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Finger Gripper OFG-HYG

Operating Instructions

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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1 Important Information

1.1 Note on Using this Document

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

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

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:

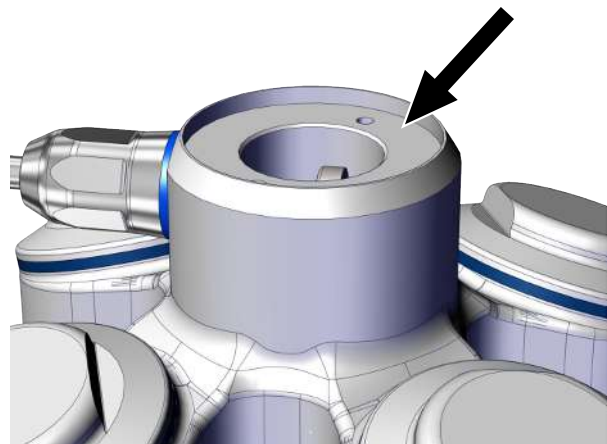
www.schmalz.com/services

1.3 Marking

The marking is incorporated into the product at the position shown in the image. It contains important information about the product.

The following data is milled in to the product:

- Part sales designation/type
- Manufacturing date
- Sequential number of the batch



Please specify all the information above when ordering replacement parts, making warranty claims or for any other inquiries.

1.4 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. |

| Signal word | Meaning |
|-------------|---|
| 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.

2 Fundamental Safety Instructions

2.1 Intended Use

The finger gripper OFG-HYG was designed in accordance with the principles of hygienic design and manufactured for industrial transport tasks. It is intended to be used in combination with a robot or a handling system for gripping and holding sensitive products of the maximum specified size, including products in the food industry. The sizes are dependent on the dimensions of the products and the method of gripping.

The finger gripper OFG is an incomplete machine within the meaning of the Machinery Directive 2006/42/EC. It must be operated only together with a robot or handling system.

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 does not accept any liability for any direct or indirect losses or damages that result from using the product. This applies, in particular, to any use of the product that is not in accordance with the intended purpose and to any use that is not described or mentioned in this documentation.

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 this Operating instructions.
2. The product must be operated only by persons who have undergone appropriate training.

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

2.4 Emissions

The device emits noise due to operation with compressed air and a vacuum.



CAUTION

Noise pollution caused by exhaust air or leakage during operation

Hearing damage

- ▶ In the event of leakage, check connections and lines and remedy leakages
- ▶ Wear ear protectors.

2.5 Overpressure



CAUTION

Risk of a gripping finger bursting if the air pressure is too high when the gripping fingers are activated.

Risk of injury

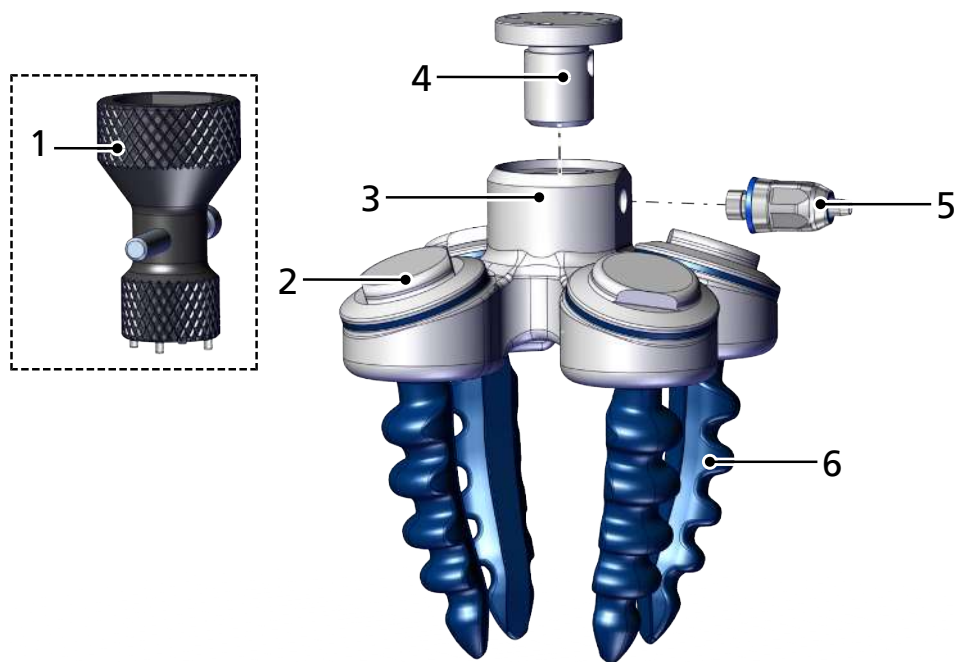
- ▶ Ensure that the pneumatic connection is operated with a maximum air pressure of 1.6 bar.
- ▶ Wear ear plugs and protective glasses.

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 Design



| | | | |
|---|---|---|---|
| 1 | Accessories: Multitool (for changing the gripper fingers) | 2 | Cover caps with sealing ring |
| 3 | Support structure OFG-HYG | 4 | Mechanical interface with the robot/handling system |
| 5 | Pneumatic connection | 6 | Gripping finger |

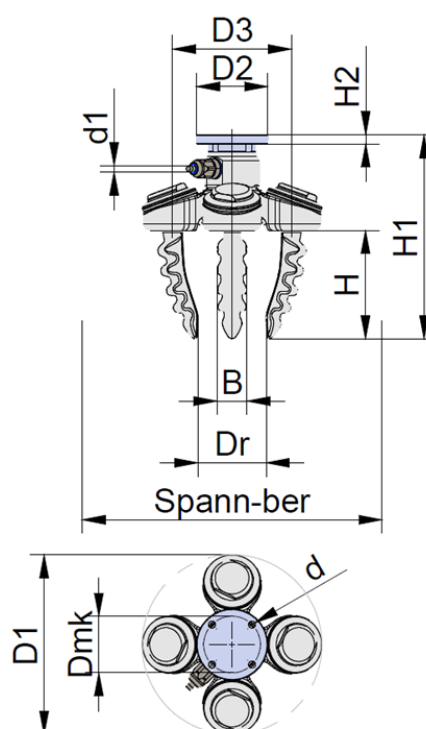
4 Technical Data

4.1 Technical Parameters

| | |
|------------------------|--|
| Device weight | 0.5 kg |
| Sound pressure level | Below 70 dB(A) |
| Pneumatic connection | - 0.8 to 1.6 bar |
| Operating medium | Compressed air, oiled or unoled in accordance with ISO 8573-1:2001, class 7-4-4 |
| Workpiece material | All shapes and materials |
| Workpiece temperature | Between -30 and 200° C |
| Maximum workpiece size | Dependent on the gripper alignment (> See <i>ch. Gripper Alignments, Page 10</i>) |
| Mass: | 1 kg |

4.2 Dimensions

| | |
|----------------------------|--|
| d1 | 8 |
| D2 | 42 (with flange 31.5) 65 (with flange 50) |
| D3 | 105 |
| H | 96 |
| H1 | 165.5 (with flange 31.5) 189.5 (with flange 50) |
| H2 | 4.1 (with flange 31.5) 12.3 (with flange 50) |
| B | 26.4 |
| Dr | 60.5 |
| Clamping range (Spann-ber) | 265 |
| d | 5.3 (with flange 31.5) 6.4 (with flange 50) |
| D1 | 159 |
| Dmk | 31.5 (with flange 31.5) 50 (with flange 50) |



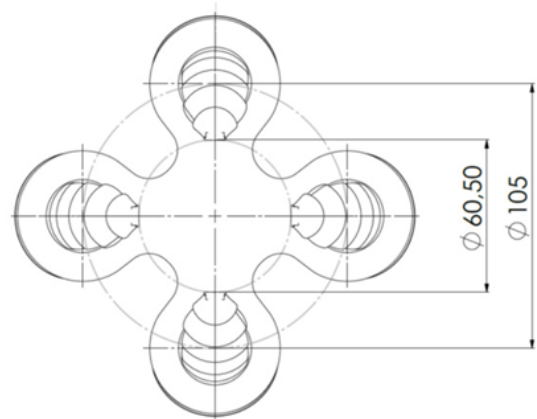
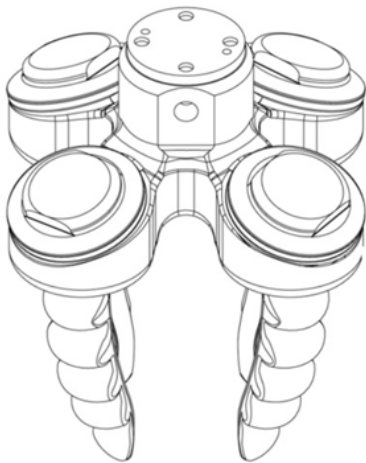
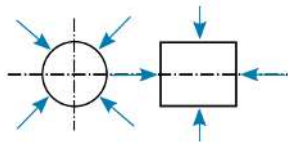
All dimensions given in millimeters [mm].

4.3 Gripper Alignments

Centered



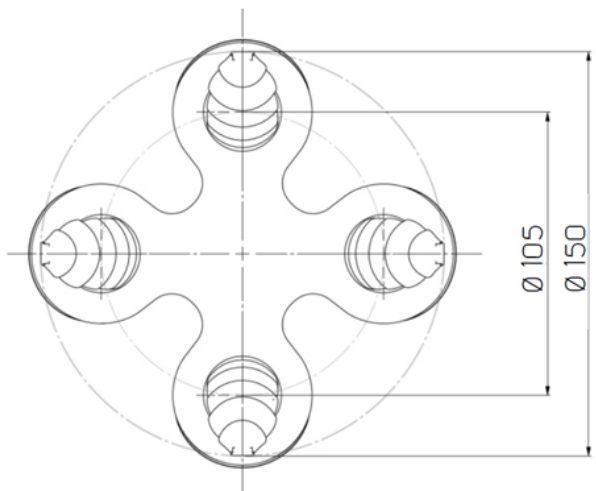
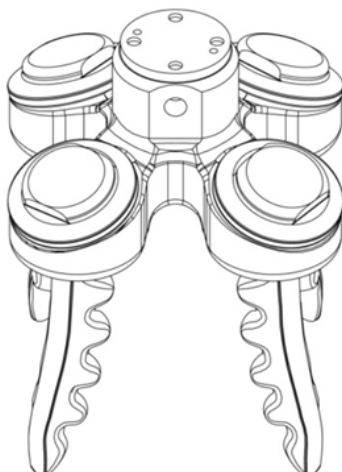
Recommended for rotationally symmetrical and cuboidal products with main dimensions < 105 mm



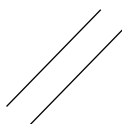
Centered out-ward



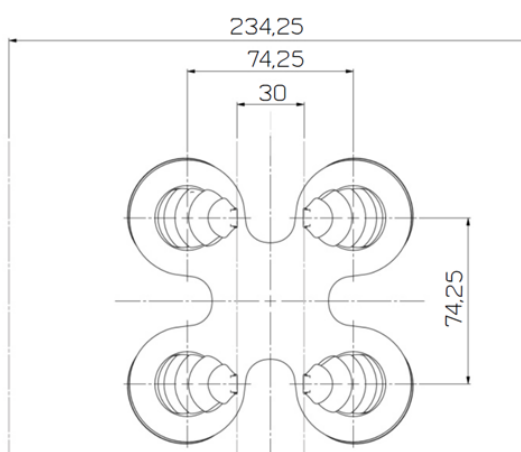
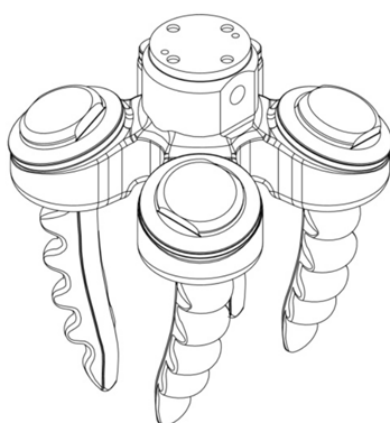
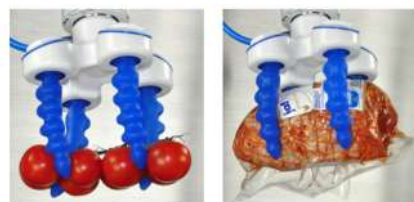
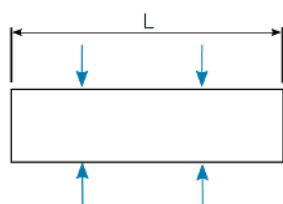
Recommended for rotationally symmetrical hollow parts with an internal diameter > 60 mm < 160 mm



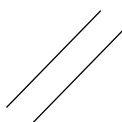
Parallel



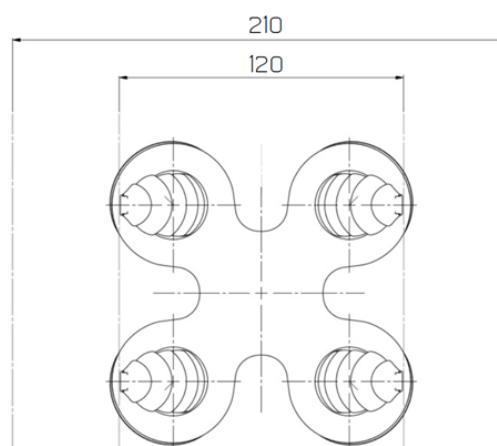
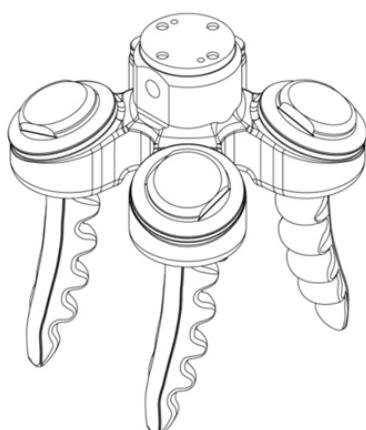
Recommended for extruded products $L > 80$ mm



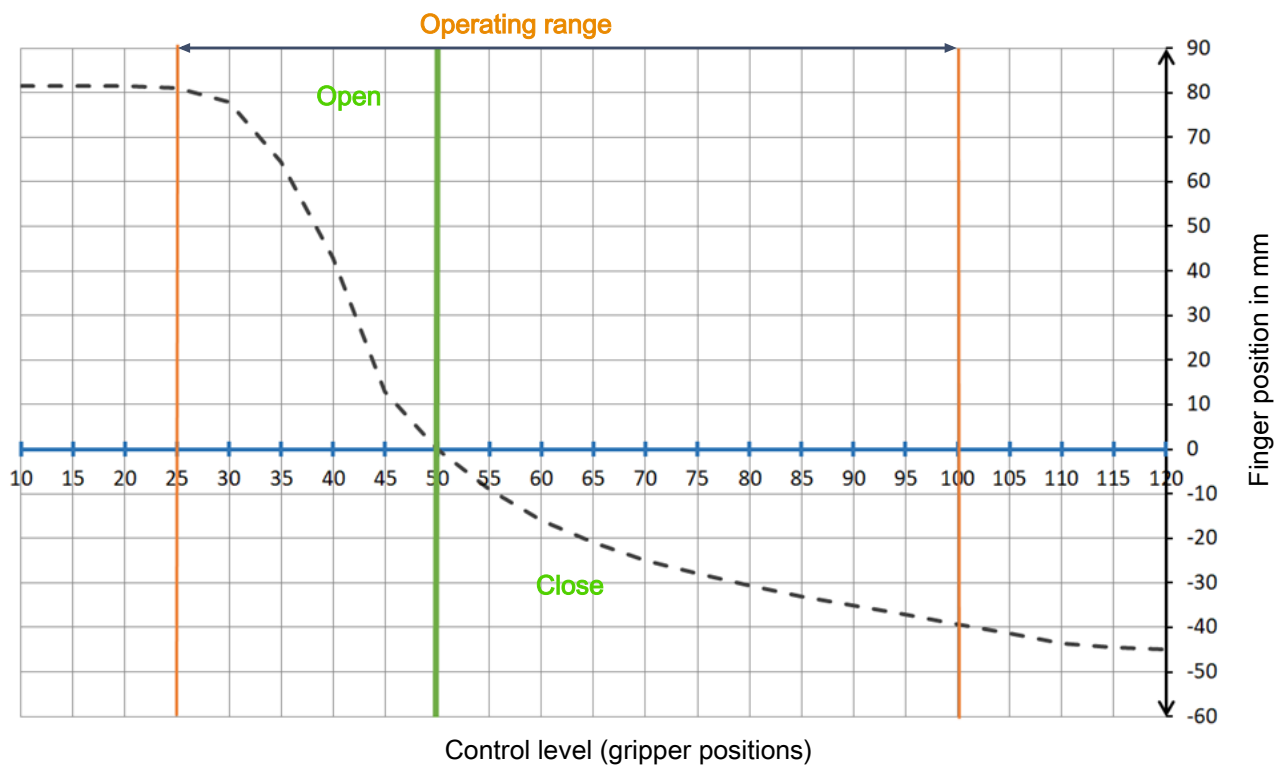
Parallel out-ward



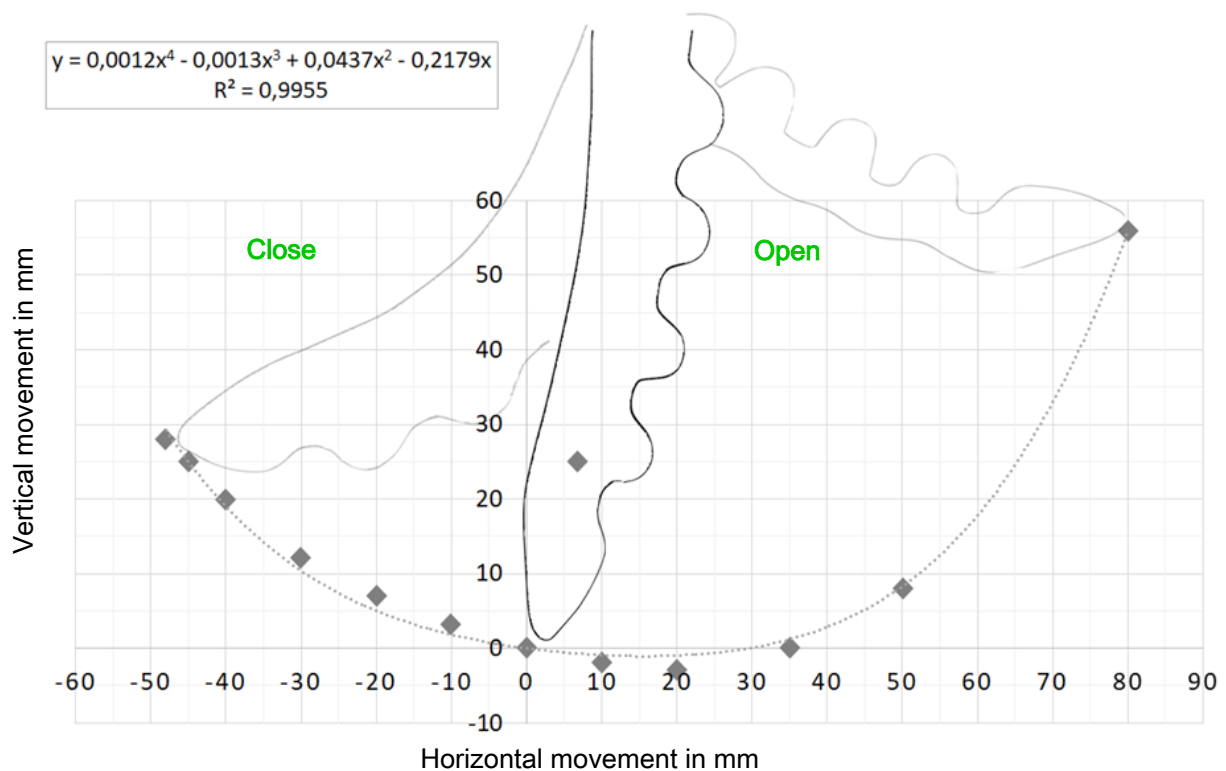
Recommended for extruded products with a cuboidal inner contour $L > 80$ mm



4.4 Finger Position vs. Control Level



4.5 Movement Path of the Gripper Fingers



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 Transport

Flawless and dust-free containers must be used for transport to and from the installation site, and professional safety measures must be ensured.

Only means of transport that comply with the statutory provisions and the specified loads must be used.

5.3 Storage



NOTE

The effects of ozone, light (especially UV), heat, oxygen, humidity as well as mechanical influences can reduce the service life of rubber products.

Damage to the finger gripper due to incorrect storage!

- ▶ Store the finger gripper in a cool place (0° C to +15°C, max. 25° C) that is dark, dry, low in dust and offers protection from the weather, ozone and drafts. It should also be free of tension (e.g. stacked appropriately to avoid deformation).

- ▶ Close all openings with adhesive tape.

6 Description of the Function

The finger gripper works using the air pressure inside the gripper fingers.

In order for the gripper fingers to move, one side of the material is designed in such a way that it is less stretchy or does not stretch at all. When the pressure inside increases, the finger therefore bends around this side.

When the pressure is released, the finger retracts. The gripper fingers are made from soft, stretchy plastic to ensure optimum gripping force.

By positioning the gripping finger in its holder (45° increments), it is possible to define the direction of bending in relation to the center of the gripper.



7 Installation

7.1 Requirements for the Higher-Level System

We recommend using the Schmalz controller as it is designed to work perfectly with the OFG.

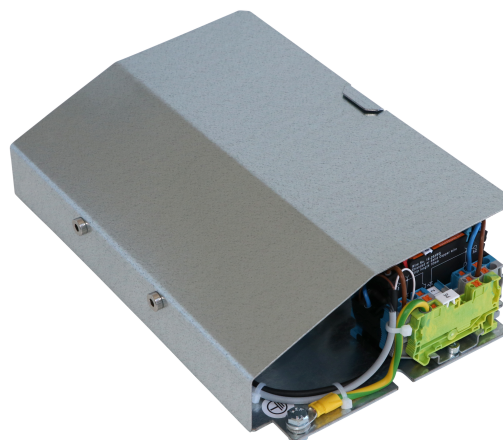
The controller is used to activate and deactivate the vacuum and compressed air and thus control the "opening" and "closing" functions of the OFG:

- **Opening:** When the vacuum is activated, the gripper fingers move outward, that is, they move in the direction of the ribbed side.
- **Closing:** When the compressed air is activated, the gripper fingers move inward, that is, they move in the direction of the smooth side.

You can choose between the following solutions to control and regulate the gripper movement:

Gripping Control Unit – Basic

Functions: Open / close --> 24 V / ground / open / close



Gripping Control Unit – Controlled

Set opening angle and gripping force, six predefined parameters (adjustable)



7.2 Installation Instructions



⚠ 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 caused by exhaust air or leakage during operation

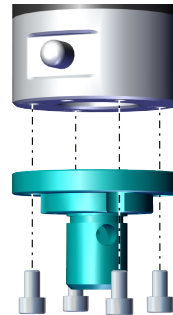
Hearing damage

- ▶ In the event of leakage, check connections and lines and remedy leakages
- ▶ Wear ear protectors.

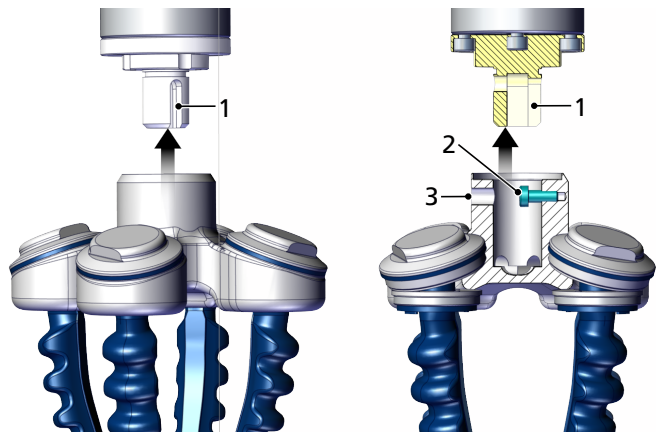
7.3 Mechanical Attachment

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

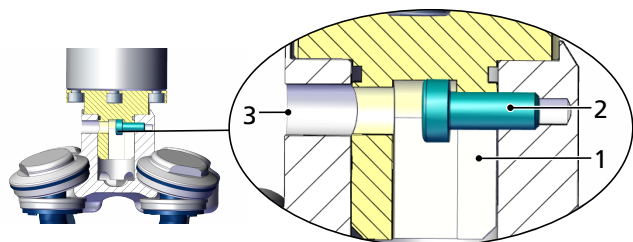
1. Secure the coupling flange to the manipulator/robot using 4x M5 machine screws and a tightening torque of 6 Nm (standard pitch diameter 31.5 or 50 mm).



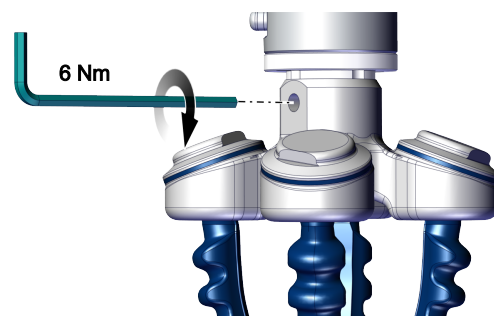
2. Push the gripping system in the correct position onto the coupling flange as far as it will go. Make sure that the slot (1) on the coupling flange and the screw (2) are aligned.



- ⇒ The gripping system is pushed onto the coupling flange as far as it will go in such a way that the screw (2) can be tightened through the hole in the pneumatic connection (3).



3. Secure the gripping system to the coupling flange through the hole in the pneumatic connection using the M4 screw with a tightening torque of 6 Nm.

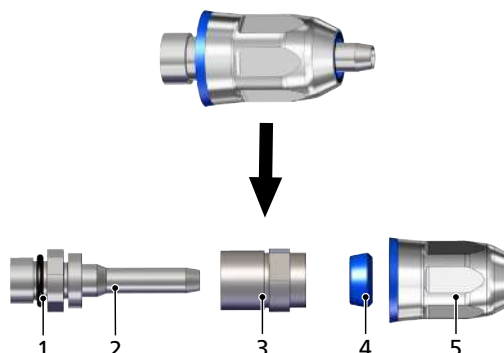


7.4 Pneumatic connection

The hose screw connection is fitted on the pneumatic connection (5).

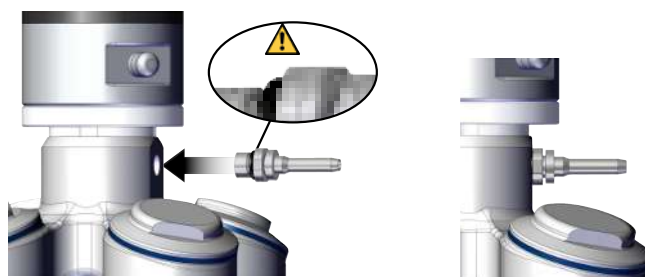
- ✓ The appropriate hose (OD = 8 mm, ID = 6 mm) is ready to hand.

1. Dismantle the hose screw connection.



- ⇒ 1 —> O-ring
- ⇒ 2 —> Inner pin
- ⇒ 3 —> Clamping element
- ⇒ 4 —> Sealing ring
- ⇒ 5 —> Union nut

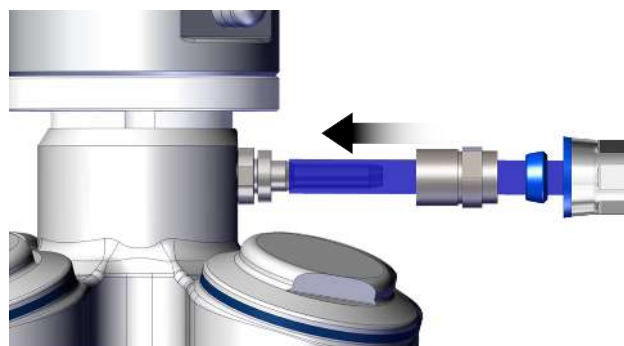
2. Attach the inner pin (2) to the gripping system, making sure that the O-ring (1) is in the correct position. Tighten the inner pin as far as it will go. Tool: Hexagon wrench SW10.



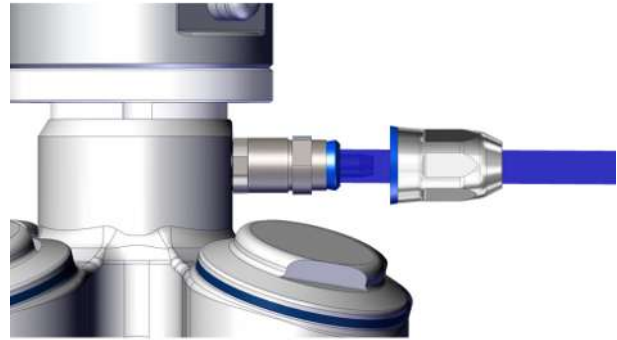
3. Push the union nut (5), the sealing ring (4) and the clamping element (3) (in this order) on to the hose.



4. Push the hose as far as possible onto the inner pin (2).

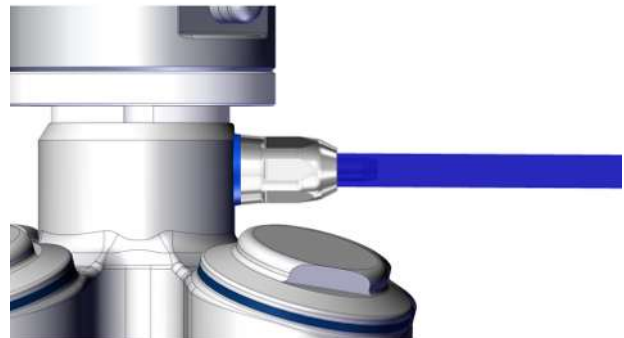


5. Screw the clamping element (3) on to the inner pin (2) as far as it will go. Tool: Hexagon wrench SW13.



6. Push the sealing ring (4) up to the clamping element (3).

7. Screw the union nut (5) on to the clamping element (3) as far as it will go. Tool: Hexagon wrench SW13.



8 Maintenance and Cleaning

8.1 Maintenance Plan and Cleaning



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 the supply hose and gripping fingers (vacuum/compressed air): <ul style="list-style-type: none"> Material not brittle No kinks Not chafed Airtightness | | | X | | X |
| The operating instructions are available, legible, and can be accessed by personnel. | | | | | X |

To safely clean the product, its materials must not react with the cleaning agent and antimicrobial chemicals (disinfectants).



NOTE

Incorrectly cleaning the product and its components

Damage to the product or individual components due to aggressive cleaning agents or excessive temperatures!

- ▶ For cleaning, use only cleaning agents that do not corrode or damage the materials used.
- ▶ Do not use sharp-edged objects (wire brushes, sandpaper, etc.).
- ▶ Do not exceed the specified max. temperature during cleaning.

The table below shows the materials used:

| Component | Material |
|-------------------------|-----------------|
| Main body | PET-P |
| Gripping finger | SI |
| O-rings | SI |
| Screws, hose connection | Stainless steel |

When cleaning the parts, a maximum temperature of 60° C must be observed.

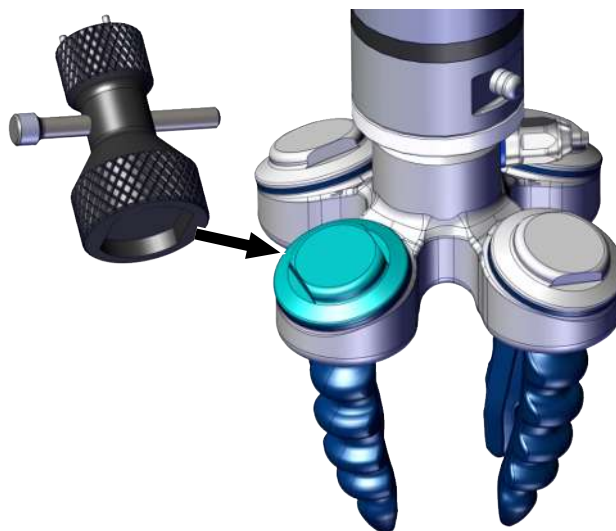


The type and frequency of cleaning is the responsibility of the operating company.

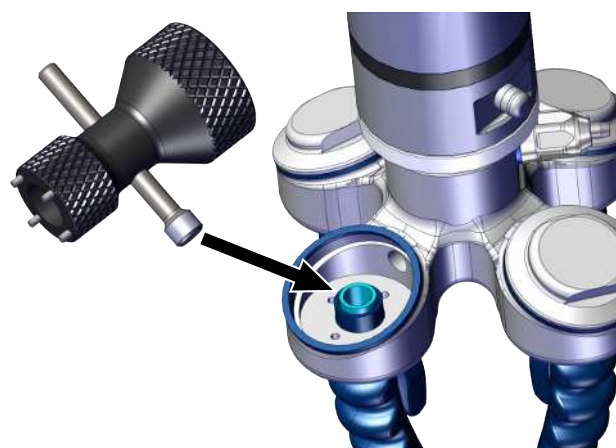
8.2 Replacing or Realigning the Gripping Fingers

8.2.1 Removing a Gripping Finger

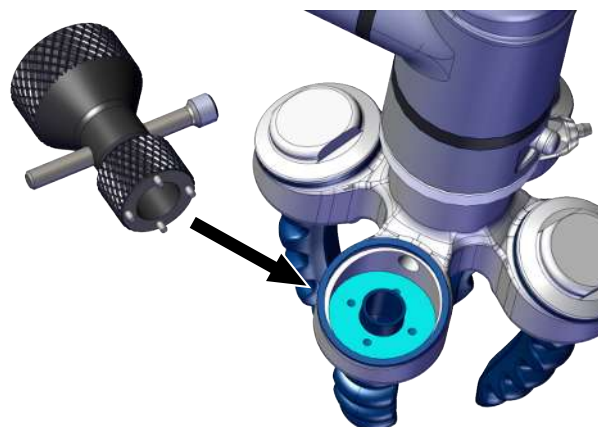
1. Remove the cover cap using the recess on the multitool (turn counterclockwise).



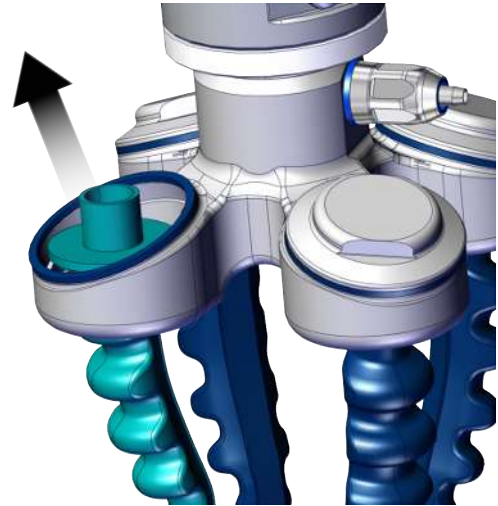
2. Remove/pull out the clamping element using the thread on the multitool.



3. Unscrew the lock washer using the four pins on the multitool (turn counterclockwise).



4. Remove the gripping finger from the holder.

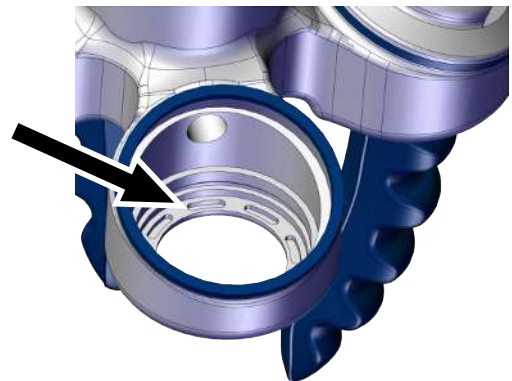
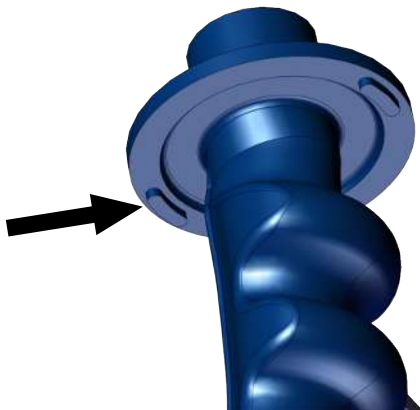


8.2.2 Fitting a Gripping Finger

Positioning the gripping fingers

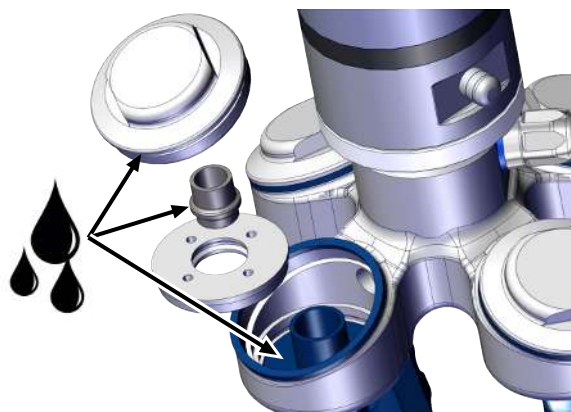
By positioning the gripping finger in its holder, it is possible to define the direction of bending in relation to the center of the gripper.

The gripping fingers can be mounted in 45° increments. This is defined by two notches on the gripper finger and corresponding recesses on the holder.



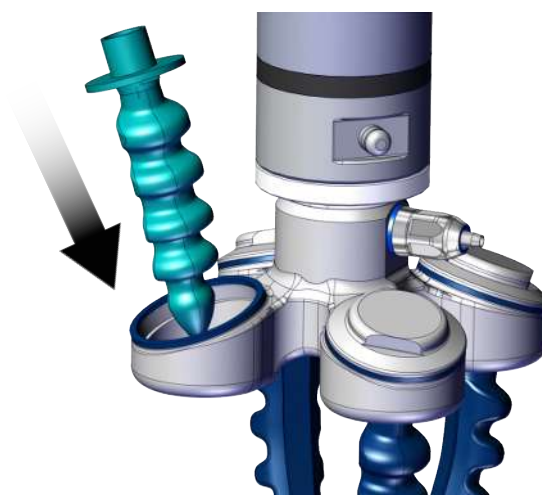
Reducing the friction during assembly

To reduce the friction, we recommend using commercial detergent during assembly. Lightly wet the silicone surfaces and the outer surface of the clamping element with diluted detergent.



Fitting the gripping finger

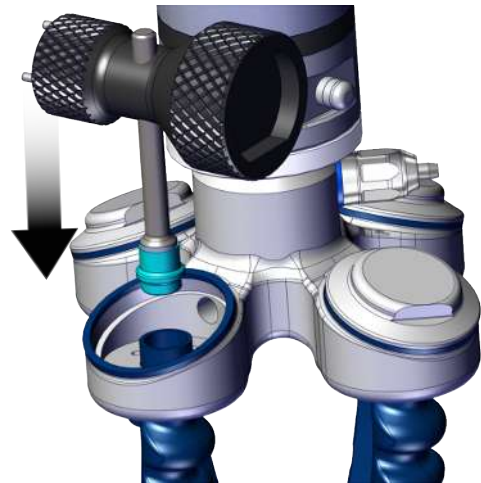
1. Insert the gripping finger into the desired position in the holder. Make sure that the two notches on the gripping finger are positioned correctly.



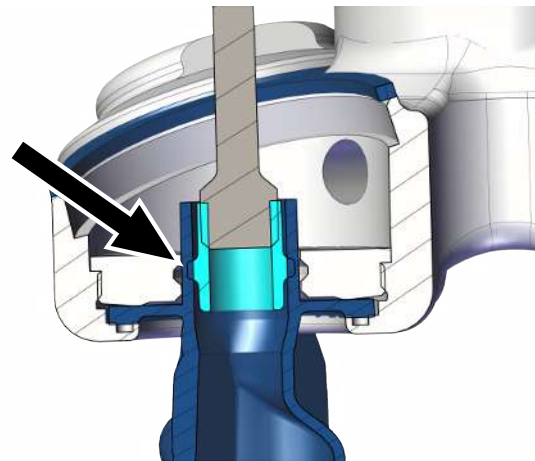
2. Fit the lock washer using the multitool, tightening torque 7 Nm.



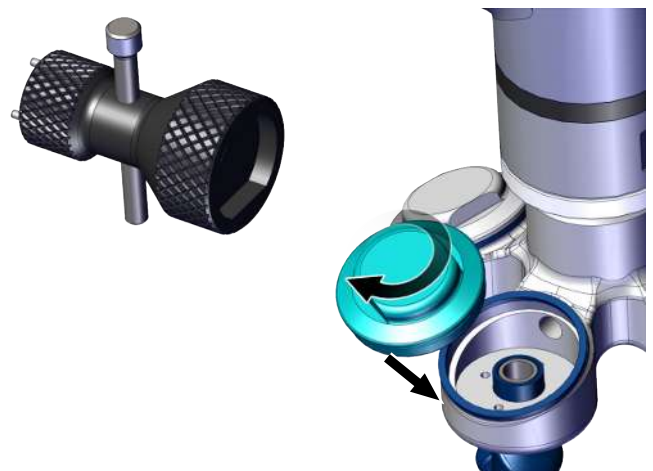
3. Press the clamping element with the thread on the multitool in the correct position (internal thread pointing upward) into the opening provided in the gripping finger until it is seated in the groove on the lock washer.



⇒ The clamping element sits in the groove in the lock washer.



4. Screw in the cover cap using the multitool, tightening torque 8 Nm.



9 Warranty

Schmalz guarantees this system pursuant to our General Terms and Conditions of Sale and Delivery. The same applies to spare parts, provided that these are original parts supplied by us.

Wearing parts are not covered by the warranty.

10 Spare and Wearing Parts, Accessories

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.

| Designation | Part no. | Type |
|------------------------------|----------------|------|
| Wearing parts set OFG | 10.01.51.00007 | W |
| Hygienic hose sleeve | 10.08.03.00386 | S |
| Multitool | 10.01.51.00010 | A |
| Pneumatic hose VSL 8-6 PU | 10.07.09.00003 | A |
| Sealing screw (for cleaning) | 10.08.06.00043 | A |
| Basic controller | 10.01.51.00005 | A |
| Controlled controller | 10.01.51.00006 | A |

| | | |
|---------|-------|---------------|
| Legend: | S ... | Spare part |
| | W ... | Wearing parts |
| | A ... | Accessories |

11 Disposing of the Device

1. Dispose of the product properly after replacement or decommissioning.
2. Observe the country-specific guidelines and legal obligations for waste prevention and disposal.

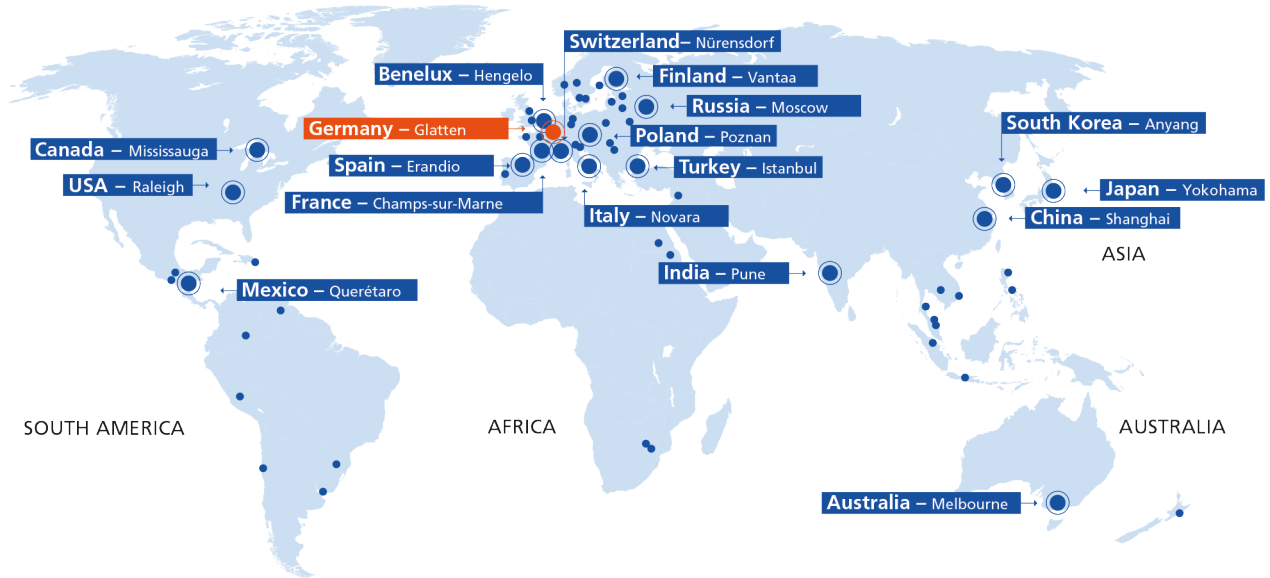
| Component | Material/material number |
|----------------------------------|--------------------------|
| Main body | PET |
| Gripping finger | SI |
| Flat gasket | SI |
| O-ring | SI |
| Screws, hose connection | Stainless steel |
| Machine screw | Stainless steel |
| Gripping finger clamping element | 1.4305 |
| Dowel pin | 1.4305 |
| Coupling | PET |

12 Notes

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