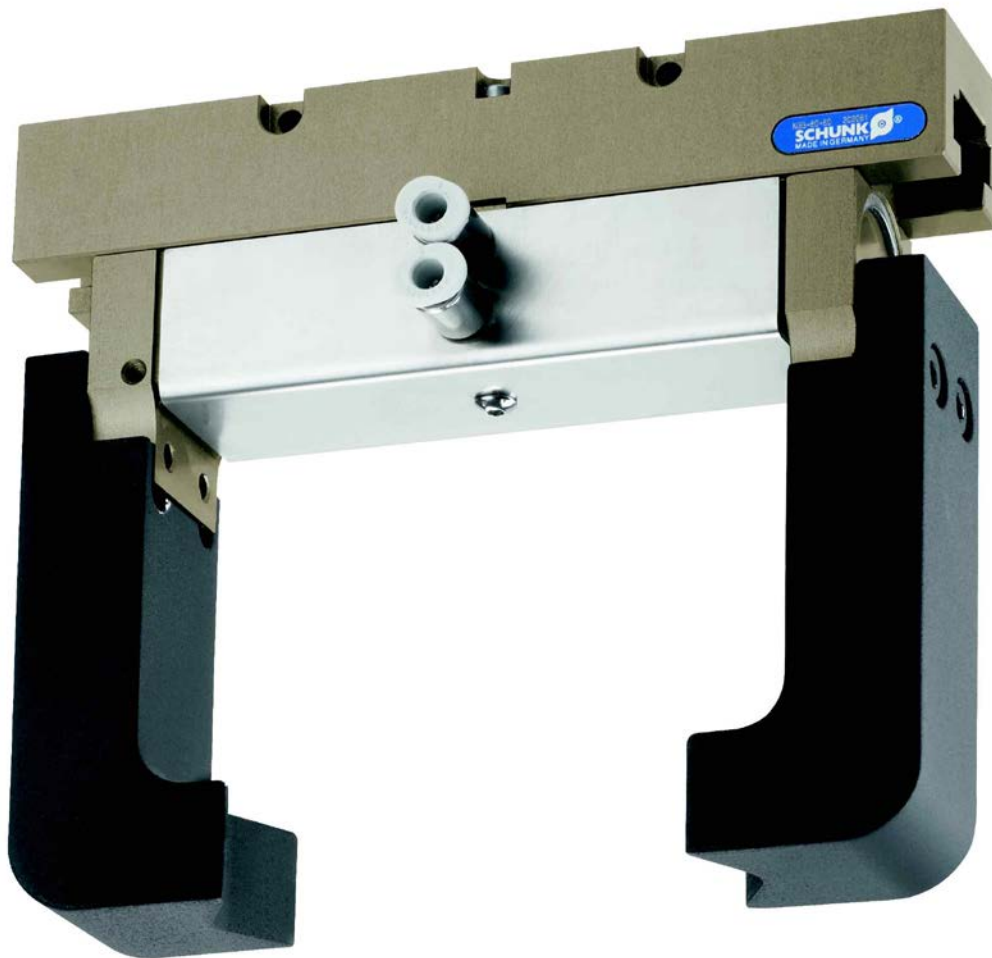


Small gripper with large stroke KGG 220-280

Assembly and Operating Manual



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,

congratulations on choosing a SCHUNK product. By choosing SCHUNK, you have opted for the highest precision, top quality and best service.

You are going to increase the process reliability of your production and achieve best machining results – to the customer's complete satisfaction.

SCHUNK products are inspiring.

Our detailed assembly and operation manual will support you.

Do you have further questions? You may contact us at any time – even after purchase.

Kindest Regards

Yours SCHUNK GmbH & Co. KG

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Reg. No. 003496 QM08



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1 About this manual

This instruction is an integral part of the product and contains important information for a safe and proper assembly, commissioning, operation, maintenance and help for easier trouble shooting.

Before using the product, read and note the instructions, especially the chapter "Basic safety notes".

1.1 Warnings

The following key words and symbols are used to highlight dangers.

1.1.1 Key words

DANGER	Dangers for persons. Non-compliance will inevitably cause irreversible injury or death.
WARNING	Dangers for persons. Non-compliance may cause irreversible injury or death.
CAUTION	Dangers for persons. Non-observance may cause minor injuries.
NOTICE	Information about avoiding material damage

1.1.2 Symbols



Warning about a danger point



Warning about hand injuries



General mandatory sign to prevent material damage

1.2 Variants

This operating manual applies for the following variations

- KGG
- KGG High-temperature version [HT]

1.3 Applicable documents

- General terms of business
- SCHUNK catalog Gripping modules
- Assembly and Operating Manuals of the accessories
- Calculation program for gripping modules (SSG)

The documents listed here, can be download on our homepage www.schunk.com

2 Basic safety notes

2.1 Intended use

The module was designed to grip and to temporarily and securely hold workpieces and objects.

The module is intended for installation in a machine/system. The requirements of the applicable guidelines must be observed and complied with.

The module may be used only in the context of its defined application parameters ([☞ 6, Page 12](#)).

SCHUNK assumes that application in question was tested with the calculation program for gripping modules (SSG).

To use this unit as intended, it is also essential to observe the technical data and installation and operation notes in this manual and to comply with the maintenance intervals.

2.2 Not intended use

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

2.3 Environmental and operating conditions

- Make sure that the module and the top jaws are a sufficient size for the application.
- Ensure that the environment is clean. Observe the maintenance and lubrication intervals ([☞ 9.2, Page 25](#)).
- Make sure that the environment is free from splash water and vapors as well as from abrasion or processing dust. This excludes modules that are designed specially for contaminated environments.

2.4 Product safety

Dangers arise from the module, if:

- the module is not used in accordance with its intended purpose.
- the module is not installed or maintained properly.
- the safety and installation notes are not observed.

Avoid any manner of working that may interfere with the function and operational safety of the module.

Wear protective equipment.

NOTE

More information are contained in the relevant chapters.

2.4.1 Protective equipment

Provide protective equipment per EC Machinery Directive.

2.4.2 Demands on the top jaws

Arrange the top jaws such that when the module is depressurized it can reach one of the end positions either open or closed and therefore no residual energy can be released when changing the top jaws.

2.4.3 Constructional changes, attachments, or modifications

Additional drill holes, threads, or attachments that are not offered as accessories by SCHUNK may be attached only with permission of SCHUNK.

2.5 Personnel qualification

The assembly, initial commissioning, maintenance, and repair of the module may be performed only by trained specialist personnel. Every person called upon by the operator to work on the module must have read and understood the complete assembly and operating manual, especially the chapter "Basic safety notes" ([☞ 2, Page 7](#)). This applies particularly to personnel only used occasionally, such as maintenance personnel.

2.6 Using personal protective equipment



When using this product, observe the relevant industrial safety regulations and use the personal protective equipment (PPE) required!

- Use protective gloves, safety shoes and safety goggles.
- Observe safe distances.
- Minimal safety requirements for the use of equipment.

2.7 Notes on particular risks

Generally valid:

- Remove the energy supplies before installation, modification, maintenance, or adjustment work.
- Make sure, that no residual energy remains in the system.
- Do not move parts by hand when the energy supply is connected.
- Do not reach into the open mechanism or the movement area of the module.
- Perform maintenance, modifications, and additions outside the danger zone.
- For all work, secure the unit against accidental operation.
- Take a precautionary approach by maintenance and disassembly.
- Only specially trained staff should disassemble the module.

	 WARNING
	<p>Risk of injury from objects falling and being ejected</p> <ul style="list-style-type: none"> • The danger zone must be surrounded by a safety fence during operation.

	 WARNING
	<p>While disassembling uncontrollable moves of parts of the gripper possible!</p>

3 Warranty

The warranty is valid for 24 months from the delivery date to the production facility under the following conditions:

- Intended use in 1-shift operation
- Observe the mandatory maintenance and lubrication intervals
- Observe the environmental and operating conditions

Parts touching the work piece and wear parts are not part of the warranty.

If necessary, check the application with the calculation program for gripping modules (SSG).


4 Scope of delivery

The scope of delivery includes:

- 2-finger parallel gripper KGG in the ordered model.
- Accessory pack

5 Accessories


A wide range of accessories is available for this module.

For information about which accessories can be used with the appropriate product version  catalog.

5.1 Sensors

Overview of the compatible sensors

Designation	Type
Inductive proximity switches	IN 80

- Exact type designation of the compatible sensors see  catalog



6 Technical data

	KGG
Pressure medium	Compressed air, standard for quality of the compressed air according to ISO 8573-1: 6 4 4
Min. pressure [bar]	2,5
Max. pressure [bar]	8,0
Noise emission [dB(A)]	≤ 70
IP rating	30
Min. ambient temperature [°C]	-10
Max. ambient temperature [°C]	90

Further technical data can be found in the catalog data sheet.
The most recent version applies.

7 Assembly

7.1 Mechanical connection

	 WARNING
	Risk of injury when the machine/system moves unexpectedly! Switch off power supply.

Check the evenness of the bolting surface The values relate to the entire bolting surface.

Requirements for levelness of the bolting surface (Dimensions in mm)

Diameter	Permissible unevenness
< 100	< 0.02
> 100	< 0.05

7.1.1 Assembly KGG 220

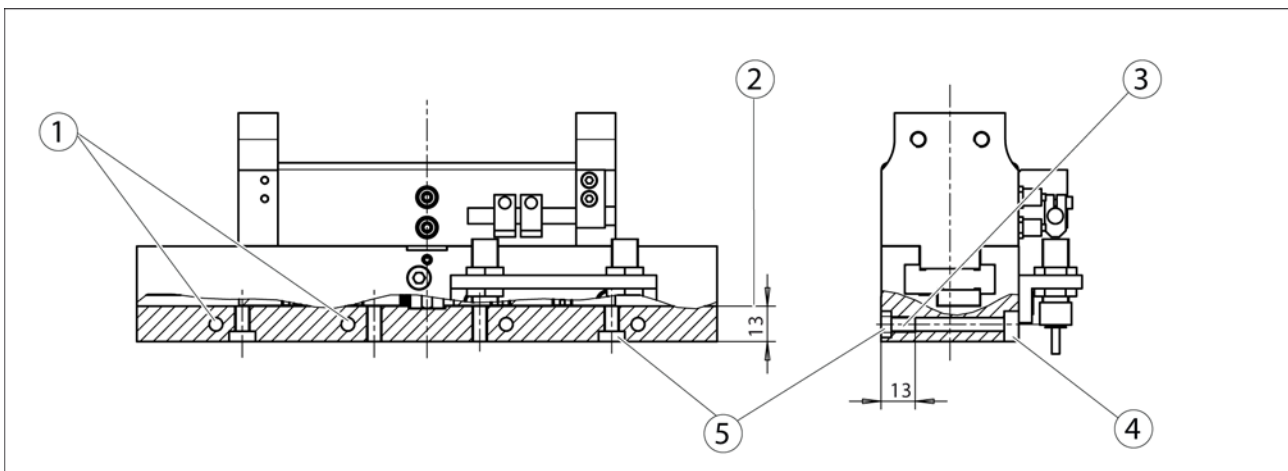



Fig. 1 Assembly KGG 220

Dimensions of centering elements (included in accessory pack)

Item	Mounting KGG	220
1	Thread	M6 (4x)
2	Depth of engagement	13 mm
3	Thread	M6 x 13
	Effective thread length	9 mm
4	For screw	DIN EN ISO 4762 M5 x 55 (4x)
5	Centering sleeves	$\varnothing 10^{H7} \times 4$ (2x)

	NOTICE
	<p>The gripper will be damaged if you exceed the maximum depth of engagement for the mounting screws.</p> <p>The depth of engagement of 13 mm (effective thread length, 9 mm) for fastening the base of the gripper absolutely must be observed.</p>

Mounting of the gripper

The gripper can be fastened at the side with screws (4). For centering, use the two sleeves (5) from the accessory pack. The mounting of the gripper at the bottom to an adapter plate is done using M6 screws.

7.1.2 Assembly KGG 280

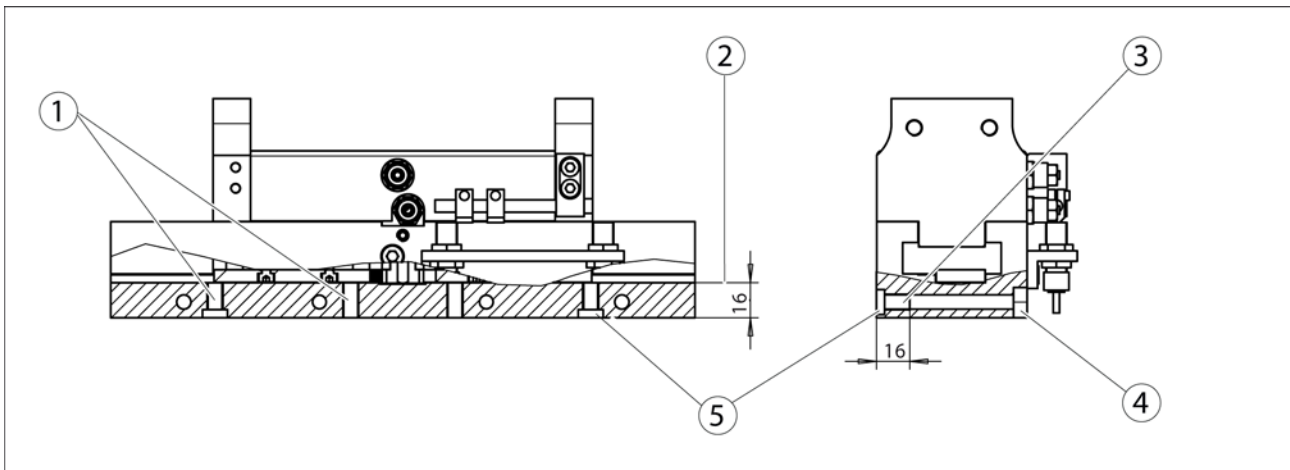



Fig. 2 Assembly KGG 280

Dimensions of centering elements (included in accessory pack)


Item	Mounting KGG	280
1	Thread	M8 (4x)
2	Depth of engagement	16 mm
3	Thread	M8 x 16
	Effective thread length	12 mm
4	For screw	DIN EN ISO 4762 M6 x 75 (4x)
5	Centering sleeves	∅ 12 ^{H7} x 4 (2x)


	NOTICE
	<p>The gripper will be damaged if you exceed the maximum depth of engagement for the mounting screws.</p> <p>The depth of engagement of 16 mm (effective thread length, 12 mm) for fastening the base of the gripper absolutely must be observed.</p>

Mounting of the gripper

The gripper can be fastened at the side with screws (4). For centering, use the two sleeves (5) from the accessory pack. The mounting of the gripper at the bottom to an adapter plate is done using M6 screws.

7.2 Air connection

	NOTICE
	<p>The maximum permissible mass per jaw is exceeded:</p> <ul style="list-style-type: none"> • Attach flow control couplings to the module.

	NOTICE
	<p>Observe the requirements for the air supply. (👉 6, Page 12) "Technical Data"</p>

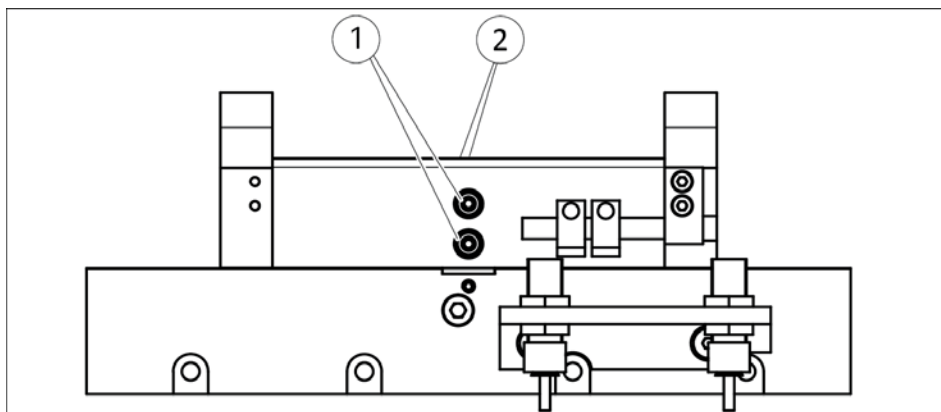


Fig. 3

1	Hose-free direct connection
2	Main 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 O-rings from the enclosed pack.
- If the maximum permissible finger weight is exceeded a throttle has to be carried out imperatively. The movement has to be without jerks and bounce.

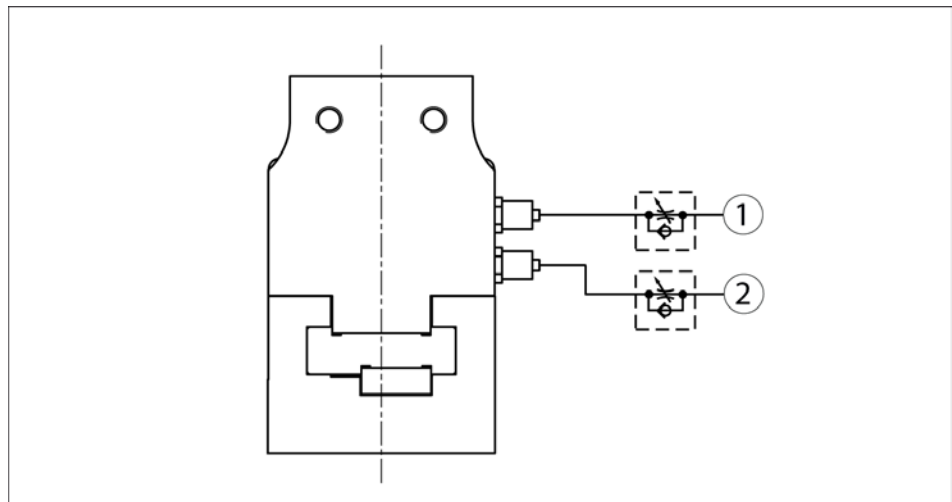



Fig. 4 Air connections

1	CLOSED
2	OPEN



NOTICE

Set the speed of the gripper using the one-way flow control valves such that the gripper opens and closes smoothly and without jerks.

7.3 Sensors

The module is prepared for a number of sensors. Other sensors can be used with a mounting kit.

- 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).

7.3.1 Inductive proximity switch IN 80

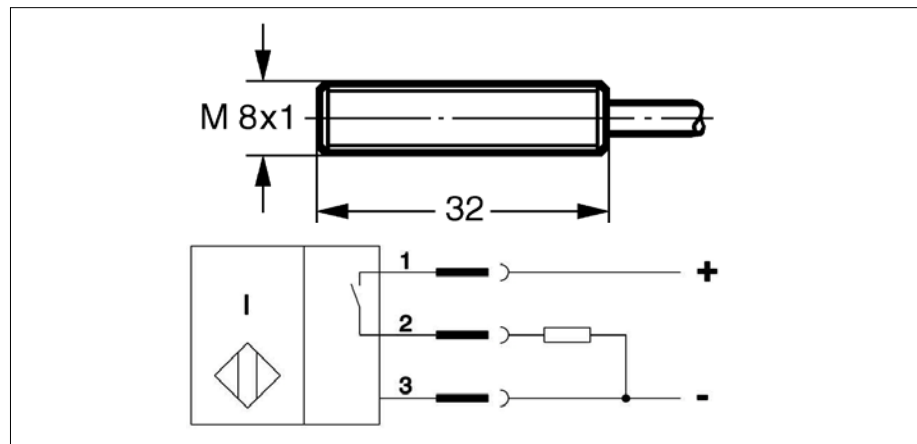


Fig. 5 Connection example for IN 80

1	brown	2	black	3	blue
---	-------	---	-------	---	------

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 (nnp, pnp) is permissible, but does not increase the permissible load current.

- Note that the leakage current of the individual sensors (ca. 2 mA) is cumulative.

Mounting and Adjusting of the proximity switch

NOTE

The proximity switches are accessories and must be ordered separately. The gripper has been prepared by SCHUNK for the use of proximity switches.

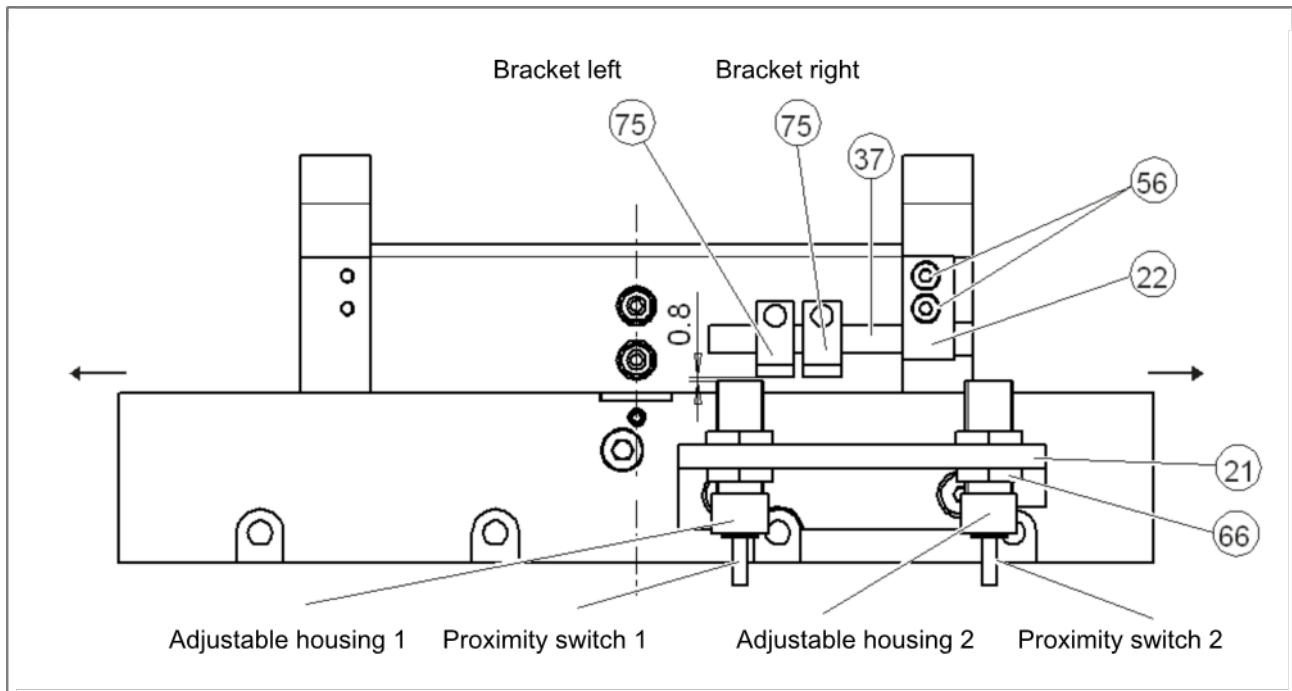


Fig. 6

Gripper closed:

- 1 Set the gripper fingers to the "CLOSED" position.
- 2 Push proximity switch 1 in adjustable housing 1 and secure the proximity switch with the slotted union nut.
- 3 Insert adjustable housing 1 (with proximity switch 1) into the oblong hole of the bracket (21) and secure it with the counter nut (66) so that a sensing distance of about 0.8 mm is present between the clamping piece and the adjustable housing.
- 4 Push adjustable housing 1 as far as possible to the left.
- 5 Connect proximity switch 1.
- 6 Carefully push adjustable housing 1 in the oblong hole to the right. If the proximity switch is attenuated, push the proximity switch another 0.5 mm or so in the same direction.
- 7 Carefully tighten the counter nuts (66).
- 8 Open and close the gripper to test its functioning.

Gripper open:

- 1 Set the gripper fingers to the "OPEN" position.
- 2 Push proximity switch 2 in adjustable housing 2 and secure the proximity switch with the slotted union nut.
- 3 Insert adjustable housing 2 (with proximity switch 2) into the oblong hole of the bracket (21) and secure it with the counter nut (66) so that a sensing distance of about 0.8 mm is present between the clamping piece and the adjustable housing.
- 4 Push adjustable housing 2 as far as possible to the right.
- 5 Connect proximity switch 2.
- 6 Carefully push adjustable housing 2 in the oblong hole to the left. If the proximity switch is attenuated, push the proximity switch another 0.5 mm or so in the same direction.
- 7 Carefully tighten the counter nuts (66).
- 8 Open and close the gripper to test its functioning.

Part gripped (O.D. gripping) by a stroke of at least 16 mm*:

- 1 Set the gripper fingers to the "OPEN" position.
- 2 Push proximity switch 1 in adjustable housing 1 and secure the proximity switch with the slotted union nut.
- 3 Push proximity switch 2 in adjustable housing 2 and secure the proximity switch with the slotted union nut.
- 4 Insert adjustable housing 1 and 2 (with proximity switch) into the oblong hole of the bracket (21) and secure it with the counter nut (66) so that a sensing distance of about 0.8 mm is present between the clamping piece (74) and the adjustable housing.
- 5 Move adjustable housing 2 as far as possible to the right.
- 6 Connect proximity switch 2.
- 7 Carefully push adjustable housing 2 in the oblong hole to the left. If the proximity switch is attenuated, push the proximity switch another 0.5 mm or so in the same direction.
- 8 Carefully tighten the counter nuts (66).
- 9 Open and close the gripper to test its functioning.
- 10 Put the gripper fingers onto the "Part gripped" position (with workpiece).
- 11 Push adjustable housing 1 as far as possible to the left.
- 12 Connect proximity switch 1.

- 13 Carefully push adjustable housing 1 in the oblong hole to the right. If the proximity switch is attenuated, push the proximity switch another 0.5 mm or so in the same direction.
- 14 Carefully tighten the counter nuts (66).
- 15 Open and close the gripper to test its functioning.
- 16 Proximity switch 1 must not be dampened in the "Gripper CLOSED" position.

NOTE

If the required stroke per finger is less than 16 mm, then this area can be queried with an additional clamping piece (74). To do this, the second clamping piece is put on the query shaft (37). Now put the clamping pieces into position so that proximity switch 1 is dampened by the left clamping piece and proximity switch 2 is damped by the right clamping piece. The setting of the proximity switch is also done in accordance with points 1 to 16.

Part gripped (I.D. gripping) by a stroke of at least 16 mm*:

- 1 Set the gripper fingers to the "CLOSED" position.
- 2 Push proximity switch 1 in adjustable housing 1 and secure the proximity switch with the slotted union nut.
- 3 Push proximity switch 2 in adjustable housing 2 and secure the proximity switch with the slotted union nut.
- 4 Insert adjustable housing 1 and 2 (with proximity switch) into the oblong hole of the bracket (21) and secure it with the counter nut (66) so that a sensing distance of about 0.8 mm is present between the clamping piece (74) and the adjustable housing.
- 5 Move adjustable housing 1 as far as possible to the right.
- 6 Connect proximity switch 1.
- 7 Carefully push adjustable housing 1 in the oblong hole to the right. If the proximity switch is attenuated, push the proximity switch another 0.5 mm or so in the same direction.
- 8 Carefully tighten the counter nuts (66).
- 9 Open and close the gripper to test its functioning.
- 10 Put the gripper fingers onto the "Part gripped" position (with workpiece).
- 11 Push adjustable housing 2 as far as possible to the right.
- 12 Connect proximity switch 2.

- 13 Carefully push adjustable housing 2 in the oblong hole to the left. If the proximity switch is attenuated, push the proximity switch another 0.5 mm or so in the same direction.
- 14 Carefully tighten the counter nuts (66).
- 15 Open and close the gripper to test its functioning.
- 16 Proximity switch 2 must not be dampened in the "Gripper OPEN" position.

NOTE

If the required stroke per finger is less than 16 mm, then this area can be queried with an additional clamping piece (74). To do this, the second clamping piece is put on the query shaft (37). Now put the clamping pieces into position so that proximity switch 1 is dampened by the left clamping piece and proximity switch 2 is damped by the right clamping piece. The setting of the proximity switch is also done in accordance with points 1 to 16.

8 Troubleshooting

8.1 Module does not move?

Possible cause	Corrective action
Base jaws jam in housing, possible cause: bolting surface not sufficiently level.	Check the levelness of the bolting surface. (👉 7.1, Page 13) Loosen the mounting screws for the gripper and actuate the gripper again.
Pressure drops below minimum.	Check the air supply. (👉 7.2, Page 15)
Compressed air lines switched	Check compressed air lines.
Proximity switch defective or set incorrect.	Repair the proximity switch.
Unused air connections not closed.	Close the unused air connections.
Choke valve closed.	Open the choke valve.
Component is broken, e.g. through overloading	Replace component or send the module with a repair order to SCHUNK. Ensure that the module was only used within its defined application parameters. If necessary, check the application with the calculation program for gripping modules (SSG).

8.2 The module does not travel through the entire stroke?

Possible cause	Corrective action
Dirt deposits between the cover and the piston	Abdeckung entfernen. Clean the module and relubricate it (☞ 9, Page 25)
Dirt deposits between the base jaws and the guide	Disassemble and clean module (☞ 9.4, Page 26)
Pressure drops below minimum.	Check the air supply. (☞ 7.2, Page 15)
Mounting surface is not even enough	Check the levelness of the bolting surface. (☞ 7.1, Page 13)
Components have become loose (e.g. due to overload)	Send the module to SCHUNK with a repair order or disassemble module (☞ 9.4, Page 26)

8.3 Module opens or closes abruptly?

Possible cause	Corrective action
Too little grease in the mechanical guiding areas of the module	Clean the module and relubricate it (☞ 9, Page 25)
Compressed air lines are blocked	Check the compressed air lines for crushing or damage.
Mounting surface is not even enough	Check the levelness of the bolting surface.
Throttle check valve is missing or not set correctly	Install and adjust throttle check valve
Load too high	Review permissible weight and length of the jaws (☞ 7.1, Page 13)

8.4 The gripping force drops?

Possible cause	Corrective action
Compressed air can escape	Check seals, if necessary disassemble module and replace seals
Too much grease in the mechanical motion spaces of the module	Clean the module and relubricate it (☞ 9, Page 25)
Pressure drops below minimum.	Check the air supply. (☞ 7.2, Page 15)

8.5 Module does not achieve the opening and closing times?

Possible cause	Corrective action
<p>Compressed air lines are not installed optimally</p>	<p>If present: Open the flow control couplings on the module to the maximum that the movement of the jaws occurs without bouncing and hitting.</p> <p>Check compressed air lines.</p> <p>Inner diameter of the compressed air lines are sufficiently large relative to the compressed air consumption</p> <p>Compressed air lines between module and control valve should be kept as short as possible</p> <p>Flow rate of valve is sufficiently large relative to the compressed air consumption</p> <p>NOTICE! The one-way flow control valves must not be removed even when the gripper has not reached the opening and closing times.</p> <p>If, despite of optimal air connections, the opening and closing times are not achieved according to the catalog, we recommend the use of quick exhaust valves direct at the module</p>
<p>Load too high</p>	<p>Review permissible weight and length of the jaws</p>

9 Maintenance and Care

9.1 Notes


Original spare parts

When replacing damaged parts (wearing parts/spare parts) only use SCHUNK original spares.

NOTE

Observe the requirement for the air supply

9.2 Maintenance and lubrication intervals

	NOTICE
	<p>At ambient temperature above 60°C the lubricants cure out faster</p> <ul style="list-style-type: none"> • Interval decrease accordingly.

Maintenance- and lubrication interval

KGG	220 / 280
Interval [Mio. cycles]	2

9.3 Lubricants/Lubrication points (basic lubrication)



We recommend the lubricants listed.

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


Lubrication point	Lubricant
Metallic sliding surfaces	LINOMAX
All seals	Renolit HLT 2
Bores on the piston	

9.4 Dismantling the module

Position of the position numbers ([👉 10, Page 28](#))

	 WARNING
	<p>Risk of injury when the machine/system moves unexpectedly! Switch off power supply.</p>

- 1 Remove pressure lines.
- 2 Unscrew and remove the screws (35) and remove holder (21) with the proximity switches.
- 3 Completely unscrew the air connections (43) with a suitable wrench (open-ended or box wrench).
- 4 Remove the screws (40) and take off the cover (10).
- 5 Manually push the gripper fingers (3) all the way apart (open gripper position).
- 6 Completely screw out the screws (33).
- 7 Carefully pull out the gripper fingers (3) to the side.
- 8 Pull the quad rings (24) off the piston (6).
- 9 Remove the O-rings (25) from the covers (7).
- 10 Turn the pistons (6) from the piston rod (2).
- 11 Pull the cover (7) from the piston rod (2).
- 12 Remove the quad rings (23) from the covers (7).
- 13 Release the set-screw (34) and screw out about 2 mm.
- 14 Remove the screws (38).
- 15 Pull the piston rod (2) carefully out of the housing (1).

	NOTICE
	<p>Be sure that the pinion (20) and its associated alignment pin (29) remain in their prescribed position.</p>

- 16 Take the O-rings (26) out of the housing's (1) counter bores.
- 17 Clean all parts thoroughly and check all parts for any defects or wear.
- 18 Replace all seals in accordance with the sealing kit list ([👉 11, Page 29](#)). The complete sealing kit can be ordered from SCHUNK.

9.5 Servicing and assembling the module

- Maintenance**
- Clean all parts thoroughly and check for damage and wear.
 - Treat all grease areas with lubricant.
([☞ 9.3, Page 25](#))
 - Oil or grease bare outside steel parts.
 - Replace all wearing parts / seals.
 - Position of the wearing parts ([☞ 10, Page 28](#))
 - Sealing kit ([☞ 11, Page 29](#))

- Assembly** Assembly takes place in the opposite order to disassembly. Observe the following:
- Unless otherwise specified, secure all screws and nuts with Loctite no. 243 and tighten with the appropriate tightening torque.



NOTICE

When inserting the gripper fingers (3) – with guide (19) and gear rack (18) – be sure that both gear racks (18) come together at the pinion (20) at the same time.

10 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.

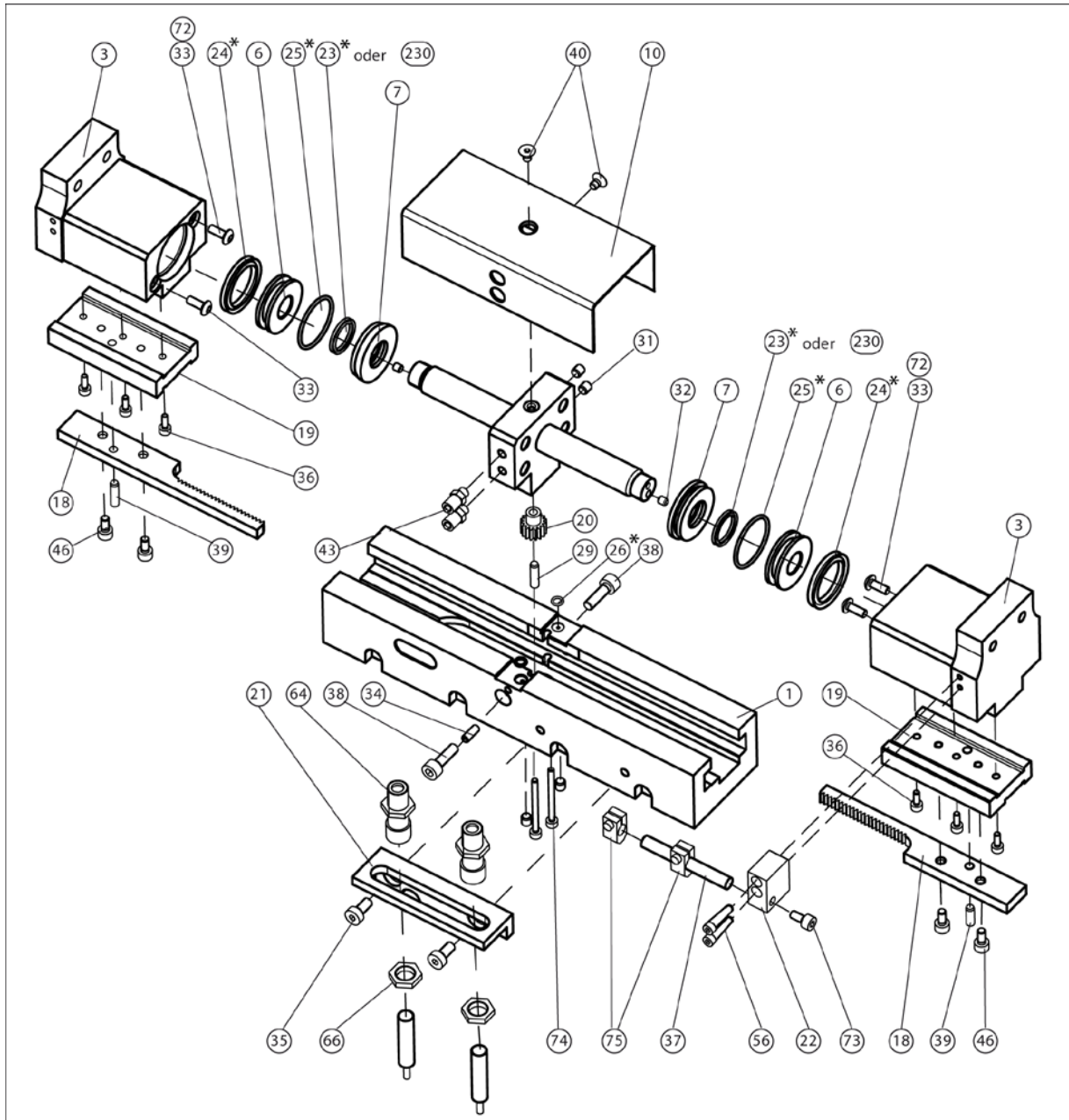


Fig. 7

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



NOTICE

When inserting the gripper fingers (3) – with guide (19) and gear rack (18) – be sure that both gear racks (18) come together at the pinion (20) at the same time.

11 Sealing kit

ID.-No. of the seal kit

Sealing kit for	ID number
KGG 220	0370803
KGG 280	0370804

Contents of the seal kit ([👉 10, Page 28](#)).

12 Accessory pack

Content of the accessories pack:

- 4 x screws for mounting
- 2 x centering sleeves for mounting
- 1 x clamping piece
- 2 x O-rings for hose-free direct connection
- 2 x locking screw for hose connection

ID.-No. of the accessory pack

Accessory pack for	ID number
KGG 220	5510566
KGG 220 - High-temperature version [HT]	395510566
KGG 280	5510567
KGG 280 - High-temperature version [HT]	395510567

13 Translation of original declaration of incorporation

In terms of the EC Machinery Directive 2006/42/EG, Annex II, Part B

Manufacturer/ SCHUNK GmbH & Co. KG
Distributor Spann- und Greiftechnik
Bahnhofstr. 106 – 134
D-74348 Lauffen/Neckar

We hereby declare that the following product:

Product designation: 2-finger parallel gripper / KGG 220-280 / pneumatic
ID number 0340312, 0340313

meets the applicable basic requirements of the **Machinery Directive (2006/42/EC)**.

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

Applied harmonized standards, especially:

EN ISO 12100:2011-03 Safety of machinery - General principles for design - Risk assessment and risk reduction

EN 62079:2001 Preparation of instructions - Structuring, content and presentation

The manufacturer agrees to forward on demand the special technical documents for the incomplete machine to state offices.

The special technical documents according to Annex VII, Part B, belonging to the incomplete machine have been created.

Person responsible for documentation: Mr. Robert Leuthner, Address:
see address of the manufacturer

Lauffen/Neckar, September 2013



Ralf Winkler; Business Unit Manager
R & D Mechanical Gripping Systems

