

OPERATING INSTRUCTIONS

SoftGripper and SoftActuators

Original Instructions

This document describes the usage of the SoftGripping SoftGripper and
SoftGripping SoftActuators

Revision 2.2

Date of Revision: 2024-08-16



Tip: For your own safety, read the operating instructions and follow the warning and safety instructions on the device and in the operating instructions. Keep the operating instructions for future reference.



Tip: If you wish to get the operating manual in an additional language, please send us your request and the corresponding product code via Email.



Warning! Not reading the manual properly can lead to injuries. Please mind the warnings provided in the operating instructions.

Technical Support: Do you have questions about the installation or operation of your device?

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Original Instructions
Errors and technical modification subject to change, you can find the newest version on our homepage.

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1. About this document

This document describes the usage of the product, certain aspects of the device are described in other documents and must be observed as well.

1.1. Applicable documents

You can find additional information in the Quick Installation Guides and data sheets. For all available documentation visit our website or contact us directly.

2. Safety

2.1. Intended use

SoftGrippers and SoftActuators are used with roboter systems for pick and place tasks.

2.2. General safety information

- The product may only be used in its original status without unauthorized modifications.
- Only use the product if it is in perfect technical conditions.
- The use is intended inside building only.
- The use is only allowed for the intended use shown 2.1.
- Take the ambient conditions at the location of use into consideration.

3. Service

Contact our regional SoftGripping partners if you need technical support.
Or contact us directly under info@soft-gripping.com

4. Accessories

You can find all accessories in our catalogue or on our website.

5. Overview

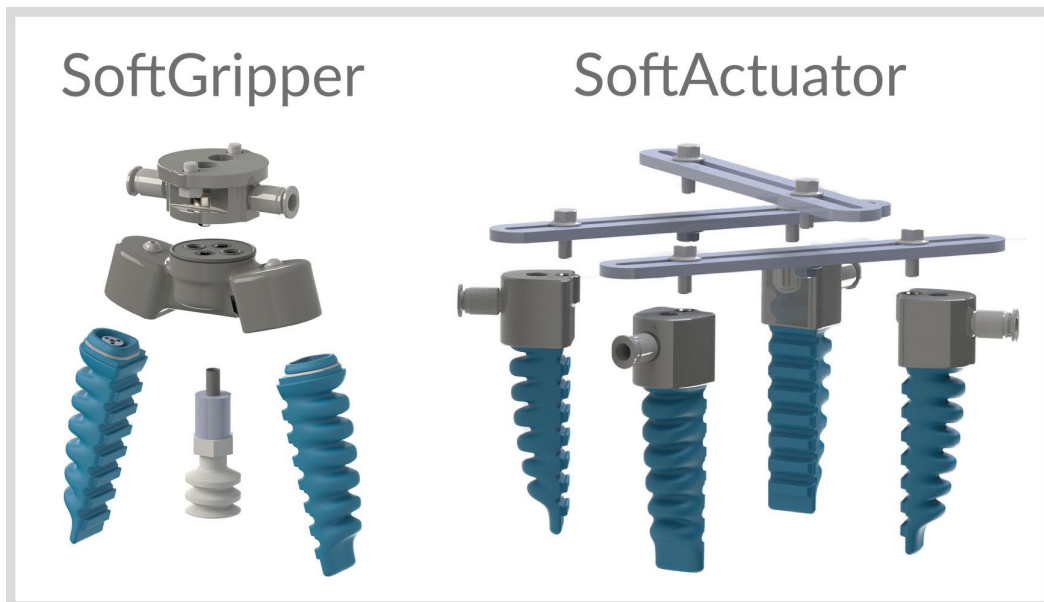


Figure 1: SoftGripper and SoftActuator

SoftGripping comes in two editions: [SoftGripper](#) and [SoftActuator](#).

[SoftGripper](#) are built from one piece. But you can switch the adapter for the specific robot and replace the fingers. Angle and base remain unchangeable. Made for the selected gripping purpose. Designed for human-robot interactions with Cobots and high-speed applications with delta or scara robots.

[SoftActuator](#): Plates or aluminium profiles and SoftActuators are all you need for pick and place tasks with industrial robots. Use the perfect plate for your application or design multi EoAT systems for your needs.

All SoftGripping Fingers are made of FDA approved silicone rubber. You can handle food safely. For special hygienic requirements e.g. handling meats and fish you can optionally get [SoftGrippers](#) and [SoftActuators](#) in hygienic version with special screws and seals and a special coating of the bases.

Finger Material	Silicone (FDA approved)
Operating Pressure	- 0.3 to 1.0 bar
Grip Force per Finger	5 N

The Fingers are operated by compressed air in accordance with ISO 8573-1:2010 [7:4:4]. When applying overpressure (< 1,2 bar) to the fingers, they bend and the position "Grip" is set. Setting vacuum, the fingers are be spread to the "Release" position. The fingers are "Relaxed" when no pressure or vacuum is applied.

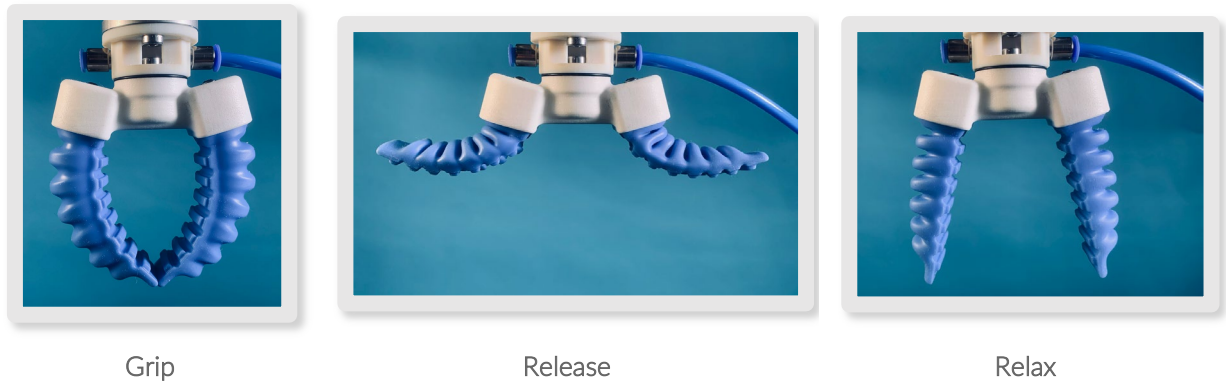


Figure 2: Three states of SoftGripping

5.1. SoftGripper

In the following modularity of SoftGripper is presented. It's the Base, the Fingers and the Robot Connector. These things are connected with a few screws and seals.

Here is an example with a 2-Finger parallel Gripper for a robot with ISO 9409-31,5-4-M5 flange.

We provide connectors for any robot. If you cannot find the connector on our website, please contact us directly.

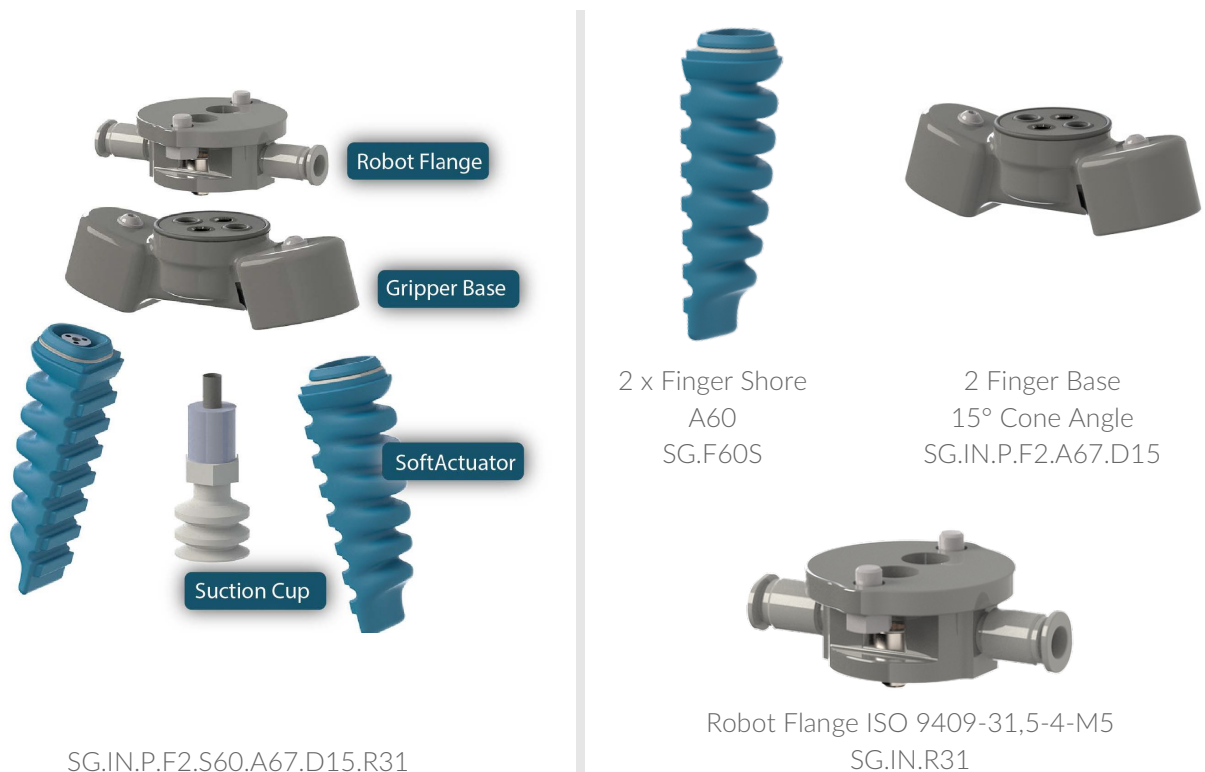


Figure 3: Modular Design of a SoftGripper

5.2. SoftActuator

The SoftGripping SoftActuator series is built for maximum flexibility. Actuators with single or multiple fingers are used for light, adjustable and fast SoftGripper. SoftActuators can be mounted on our SoftGripping Plates or you can build your own EoAT according to your needs.

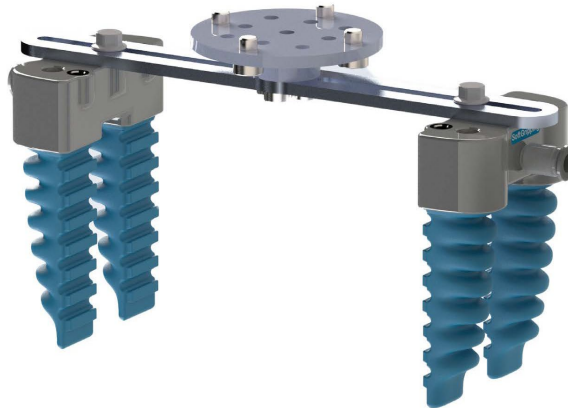


Figure 4: 4-Finger Gripper with SoftActuators

1-Finger SoftActuator

SG:AN.F1.S60

Mass 40 g



2 Arm Plate

SG:AN.P2.A185

Mass 40 g



2-Finger SoftActuator

SG:AN.F2.S60

Mass 100 g



3 Arm Plate

SG:AN.P3.A185

Mass 50 g



4 Arm Plate

SG:AN.P4.A185

Mass 60 g



3-Finger SoftActuator

SG:AN.F3.S60

Mass 120 g



6 Arm Plate

SG:AN.P6.A185

Mass 75 g



8 Arm Plate

SG:AN.P8.A185

Mass 90 g



6. Installation

For mechanical installation: Make sure to use the right screws and sealings and make sure to tighten the screws with right torque, so no parts can disconnect during operation.

For pneumatical installation: Make sure to use the right diameter of tubing and your pneumatic setup not to exceed the maximal operating pressure. Connect the tubing to the corresponding connectors. The number of connections you have to make depends on the configuration of your SoftGripper. Verify, that all connections are made, before operating the setup. The compressed air to operate the Controlbox and all our SoftGripping products must be in accordance with ISO 8573-1:2010 [7:4:4].



An unfavorable mounting position can impair the functionality of this product:

- Make sure to tighten the screws, so no parts can disconnect during operation.
- Be sure not to handle SoftGrippers near sharp items or in corrosive environments.



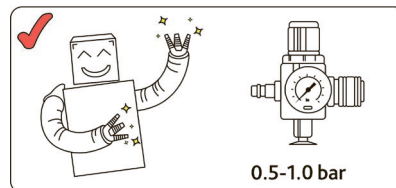
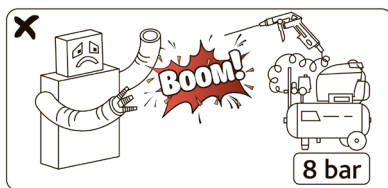
Warning! Turn of all pneumatics, robots and moving parts before mounting or unmounting the SoftGripper or disassembling it.

Keep the dangers of compressed air and the following points in mind:

- Make sure to connect and disconnect tubing while the compressor is turned off.
- Do not bend the tubing excessively. The flow must be provided at any time.
- Check the tubing for leaks and abrasions. Verify that you are using suitable tubing.
- Mind, that tubing with the right diameter must be used.
- The maximum input pressure should not be exceeded at any time.



MAXIMUM INPUT PRESSURE <1,0 bar



Warning! Injury caused by pressurized system. To minimize risks of injuries while handling pneumatics:

- Wear personal protective equipment (PPE) such as hearing and eye protection at any time.
- and operate high pressure equipment behind a blastshield.



6.1. SoftGripper

Depending on the selected product, a SoftGripper comes assembled or unassembled. The following steps shows you how to install your SoftGripper. These steps are also to be used for replacement of the components.

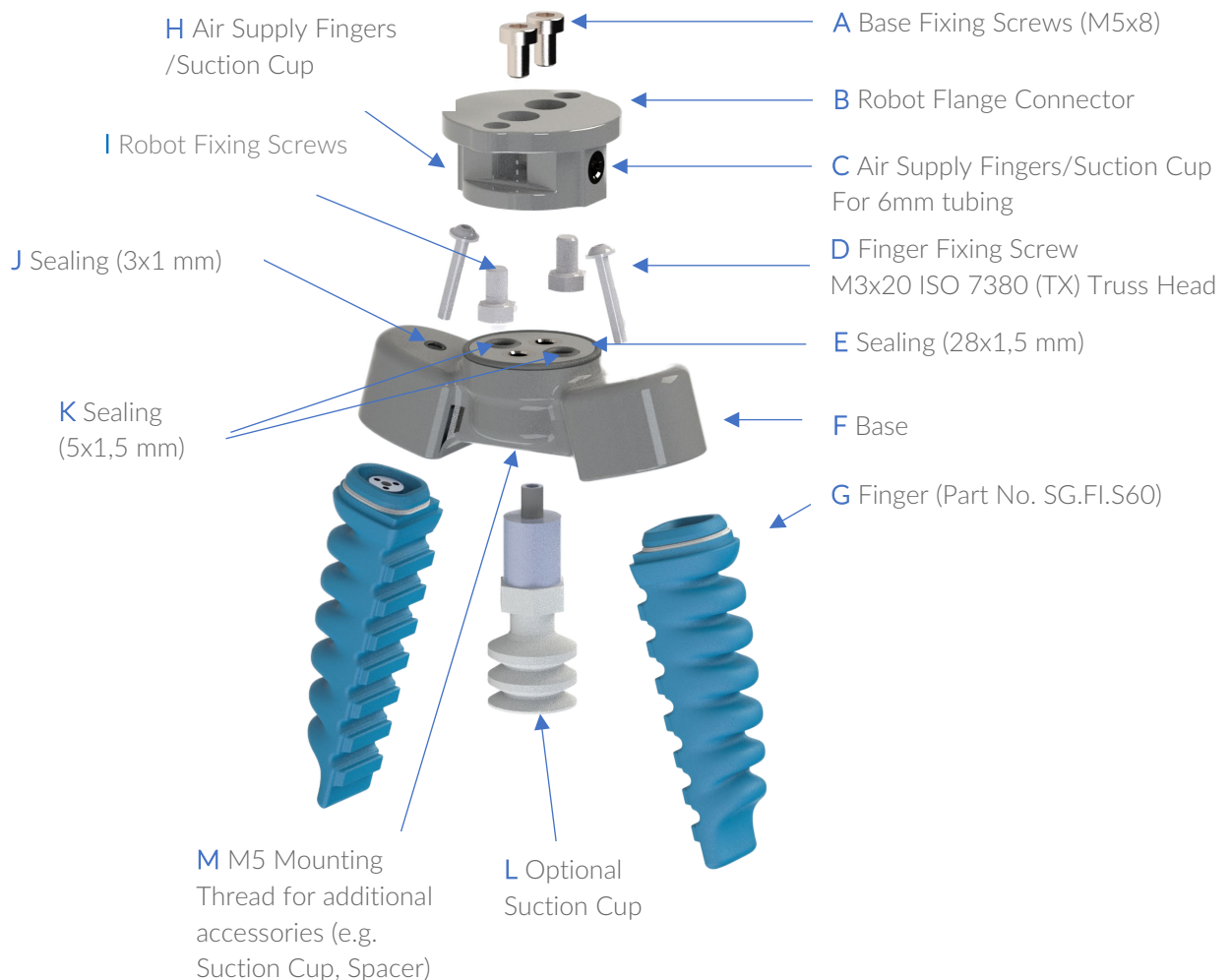


Figure 5: Parts of a SoftGripper

6.1.1. Mounting or Replacing a SoftGripper Finger

To replace a SoftGripper Finger, loosen the finger fixing screw **D** on the base (M3x20 ISO 7380 TX).

Take a new Finger **G** (Part No. SG.FI.S60).

For replacing we recommend to use a new 3x1 mm sealing **J**. The screw can be further used.

To mount a SoftGripper Finger at a base, use the truss head (TX) screw **D** M3x20 ISO 7380 and the 3x1 mm sealing **J**. **Use a torque screwdriver to mount with 0.7 Nm (0.5 lbf·ft)**. The sealing has to be placed in the groove at the base before.

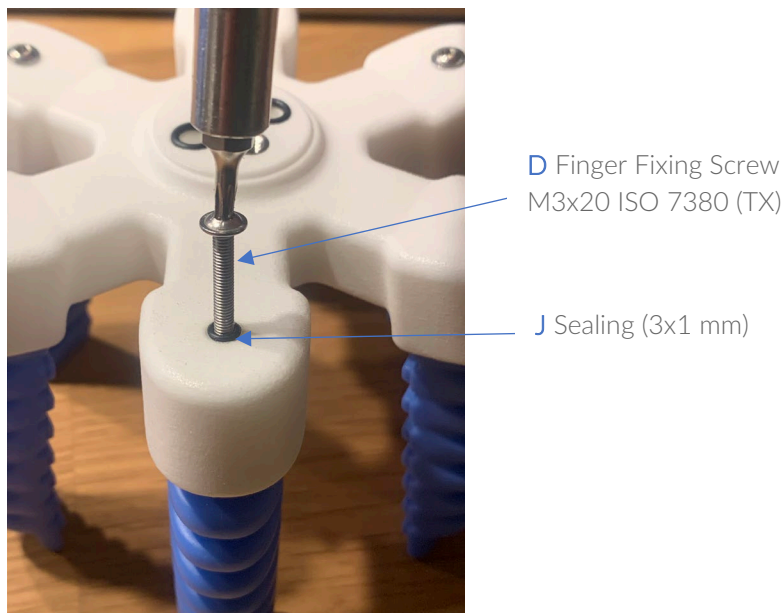


Figure 6: Mounting a SoftGripper Finger

6.1.2. Mounting or Replacing a SoftGripper Robot Connector

To replace a SoftGripper Robot Connector **B**, loosen the both fixing screws **A** (M5x8) on top of the Robot Connector.

For replacing we recommend to use new sealings **K** (2 pc. 5x1,5 mm , 1 pc. 28x1,5 mm). The screw can be further used.

To mount a SoftGripper Robot Connector to a base, place the two seals 5x1,5 mm **K** on the both sealing grooves at the SoftGripper base. Place the 28x1,5 mm sealing **E** around the flange between base and Robot Connector.

Place the Robot Connector on the SoftGripper base and fix it with the two M5x8 fixing screws **A**.

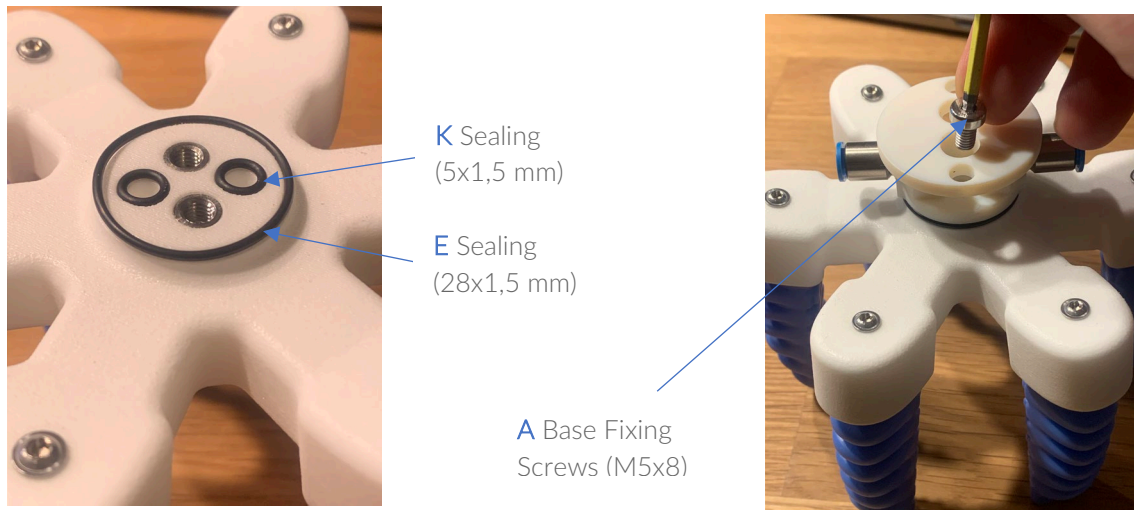


Figure 7: Mounting SoftGripper Robot Connector

6.1.3. Install or Replace SoftGripper Accessories (Suction Cup, Spacer)



SoftGripper with up to 4 Fingers have the option of mounting an additional suction cup. SoftGrippers with more than 4 fingers only have a mounting thread for accessories such as spacers, not for suction cups.

All SoftGripping Bases have a centric mounting thread **M** (M5 thread) for additionally accessories. For example, you can mount the SoftGripping Spacer or a Suction Cup **L** with or without Suction Cup Extender.

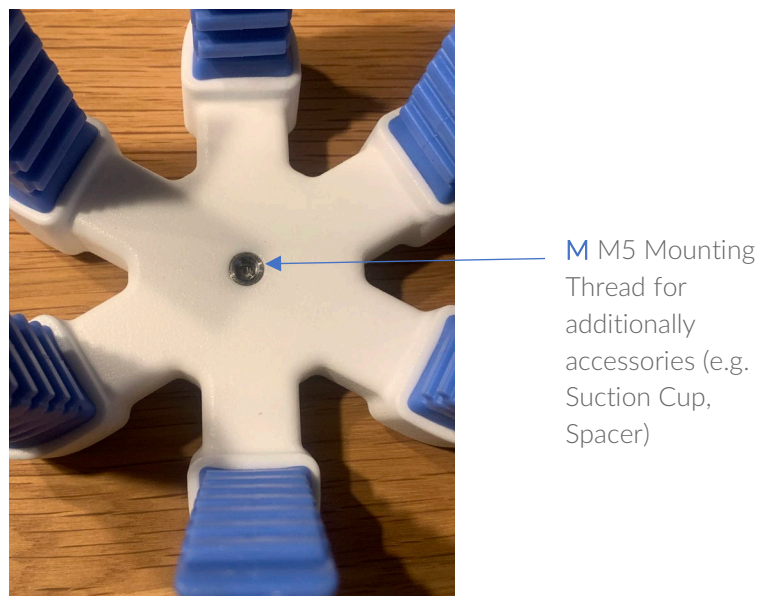


Figure 8: Mounting thread for accessories

6.1.4. Install a SoftGripper on Robot and pneumatic system



Make sure to use the right robot connector. Please check the manual and further instructions of your robot.

If you have the right connector **B** for your robot, use the supplied screws **I** to mount a SoftGripper to your robot tool flange. E.g. for ISO 9409-50-4-M6 flange use M6x8 screws, for ISO 9409-31,5-4-M5 flange M5x8 screws.

For pneumatically installation, make sure to use the right diameter of tubing (6 x 1 mm diameter) and that your pneumatic setup not to exceed the maximal operating pressure.

The maximum operating pressure have to be <1,2 bar and -0.3 for vacuum!

If you use our SoftGripping ControlBox, please check the manual of it.



Warning! Use compressed air according ISO 8573-1:2010 [7:4:4] with maximum pressure 1,2 bar!

Connect the tubing to the corresponding push-in-fittings **H** and **C**. Robot Connectors always have 2 of it. The function depends on your selected SoftGripper. SoftGripper with up to 4 Fingers have the option of mounting an additional suction cup. Accordingly, one of the push-in-fitting is for supplying the fingers, the other for the suction cup. If you don't want to use a suction cup, only the push-in-fitting for the finger supply must be connected. SoftGrippers with more than 4 fingers only have a mounting thread for accessories such as spacers, not for suction cups. According to this, both of the push-in-fittings are for supplying the fingers and have to be connected.

Verify, that all needed connections are made, before operating the setup. Test it with lower pressure.



Figure 9: Connect the Tubing

6.2. SoftActuators

SoftActuators are built to be used for highly flexible, very easily modifiable gripping systems. They can be used with our plates or with a base of your own design. SoftActuators have an integrated air connector.

The following steps shows you how to install your SoftActuator. These steps are also to be used for replacement of the components.

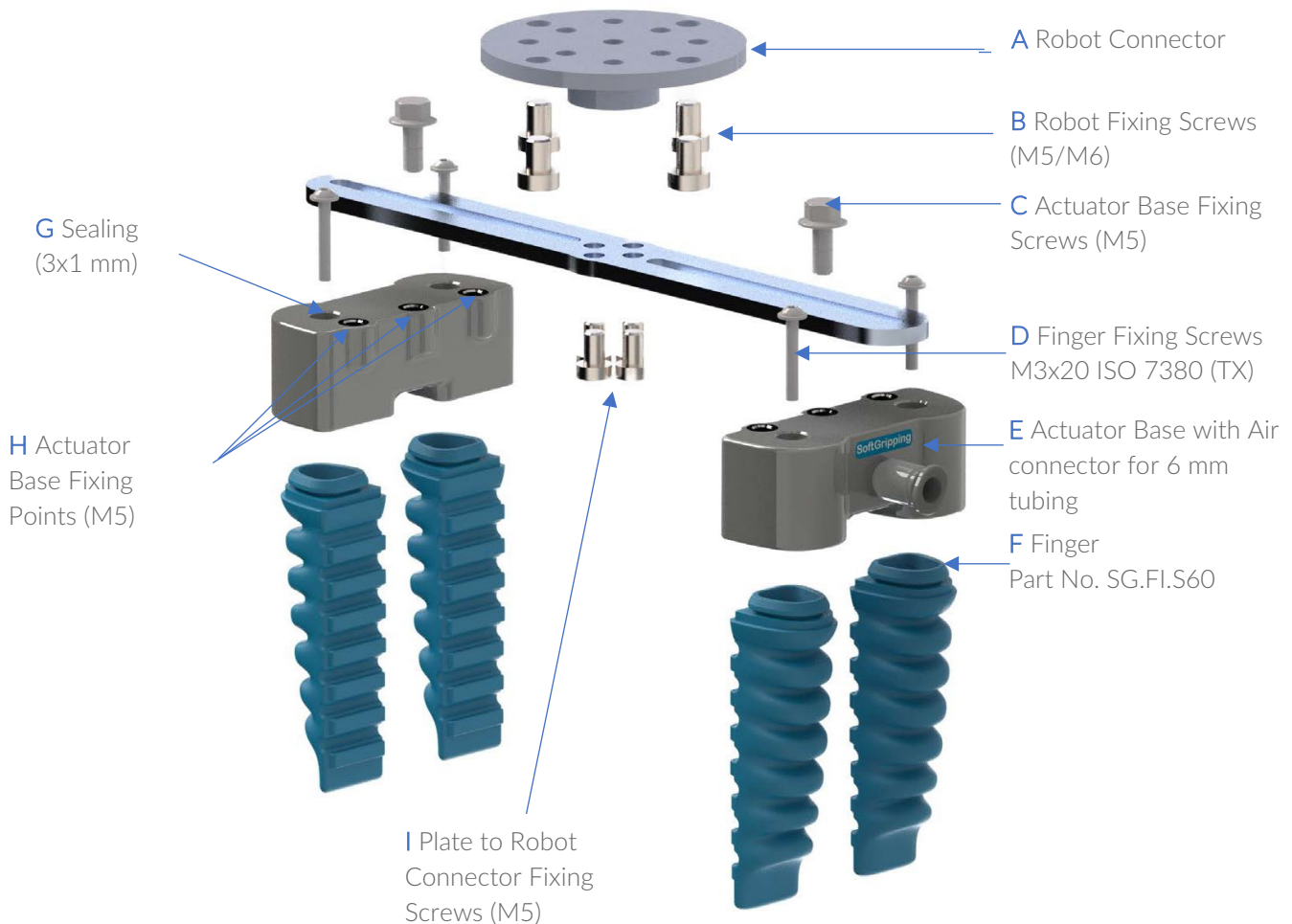


Figure 10: Parts of a SoftActuator Gripper System

6.2.1. Mounting or Replacing a SoftActuator Finger

To replace a SoftGripper Finger, loosen the finger fixing screw **D** on the actuator base **E** (M3x20 ISO 7380 TX).

Take a new Finger **F** (Part No. SG.FI.S60).

For replacing we recommend to use a new 3x1 mm sealing **G**. The screw can be further used.

To mount a SoftGripper Finger at an actuator base, take the truss head (TX) screw **D** M3x20 ISO 7380 and the 3x1 mm sealing **G**. **Use a torque screwdriver to mount with 0,7 Nm (0.5 lbf·ft)**. The sealing has to be placed in the groove inside the screw hole before.



G Sealing
(3x1 mm)

Figure 11: Placement of the sealing G

6.2.2. Mounting or Replacing a SoftActuator Robot Connector

The SoftActuator Robot Connector can be used for robots with 31.5 mm, 40 mm and 50 mm tool flange.

To mount the Robot Connector a plate, use the 4 threats (M5) of the Connector. For SoftGripping Plates, M5x8 screws are needed, for your own built base you'll have to use screws with a length according to the material thickness

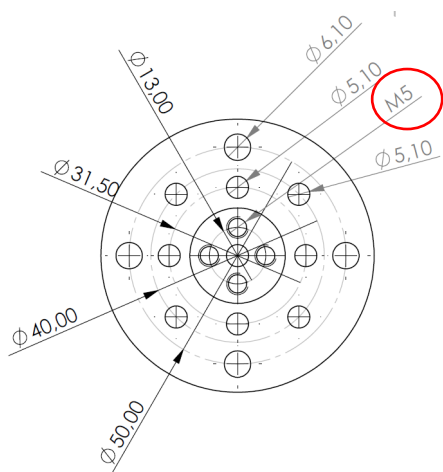


Figure 12: SoftActuator Robot Connector



Plate to Robot
Connector Fixing
Screws (M5)

Figure 13: Mounting of a SoftActuator Robot Connector

6.2.3. Mounting or Replacing a SoftActuator Base to a Plate

SoftActuator Bases have M5 threads on top for mounting on every type of plate or profile. For SoftGripping Plates, M5x12 screws are needed, for your own built base you'll have to use screws with a length according to the material thickness

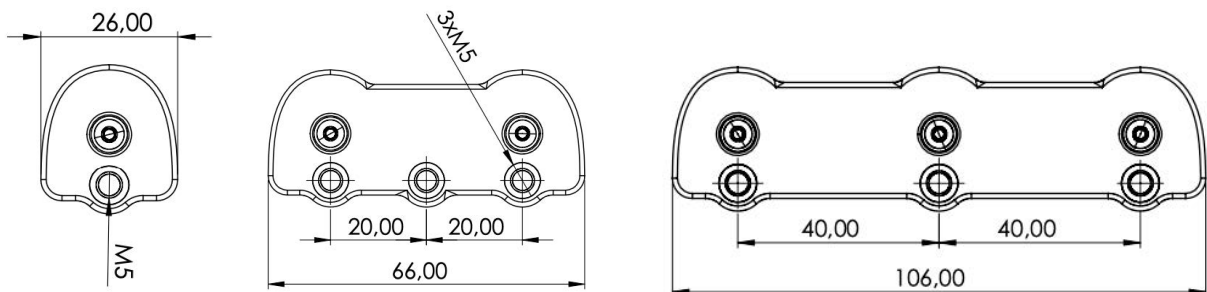
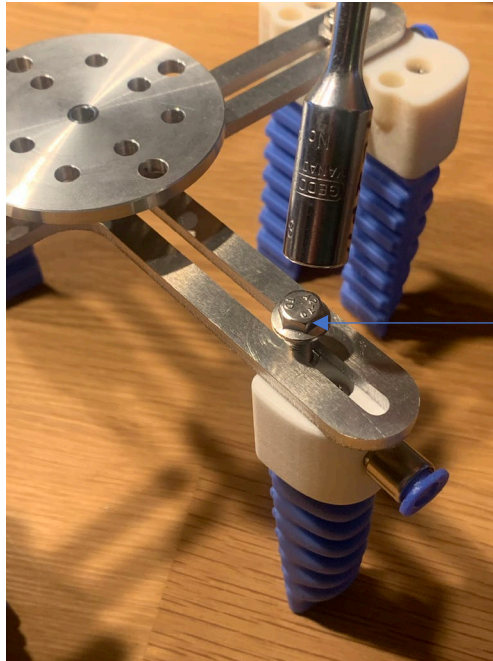


Figure 14: Drawing of SoftActuator Fixing Points



C Actuator Base Fixing
Screws (M5)

Figure 15: Mounting SoftActuator to a Plate Base

6.2.4. Install a SoftActuator on Robot and pneumatic system



Make sure to use the right robot connector. Please check the manual and further instructions of your robot.

If you use the Robot Connector **A** for your robot, use the supplied screws **B** to mount a SoftGripper to your robot tool flange. E.g. for ISO 9409-50-4-M6 flange use M6x8 screws, for ISO 9409-31,5-4-M5 flange M5x8 screws.

For pneumatically installation, make sure to use the right diameter of tubing (6 x 1 mm diameter) and that your pneumatic setup not to exceed the maximal operating pressure. Every SoftActuator needs an own air supply.

The maximum operating pressure have to be <1,2 bar!

If you use our SoftGripping ControlBox, please check the manual of it.



Warning! Use compressed air according ISO 8573-1:2010 [7:4:4] with maximum pressure 1,2 bar!

Connect a 6 mm tubing to the push-in-fitting at a SoftActuator Base **E**.

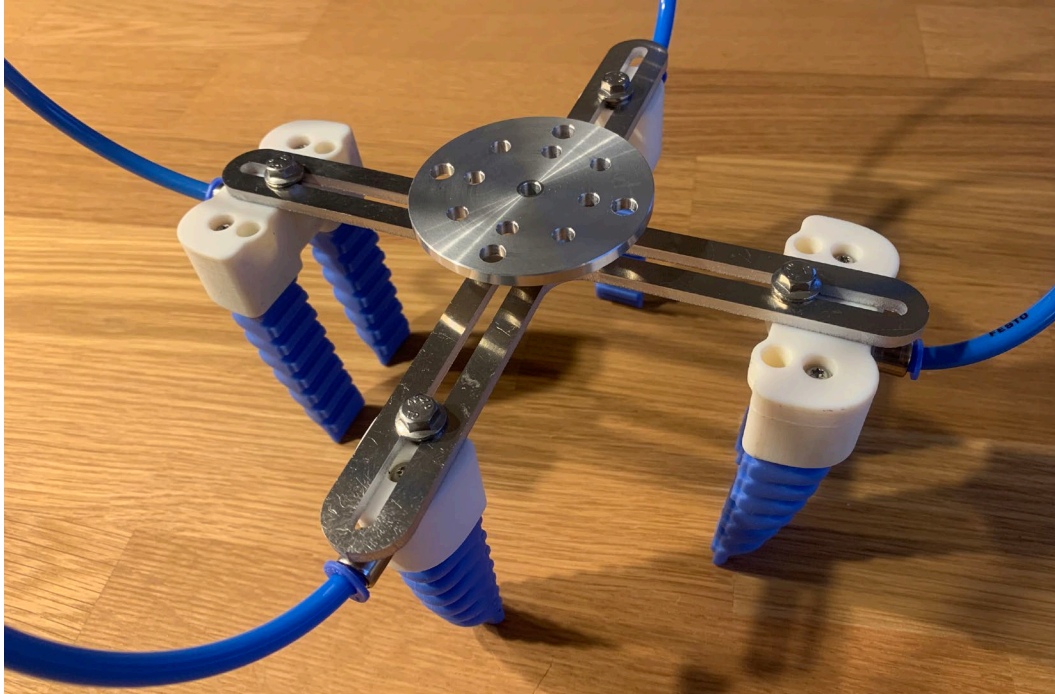


Figure 16: Gripping System with SoftActuators

Verify, that all needed connections are made, before operating the setup. Test it with lower pressure. Starting Procedure

For starting the setup, please consult the operating instructions of your robot and your pneumatic setup. If you use the SoftGripping ControlBox, check our operating instructions for it.

7. Operation

For operating the setup, please consult the operating instructions of your robot and your pneumatic setup. If you use the SoftGripping ControlBox, check our operating instructions for it.



Make sure to control the SoftGripper regularly for signs of wear and change fingers when needed. The frequency in which the fingers must be changed depends on the task at hand. Operate with maximum pressure $< 1,2$ bar.

8. Decommissioning

Turn off the air compressor. Before disconnecting any tubing, be sure that the system is not pressurized. Store the SoftGripper under dry conditions. Avoid abrasive and corrosive storing conditions.



Do not disconnect the pneumatics while the system is still pressurized.

9. Maintenance and Troubleshooting

If you find problems using the system, please follow the following steps checking the components:

1. Are all connections made?
2. Is the input pressure suitable?
3. Can you find leaks, excessive bends or ruptures in the tubing?
4. Are all seals in proper conditions?

If you still have problems operating the device, please contact our service team.

10. Disassembly

All SoftGrippers are modular and are screwed together. You can disassemble the elements in order to change elements or wearing parts. Further disassembly of SoftGripper Fingers can lead to breaking or leakage and must be carried out by qualified personnel to guarantee the warranty.

11. Legal information

11.1. Damage in transit

The packaging of our devices ensures the best possible protection against transport damage. Check the packaging for transport damage. In case of damage, contact the manufacturer's technical customer service within three working days and inform the carrier.

11.2. Warranty and warranty conditions

The factory warranty for the device is contractually agreed. During the warranty period, the manufacturer will replace or repair free of charge any material or construction-related defects. Please inform yourself about our terms and conditions on the website.

Warranty claims will become void in the event of unauthorized intervention in the device. Also excluded from the warranty:

- Unintentional or intentional damage
- Damage or defects caused by third parties not contractually bound to the manufacturer at the time of damage
- Wearing parts
- Damage due to negligence or improper operation of the device
- Packaging and shipping damage

If your device malfunctions, contact the manufacturer directly:

SoftGripping GmbH
Am Plessower See 32A
14542 Werder (Havel)
Germany

Phone: +49 (0)40 319 76 995
E-Mail: info@soft-gripping.com

11.3. Declaration of Conformity

The declaration of conformity can be obtained directly from the manufacturer.

11.4. Disposal

Old devices or dismantled old assemblies can be returned to the manufacturer or a certified disposal company for proper disposal.