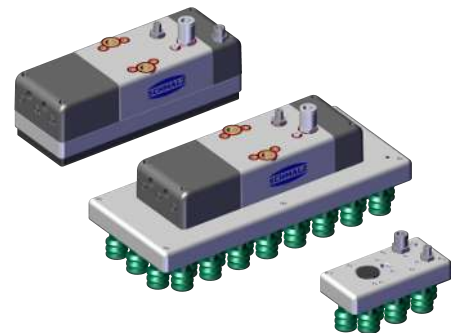


技術資料 Technische Documentatie **Documentation**
Documentação técnica Documentación técnica Documentazione tecnica
Technische Dokumentation Technical Documentation Техническая документация
Documentazione tecnica Technische documentatie
Техническая документация **Teknik Doküman** 技术资料
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Gripping System FQE

Assembly Instructions

Note

The Assembly 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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1 Important Information

1.1 Warranty and Liability

J. Schmalz GmbH, as a supplier and manufacturer of vacuum technology, takes no responsibility for the function of the product described below in a specific process.

The exact application parameters and the individual environment are decisive factors for selecting the right components.

The specifications for our products are based on our current technical knowledge and experience, as well as the available literature. We encourage you to test the products under the specific conditions that apply to your application purposes, and we would be glad to use our experience to assist you.

The packaging material, the goods that are packaged, the fill level, porosity, surface condition, center of gravity or the air content of the workpiece influence the entire handling process.

Following functional testing, different suction cup sizes, additional suction cups, a higher suction rate or modifications to the configuration may be necessary.

Therefore, J. Schmalz GmbH accepts no liability and excludes all legal claims for damages.

The products and the configurator are subject to technical changes or further development without notice.

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 gripper and for the validity of the warranty.

Wearing parts are not covered by the warranty.

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 Assembly instructions may result in life-threatening 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 Note on Using this Document

J. Schmalz GmbH is generally referred to as Schmalz in these Assembly instructions.

These Assembly instructions contain 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 Assembly instructions describe the product at the time of delivery by Schmalz.

1.4 Warnings in this document

Warnings warn against hazards that may occur when handling the product. There are four levels of danger that you can recognize by the signal word.

| Signal word | Meaning |
|-------------|--|
| DANGER | Indicates a high-risk hazard which, if not avoided, will result in death or serious injury. |
| WARNING | Indicates a medium-risk hazard which, if not avoided, could result in death or serious injury. |
| CAUTION | Indicates a low-risk hazard which, if not avoided, could result in minor or moderate injury. |
| NOTE | Indicates a danger that leads to property damage. |

1.5 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.

1.6 Type Plate

The type plate is permanently attached to the product and must always be clearly legible.

The type plate contains the following data:

- Product key
- Product service number
- Order number
- QR code – access to the Schmalz app
- ▶ Please specify all the information above when ordering replacement parts, making warranty claims or for any other inquiries.

1.7 Other Applicable Documents

Depending on the configuration of the gripper FQE, the following operating instructions must also be observed:

- The operating instructions for the ejector nozzle SEP
- The operating instructions for the vacuum switch VSi

2 Fundamental Safety Instructions

2.1 Intended Use

The product described below is a universal gripper and is therefore not limited to a specific application. Due to its small size, low weight and energy efficiency, the gripper is suitable for applications on small robots or even for human-robot collaboration applications.

The system must be operated only at the supply voltage specified for the components.

The load must only be vacuum-gripped in the position defined in advance or on initial set-up of the product.

Ensure that the load cannot slide or tip over during all phases of operation.

Use only the connections, mounting holes and attachment materials that have been provided.

The gripping system 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 maximum lift capacity must not be exceeded (> See *ch. Technical Data*).

2.2 Non-Intended Use

Schmalz accepts no liability for damage caused by the use of the gripper for purposes other than those described under Intended Use.

Non-intended use includes the following:

- Lifting people or animals
- Storing loads while picked up
- Supporting the lifting process by applying external forces
- Applying suction to building components, equipment or supporting surfaces.
- Applying suction to bulk materials (e.g. granulates)
- Evacuation of objects that are in danger of imploding
- Use in potentially explosive atmospheres
- Freeing building components or immovable equipment

2.3 Danger Zone

Persons in the danger zone of the gripper may suffer life-threatening injuries.

Gripper operating modes

- Automatic operation on the industrial robot or gantry
- Collaborative operation on the lightweight robot (cobot)

For both operating modes, the system integrator must carry out a risk assessment of the entire system and define the danger zone precisely. In doing so, country-specific provisions and regulations must be observed.

Automatic operation on the industrial robot or gantry

- During automatic operation of the handling system, no persons or animals may be present in the danger zone.
- In other operating modes, ensure that no unauthorized persons or animals are present in the danger zone.
- Ensure that collisions with the surrounding environment and objects do not occur to prevent the load from breaking off.

During automatic operation of the handling system, the danger zone must be secured to prevent access by persons (protective barrier or sensor system).

The danger zone of the gripper includes the following areas:

- The area directly below the gripper and load.

- The area immediately surrounding the gripper and load.
- The working area of the automatic handling system.

2.4 Environmental and Operating Conditions

The gripping system must **not** be operated under the following conditions:

- In potentially explosive atmospheres
- In environments with acidic or alkaline media



CAUTION

Dangerous gases, vapors or dusts are sucked in and dispersed by the vacuum generator.

Difficulty breathing.

- ▶ Before commencing work, ensure that the ambient air does not contain any hazardous substances.
- ▶ Make sure that there are no hazardous substances on the load that can be sucked in.
- ▶ If the ambient air is dusty, use a dust filter (particle size max. 5 µm).



CAUTION

Blockage of the vacuum system from sucking in liquids

Risk of injury from falling load!

- ▶ Do not pick up liquids or bulk materials.
- ▶ Observe the vacuum display.
- ▶ If the suction of liquids cannot be avoided, use a water separator (contact Schmalz service).

The gripping system must be operated only under the following conditions:

- The environment must be free from humidity, moisture, dirt, dust, oil or other climatic conditions that may reduce friction levels.
- The gripping system must be sufficiently dimensioned for the loads to be lifted.
- ▶ If in doubt, consult Schmalz before the start of operations.

2.5 Personnel Qualifications

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 instructions.
- The staff must be at least 18 years of age and physically and mentally capable.
- The product must be operated only by persons who have undergone appropriate training.
- Personnel must receive regular safety briefings (frequency as per country-specific regulations).
- Work on electrical equipment must be carried out only by qualified electrical specialists.
- Installation, maintenance, and repairs must be carried out only by specialists from J. Schmalz GmbH or by persons who can prove that they have undergone appropriate training at Schmalz.

The following target groups are addressed in these instructions:

- Mechanical and electrical specialists who are responsible for installing, troubleshooting and maintaining the product.

The operator of the system must comply with country-specific regulations regarding the age, ability and training of the personnel.

Valid 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 personnel must observe the pertinent industry-specific rules and regulations.

2.6 Personal Protective Equipment

To avoid injury, always use appropriate protective equipment that is suitable for the situation. The protective equipment must meet the following standards:

- Protective work shoes in safety class S1 or higher
- Sturdy work gloves in safety category 2133 or higher
- Industrial helmet
- Ear protection class L or higher
- Eye protection class F
- Hair net
- Closely fitting clothing

2.7 Technical Condition

If the product is operated while in a defective state, safety and function will be impaired.

- Only operate the gripper when in perfect working order as originally delivered.
- Follow the maintenance schedule.
- Use only original spare parts from Schmalz.
- If the operating behavior changes, check the gripper for faults. Rectify faults immediately!
- Do not independently modify or alter the gripper.
- Safety features must not be disabled under any circumstances.

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

2.8 Responsibility of the Integrator

The integrator is obligated to perform a risk assessment for the environmental conditions at the installation location.

The integrator is also responsible for third parties in the working area of the gripper. The operating company must ensure that they have the appropriate qualifications and skills.

- Ensure that regular breaks are taken.
- Ensure that the gripper cannot be started up by unauthorized persons.
- During maintenance or repair work, ensure that the gripper cannot be operated.
- Clearly define the responsibilities for the various activities performed with the gripper.
- Ensure that these responsibilities are observed.
- When handling unfamiliar loads, carry out tests where necessary to ensure safe operation:
 - The load is sufficiently rigid that it cannot be damaged during handling.

2.9 Country-Specific Regulations for the Operating Company

1. Observe the country-specific regulations regarding accident prevention, safety testing and environmental protection.
2. The gripper is to be used in combination with an automated handling system (gantry/robot). Ensure that the appropriate country-specific regulations and safety regulations are adhered to.

3 Product Description

3.1 Description of the Gripper

Gripping systems use a vacuum to lift defined products. One or more workpieces of different sizes can be lifted. The gripping system achieves its maximum load-bearing capacity when all the suction cups or the sealing foam are placed on an airtight workpiece with a smooth surface.

The handling system is responsible for the motion in the various axes (robot/gantry). The gripper is connected to the handling system through the integrated threaded bushes or special robot flanges (> See *ch. Accessories*).

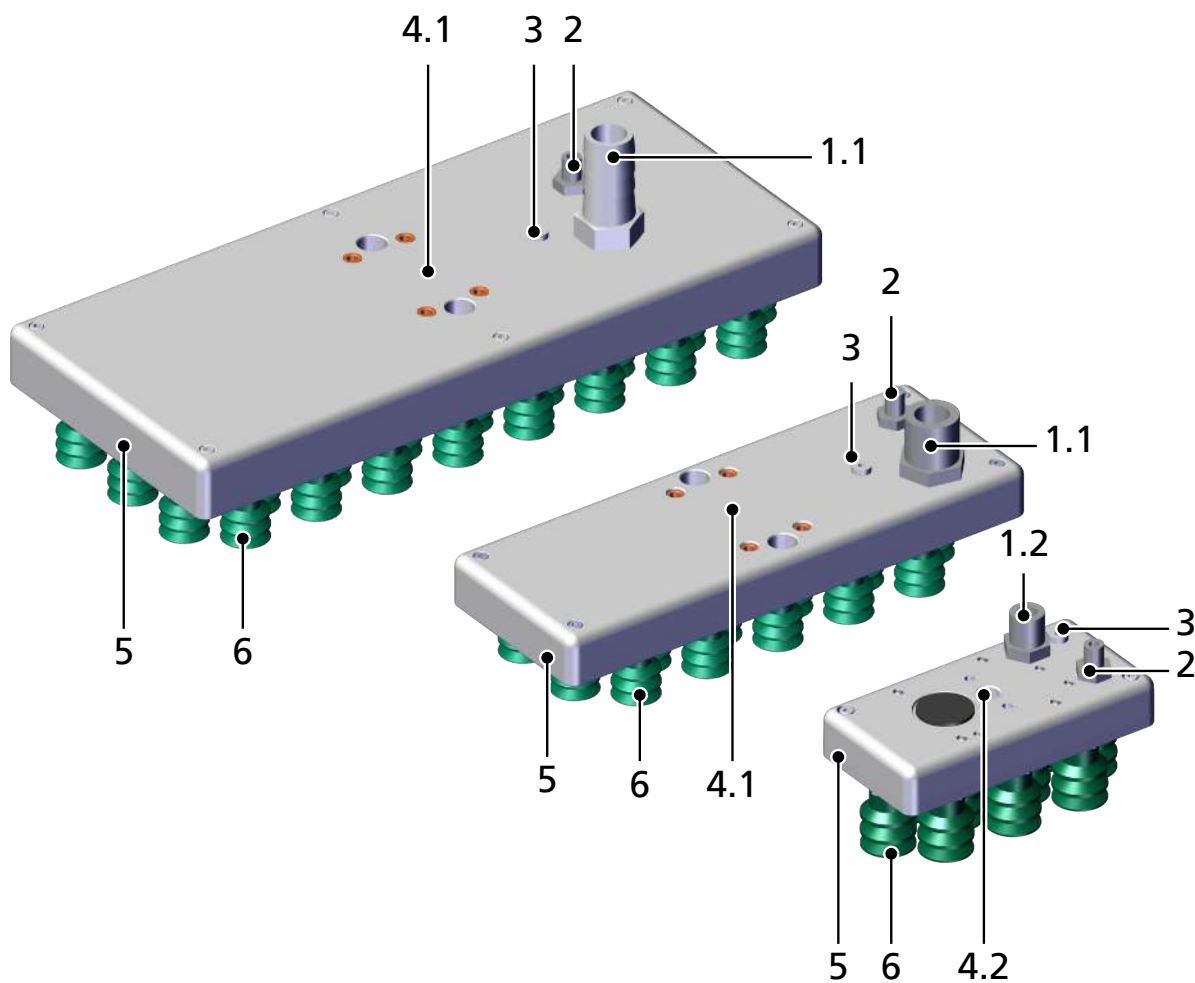
The gripper FQE is available in three basic technical designs:

- Version FQE ... M, for an external vacuum supply
- Version FQE ... Xb, with internal vacuum generation
- Version FQE ... Xc, with internal vacuum generation and control of "suction" and "blow-off"

Each gripper is individual thanks to its customized design. Therefore, the grippers differ in detail in terms of the size of the suction area, the number of vacuum generators (SEP), the arrangement and design of the suction cups or suction cells in the sealing plate, the flow restrictors, etc.

3.2 FQE ... M

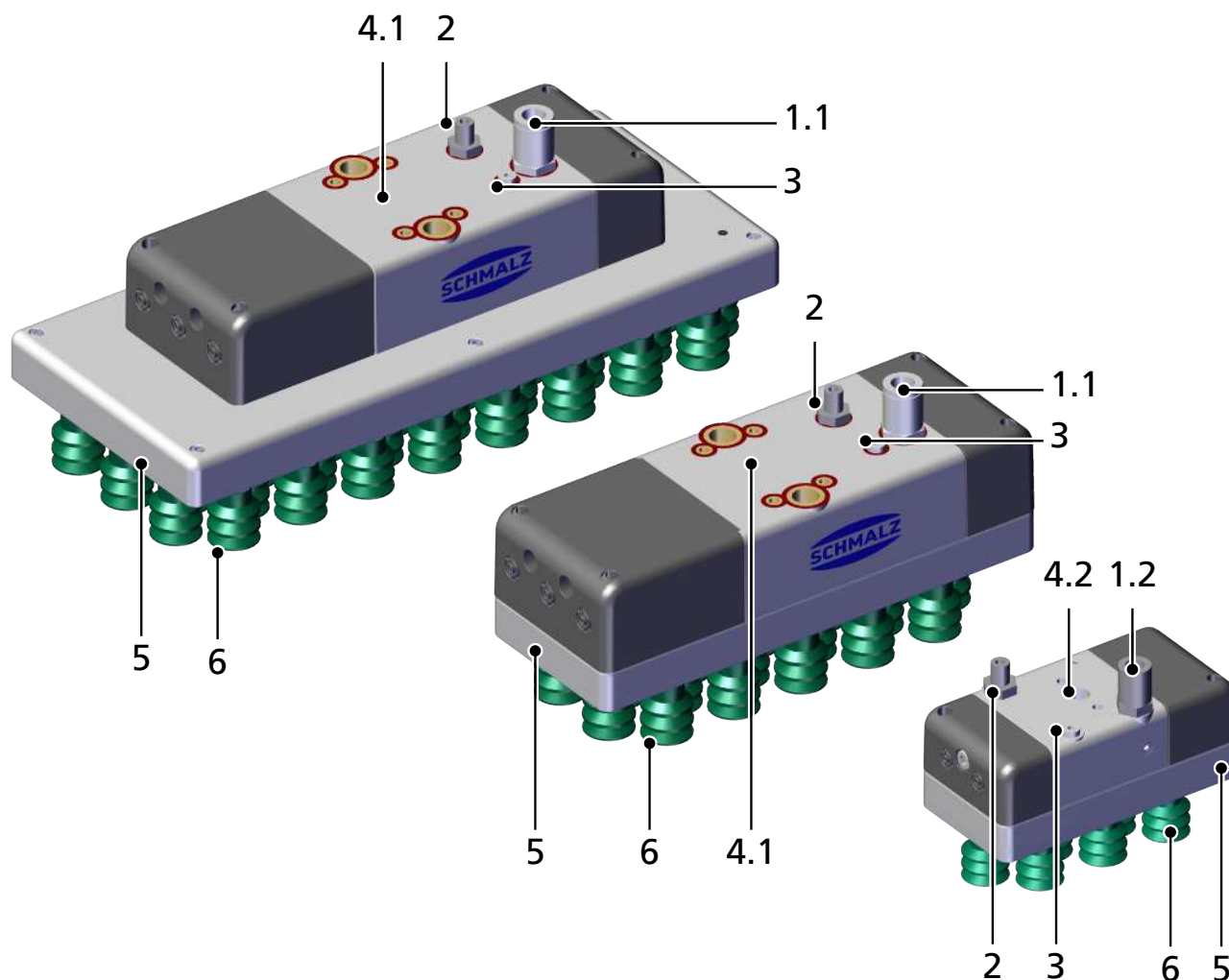
The gripper is supplied by an external vacuum. The connections for measuring the vacuum and for external blow-off are available for optional use.



| | | | |
|-----|--|-----|---|
| 1.1 | 1/2" vacuum connection | 1.2 | 1/4" vacuum connection |
| 2 | 1/8" vacuum measurement connection | 3 | M5 blow-off pulse connection |
| 4.1 | Mechanical connection, 2x 1/4" and 4x M5 | 4.2 | Mechanical connection, 1x 1/8" and 2x M5 |
| 5 | Suction trough | 6 | Suction plate, with suction cups or with sealing foam |

3.3 FQE ... Xb

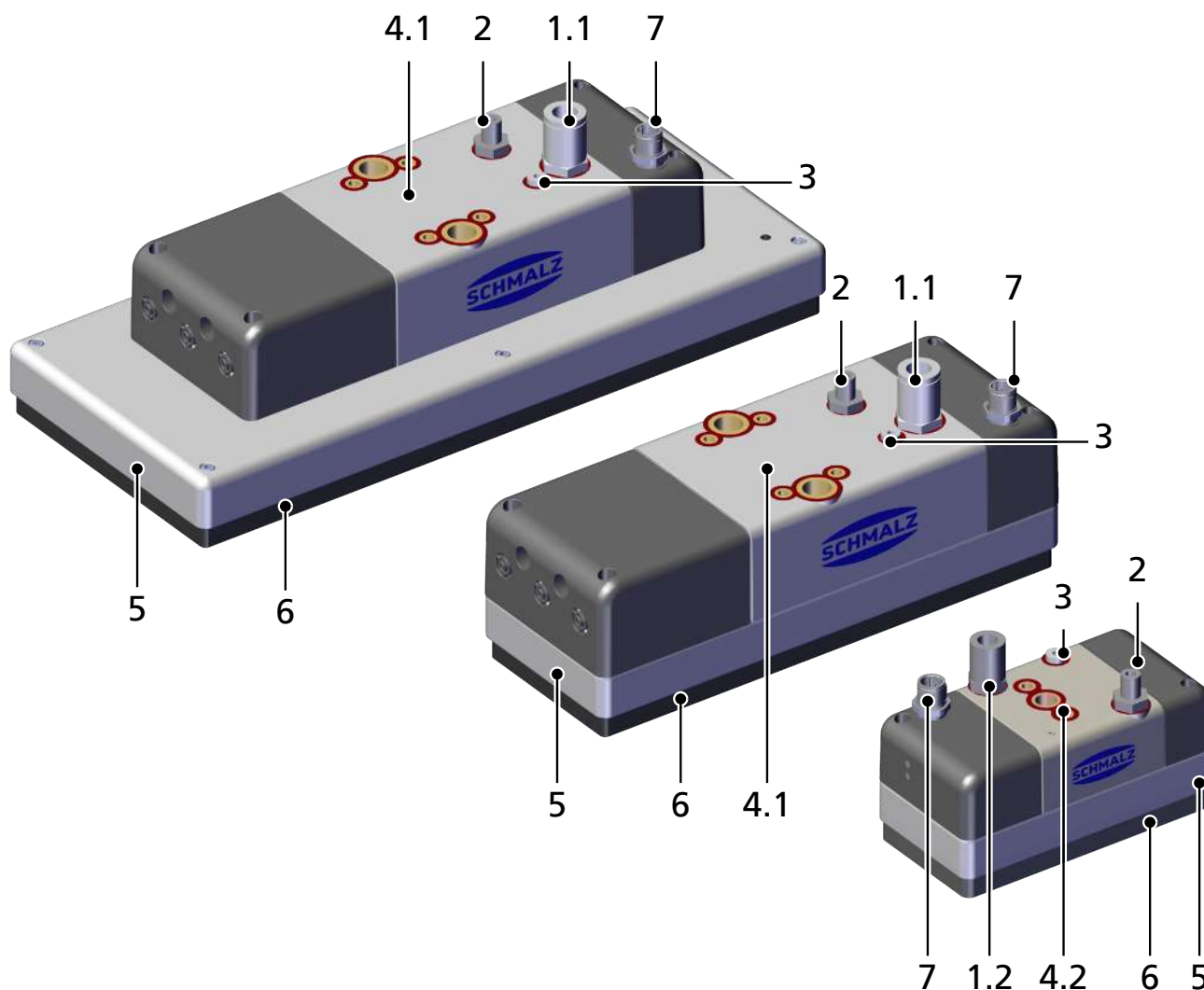
Depending on the configuration, the gripper is equipped with one to three vacuum generators (SEP nozzles). The connections for measuring the vacuum and for an external blow-off pulse are available for optional use.



| | | | |
|-----|---|-----|--|
| 1.1 | 1/4" compressed air connection | 1.2 | 1/8" compressed air connection |
| 2 | 1/8" vacuum measurement connection | 3 | M5 blow-off pulse connection |
| 4.1 | Mechanical connection, 2x 1/4" and 4x M5 | 4.2 | Mechanical connection, 1x 1/8" and 2x M5 |
| 5 | Suction trough | 6 | Suction plate, with suction cups or with sealing foam |

3.4 FQE ... Xc

Depending on the configuration, the gripper is equipped with one to three vacuum generators (SEP nozzles). The connections for measuring the vacuum and for an external blow-off pulse are available for optional use. "Suction" and "blow-off" can be controlled via the integrated valves.



| | | | |
|-----|---|-----|--|
| 1.1 | 1/4" compressed air connection | 1.2 | 1/8" compressed air connection |
| 2 | 1/8" vacuum measurement connection | 3 | M5 blow-off pulse connection |
| 4.1 | Mechanical connection, 2x 1/4" and 4x M5 | 4.2 | Mechanical connection, 1x 1/8" and 2x M5 |
| 5 | Suction trough | 6 | Suction plate, with suction cups or with sealing foam |
| 7 | M12-5 electrical connection | | |

4 Technical Data

4.1 General Parameters

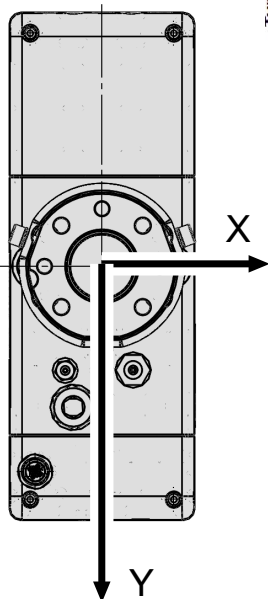
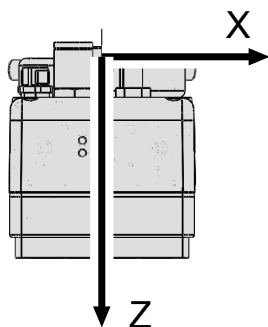
| Parameter | Gripper type | | | Unit |
|---|---|---|------------|-------|
| | FQE ... M | FQE ... Xb | FQE ... Xc | |
| Number of suction points | Based on the configuration – see order confirmation | | | |
| Operating pressure | 3.0 – 6.0 | | | bar |
| Maximum degree of evacuation (at opt. input pressure) | 90*** | 670 (gripper size of 120x60 mm, 2 vacuum modules) 610 (gripper size of 220x80 and 300x130 mm, 2 or 3 vacuum modules) | | % |
| Optimal input pressure | — | 5.0 | | bar |
| Compressed air consumption * | — | 45 to 250 (depending on the number and size of the SEP nozzles) | | l/min |
| Max. suction rate | — | 50 to 380 (depending on the number and size of the SEP nozzles; see the order confirmation) | | l/min |
| Permissible lift capacity ** | 70 (gripper size of 120x60 mm) 160 (gripper size of 220x80 mm) 350 (gripper size of 300x130 mm) | | | N |
| Sound level at full coverage | — | 64.1 (gripper size of 120x60 mm) 62.7 (gripper size of 220x80 mm) 64.6 (gripper size of 300x130 mm) | | dB(A) |
| Operating voltage | 24 | | | V DC |
| Permitted temperature range | 5 to +60 (with sealing foam) -20 to +60 (with suction cups) | 5 to +50 | | ° C |
| Foam/suction cup grid | Based on the configuration – see order confirmation | | | |
| Weight | Based on the configuration – see order confirmation | | | |

* Compressed air provided by the customer: Dry and filtered air in accordance with ISO 8573-1:2010 [7:4:4]

** Depending on the suction element and vacuum, the lift capacity cannot be reached or exceeded!

*** Dependent on the vacuum generator but not above 90%

Tool Center Point (TCP) and Center of Gravity (COG)



Typ /type

Schaum / foam

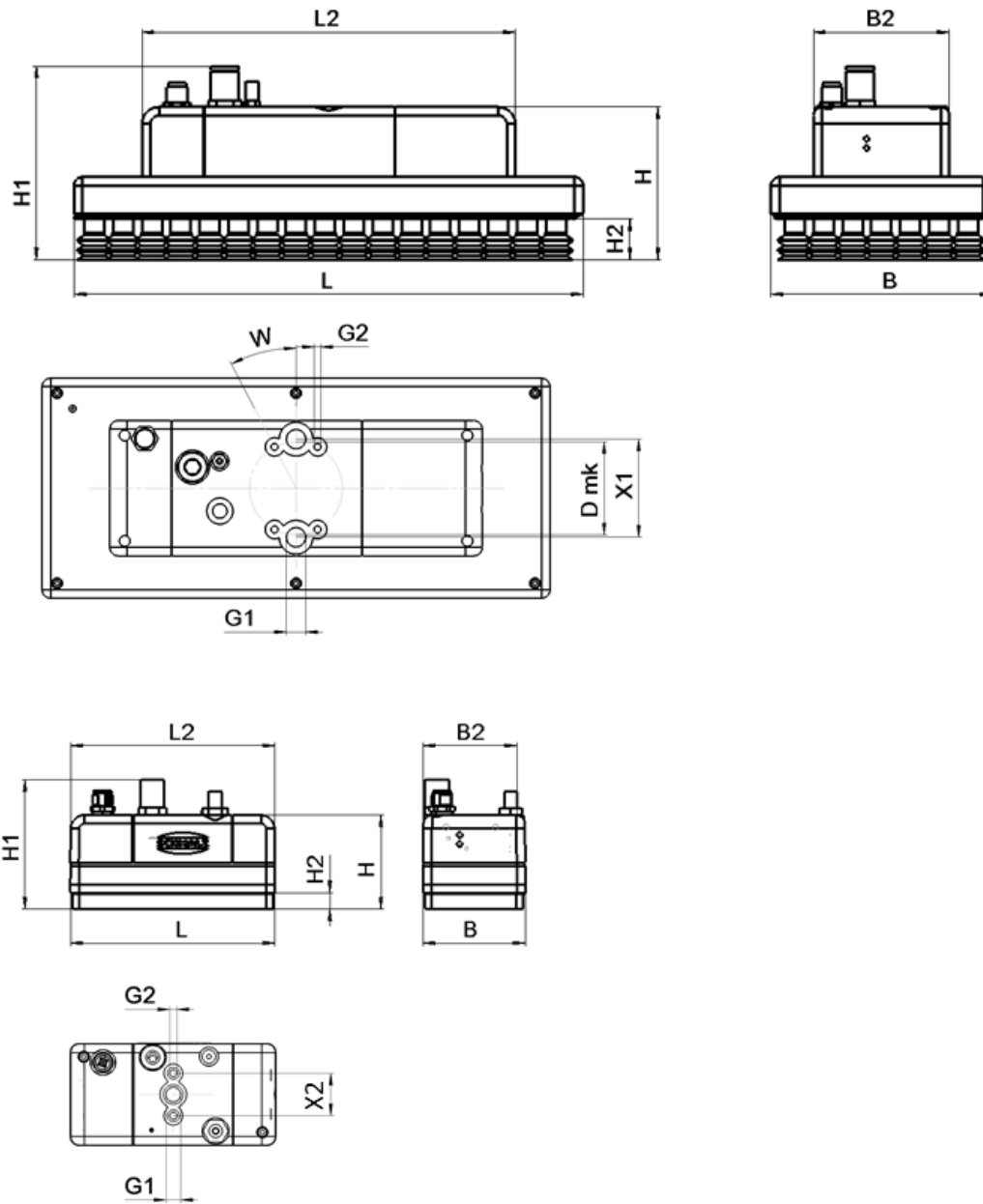
Push-In Sauger / push-in suction cups

Einschraubsauger / screw in suction cups

Greifergröße / Gripper dimensions [mm]

| | | 120x60 | | 220x80 | | 300x130 | |
|---------------------|---|--------|------|--------|-----|---------|-----|
| TCP [mm] | X | 0 | 0 | 0 | 0 | 0 | 0 |
| | Y | 0 | 0 | 0 | 0 | 0 | 0 |
| | Z | 80 | 80 | 80 | 85 | 85 | 85 |
| COG [mm] | X | 0 | 0 | 0 | 0 | 0 | 0 |
| | Y | 0 | 15 | 10 | 10 | 10 | 10 |
| | Z | 40 | 40 | 40 | 50 | 50 | 50 |
| Gewicht/ weight [g] | | 630 | 950 | 1350 | | | |
| TCP [mm] | X | 0 | 0 | 0 | 0 | 0 | 0 |
| | Y | 0 | 0 | 0 | 0 | 0 | 0 |
| | Z | 100 | 95 | 100 | 100 | 100 | 100 |
| COG [mm] | X | 0 | 0 | 0 | 0 | 0 | 0 |
| | Y | 0 | 10 | 10 | 10 | 10 | 10 |
| | Z | 40 | 45 | 55 | 55 | 55 | 55 |
| Gewicht/ weight [g] | | 650 | 1010 | 1520 | | | |
| TCP [mm] | X | 0 | 0 | 0 | 0 | 0 | 0 |
| | Y | 0 | 0 | 0 | 0 | 0 | 0 |
| | Z | 105 | 100 | 105 | 105 | 105 | 105 |
| COG [mm] | X | 0 | 0 | 0 | 0 | 0 | 0 |
| | Y | 0 | 10 | 10 | 10 | 10 | 10 |
| | Z | 45 | 50 | 60 | 60 | 60 | 60 |
| Gewicht/ weight [g] | | 700 | 1150 | 1920 | | | |

4.2 Dimensions

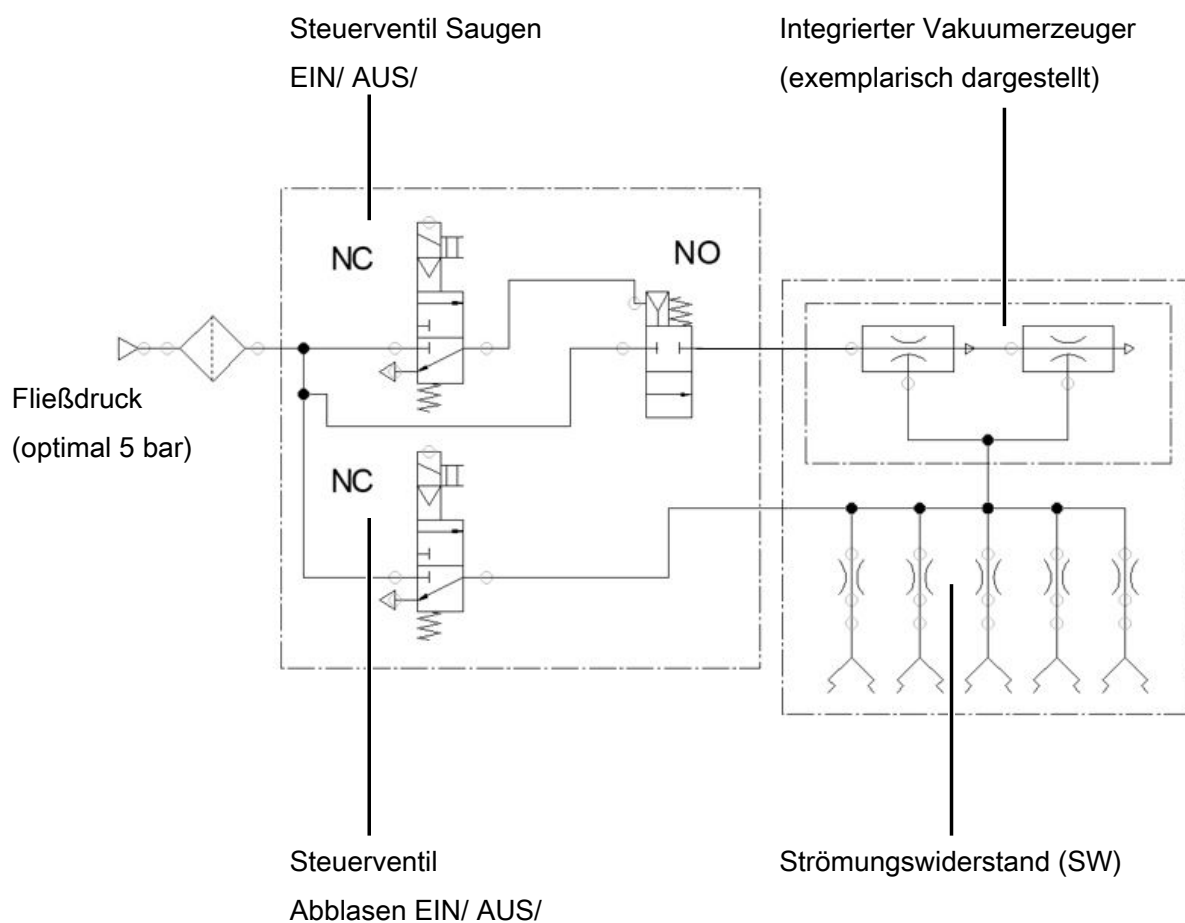


| | L | L2 | B | B2 | H | H1* | H2 | G1 | G2 | Dmk | W | X1 | X2 |
|----------------------------------|-----|-------|----|------|------|------|------|------|----|-----|-------|----|----|
| FQE 120x60, sealing foam | 120 | 120.1 | 60 | 60 | 55 | 75.7 | 10 | 1/8" | M5 | — | — | — | 25 |
| FQE 120x60, screw-in suction cup | 120 | 120.1 | 60 | 60 | 76.3 | 97 | 31.3 | 1/8" | M5 | — | — | — | 25 |
| FQE 120x60, plug-in suction cup | 120 | 120.1 | 60 | 60 | 69.3 | 90 | 24.3 | 1/8" | M5 | — | — | — | 25 |
| FQE 220x80, sealing foam | 220 | 220.5 | 80 | 80.5 | 70 | 94 | 10 | 1/4" | M5 | 55 | 27.5° | 58 | — |

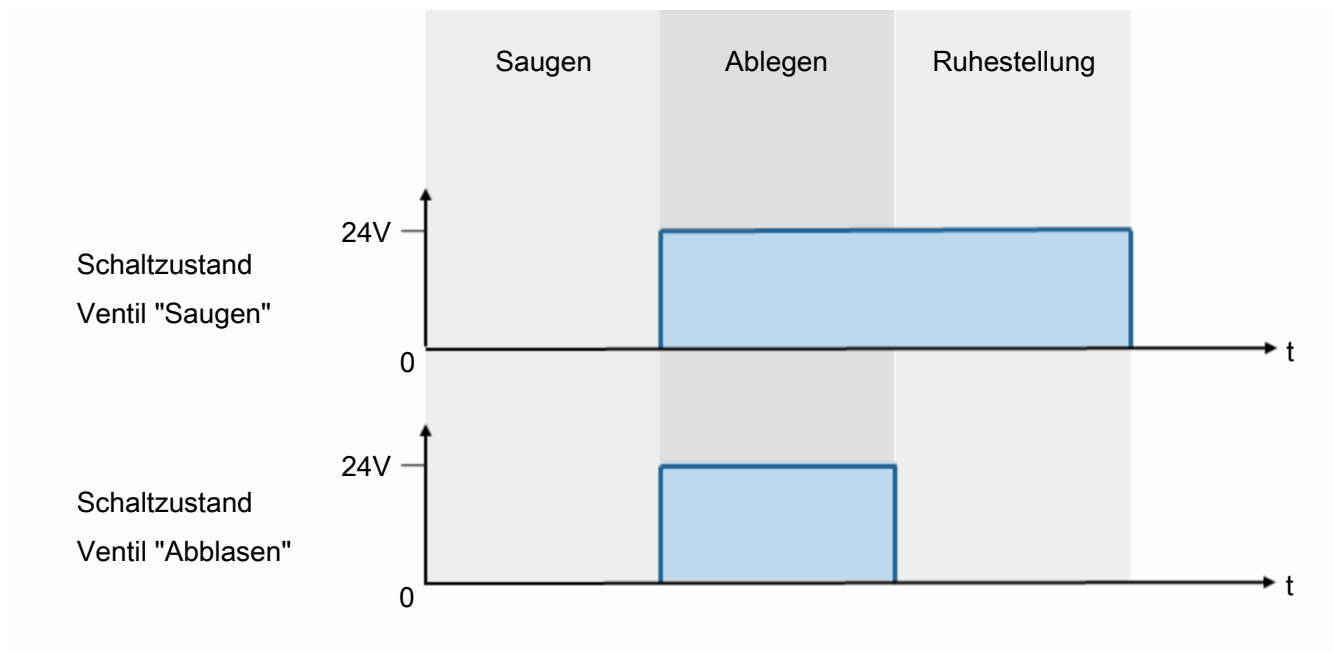
| | | | | | | | | | | | | | |
|-----------------------------------|-----|-------|-----|------|------|-------|------|------|----|----|-------|----|---|
| FQE 220x80, screw-in suction cup | 220 | 220.5 | 80 | 80.5 | 91.3 | 115.3 | 31.3 | 1/4" | M5 | 55 | 27.5° | 58 | — |
| FQE 220x80, plug-in suction cup | 220 | 220.5 | 80 | 80.5 | 84.3 | 108.3 | 24.3 | 1/4" | M5 | 55 | 27.5° | 58 | — |
| FQE 300x130, sealing foam | 300 | 220.5 | 130 | 80.5 | 70 | 94 | 10 | 1/4" | M5 | 55 | 27.5° | 58 | — |
| FQE 300x130, screw-in suction cup | 300 | 220.5 | 130 | 80.5 | 91.3 | 115.3 | 31.3 | 1/4" | M5 | 55 | 27.5° | 58 | — |
| FQE 300x130, plug-in suction cup | 300 | 220.5 | 130 | 80.5 | 84.3 | 108.3 | 24.3 | 1/4" | M5 | 55 | 27.5° | 58 | — |

* H1 is provided as an example and varies based on the configuration

4.3 Pneumatic Circuit Diagram (Version FQE ... Xc)

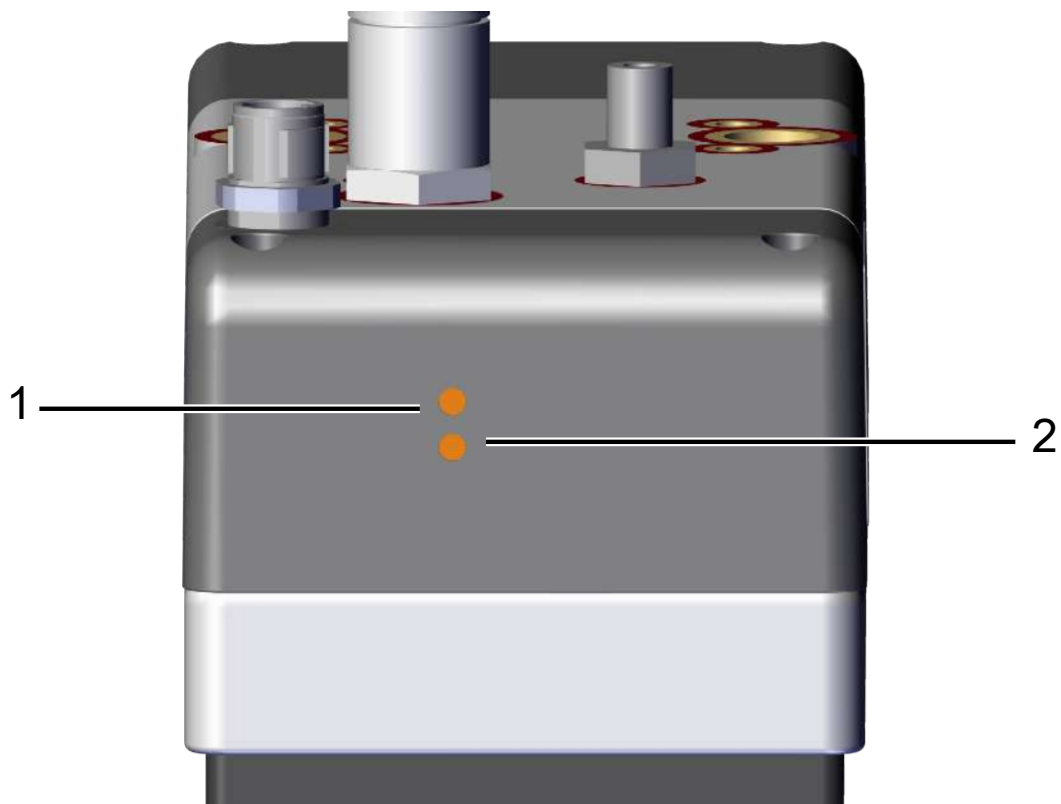


4.4 Circuit Diagram for Valves (Version FQE ... Xc)



4.5 Display Elements (Version FQE ... Xc)

With the gripper version FQE ... Xc, the "suction" and "blow-off" process states are each assigned an LED.



| Item | Meaning | State | Description |
|-------------|----------------|--------------|------------------------------------|
| 1 | Suction LED | Lit up | "Suction" OFF |
| | | OFF | "Suction" ON (transport workpiece) |
| 2 | Blow-off LED | Lit up | "Blow-off" ON (deposit workpiece) |
| | | OFF | "Blow-off" OFF |

5 Transport 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.

5.2 Reusing the Packaging

The product is delivered in cardboard packaging. The packaging should be reused to safely transport the product at a later stage.



Keep the packaging for future transport or storage.

6 Installation

6.1 Installation Instructions



⚠ CAUTION

Improper installation or maintenance

Personal injury or damage to property

- ▶ Prior to installation and before maintenance work, the product must be disconnected from the power supply, depressurized (vented to the atmosphere) and secured against unauthorized restart.

The gripper FQE may be installed in any position.

The grippers FQE can be mechanically connected as follows:

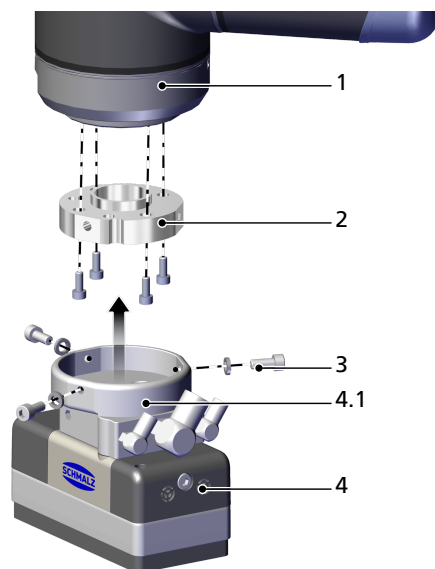
- Via the mounting holes in the housing (> See *ch. Dimensions*)
- Via the robot-specific connection sets (ROB-SET) that can be chosen during configuration
- Via various accessory parts such as a connecting plate, spring plunger, ball joint, Flexolink, etc.(> See *ch. Accessories*)

6.2 Mechanical Attachment

Mounting the FQE on the robot using ROB-SETs:

The robot is selected while configuring the gripper FQE. The flange module is mounted on the gripper at the factory. The flange plate is supplied loose and mounted on the robot by the customer.

The design of the flange module varies depending on the size of the gripper. The figure below shows the 120x60 mm gripper.



1. Mount the flange plate (2) on the robot (1)

2. Attach the gripper (4) onto the flange plate (2) via the flange module mounted at the factory (4.1)

3. Mount the gripper on the flange plate using wedge lock washers and machine screws (3) with a tightening torque of 2 Nm

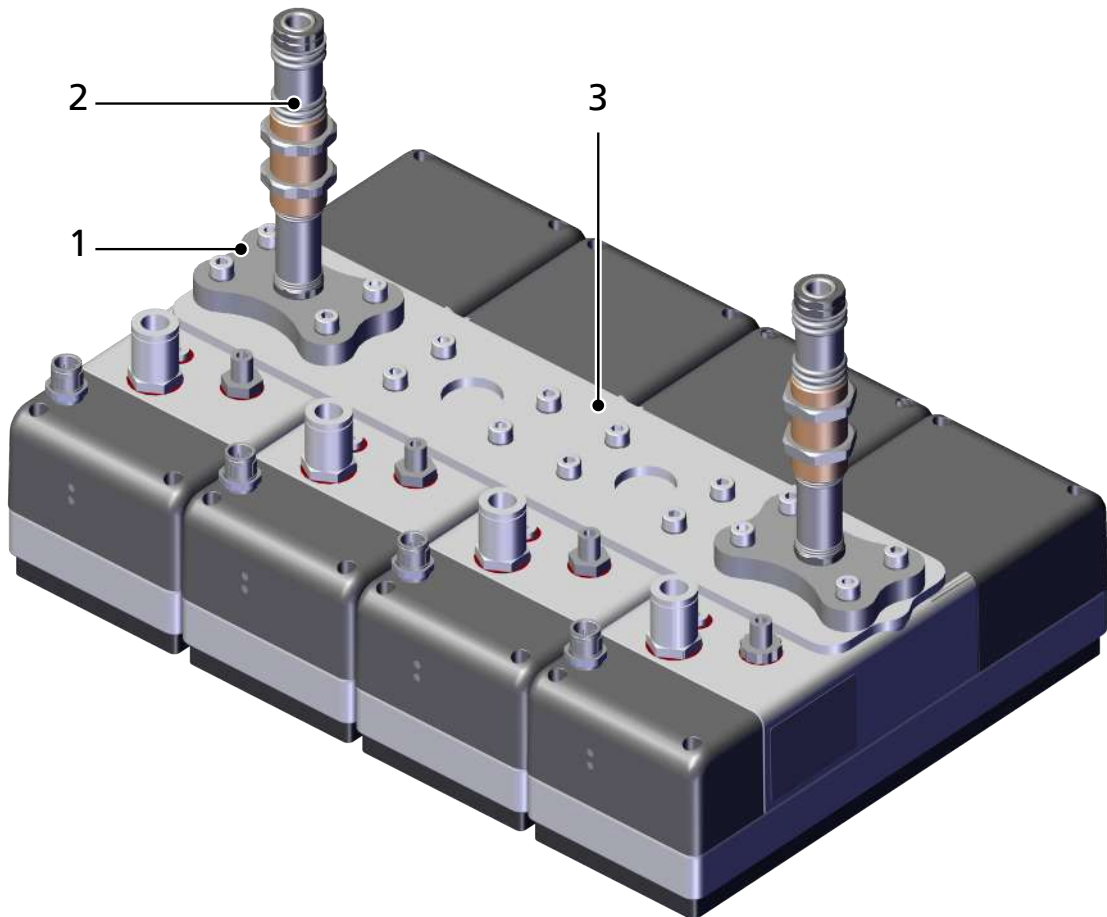
Mounting the FQE directly on the mounting holes on the gripper:
It is connected to the upper part of the housing using 1x 1/8" and 2x M5 (gripper size of 120x60 mm) or 2x 1/4" and 4x M5 (gripper sizes of 220x80 mm and 300x130 mm) (> See ch. Dimensions).

Mounting the FQE on the mounting holes on the gripper using accessory parts such as connecting plates and spring plungers (> See ch. Accessories):

The components for this type of connection are available as accessories for the respective gripper sizes.

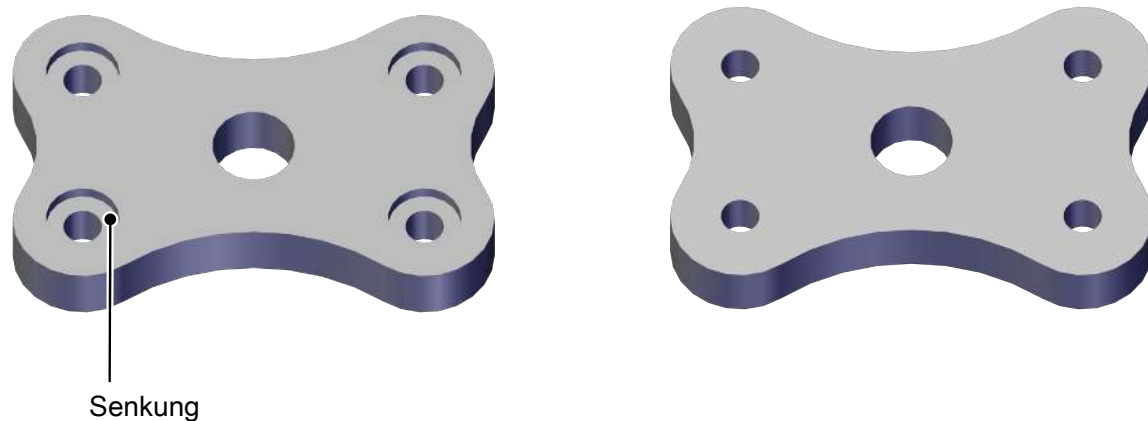
- Connecting plates can be used to mechanically connect two to four grippers.
- Depending on the version, the connection elements have a connection thread of 1/8", 1/4" and 1/2" that allows them to be adapted to the Schmalz spring plunger.
- The connection and adapter plates are supplied with the screws required for mounting.
- The customer is responsible for choosing the appropriately sized connection (application, transported load).

The spring plungers are to be positioned as far out as possible on the block-mounted grippers. An example for mounting 220x80 mm grippers on blocks is provided below.



| | | | |
|---|--|---|----------------|
| 1 | Adapter plate (220x80 and 300x130 gripper sizes only) | 2 | Spring plunger |
| 3 | Connecting plate | | |

Notes on the adapter plate



1. The adapter plate is used only in combination with the 220x80 and 300x130 gripper sizes
2. The boreholes on the adapter plate are sunken on one side.
With the 220x80 gripper size, the adapter plates must be set onto the connecting plates such that the sunken side is pointing downwards (towards the gripper; otherwise, the supplied screw is too long).
With the 300x130 gripper size, the adapter plates must be set onto the connecting plates such that the sunken side is pointing upwards (away from the gripper; otherwise, the supplied screw is too short).

6.3 Electrical Connection



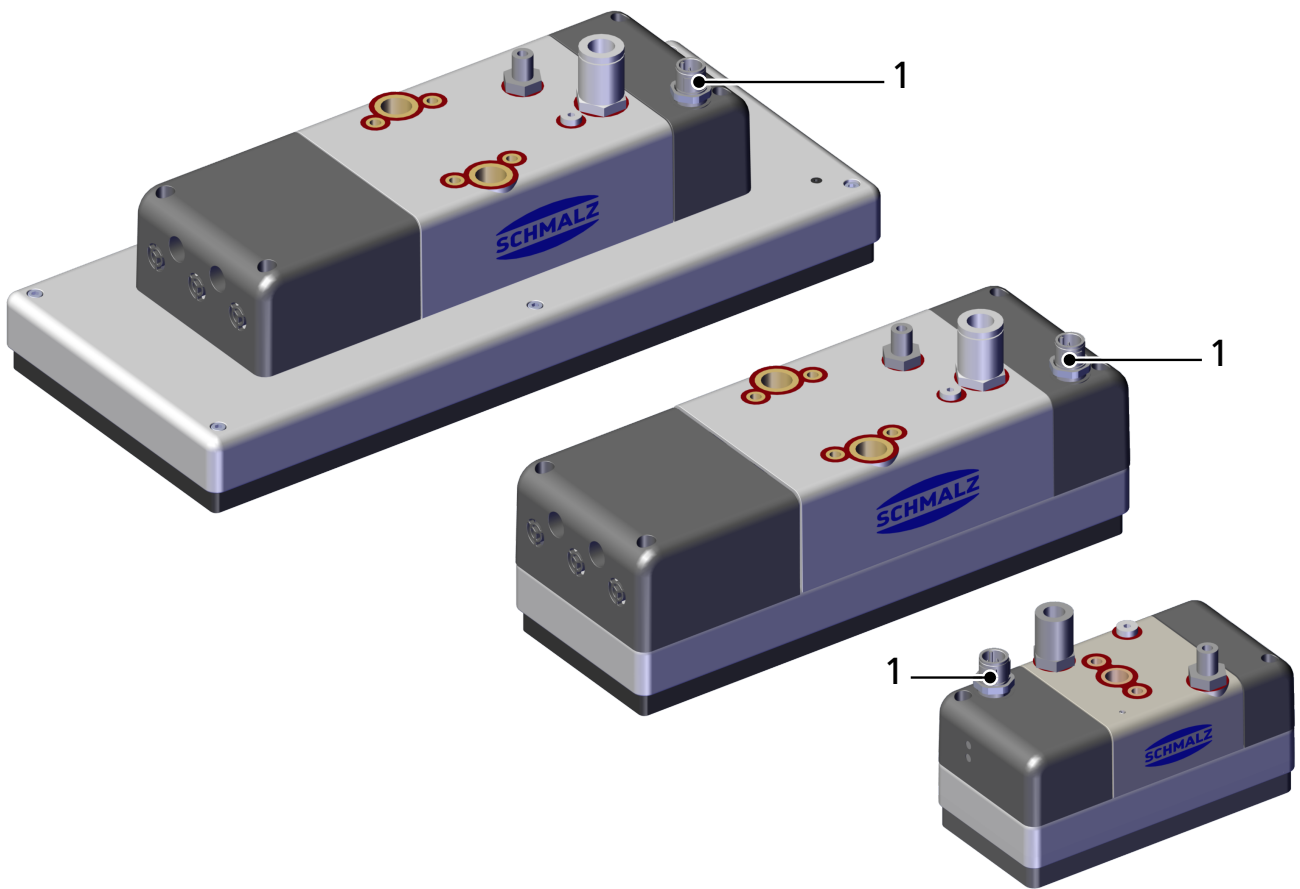
⚠ DANGER

Electric shock from touching live components

Serious injury or death!

- ▶ Make sure that the electrical components are not live before installation, maintenance and troubleshooting.
- ▶ Switch off the mains switch and secure against unauthorized restart.

The gripper types FQE ... M and FQE ... Xb do not have electrical connections.
 With the gripper type FQE ... Xc, the integrated valves are activated via an M12-5 plug.

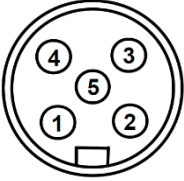


1 M12-5 electrical connection

PNP version:

| M12 connector | Pin | Litz wire color | Function |
|---------------|-----|-----------------|---------------------|
| | 1 | Brown | Not used |
| | 2 | White | Blow-off valve "On" |
| | 3 | Blue | Ground |
| | 4 | Black | Suction valve "Off" |
| | 5 | Gray | Not used |

NPN version:

| M12 connector | Pin | Litz wire color | Function |
|---|-----|-----------------|---------------------|
|  | 1 | Brown | 24 V |
| | 2 | White | Blow-off valve "On" |
| | 3 | Blue | Not used |
| | 4 | Black | Suction valve "Off" |
| | 5 | Gray | Not used |

6.4 Pneumatic connection

1. Shorten the hoses and pipelines as much as possible.
2. Keep hose lines free of bends and crimps.
3. Lay hose lines in such a way that they do not rub.

Ensure that the hose lines have the appropriate dimensions.



⚠ CAUTION

Compressed air or vacuum in direct contact with the eye

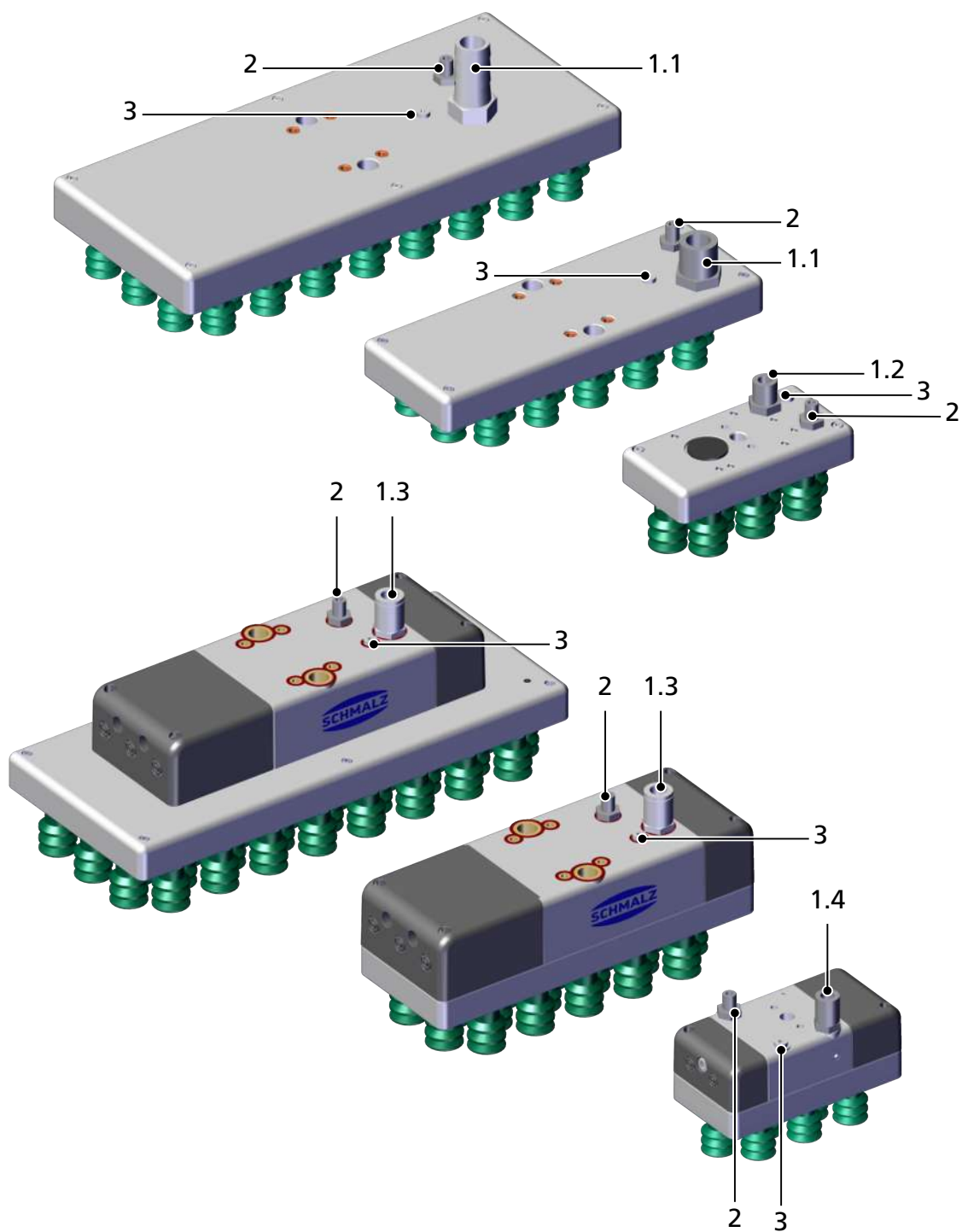
Severe eye injury

- ▶ 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

The gripper type FQE ... M is supplied with an external vacuum. The gripper types FQE ... X come with integrated vacuum generators (SEP nozzles).

The vacuum can be monitored on connection 2 (e.g. using a vacuum switch (> See *ch. Accessories*)).

To ensure that the workpiece is deposited quickly, an external blow-off pulse can be provided via connection 3. In the case of the gripper FQE ... Xc, a blow-off pulse can be provided via the control.



| | | | |
|-----|------------------------------------|-----|--------------------------------|
| 1.1 | 1/2" vacuum connection | 1.2 | 1/4" vacuum connection |
| 1.3 | 1/4" compressed air connection | 1.4 | 1/8" compressed air connection |
| 2 | 1/8" vacuum measurement connection | 3 | M5" blow-off pulse connection |

7 Start of Operations

7.1 Personnel Qualification

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

1. Only instruct qualified personnel to perform the tasks described in these operating instructions.
2. The product may only be operated by persons who have undergone appropriate training.
3. Electrical work and installations may only be carried out by qualified electrical specialists.
4. Assembly and maintenance work must only be carried out by qualified personnel.

7.2 Before Initial Start of Operations

Before the initial start of operations following the installation, repair, servicing or maintenance work, you must check the following:

- All mechanical connectors are properly attached and secured.
- All screws and nuts are tightened to specified torques.
- All components are installed.
- The safety distances have been maintained.
- The electrical cable and supply hoses are properly routed.
- The EMERGENCY STOP switch for the overall system is working.
- The type plate is clearly legible.



DANGER

Electric shock from touching live components

Serious injury or death!

- ▶ Make sure that the electrical components are not live before installation, maintenance and troubleshooting.
- ▶ Switch off the mains switch and secure against unauthorized restart.



CAUTION

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

Hearing damage

- ▶ Correct installation.
- ▶ Wear ear protectors.



CAUTION

Vacuum close to the eye

Severe eye injury!

- ▶ Wear eye protection.
- ▶ Do not look into vacuum openings, e.g. suction cups.





CAUTION

Risk of crushing if the suction cup is abruptly attached to a workpiece

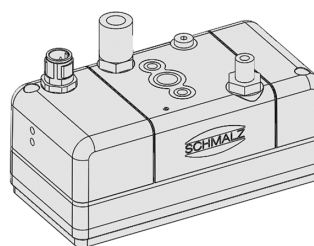
- ▶ Do not place any body parts between the suction cup and the workpiece

Handling procedure

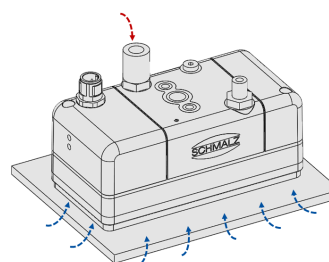
1. Placement of the gripper on the workpiece
 - Optimally position the gripper on the workpiece (centrally/on the center of gravity)
 - Suction cups must be compressed by 50% of the suction cup stroke
2. Generate or establish vacuum
 - M version: apply vacuum on the vacuum connection
 - Xb version: apply compressed air on the compressed air connection
 - Xc-Version: compressed air must be applied at the compressed air connection. In addition, the appropriate control valve must be activated (> See *ch. Pneumatic Circuit Diagram*).
3. Movement of the gripper after reaching the pre-set vacuum value
4. Lower workpieces onto clear, even surfaces
5. Only switch off the vacuum when the workpiece rests completely and safely on a secure surface
 - When switching off the device, the suction cups are automatically ventilated
 - Optionally, a blow-off pulse can be produced at the compressed air connection.
6. Depending on the gripper version, switch off the compressed air, vacuum or valves.

 Druckluft
 Vakuum

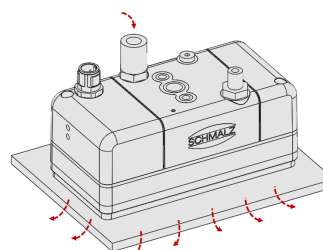
FQE X



FQE X
Ansaugen



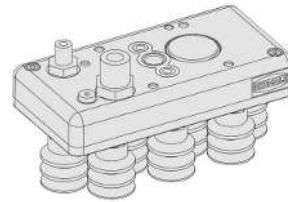
FQE X
Ablegen



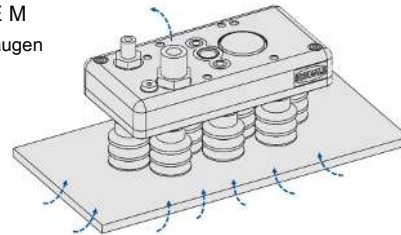
c version: switch off compressed air via the valve
b version: switch off compressed air externally

Druckluft
Vakuum

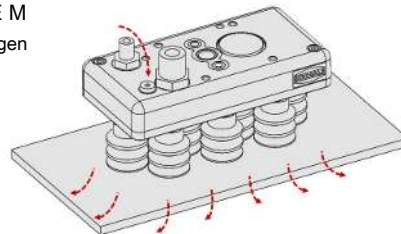
FQE M



FQE M
Ansaugen



FQE M
Ablegen



Use an external blow-off pulse to deposit workpieces more quickly.

8 Operation

8.1 Preparations

- ▶ The product must be operated only by persons who have undergone appropriate training.

To avoid injury, always use appropriate protective equipment that is suitable for the situation. The protective equipment must meet the following standards:

- Protective work shoes in safety class S1 or higher
- Ear protection class L or higher
- Sturdy work gloves in safety category 2133 or higher
- Eye protection class F



⚠ 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.

Before each activation of the gripping system, the following measures must be taken:

1. Check the device for visible damage. Correct any faults or report them to the supervising personnel.
2. 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.
3. Ensure that the danger zone of the machine or system is free of persons during automatic operation in non-HRC applications.



⚠ WARNING

Applications with collaborative robots:

Insufficient vacuum generation or insufficient coverage of the gripper.

The load drops immediately.

Risk of injury from falling load!

- ▶ The operator must be separated from the handling area of the load by a secure barrier.

9 Troubleshooting

9.1 Safety

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.



⚠ CAUTION

Improper installation or maintenance

Personal injury or damage to property

- ▶ Prior to installation and before maintenance work, the product must be disconnected from the power supply, depressurized (vented to the atmosphere) and secured against unauthorized restart.

9.2 Faults, Causes, Solutions

| Fault | Possible cause | Solution |
|---|---|---|
| Vacuum level is not reached or vacuum is created too slowly | Leakage | Check the vacuum generator and, where applicable, the compressed air supply (input pressure) (defective/dirty/installed correctly?) |
| | Wear | Check the hose connections (tight fit, hose has no faults or kinks) |
| | Dirt | Check the seals (between the suction trough and suction plate) |
| | Incorrect installation | When using suction cups --> check whether flow restrictors are pressed in or screwed in (if the openings are too large, the vacuum generator power may be insufficient) |
| | | Clean the dust filter if necessary |
| | | Replace worn sealing mat/suction cup Internal diameter of compressed air/vacuum hoses too low (note when retrofitting the gripper – e.g. with larger or extra flow restrictors or adding additional SEP nozzles) |
| Load cannot be held | Vacuum level too low | See above for possible causes |
| | Suction force insufficient/workpiece too heavy | Increase the vacuum where applicable or use additional grippers. Observe the max. permissible lift capacity (> See <i>ch. General Parameters</i>) |
| | Flow restrictors are dirty | Clean the flow restrictors |
| | Gripper contact force on the workpiece is too low | Press the area grippers more firmly Recommendation: on even surfaces, compress the foam and suction cups by 50% |

| Fault | Possible cause | Solution |
|---|--|--|
| | Too short retention time for the gripper on the workpiece to be lifted | Extend the retention time while picking up the workpiece |
| | Too fast or jerky lifting of workpieces | Optimize the motion and avoid peaks in acceleration |
| | The workpieces to be lifted are not suitable for the gripper (e.g. non-rigid) | Use a different gripping system. If necessary, switch from foam to suction cups |
| | Flow restrictors are too small | With air-permeable workpieces, a larger flow restrictor may need to be used. Replace the sealing plate |
| Sealing mat wears out very quickly | The suction cup is angled or makes a grinding noise when applied to the workpiece to be lifted | Set it down vertically on the workpiece |
| Version FQE Xc: The activation of the valves does not work | Electrical control is not working | Check connections. Input signals correct? |
| | Solenoid valve is defective | Please contact the J.Schmalz GmbH customer service team |

10 Maintenance

10.1 Safety

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.



⚠️ CAUTION

Improper installation or maintenance

Personal injury or damage to property

- ▶ Prior to installation and before maintenance work, the product must be disconnected from the power supply, depressurized (vented to the atmosphere) and secured against unauthorized restart.

10.2 Maintenance Schedule



Schmalz stipulates the following checks and check intervals. The operator must comply with the legal regulations and safety regulations applicable at the location of use. These intervals apply to single-shift operation. For heavier use, such as multi-shift operation, the intervals must be shortened accordingly.

| Maintenance task | Daily | Weekly | Monthly | Every six months | Yearly |
|--|-------|--------|---------|------------------|--------|
| Check if the vacuum generator generates unusual noise under full load | | X | | | |
| Check connections on flange for secure fit – machine screws with wedge lock washers for attachment of the flange to the suction spider | | X | | | |
| Check the suction cup and foam for wear, tears and leaks. Replace if necessary. | | X | | | |
| Check the ejectors for dirt and clean if necessary | | | X | | |
| Check the condition of the vacuum hoses (not brittle, no kinks, no chafe marks). | | | X | | |
| Check all load-bearing parts (e.g. suspension) for deformation, wear or other damage. | | | X | | |
| Leak test | | | X | | |
| Is the electrical installation still OK? Is the cable screw union secure? | | | | X | |
| Check that all the connections are secure, e.g. the screws, hose clamps, etc. | | | | X | |

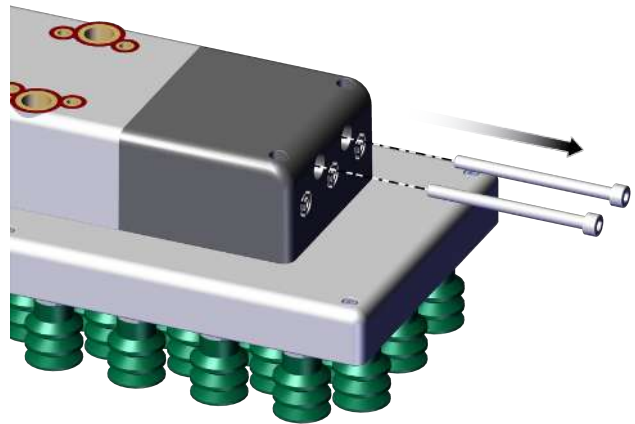
| Maintenance task | Daily | Weekly | Monthly | Every six months | Yearly |
|--|-------|--------|---------|------------------|--------|
| Check the legibility of the type plate and clean it if necessary. | | | | | X |
| The operating instructions are available, legible, and can be accessed by personnel. | | | | | X |
| Check the general condition of the device. | | | | | X |

10.3 Cleaning the Gripper

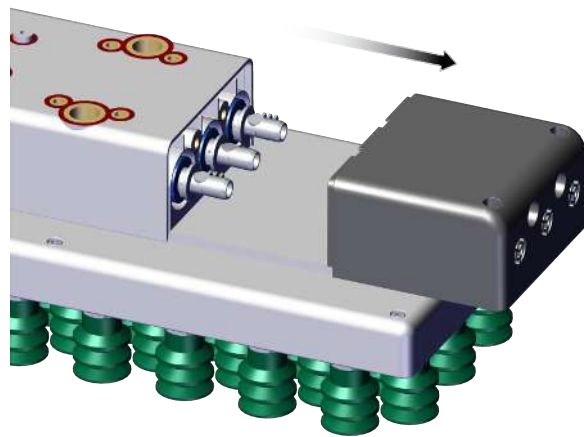
1. For cleaning, do not use aggressive cleaning agents such as industrial alcohol, white spirit or thinners. Only use cleaning agents with pH 7–12.
2. Remove dirt on the exterior of the device with a soft cloth and soap suds at a maximum temperature of 60° C. Make sure that the silencer is not soaked in soapy water.
3. Ensure that no moisture can reach the electrical connection or other electrical components.

10.4 Removing the Ejector Module

The following disassembly steps apply to all sizes of the versions FQE ... Xb / Xc.

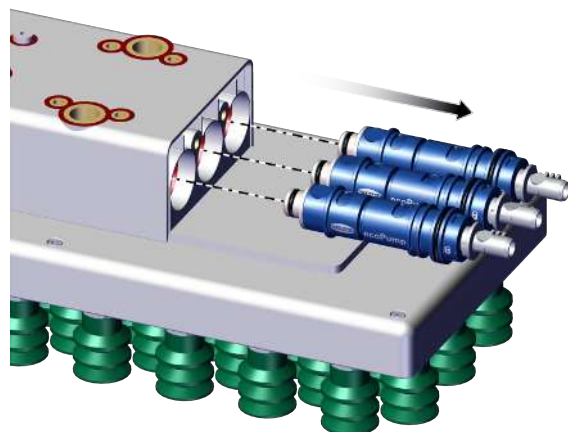


- ▶ Unscrew the fastening screws



- ▶ Remove the silencer cap

1. Pull out the ejector module (2 or 3 pieces)



2. For further cleaning of the ejector module, refer to operating instructions 30.30.01.00600 (> See *ch. Other Applicable Documents*).

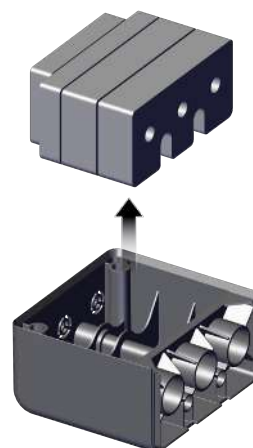
During assembly, ensure the silencer cap is properly fitted on the basic module.

10.5 Disassembling and Cleaning the Silencer Inserts

The following steps apply to all sizes of the versions FQE ... Xb / Xc

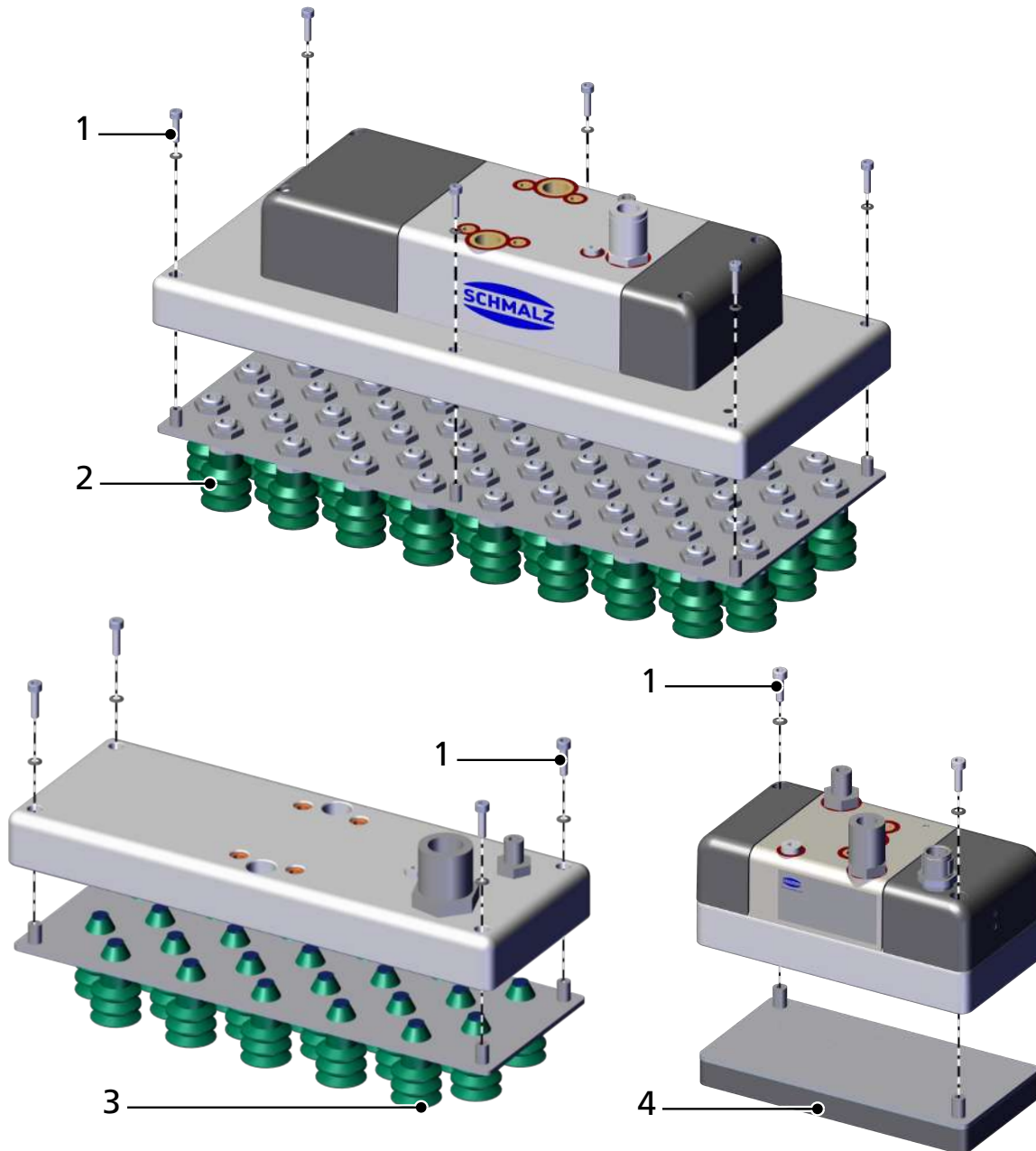
- ▶ Depending on the version, remove the one to four silencer sections from the silencer cap

The silencer sections can be cleaned with a soft brush.



10.6 Removing the Sealing/Suction Plate

The following steps apply to all sizes of the versions FQE ... Xb / Xc



| | | | |
|---|---|---|--|
| 1 | Screw | 2 | Suction plate with screw-in suction cups |
| 3 | Suction plate with plug-in suction cups | 4 | Sealing plate (foam) |

10.7 Replacing the Sealing Plate (Foam)

The following steps apply to all sizes with a sealing plate

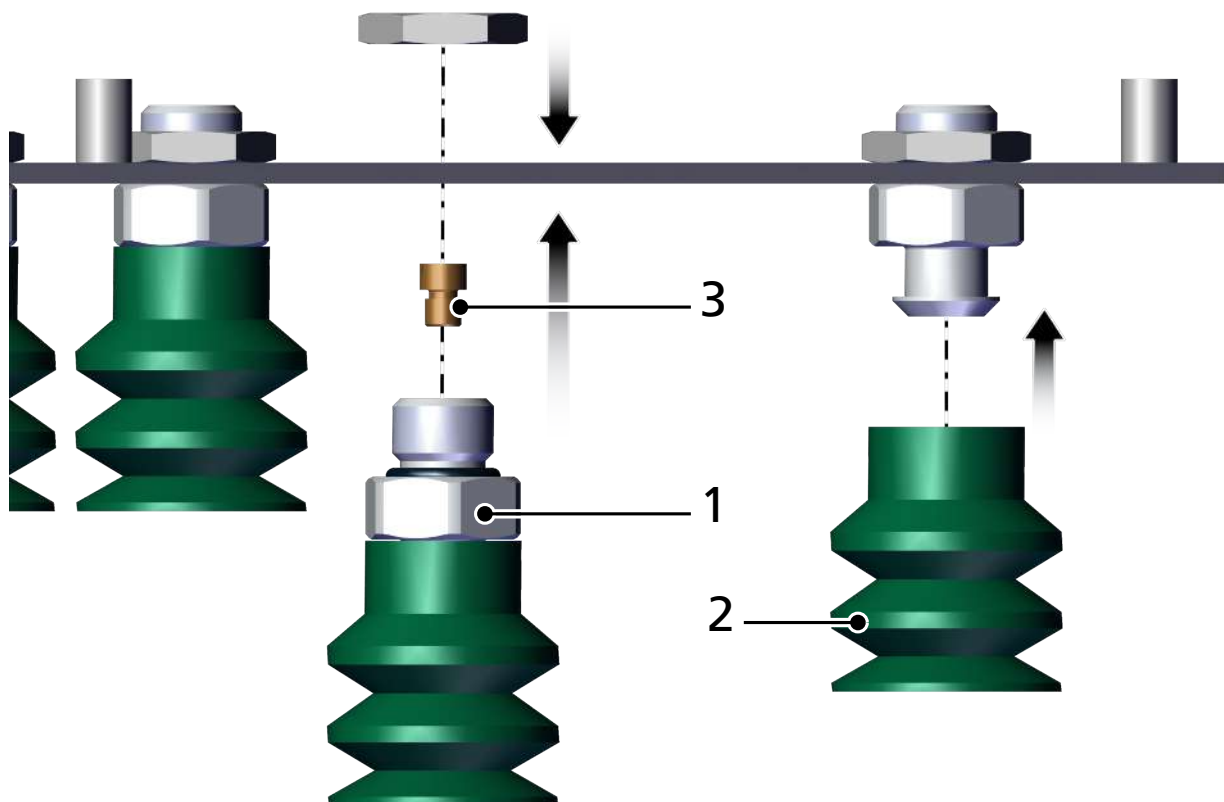
1. Remove the worn sealing plate from the mounting plate.
2. Clean the mounting plate. The surface must be free from grease and adhesive residues
3. Remove the protective film from the new foam
4. Place the new foam on the mounting plate

10.8 Replacing Screw-in Suction Cups

Screw-in suction cups can be replaced in two ways:

- Replace the entire screw-in suction cup (1) by unscrewing it in the mounting plate
- Replace the suction cup (2) by removing it from the suction cup connection nipple.

If necessary, the flow restrictor (3) can also be replaced in both versions.

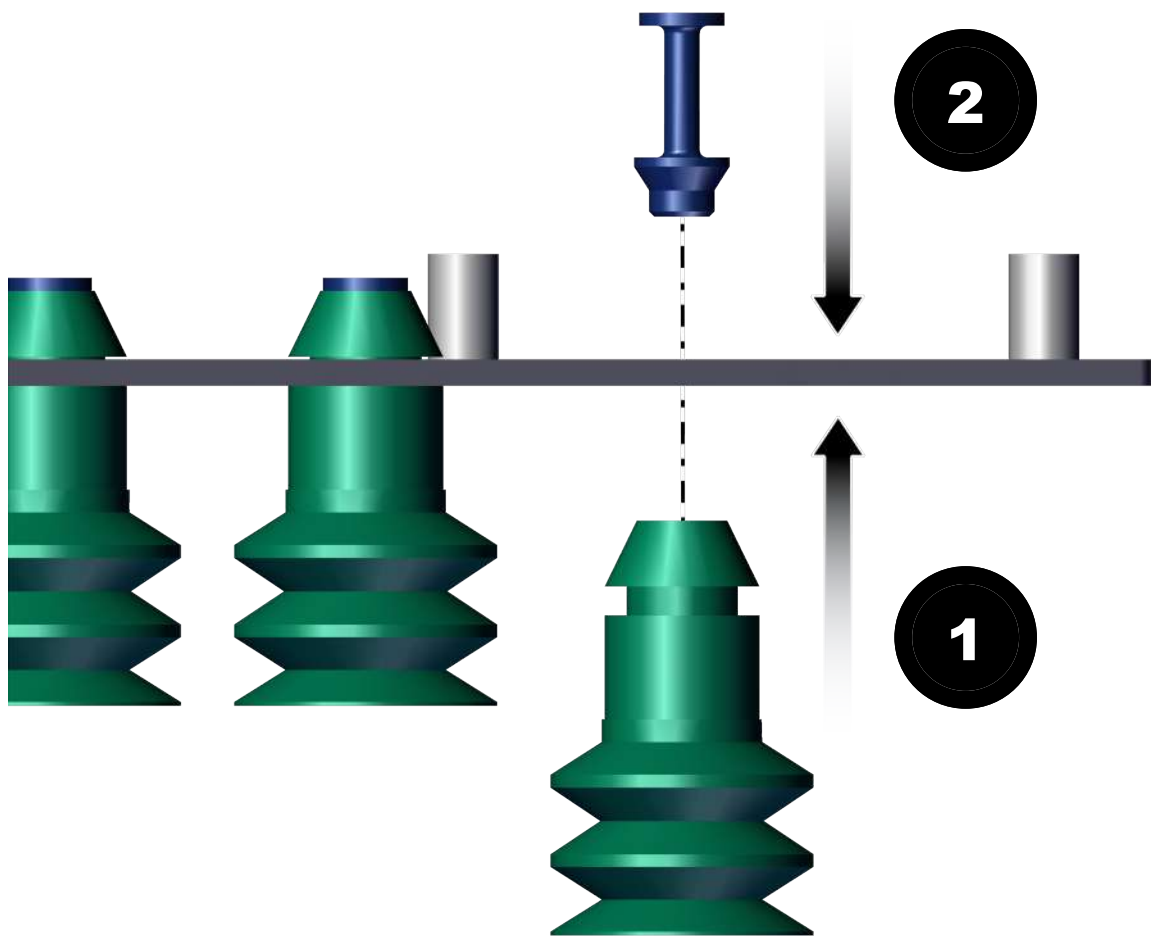


| | |
|---|----------------------|
| 1 | Screw-in suction cup |
| 3 | Flow restrictor |

| | |
|---|-------------|
| 2 | Suction cup |
|---|-------------|

10.9 Replacing Plug-in Suction Cups

The plug-in suction cup is destroyed while removing it



1. Plug the plug-in suction cup into the mounting plate from below
2. Plug the flow restrictor into the plug-in suction cup from above

10.10 Accessories, Spare Parts and Wearing Parts

Accessories, spare parts and wearing parts can be requested from the Schmalz service team using the order number, product key or product service number.

General Accessories

| Designation | Part no. | Note |
|--------------------------|----------------|------------------|
| Connection cable | 21.04.06.00295 | Straight |
| Connection cable | 21.04.05.00557 | Angled |
| Vacuum hose | 10.07.09.00001 | VSL 4-2 PU |
| Vacuum hose | 10.07.09.00002 | VSL 6-4 PU |
| Vacuum hose | 10.07.09.00003 | VSL 8-6 PU |
| Vacuum hose | 10.07.09.00083 | VSL 10-7 |
| Vacuum hose | 10.07.09.00037 | VSL 12-9 PU |
| Vacuum hose | 10.07.09.00038 | VSL 14-11 PU |
| Vacuum hose | 10.07.09.00007 | VSL 26-19 PVC-DS |
| Vacuum gauge (manometer) | 10.07.02.00046 | Analog |
| Vacuum/pressure switch | 10.06.02.00577 | VSi |

Accessories for 120x60 Gripper Size

| Designation | Part no. | Note |
|------------------------|----------------|--|
| Spring plunger | 10.01.02.00602 | FSTE, 1/8" external thread, 15 |
| Spring plunger | 10.01.02.00605 | FSTE, 1/8" external thread, 15 VG |
| Spring plunger | 10.01.02.00603 | FSTE, 1/8" external thread, 25 |
| Spring plunger | 10.01.02.00604 | FSTE, 1/8" external thread, 50 |
| Spring plunger | 10.01.02.00606 | FSTE, 1/8" external thread, 50 VG |
| Spring plunger | 10.01.02.00756 | FSTE-HD, 1/8" external thread, 15 |
| Spring plunger | 10.01.02.00872 | FSTE-HD, 1/8" external thread, 15 VG |
| Spring plunger | 10.01.02.00757 | FSTE-HD, 1/8" external thread, 25 |
| Spring plunger | 10.01.02.00873 | FSTE-HD, 1/8" external thread, 25 VG |
| Spring plunger | 10.01.02.00758 | FSTE-HD, 1/8" external thread, 50 |
| Spring plunger | 10.01.02.00874 | FSTE-HD, 1/8" external thread, 50 VG |
| Ball joint | 10.01.03.00109 | KGL, 1/8", A2 |
| Flange module | 10.01.44.00195 | FQE 2x connection, 120x60 incl. screws |
| Flange module | 10.01.44.00194 | FQE 3x connection, 120x60 |
| Flange module | 10.01.44.00193 | FQE 4x connection, 120x60 |
| Basic ejector | 10.02.01.00565 | SBP 10 |
| Basic ejector | 10.02.01.00566 | SBP 15 |
| Vacuum filter (inline) | 10.07.01.00328 | VFI 6/4 50 |
| Solenoid valve | 10.05.02.00162 | EMVP 5 3/2 NC |

Accessories for 220x80/300x130

| Designation | Part no. | Note |
|----------------|----------------|---|
| Spring plunger | 10.01.02.00567 | FSTE 1/4" external thread, 25 (2,400 N) |
| Spring plunger | 10.01.02.00568 | FSTE, 1/4" external thread, 50 (2,400 N) |
| Spring plunger | 10.01.02.00569 | FSTE, 1/4" external thread, 75 (2,400 N) |
| Spring plunger | 10.01.02.00570 | FSTE, 1/4" external thread, 25 VG (2,400 N) |

| Designation | Part no. | Note |
|-------------------|----------------|---|
| Spring plunger | 10.01.02.00571 | FSTE, 1/4" external thread, 75 VG (2,400 N) |
| Spring plunger | 10.01.02.00763 | FSTE-HD, 1/4" external thread, 25 (2,400 N) |
| Spring plunger | 10.01.02.00764 | FSTE-HD, 1/4" external thread, 50 (2,400 N) |
| Spring plunger | 10.01.02.00765 | FSTE-HD, 1/4" external thread, 75 (2,400 N) |
| Spring plunger | 10.01.02.00875 | FSTE-HD, 1/4" external thread, 25 VG (2,400 N) |
| Spring plunger | 10.01.02.00876 | FSTE-HD, 1/4" external thread, 50 VG (2,400 N) |
| Spring plunger | 10.01.02.00877 | FSTE-HD, 1/4" external thread, 75 VG (2,400 N) |
| Spring plunger | 10.01.02.01056 | FSTE-HD, 1/4" external thread, 90 VG (1,500N) |
| Spring plunger | 10.01.02.00574 | FSTE, 1/2" external thread, 25 (4,900N) |
| Spring plunger | 10.01.02.00575 | FSTE, 1/2" external thread, 75 (4,900N) |
| Spring plunger | 10.01.02.00576 | FSTE, 1/2" external thread, 90 (4,900N) |
| Spring plunger | 10.01.02.00770 | FSTE-HD, 1/2" external thread, 25 (4,900N) |
| Spring plunger | 10.01.02.00771 | FSTE-HD, 1/2" external thread, 75 (4,900N) |
| Spring plunger | 10.01.02.00772 | FSTE-HD, 1/2" external thread, 90 (4,900N) |
| Spring plunger | 10.01.02.00881 | FSTE-HD, 1/2" external thread, 25 VG (4,900N) |
| Spring plunger | 10.01.02.00882 | FSTE-HD, 1/2" external thread, 75 VG (4,900N) |
| Spring plunger | 10.01.02.00883 | FSTE-HD, 1/2" external thread, 90 VG (4,900N) |
| Flexolink | 10.01.03.00178 | FLK, 1/4" internal thread, 1/4" external thread |
| Flexolink | 10.01.03.00175 | FLK, 1/2" internal thread, 1/2" external thread |
| Ball joint | 10.01.03.00110 | KGL, 1/4" internal thread, 1/4" external thread |
| Ball joint | 10.01.03.00111 | KGL, 1/2" internal thread, 1/2" external thread |
| Flange module | 10.01.44.00203 | 2x connection module, 220x80 |
| Flange module | 10.01.44.00209 | 3x connection module, 220x80 |
| Flange module | 10.01.44.00208 | 4x connection module, 220x80 |
| Flange module | 10.01.44.00202 | 2x connection module, 300x130 |
| Flange module | 10.01.44.00210 | 3x connection module, 300x130 |
| Flange module | 10.01.44.00205 | 4x connection module, 300x130 |
| Flange module | 10.01.44.00204 | 1/4" spring plunger adapter |
| Flange module | 10.01.44.00212 | 1/2" spring plunger adapter |
| Basic ejector | 10.07.01.00122 | SBPL 50 HF |
| Basic ejector | 10.07.01.00123 | SBPL 75 HF |
| Basic ejector | 10.07.01.00128 | SBPL 100 HF |
| Vacuum cup filter | 10.07.01.00122 | VFT, 3/8" internal thread, 80 |
| Vacuum cup filter | 10.07.01.00128 | VFT, 3/4" internal thread, 80 |
| Vacuum cup filter | 10.07.01.00123 | VFT, 3/8" internal thread, 100 |
| Solenoid valve | 10.05.02.00144 | EMVP 10 3/2 NO/NC |
| Solenoid valve | 10.05.02.00146 | EMVP 15 NO/NC |
| Solenoid valve | 10.05.02.00149 | EMVP 20 3/2 NO/NC |

Spare and Wearing Parts

| Designation | Part no. | Description | Replacement / Wearing part |
|---------------------|----------------|------------------------------------|----------------------------|
| Sealing plate (FQE) | 10.01.44.00047 | Sealing for suction trough, 120x60 | S |
| Sealing plate (FQE) | 10.01.44.00037 | Sealing for suction trough, 220x80 | S |

| Designation | Part no. | Description | Replacement / Wearing part |
|-------------------------------|----------------|---|----------------------------|
| Sealing plate (FQE) | 10.01.44.00050 | Sealing for suction trough, 300x130 | S |
| Ejector module | 10.02.01.01343 | SEP HF 2 06 13 | S |
| Ejector module | 10.02.01.01347 | SEP HF 2 13 22 | S |
| Plug | 10.01.44.00061 | Instead of ejector module 2-13-22 | S |
| Silencer insert | 10.01.44.00021 | for 120x60 | S |
| Silencer insert | 10.01.44.00116 | for large version/ Set – consisting of 4 parts | S |
| Silencer cap | 10.01.44.00001 | small | S |
| Silencer cap | 10.01.44.00030 | large | S |
| Plug-in screw union, straight | 10.08.02.00200 | M5 AG4 | S |
| Sealing screw with collar | 10.08.06.00064 | M5 | S |
| Plug-in screw union, bracket | 10.08.02.00155 | M5 AG4 | S |
| Plug-in screw union, straight | 10.08.02.00204 | STV-GE, 1/8" external thread, 6 | S |
| Plug-in screw union, bracket | 10.08.02.00158 | STV-W, 1/8" external thread, 6 | S |
| Plug-in screw union, straight | 10.08.02.00206 | 1/8" external thread, 8 | S |
| Plug-in screw union, bracket | 10.08.02.00160 | 1/8" external thread, 8 | S |
| Plug-in screw union, straight | 10.08.02.00202 | 1/8" external thread, 4 | S |
| Sealing screw with collar | 10.08.06.00043 | 1/8" | S |
| Plug-in screw union, bracket | 10.08.02.00156 | 1/8" external thread, 4 | S |
| Plug-in screw union, straight | 10.08.02.00207 | STV-GE, 1/4" external thread, 8 | S |
| Plug-in screw union, bracket | 10.08.02.00161 | STV-W, 1/4" external thread, 8 | S |
| Plug-in screw union, bracket | 10.08.02.00171 | STV-WF, 1/4" external thread, 8 | S |
| Plug-in screw union, straight | 10.08.02.00128 | STV-GE, 1/4" external thread, 10 | S |
| Plug-in screw union, bracket | 10.08.02.00254 | STV-W, 1/4" external thread, 10 | S |
| Plug-in screw union, bracket | 10.08.02.00258 | STV-WF, 1/4" external thread, 10 | S |
| Plug-in screw union, straight | 10.08.02.00210 | STV-GE, 1/2" external thread, 12 | S |
| Plug-in screw union, bracket | 10.08.02.00164 | STV-W, 1/2" external thread, 12 | S |
| Plug-in screw union, straight | 10.08.02.00300 | STV-GE, 1/2" external thread, 14 | S |
| Plug-in screw union, bracket | 10.08.02.00273 | STV-W, 1/2" external thread, 14 | S |
| Hose sleeve | 10.08.03.00163 | ST, 1/2" external thread, 19 MS-V | S |
| Machine screw | 20.01.02.00504 | for silencer cap, 120x60 | S |
| Machine screw | 20.01.02.04002 | for silencer cap, 220x80/300x130 (identical) | S |
| Machine screw | 20.01.02.00001 | M3x10 attachment, mounting plate to suction trough, 120x60 | S |
| Machine screw | 20.01.02.00002 | M3x12 attachment, mounting plate to suction trough, 220x80/300x130 | S |
| Machine screw | 20.01.02.00006 | M3x16 attachment, mounting plate to suction trough, FQE-M (FM), 300x130 | S |
| Safety washer | 20.06.02.00027 | for 120x60 | S |
| Sealing plate | 10.01.44.00007 | 120x60 O10 | W |
| Sealing plate | 10.01.44.00137 | 120x60 O20 | W |

| Designation | Part no. | Description | Replace- ment / Wearing part |
|----------------------|-----------------|--------------------------|---|
| Sealing plate | 10.01.44.00140 | 120x60 O10O10F | W |
| Sealing plate | 10.01.44.00058 | 220x80 O10 | W |
| Sealing plate | 10.01.44.00156 | 220x80 O20 | W |
| Sealing plate | 10.01.44.00176 | 220x80 O10O10F | W |
| Sealing plate | 10.01.44.00052 | 300x130 O10 | W |
| Sealing plate | 10.01.44.00180 | 300x130 O20 | W |
| Sealing plate | 10.01.44.00189 | 300x130 O10O10F | W |
| Bellows suction cup | 10.01.06.03125 | SPB2 20 SI-40 P | W |
| Filter screen | 10.01.06.02567 | FD 18 120 | W |
| Flow restrictor | 10.05.04.00090 | SW-80-P-7.3 | S |
| Flow restrictor | 10.05.04.00091 | SW-100-P-7.3 | S |
| Flow restrictor | 10.05.04.00092 | SW-130-P-7.3 | S |
| Bellows suction cups | 10.01.44.00131 | | W |
| Bellows suction cup | 10.01.06.03409 | | W |
| Filter screen | 10.01.06.02567 | FD 18 120 | W |
| Screw-in nozzle | 10.05.04.00022 | Flow restrictor (SW) 60 | S |
| Screw-in nozzle | 10.05.04.00024 | Flow restrictor (SW) 80 | S |
| Screw-in nozzle | 10.05.04.00026 | Flow restrictor (SW) 100 | S |
| Screw-in nozzle | 10.05.04.00087 | Flow restrictor (SW) 130 | S |

11 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.

12 EC Conformity

EC declaration of incorporation

The manufacturer Schmalz confirms that the gripping system described in these assembly instructions fulfills the following applicable EC directives:

| | |
|------------|---------------------|
| 2006/42/EC | Machinery Directive |
| 2011/65/EU | RoHs Directive |

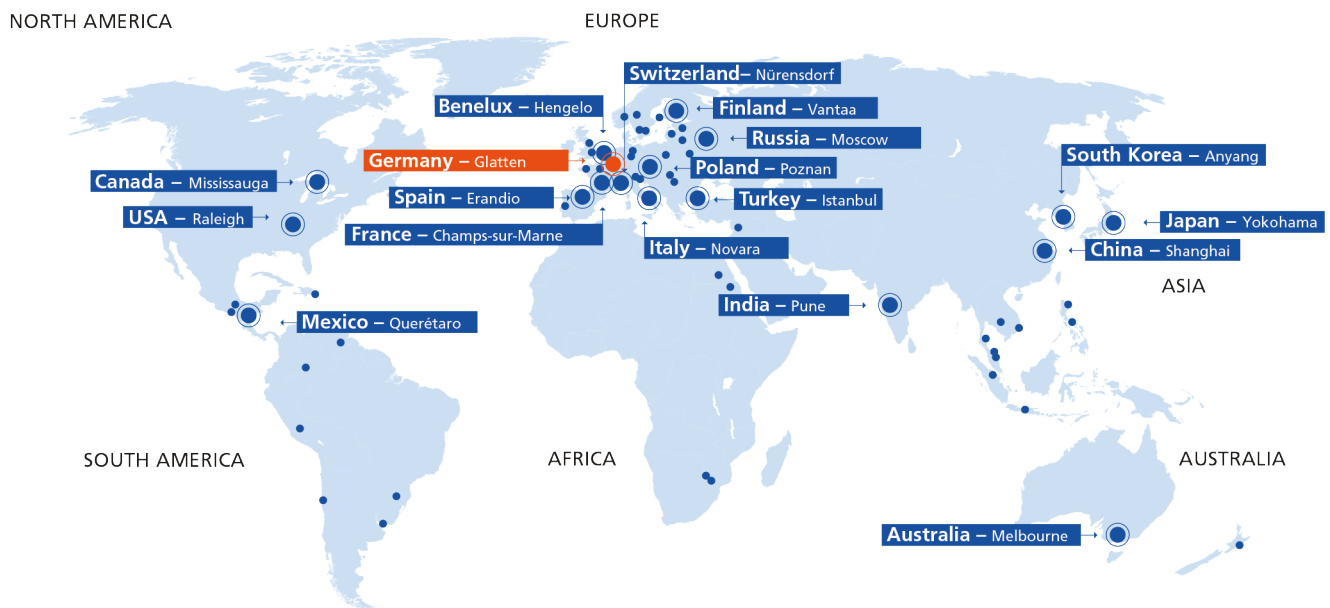
The product specified is solely intended for installation indoors in a complete system. Startup is prohibited until the end product has been declared to comply with the Directive 2006/42/EC.

The manufacturer commits to provide special documentation of the partly completed machinery to national authorities in electronic form if requested. The special technical documentation belong to the machine as per Annex VII Part B has been created.

The following harmonized standards were applied:

| | |
|---------------------|--|
| EN ISO 12100 | Safety of machinery — General principles for design — Risk assessment and risk reduction |
| EN ISO 13849-1:2015 | Safety of machinery - Safety-related parts of control systems - Part 1 General principles for design |
| EN 1012-1 | Compressors and Vacuum Pumps - Safety requirements - Part 1: compressors |
| EN 50581 | Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances |
| DIN ISO/TS 15066 | Robots and robotic devices – Collaborative robots |
| EN ISO 10218-1 | Industrial Robots – Safety Requirements – Part 1: Robots |
| EN ISO 10218-2 | Industrial Robots – Safety Requirements – Part 2: Robot Systems and Integration |

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