000 K-2P	21.04.06.00086	Vent Micro10 mm socket; cable length: 3000 mm, cable, 2-pole
Connection cable ASK JST-5 2000 K-5P	21.04.05.00779	JST plug, 5-pole, cable length: 2000 mm, open cable end, 5-pole
Connection distributor ASV SCPMi B-M8-6 2xS-M12-4	10.02.02.05602	For: SCPMi, M8 socket, 6-pole, connection 2: 2x M12 plug, 4-pole; length: 1000 mm
Plug-in screw union M5 STV-GE M5-AG 4	10.08.02.00468	—
Plug-in screw union M7 STV-GE M7-AG 6	10.08.02.00469	—
DIN rail mounting kit SET SCPM MOUNT1	10.02.02.05805	For TS 35-type DIN rail
Mounting bracket BEF-WIN 15x50x36.1 1.5 SCPM	10.02.02.05824	—
Exhaust air set ABL-SET SCPMi/c/b	10.02.02.06080	Plug-in screw union and thread adapter
Thread adapter (assembled) ADP-G M7-IG 10.8x7.9 SCPMi/c/b	10.02.02.05522	—
Thread adapter (assembled) ADP-G M5-IG 10.5x8.6 SCPMi/c/b	10.02.02.05643	For: mini compact eject. SCPMi/c/b, thread G1: M5 female, outside diameter 10.5 mm, length 8.6 mm
Thread adapter (assembled) ADP-G M7-IGx15 SCPMi/c/b	10.02.02.05641	For: mini compact eject. SCPMi/c/b, thread M7 female, length 15 mm

11 Declarations of Conformity

11.1 EU Declaration of Conformity

The manufacturer Schmalz confirms that the product Valve described in these operating instructions fulfills the following applicable EU directives:

2006/42/EC	Machinery Directive
2014/30/EU	Electromagnetic Compatibility
2011/65/EU	Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment

The following harmonized standards were applied:

EN ISO 12100	Safety of machinery — General principles for design — Risk assessment and risk reduction
EN 61000-6-2+AC	Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments
EN 61000-6-3+A1+AC	Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments
EN 50581	Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

The EU Declaration of Conformity valid at the time of product delivery is delivered with product or made available online. The standards and directives cited here reflect the status at the time of publication of the operating and assembly instructions.

11.2 UKCA Conformity

The manufacturer Schmalz confirms that the product described in these operating instructions fulfills the following applicable UK regulations:

2008	Supply of Machinery (Safety) Regulations
2016	Electromagnetic Compatibility Regulations
2012	The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations

The following designated standards were applied:

EN ISO 12100	Safety of machinery — General principles for design — Risk assessment and risk reduction
EN 61000-6-2+AC	Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments
EN 61000-6-3+A1+AC	Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments
EN 50581	Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

The Declaration of Conformity (UKCA) valid at the time of product delivery is delivered with the product or made available online. The standards and directives cited here reflect the status at the time of publication of the operating and assembly instructions.