

# Assembly and operating manual

## PWG-S

### 2-finger angular gripper

Original operating manual

Hand in hand for tomorrow

## Imprint

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### Technical changes:

We reserve the right to make alterations for the purpose of technical improvement.

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Dear Customer,

Thank you for trusting our products and our family-owned company, the leading technology supplier of robots and production machines.

Our team is always available to answer any questions on this product and other solutions. Ask us questions and challenge us. We will find a solution!

Best regards,

Your SCHUNK team

Customer Management

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**Please read the operating manual in full and keep it close to the product.**

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# 1 General

## 1.1 About this manual

This manual contains important information for a safe and appropriate use of the product.

This manual is an integral part of the product and must be kept accessible for the personnel at all times.

Before starting work, the personnel must have read and understood this operating manual. Prerequisite for safe working is the observance of all safety instructions in this manual.

In addition to these instructions, the documents listed under ▶ 1.1.2 [ 6 ] are applicable.

**NOTE:** The illustrations in this manual are intended to provide a basic understanding and may deviate from the actual version.

### 1.1.1 Presentation of Warning Labels

To make risks clear, the following signal words and symbols are used for safety notes.



#### **⚠ DANGER**

**Dangers for persons!**

Non-observance will inevitably cause irreversible injury or death.



#### **⚠ WARNING**

**Dangers for persons!**

Non-observance can lead to irreversible injury and even death.



#### **⚠ CAUTION**

**Dangers for persons!**

Non-observance can cause minor injuries.

#### **NOTICE**

**Material damage!**

Information about avoiding material damage.

### 1.1.2 Applicable documents

- General terms of business \*
- Catalog data sheet of the purchased product \*
- Assembly and operating manuals of the accessories \*

The documents labeled with an asterisk (\*) can be downloaded from [schunk.com](http://schunk.com).

### 1.1.3 Sizes

This operating manual applies to the following sizes:

- PWG-S 40
- PWG-S 60
- PWG-S 80

## 1.2 Warranty

If the product is used as intended, the warranty is valid for 24 months from the ex-works delivery date under the following conditions:

- Observe the specified maintenance and lubrication intervals
- Observe the ambient conditions and operating conditions

Parts touching the workpiece and wear parts are not included in the warranty.

## 1.3 Scope of delivery

The scope of delivery includes

- 2-finger angular gripper PWG-S in the version ordered
- Assembly and Operating Manual
- Accessory pack

### 1.3.1 Sealing kit

Content of the accessory pack:

- 2 x O-ring for hose-free direct connection
- 1x cylindrical pin
- **PWG-S 80:** 2 x locking screw for hose connections

Accessory pack for	ID number
PWG-S 40	5509449
PWG-S 60	5509450
PWG-S 80	5509451

## 1.4 Accessories

A wide range of accessories are available for this product  
For information regarding which accessory articles can be used  
with the corresponding product variants, see catalog data sheet.

### 1.4.1 Sealing kit

Content of the sealing kit:

- 1 x sealing wiper ring
- **PWG-S 40**: 1 x sealing wiper ring (PUR)
- **PWG-S 40**: 3 x O-rings for hose-free direct connection:  
**PWG-S 60-80**: 4 x O-rings for hose-free direct connection
- **PWG-S 40/80**: 2 x quad ring  
**PWG-S 60**: 1x quad ring
- **PWG-S 80**: 1 x sealing ring

Seal kit for	ID number
PWG-S 40	0370550
PWG-S 60	0370551
PWG-S 80	0370552

## 2 Basic safety notes

### 2.1 Intended use

The product is designed exclusively for gripping and temporarily holding workpieces or objects.

- The product may only be used within the scope of its technical data, ▶ 3 [15].
- The product is intended for installation in a machine/ automated system. The applicable guidelines for the machine/ automated system must be observed and complied with.
- The product is intended for industrial and industry-oriented use. Its use outside enclosed spaces is only permitted if suitable protective measures are taken against outdoor exposure. The product is not suitable for use in salty air.
- The product can be used within the permissible load limits and technical data for holding workpieces during simple machining operations, but is not a clamping device according to EN 1550:1997+A1:2008.
- Appropriate use of the product includes compliance with all instructions in this manual.
- Any utilization that exceeds or differs from the appropriate use is regarded as misuse.

### 2.2 Not intended use

It is not intended use if the product is used, for example, as a pressing tool, stamping tool, lifting gear, guide for tools, cutting tool, clamping device or a drilling tool.

- Any utilization that exceeds or differs from the appropriate use is regarded as misuse.

### 2.3 Constructional changes

#### Implementation of structural changes

By conversions, changes, and reworking, e.g. additional threads, holes, or safety devices can impair the functioning or safety of the product or damage it.

- Structural changes should only be made with the written approval of SCHUNK.

### 2.4 Spare parts

#### Use of unauthorized spare parts

Using unauthorized spare parts can endanger personnel and damage the product or cause it to malfunction.

- Use only original spare parts or spares authorized by SCHUNK.

## 2.5 Gripper fingers

### Requirements of gripper fingers

Accumulated energy can make the product unsafe and risk the danger of serious injuries and considerable material damage.

- Execute the gripper fingers in such a way that the product reaches either the "open" or "closed" position in a de-energized state.
- Only change gripper fingers if no residual energy can be released.
- Make sure that the product and the top jaws are a sufficient size for the application.

## 2.6 Environmental and operating conditions

### Required ambient conditions and operating conditions

Incorrect ambient and operating conditions can make the product unsafe, leading to the risk of serious injuries, considerable material damage and/or a significant reduction to the product's life span. See also Link Daten Umgebungs- und Einsatzbedingungen.

## 2.7 Personnel qualification

### Inadequate qualifications of the personnel

If the personnel working with the product is not sufficiently qualified, the result may be serious injuries and significant property damage.

- All work may only be performed by qualified personnel.
- Before working with the product, the personnel must have read and understood the complete assembly and operating manual.
- Observe the national safety regulations and rules and general safety instructions.

The following personal qualifications are necessary for the various activities related to the product:

#### **Trained electrician**

Due to their technical training, knowledge and experience, trained electricians are able to work on electrical systems, recognize and avoid possible dangers and know the relevant standards and regulations.

#### **Qualified personnel**

Due to its technical training, knowledge and experience, qualified personnel is able to perform the delegated tasks, recognize and avoid possible dangers and knows the relevant standards and regulations.

<b>Instructed person</b>	Instructed persons were instructed by the operator about the delegated tasks and possible dangers due to improper behaviour.
<b>Service personnel of the manufacturer</b>	Due to its technical training, knowledge and experience, service personnel of the manufacturer is able to perform the delegated tasks and to recognize and avoid possible dangers.

## 2.8 Personal protective equipment

### Use of personal protective equipment

Personal protective equipment serves to protect staff against danger which may interfere with their health or safety at work.

- When working on and with the product, observe the occupational health and safety regulations and wear the required personal protective equipment.
- Observe the valid safety and accident prevention regulations.
- Wear protective gloves to guard against sharp edges and corners or rough surfaces.
- Wear heat-resistant protective gloves when handling hot surfaces.
- Wear protective gloves and safety goggles when handling hazardous substances.
- Wear close-fitting protective clothing and also wear long hair in a hairnet when dealing with moving components.

## 2.9 Notes on safe operation

### Incorrect handling of the personnel

Incorrect handling and assembly may impair the product's safety and cause serious injuries and considerable material damage.

- Avoid any manner of working that may interfere with the function and operational safety of the product.
- Use the product as intended.
- Observe the safety notes and assembly instructions.
- Do not expose the product to any corrosive media. This does not apply to products that are designed for special environments.
- Eliminate any malfunction immediately.
- Observe the care and maintenance instructions.
- Observe the current safety, accident prevention and environmental protection regulations regarding the product's application field.

## 2.10 Transport

### Handling during transport

Incorrect handling during transport may impair the product's safety and cause serious injuries and considerable material damage.

- When handling heavy weights, use lifting equipment to lift the product and transport it by appropriate means.
- Secure the product against falling during transportation and handling.
- Stand clear of suspended loads.

## 2.11 Malfunctions

### Behavior in case of malfunctions

- Immediately remove the product from operation and report the malfunction to the responsible departments/persons.
- Order appropriately trained personnel to rectify the malfunction.
- Do not recommission the product until the malfunction has been rectified.
- Test the product after a malfunction to establish whether it still functions properly and no increased risks have arisen.

## 2.12 Disposal

### Handling of disposal

The incorrect handling of disposal may impair the product's safety and cause serious injuries as well as considerable material and environmental harm.

- Follow local regulations on dispatching product components for recycling or proper disposal.

## 2.13 Fundamental dangers

### General

- Observe safety distances.
- Never deactivate safety devices.
- Before commissioning the product, take appropriate protective measures to secure the danger zone.
- Disconnect power sources before installation, modification, maintenance, or calibration. Ensure that no residual energy remains in the system.
- If the energy supply is connected, do not move any parts by hand.

- Do not reach into the open mechanism or movement area of the product during operation.

### **2.13.1 Protection during handling and assembly**

#### **Incorrect handling and assembly**

Incorrect handling and assembly may impair the product's safety and cause serious injuries and considerable material damage.

- Have all work carried out by appropriately qualified personnel.
- For all work, secure the product against accidental operation.
- Observe the relevant accident prevention rules.
- Use suitable assembly and transport equipment and take precautions to prevent jamming and crushing.

#### **Incorrect lifting of loads**

Falling loads may cause serious injuries and even death.

- Stand clear of suspended loads and do not step into their swiveling range.
- Never move loads without supervision.
- Do not leave suspended loads unattended.

### **2.13.2 Protection during commissioning and operation**

#### **Falling or violently ejected components**

Falling and violently ejected components can cause serious injuries and even death.

- Take appropriate protective measures to secure the danger zone.
- Never step into the danger zone during operation.

### **2.13.3 Protection against dangerous movements**

#### **Unexpected movements**

Residual energy in the system may cause serious injuries while working with the product.

- Switch off the energy supply, ensure that no residual energy remains and secure against inadvertent reactivation.
- Never rely solely on the response of the monitoring function to avert danger. Until the installed monitors become effective, it must be assumed that the drive movement is faulty, with its action being dependent on the control unit and the current operating condition of the drive. Perform maintenance work, modifications, and attachments outside the danger zone defined by the movement range.

- To avoid accidents and/or material damage, human access to the movement range of the machine must be restricted. Limit/prevent accidental access for people in this area due through technical safety measures. The protective cover and protective fence must be rigid enough to withstand the maximum possible movement energy. EMERGENCY STOP switches must be easily and quickly accessible. Before starting up the machine or automated system, check that the EMERGENCY STOP system is working. Prevent operation of the machine if this protective equipment does not function correctly.

## 2.14 Notes on particular risks



### **⚠ DANGER**

#### **Risk of fatal injury from suspended loads!**

Falling loads can cause serious injuries and even death.

- Stand clear of suspended loads and do not step within their swiveling range.
- Never move loads without supervision.
- Do not leave suspended loads unattended.
- Wear suitable protective equipment.



### **⚠ WARNING**

#### **Risk of injury from objects falling and being ejected!**

Falling and ejected objects during operation can lead to serious injury or death.

- Take appropriate protective measures to secure the danger zone.



### **⚠ WARNING**

#### **Risk of injury due to unexpected movements!**

If the power supply is switched on or residual energy remains in the system, components can move unexpectedly and cause serious injuries.

- Before starting any work on the product: Switch off the power supply and secure against restarting.
- Make sure, that no residual energy remains in the system.



**⚠ WARNING**

**Risk of injury from crushing and impacts!**

Serious injury could occur during movement of the base jaw, due to breakage or loosening of the gripper fingers or if the workpiece is lost.

- Wear suitable protective equipment.
- Do not reach into the open mechanism or the movement area of the product.



**⚠ WARNING**

**Risk of injury from sharp edges and corners!**

Sharp edges and corners can cause cuts.

- Use suitable protective equipment.

### 3 Technical data

Designation	PWG-S
Pressure medium	Compressed air, compressed air quality according to ISO 8573-1:7 4 4
Nominal working pressure [bar]	6
Min. pressure [bar]	4
Max. pressure [bar]	8
Ambient temperature [°C]	
Min.	-10°C
Max.	90°C
Noise emission [dB(A)]	≤70

More technical data is included in the catalog data sheet. Whichever is the latest version.

## 4 Assembly

### 4.1 Connections

#### 4.1.1 Mechanical connection



#### **⚠ WARNING**

##### **Risk of injury due to unexpected movements!**

If the power supply is switched on or residual energy remains in the system, components can move unexpectedly and cause serious injuries.

- Before starting any work on the product: Switch off the power supply and secure against restarting.
- Make sure, that no residual energy remains in the system.

#### **Evenness of the mounting surface**

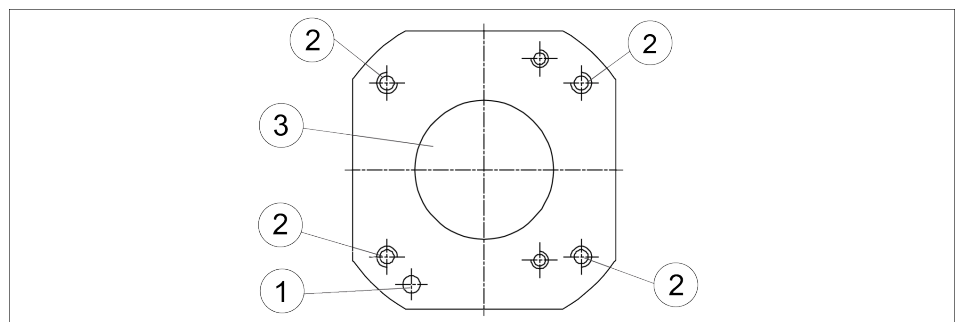
The values apply to the whole mounting surface to which the product is mounted.

Edge length	Permissible unevenness
< 100	< 0.02
> 100	< 0.05

Tab.: Requirements for evenness of the mounting surface (Dimensions in mm)

#### **Mounting**

Fasten the gripper to the base surface using four threaded holes. A centering bore and fixing bore are in the base surface in order to position the gripper.



Item	Designation	PWG-S		
		40	60	80
1	Mounting thread	M4	M5	M6
	Max. depth of engagement from locating surface [mm]	10	14	16
2	Centering bore [H7]	Ø20H7	Ø25H7	Ø40H7
3	Fixing bore [H7]	Ø4H7	Ø4H7	Ø5H7

## 4.1.2 Pneumatic connection



### ⚠ WARNING

#### Risk of injury due to unexpected movements!

If the power supply is switched on or residual energy remains in the system, components can move unexpectedly and cause serious injuries.

- Before starting any work on the product: Switch off the power supply and secure against restarting.
- Make sure, that no residual energy remains in the system.

### NOTICE

#### Damage to the gripper is possible!

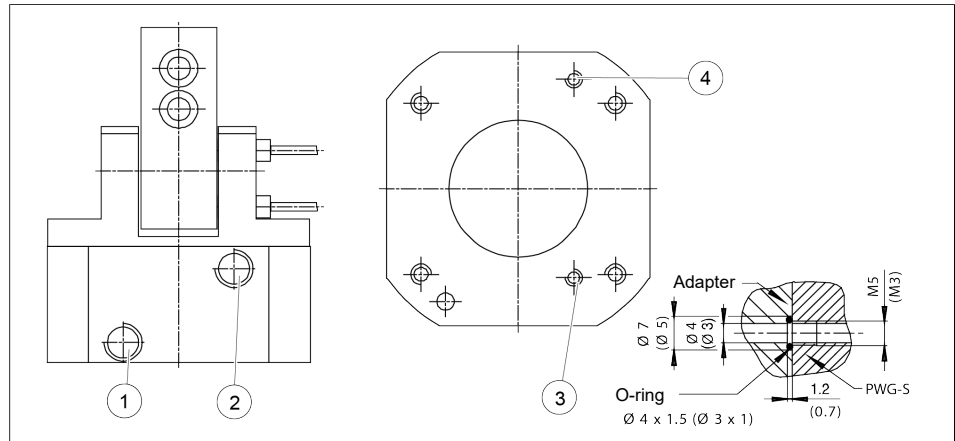
If the maximum permissible finger weight or the permissible mass moment of inertia of the fingers is exceeded, the gripper can be damaged.

- A jaw movement always has to be without jerks and bounce.
- You must therefore implement sufficient reduction and/or damping.
- Observe the information in the catalog data sheet.

### NOTE

- Observe the requirements for the compressed air supply, ▶ 3 [15].
- In case of compressed air loss (cutting off the energy line), the components lose their dynamic effects and do not remain in a secure position. However, the use of a SDV-P pressure maintenance valve is recommended in this case in order to maintain the dynamic effect for some time. Product variants are also offered with mechanical gripping force via springs, which also ensure a minimum clamping force in the event of a pressure drop.

Screw in the seal set-screws **only flush**.



Pneumatic connection

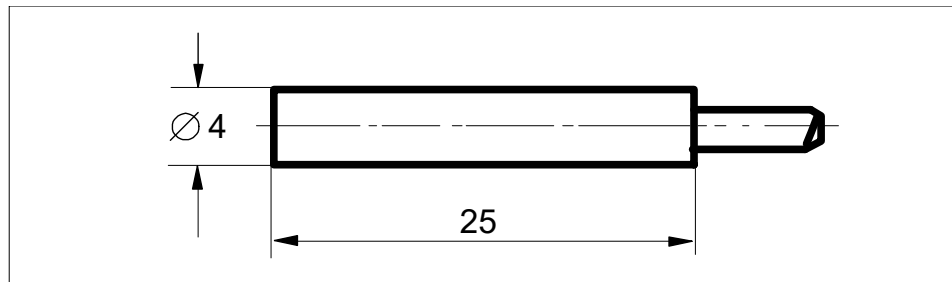
Item	Designation	PWG-S		
		40	60	80
1	Main connections	M5	M5	R1/8"
2	(Hose connection ) (A = open, B = close)	M5	M5	R1/8"
3	Hose-free direct	M5	M5	M5
4	connection at the base (a = open, b = close)	M5	M5	M5

Tab.: Thread diameter of the air connections

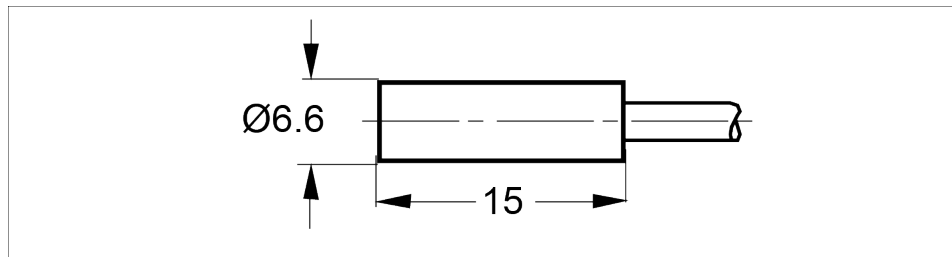
- Only open the air connections required.
- Seal air connections not required using the locking screws from the enclosed pack.
- For hose-free direct connections use the two O-rings from the enclosed pack.

## 4.2 Mounting the sensors

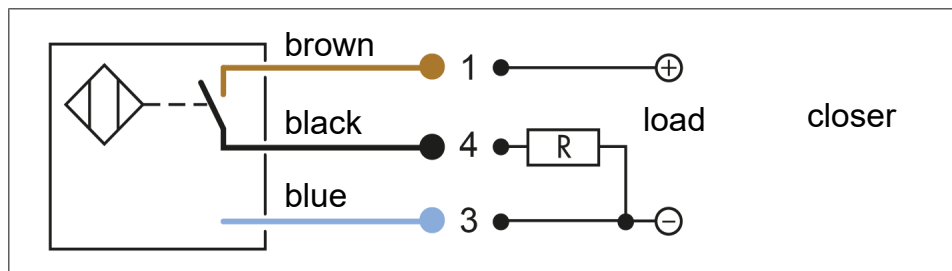
The gripper is prepared for the application of the IN 40 / IN 60 sensors.



IN 40



IN 60



The inductive proximity switches used are equipped with reverse polarity protection and are short-circuit-proof.

Make sure that you handle the proximity switches properly:

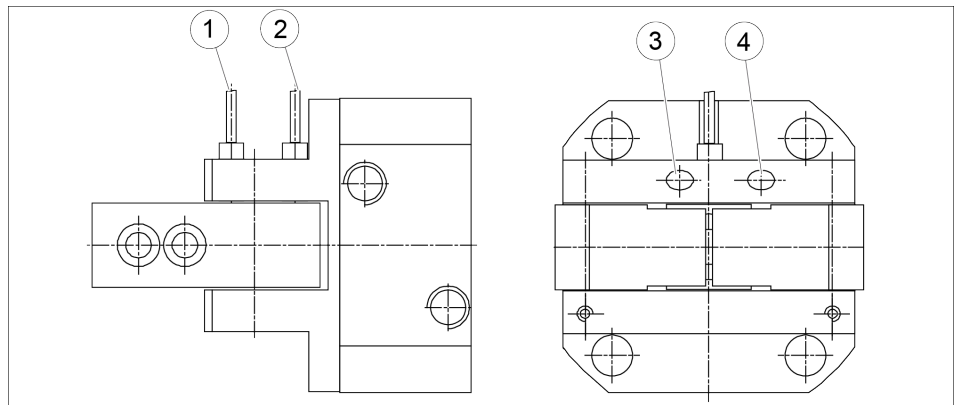
- Do not pull on the cable.
- Do not allow the sensor to dangle from the cable.
- Do not overtighten the mounting screw or mounting clip
- Please adhere to a permitted bend radius of the cable (→ catalog).
- Avoid contact of the proximity switches with hard objects and with chemicals, in particular nitric acid, chromic acid and sulphuric acid.

The inductive proximity switches are electronic components, which can react sensitively to high-frequency interference or electromagnetic fields.

- Check to make sure that the cable is fastened and installed correctly. Provide for sufficient clearance to sources of high-frequency interference and their supply cables.

- Parallel switching of several sensor outputs of the same type (npn, pnp) is permissible, but does not increase the permissible load current.
- Note that the leakage current of the individual sensors (approx. 2 mA) is cumulative.
- If you require further information on sensor operation, contact your SCHUNK contact person or download information from our homepage.
- Technical data for the sensors can be found in the data sheets (included in the scope of delivery).

**Assembly of the proximity switch**



1	Proximity switch "open"	3	attachment screw "open"
2	Proximity switch "closed"	4	attachment screw "closed"

**NOTICE**

**Material damage due to an incorrect tightening torque!**

If the threaded pin is tightened with an incorrect tightening torque, the product may be damaged.

- Observe a maximum tightening torque of 10 Ncm for the set-screws.

**Gripper open:**

1. Set the gripper to "open" position.
2. Loosen the attachment screw (3) "open".
3. Carefully push the proximity switch (1) into the bracket until it touches the control cam.
4. Pull back the proximity switch approx 0.5 mm.
5. Fasten the proximity switch by tightening the attachment screw (3).
6. Connect the proximity switch.
7. Move the gripper into "open" position and test the function.

**Gripper closed:**

1. Set the gripper to "closed" position.
2. Loosen the attachment screw (3) "closed".
3. Carefully push the proximity switch (2) into the bracket until it touches the control cam.
4. Pull back the proximity switch approx 0.5 mm.
5. Fasten the proximity switch by tightening the attachment screw (4).
6. Connect the proximity switch.
7. Move the gripper into "closed" position and test the function.

## 5 Troubleshooting

### 5.1 Product does not move

Possible cause	Corrective action
Base jaws jam in housing, e.g. mounting surface is not sufficiently even.	Check the evenness of the mounting surface. ▶ 4.1.1 [16]
Pressure drops below minimum.	Check air supply. ▶ 3 [15]
Compressed air lines switched.	Check compressed air lines. ▶ 4.1.2 [17]
Proximity switch defective or set incorrect.	Readjust or change sensor.
Unused air connections open.	Close unused air connections.
Flow control valve closed.	Open the flow control valve.
Component part defective.	Replace component or send it to SCHUNK for repair.

### 5.2 Product is not executing the complete stroke

Possible cause	Corrective action
Dirt deposits between cover and piston.	Clean and if necessary re-lubricate.
Dirt deposits between basic jaws and guidance.	Disassemble and clean the product.
Pressure drops below minimum.	Check air supply. ▶ 4.1.2 [17]
Mounting surface is not sufficiently flat.	Check the evenness of the mounting surface. ▶ 4.1.1 [16]
Component part defective.	Replace component or send it to SCHUNK for repair.

### 5.3 Gripping force is dropping

Possible cause	Corrective action
Compressed air can escape.	Check seals, if necessary, disassemble the product and replace seals.
Too much grease in the mechanical movement space.	Clean and lubricate product.
Pressure drops below minimum.	Check air supply. ▶ 3 [15]
Component part defective.	Replace component or send it to SCHUNK for repair.

## 6 Maintenance

### 6.1 Notes

#### Original spare parts

Use only original spare parts of SCHUNK when replacing spare and wear parts.

It is of advantage to have maintenance performed and the seals replaced at SCHUNK. If this is not possible, you can perform the maintenance and replace the seals yourself.

To replace parts, send the complete gripper with a repair order to SCHUNK.

In the case of the PWG-S 80, the piston and body must be aligned and mounted with a device during the assembly.

- Description for the disassembly of the PWG-S ▶ [6.4 \[25\]](#)
- Drawing for the construction of the device ▶ [6.6 \[28\]](#)
- RM assembly drawings ▶ [6.6 \[28\]](#)

### 6.2 Maintenance interval

#### NOTICE

#### Material damage due to hardening lubricants!

Lubricants harden more quickly at temperatures above 60°C, leading to possible product damage.

- Reduce the lubricant intervals accordingly.

---

Interval [Mio. cycles]	2
------------------------	---

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### 6.3 Lubricants/Lubrication points

SCHUNK recommends the lubricants listed.

Lubricant point	Lubricant
Metallic sliding surfaces	Rivolta F.L.G. GT-2
All seals	Rivolta F.L.G. GT-2
Bore hole at the piston	Rivolta F.L.G. GT-2

The product contains food-compliant lubricants as standard. **The requirements of standard EN 1672-2:2020 are not fully met.**

During maintenance, treat all greased areas with lubricant. Thinly apply lubricant with a lint-free cloth.

---

#### NOTE

- Change contaminated food-compliant lubricant.
  - Observe information in the safety data sheet from the lubricant manufacturer.
-

## 6.4 Disassembling the module

Position of the item numbers ▶ 6.6 [ 28]



### **⚠ WARNING**

#### **Risk of injury due to unexpected movements!**

If the power supply is switched on or residual energy remains in the system, components can move unexpectedly and cause serious injuries.

- Before starting any work on the product: Switch off the power supply and secure against restarting.
- Make sure, that no residual energy remains in the system.

1. Remove the compressed air line.
2. Loosen the set-screws (12).
3. Push out both bolts (6).
4. Pull out the fingers (4) and compensation disks from the side of the body.
5. Connect the pressure line to the CLOSED connection and apply air pressure of 6 bar to the gripper.
6. Unscrew the countersunk screw (11) and remove the bar (5).
7. Depressurize the gripper and remove the pressure line.



### **⚠ WARNING**

#### **The body (1) is under spring tension.**

#### **Risk of injury due to spring forces!**

Strictly adhere to the following instructions. **Carefully** disassemble the module.

8. Clamp the body (1) and cylinder (2) between "a" and "b".
9. Remove the screws (10).
10. Unclamp slowly until the springs are no longer under tension.
11. Remove the body (1).
12. Pull the piston (3) out of the cylinder (2)
13. Remove all seals according to the sealing kit list.

## 6.5 Servicing and assembling the module

Position of the item numbers ▶ 6.6 [ 28]



### **⚠ WARNING**

#### **Risk of injury due to spring forces!**

The cover may be ejected due to the high spring forces.

- Dismantle the product carefully.

### **Maintenance**

- Clean all parts thoroughly and check for damage and wear.
- Treat all greased areas with lubricant.
  - ▶ 6.3 [ 24]
- Oil or grease bare external steel parts.
- Replace all wear parts / seals.
  - Position of the wearing parts ▶ 6.6 [ 28]
  - Seal kit ▶ 1.4.1 [ 7]

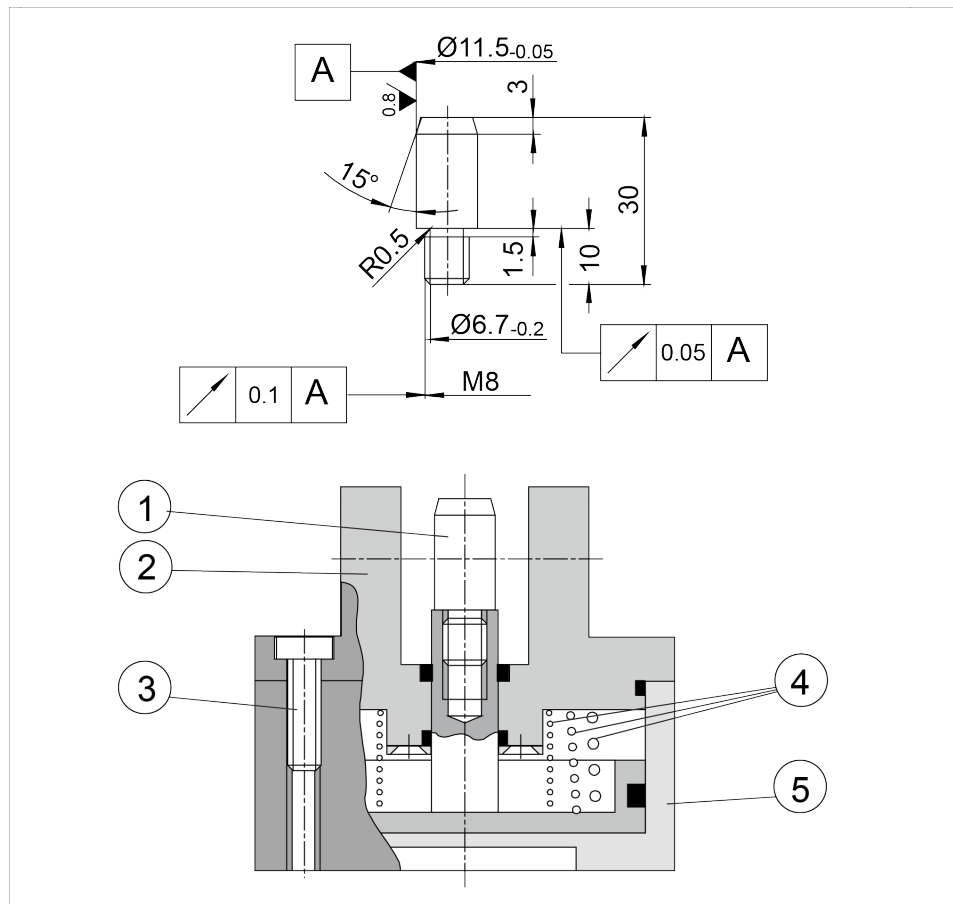
### **Assembly**

Assembly takes place in the opposite order to disassembly.

Observe the following:

- An assembly bolt is required for the assembly of the PGW-S 80 ▶ 6.5.1 [ 27].
- Unless otherwise specified, secure all screws and nuts with Loctite no. 243 and tighten with the appropriate tightening torque.

### 6.5.1 Assembly with assembly bolt



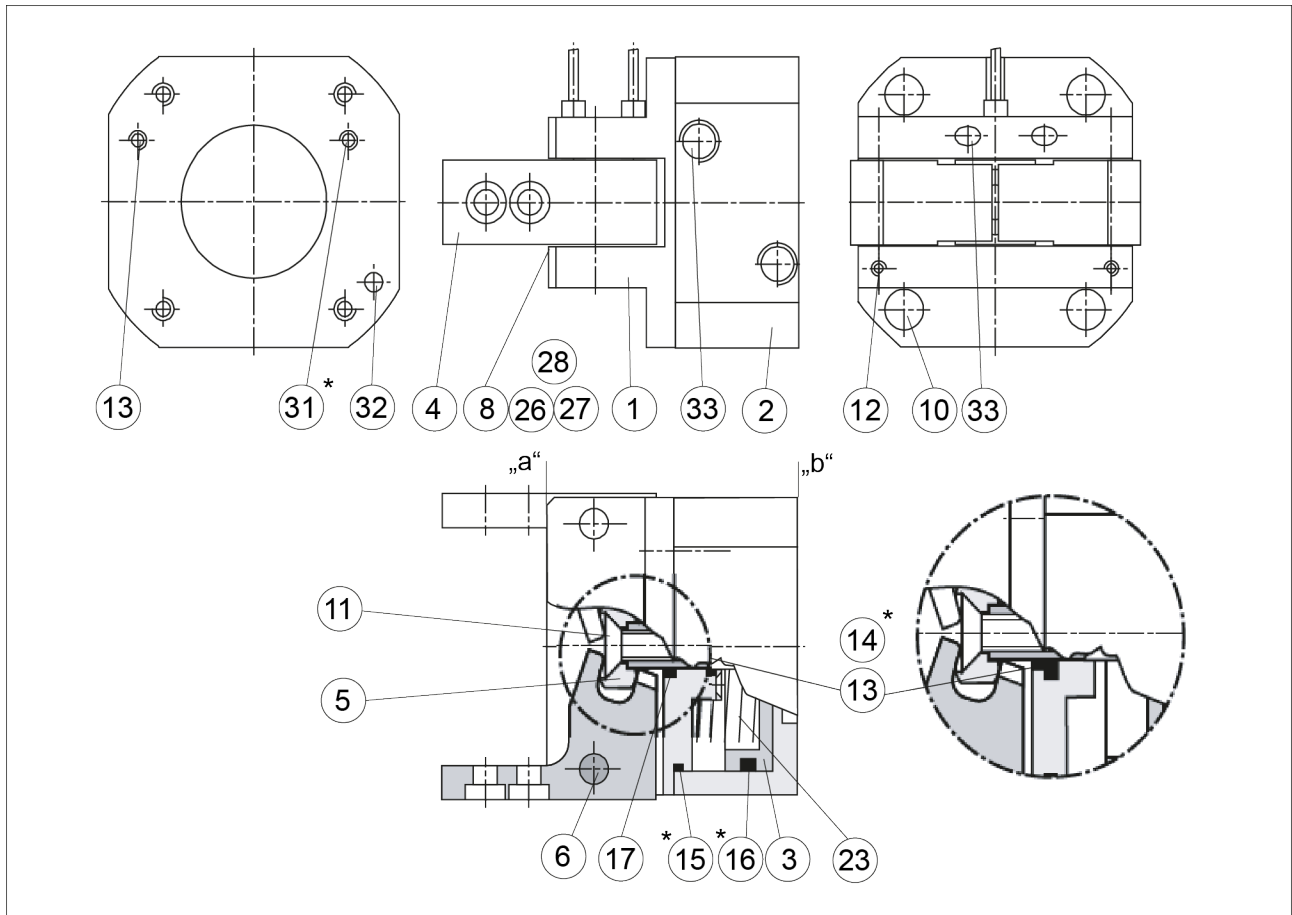
*Dimensions and purpose of the assembly bolt*

1	Assembly bolt	4	Compression spring
2	Body	5	Cylinder
3	Cylindrical screws		

1. Screw in the assembly bolt (1) by hand.
2. Press the body (2) onto the cylinder (5).
3. Screw in the cylindrical screws (3).

## 6.6 Assembly drawing

The following figure is an example image.  
It serves for illustration and assignment of the spare parts.  
Variations are possible depending on size and variant.



- \* Wearing part, replace during maintenance.  
Included in the seal kit. Seal kit can only be ordered completely.

## 7 Translation of the original declaration of incorporation

in terms of the Directive 2006/42/EG, Annex II, Part 1.B of the European Parliament and of the Council on machinery.

Hersteller/ SCHUNK GmbH & Co. KG Clamping and gripping technology  
Inverkehrbringer Bahnhofstr. 106 – 134  
D-74348 Lauffen/Neckar

We hereby declare that on the date of the declaration the following partly completed machine complied with all basic safety and health regulations found in the directive 2006/42/EC of the European Parliament and of the Council on machinery. The declaration is rendered invalid if modifications are made to the product.

Product designation: 2-finger angular gripper / PWG-S / pneumatic  
ID number 0302611, 0302612, 0302613

The partly completed machine may not be put into operation until conformity of the machine into which the partly completed machine is to be installed with the provisions of the Machinery Directive (2006/42/EC) is confirmed.

Applied harmonized standards, especially:

EN ISO 12100:2010 Safety of machinery – General principles for design –  
Risk assessment and risk reduction

The manufacturer agrees to forward on demand the relevant technical documentation for the partly completed machinery in electronic form to national authorities.

The relevant technical documentation according to Annex VII, Part B, belonging to the partly completed machinery, has been created.

Person authorized to compile the technical documentation:  
Robert Leuthner, Address: see manufacturer's address

*Signature: see original declaration*

Lauffen/Neckar, March 2023

Dr.-Ing. Manuel Baumeister,  
Technology & Innovation



## 9 Annex to declaration of Incorporation

in accordance with 2006/42/EC, Appendix II, no. 1 B

as well as

in accordance with the Supply of Machinery (Safety) Regulations 2008.

1. Description of the basic safety and health protection requirements, as per 2006/42/EC, Annex I and per the Supply of Machinery (Safety) Regulations 2008, that apply to and are fulfilled for the scope of the incomplete machine:

Product designation 2-finger angular gripper

Type designation PWG-S

ID number 0302611, 0302612, 0302613

### Legend:

To be provided by the System Integrator for the overall machine



Fulfilled for the scope of the partly completed machine



Not relevant



### 1.1 Essential Requirements

1.1.1 Definitions



1.1.2 Principles of safety integration



1.1.3 Materials and products



1.1.4 Lighting



1.1.5 Design of machinery to facilitate its handling



1.1.6 Ergonomics



1.1.7 Operating positions



1.1.8 Seating



### 1.2 Control Systems

1.2.1 Safety and reliability of control systems



1.2.2 Control devices



1.2.3 Starting



1.2.4 Stopping



1.2.4.1 Normal stop



1.2.4.2 Operational stop



1.2.4.3 Emergency stop








1.2.4.4 Assembly of machinery





1.2.5 Selection of control or operating modes



<b>1.2</b>	<b>Control Systems</b>	
1.2.6	Failure of the power supply	
<b>1.3</b>	<b>Protection against mechanical hazards</b>	
1.3.1	Risk of loss of stability	
1.3.2	Risk of break-up during operation	
1.3.3	Risks due to falling or ejected objects	
1.3.4	Risks due to surfaces, edges or angles	
1.3.5	Risks related to combined machinery	
1.3.6	Risks related to variations in operating conditions	
1.3.7	Risks related to moving parts	
1.3.8	Choice of protection against risks arising from moving parts	
1.3.8.1	Moving transmission parts	
1.3.8.2	Moving parts involved in the process	
1.3.9	Risks of uncontrolled movements	
<b>1.4</b>	<b>Required characteristics of guards and protective devices</b>	
1.4.1	General requirements	
1.4.2	Special requirements for guards	
1.4.2.1	Fixed guards	
1.4.2.2	Interlocking movable guards	
1.4.2.3	Adjustable guards restricting access	
1.4.3	Special requirements for protective devices	
<b>1.5</b>	<b>Risks due to other hazards</b>	
1.5.1	Electricity supply	
1.5.2	Static electricity	
1.5.3	Energy supply other than electricity	
1.5.4	Errors of fitting	
1.5.5	Extreme temperatures	
1.5.6	Fire	
1.5.7	Explosion	
1.5.8	Noise	
1.5.9	Vibrations	
1.5.10	Radiation	
1.5.11	External radiation	

<b>1.5</b>	<b>Risks due to other hazards</b>	
1.5.12	Laser radiation	⊘
1.5.13	Emissions of hazardous materials and substances	👤
1.5.14	Risk of being trapped in a machine	⊘
1.5.15	Risk of slipping, tripping or falling	⊘
1.5.16	Lightning	👤
<b>1.6</b>	<b>Maintenance</b>	
1.6.1	Machinery maintenance	✓
1.6.2	Access to operating positions and servicing points	✓
1.6.3	Isolation of energy sources	✓
1.6.4	Operator intervention	✓
1.6.5	Cleaning of internal parts	✓
<b>1.7</b>	<b>Information</b>	
1.7.1	Information and warnings on the machinery	✓
1.7.1.1	Information and information devices	✓
1.7.1.2	Warning devices	✓
1.7.2	Warning of residual risks	✓
1.7.3	Marking of machinery	⊘
1.7.4	Instructions	⊘
1.7.4.1	General principles for the drafting of instructions	⊘
1.7.4.2	Contents of the instructions	⊘
1.7.4.3	Sales literature	⊘
<b>The classification from Annex 1 is to be supplemented from here forward.</b>		
2	Supplementary essential health and safety requirements for certain categories of machinery	👤
2.1	Foodstuffs machinery and machinery for cosmetics or pharmaceutical products	👤
2.2	Portable hand-held and/or guided machinery	👤
2.2.1	Portable fixing and other impact machinery	👤
2.3	Machinery for working wood and material with similar physical characteristics	👤
3	Supplementary essential health and safety requirements to offset hazards due to the mobility of machinery	✓
4	Supplementary essential health and safety requirements to offset hazards due to lifting operations	✓

<b>The classification from Annex 1 is to be supplemented from here forward.</b>		
5	Supplementary essential health and safety requirements for machinery intended for underground work	
6	Supplementary essential health and safety requirements for machinery presenting particular hazards due to the lifting of persons	





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Clamping and gripping technology

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