

3-Finger Centric Gripper LGZ 16 - 50

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

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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

- LGZ Without gripping force maintenance
- LGZ with gripping force maintenance device "O.D. gripping"
- LGZ with gripping force maintenance device "I.D. gripping"

1.3 Applicable documents

- General terms of business
- Catalog data sheet of the purchased product
- Assembly and Operating Manuals of the accessories

The documents listed here, can be downloaded 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 13](#)).

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

The module is intended for industrial use.

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.
- Make sure that the module has a sufficient size for the application.
- Make sure that the environment is free from splash water and vapors as well as from abrasion or processing dust. Exceptions are modules that are designed especially 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 of 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 due to squeezing and bumping during movement of the gripper jaws and breaking or loosening of the gripper fingers !</p>

	 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>

2.7.1 Variant gripping force maintenance

	 WARNING
	<p>Risk of injury from objects falling during energy supply failure Modules with a mechanical gripping force maintenance can, during energy supply failure, still move independently in the direction specified by the mechanical gripping force maintenance.</p> <ul style="list-style-type: none"> • Secure the end positions of the module with SCHUNK SDV-P pressure maintenance valves.

	 WARNING
	<p>Risk of injury due to residual energy in the gripper because of gripping force maintenance by springs!</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:


- 3-Finger Centric Gripper LGZ in the ordered model.
- Accessory pack

5 Accessories

The following accessories that are required for the module must be ordered separately:

- Sensors


A wide range of accessories are 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
Programmable magnetic switch	MMS-P

- Exact type designation of the compatible sensors see  catalog.
- If you require further information on sensor operation, contact your SCHUNK contact person or download information from our homepage.
- For mounting the sensors, mounting kits are partly necessary.

6 Technical data

Size	16	32	50
Mechanical operating data			
Stroke per jaw [mm]	3	4	7
Weight [kg]			
Without gripping force maintenance	0,1	0,32	0,95
with gripping force maintenance device	0,1	0,35	0,99
Recommended workpiece weight [kg]	0,6	2,25	5,7
Max. permissible finger length [mm]	30	60	80
Max. permitted weight per finger [kg]	0,03	0,08	0,25
Ambient temperature [°C]			
Min.	-10	-10	-10
Max.	90	90	90
Min. Federkraft [N]			
Without gripping force maintenance	-	-	-
with gripping force maintenance device AS	30	150	330
with gripping force maintenance device IS	30	150	330
Closing force [N]			
Without gripping force maintenance	120	450	1140
with gripping force maintenance device AS	150	600	1470
with gripping force maintenance device IS	-	-	-
Opening force [N]			
Without gripping force maintenance	144	540	1320
with gripping force maintenance device AS	-	-	-
with gripping force maintenance device IS	174	590	1650
IP rating	40	40	40
Operating data for compressed air connection			
Pressure medium	Compressed air, standard for quality of the compressed air according to ISO 8573-1: 7 4 4		
Noise emission [dB(A)]	≤ 72		



Technical data

Size	16	32	50
Min. pressure [bar]			
Without gripping force maintenance	2	2	2
with gripping force maintenance device	4	4	4
Max. pressure [bar]			
Without gripping force maintenance	8	8	8
with gripping force maintenance device	6,5	6,5	6,5
Nominal working pressure [bar]			
Without gripping force maintenance	6	6	6
with gripping force maintenance device AS	6	6	6
with gripping force maintenance device IS	6	6	6

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

7 Assembly

7.1 Mechanical connection

	 WARNING
	<p>Warning: Risk of injury when the machine/system moves unexpectedly! Remove the energy supplies before starting with assembly and adjustments. Make sure that no residual energy remains in the system.</p>

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

Mounting The module can be mounted from the front or the rear.

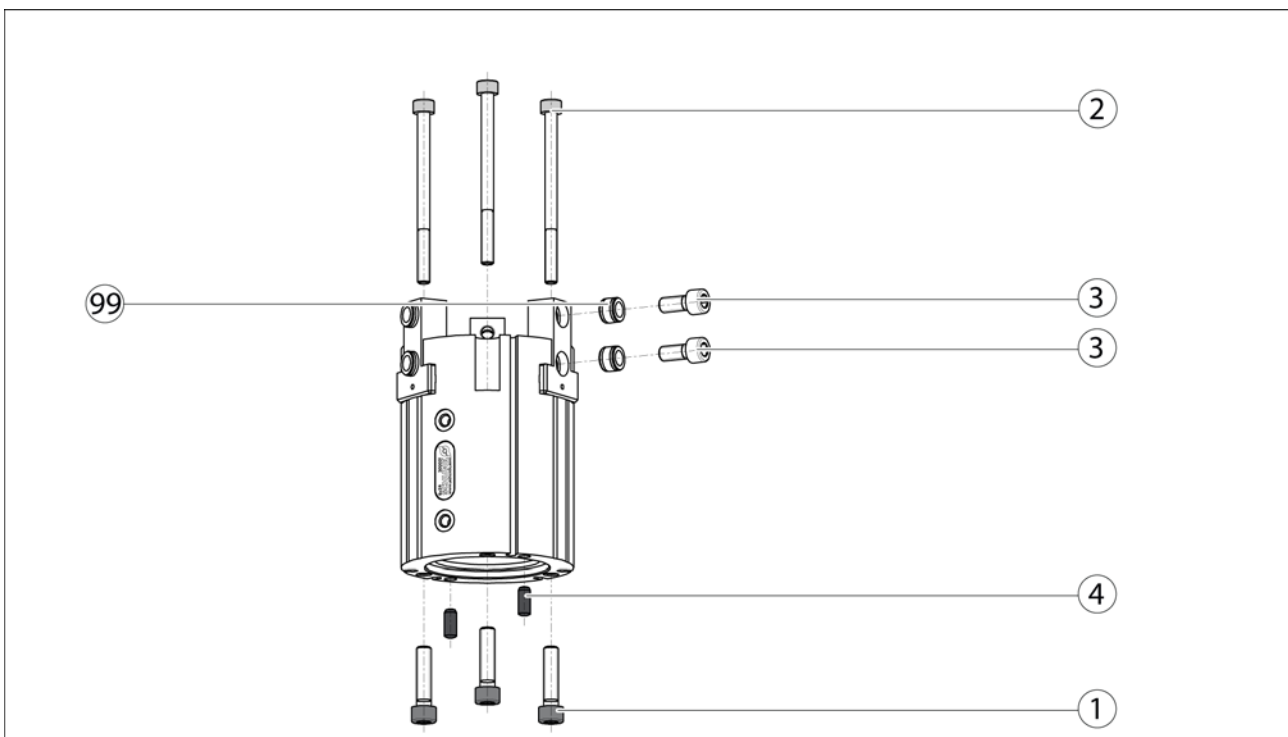


Fig. 1 Assembly options



Mounting material (provided by customer)


Item	Mounting	16	32	50
1	Rear module	M3 x max. 7,4	M4 x max. 10	M8 x max. 16
2	Module on the side	M3 x max. 7,4	M4 x max. 10	M8 x max. 16
3	Top jaws	M3 x max. 5	M4 x max. 10	M8 x max. 16
4	Centering pin	Ø3 x max. 3	Ø5 x max. 5	Ø8 x max. 8
99	Centering sleeve	Ø5h6 / 4,35	Ø5h6 / 4,35	Ø8h6 / 5,35


NOTE

- For mounting from the rear fix the module using the provided centering pins (4).
- Mount the module using the mounting bores.
- Mount the top jaws using the mounting bores provided. Use centering sleeves (99).

7.2 Air connection

	 WARNING
	<p>Warning: Risk of injury when the machine/system moves unexpectedly! Remove the energy supplies before starting with assembly and adjustments. Make sure that no residual energy remains in the system.</p>

	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 13) "Technical Data"</p>

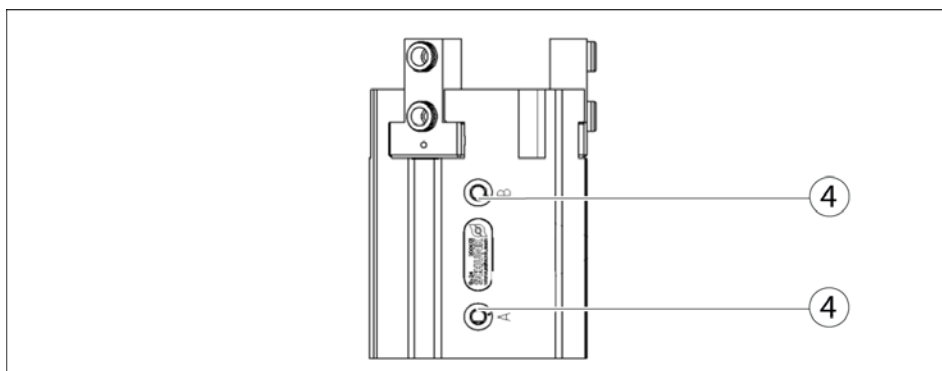


Fig. 2 Air connection

Thread diameter of the air connections

Item	Connection	16 - 50
4	Thread diameter of the air connections (A = open, B = closed)	2 x M5

- 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.

Further information on the hose-free direct connection contains the catalog data sheet.

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 Programmable magnetic switch (MMS-P)

NOTE

The MMS-P can be used for sizes LGZ 16 to LGZ 50.

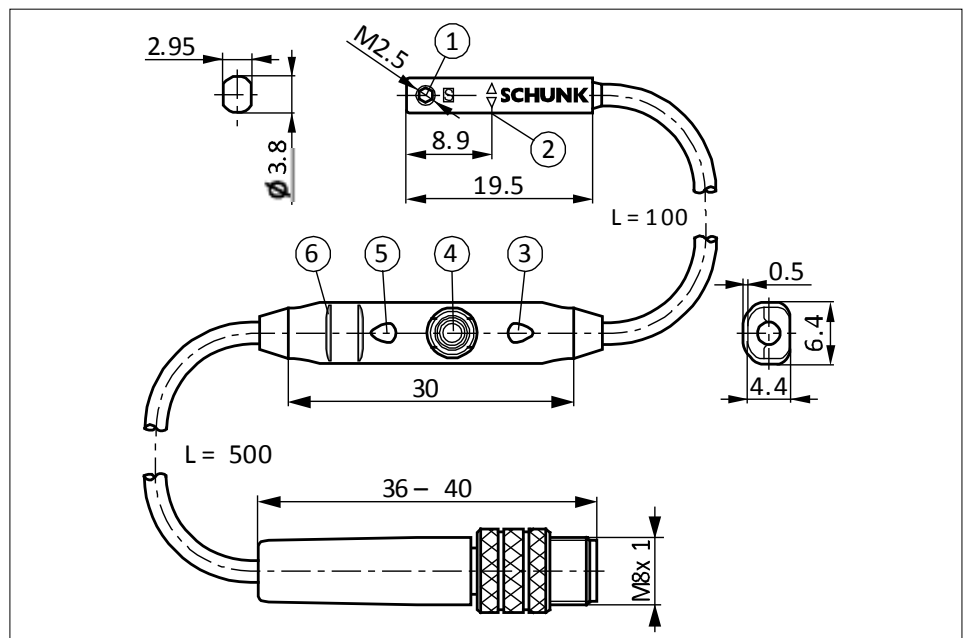


Fig. 3 Magnetic switch (MMS-P 22)

1	Mounting screw	4	Teach-button
2	Center sensor elements	5	LED display
3	LED display	6	Rips for cable tires

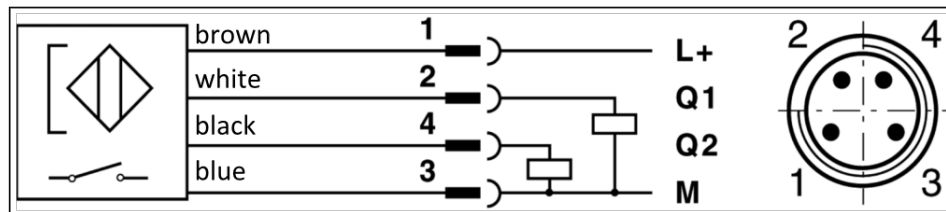


Fig. 4 Connection diagram PNP-4 conductor (MMS-P 22)


Types available for order (see catalog):

- MMS-P 22-S-M8-PNP
- MMSK-P 22-S-PNP
- V2-M8-4-2XM8-3

The MMSK-P 22-S-PNP features a cable with open strands so that it can be connected by means of terminal contacts.

The V2-M8-4-2XM8-3 distributor is used to convert the 4-pin connector plug of the MMS-P 22-S-M8-PNP sensor to two standard M8 plugs with 3 pins each.

Mounting of the sensor

	NOTICE
	<p>Sensor can be damaged during assembly.</p> <ul style="list-style-type: none"> • Do not exceed the maximum tightening torque of 10 Ncm for the set screws.

NOTE

Ferromagnetic material changes the switching positions of the sensor. For example: Adapter plate made of ordinary steel.

At ferromagnetic adapter plates:

- The module must firstly be mounted on the adapter plate
- Then, the positions of the magnetic switch have to be set

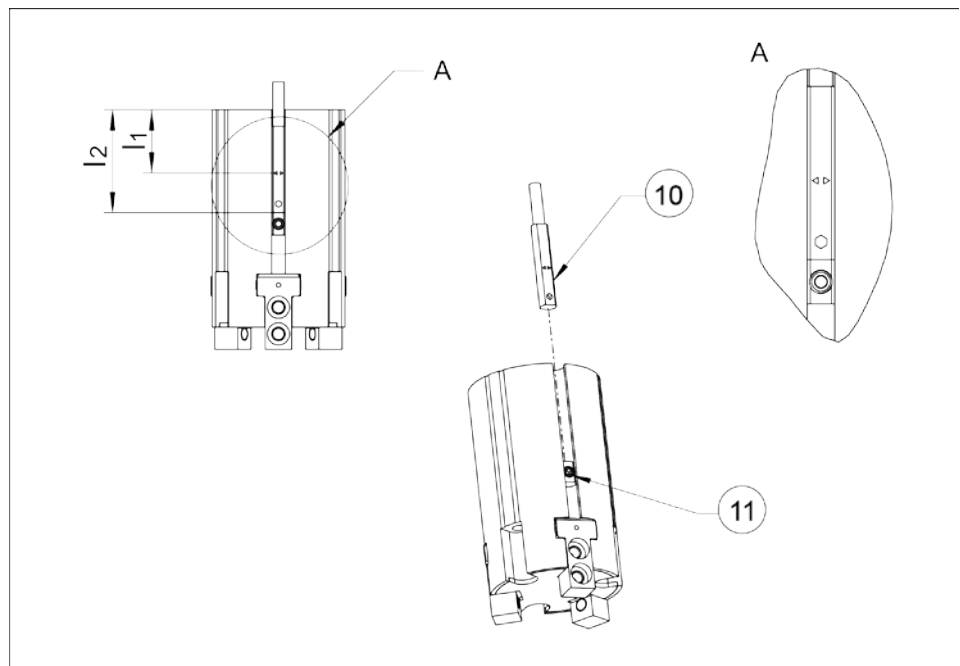


Fig. 5

- 1 Push the magnetic switch (10) into the groove until it rests on the back stop (11) (if present).
- 2 If no clamping stop is available, push in the magnetic switch in accordance with dimension l_2 (lower edge gripper up to front side sensor) or with dimension l_1 (lower edge gripper up to the double arrow on the sensor) and then clamp.

Type	Dimension	Dimension	Type	Dimension	Dimension
LGZ 16 °	14,3 mm	23,2 mm	LGZ 50 °	33,1 mm	42,0 mm
LGZ 16-AS °	14,3 mm	23,2 mm	LGZ 50-AS °	33,1 mm	42,0 mm
LGZ 16-IS °	12,8 mm	21,7 mm	LGZ 50-IS °	26,1 mm	35,0 mm
LGZ 32 °	23,0 mm	31,9 mm			
LGZ 32-AS °	23,0 mm	31,9 mm			
LGZ 32-IS °	18,0 mm	26,9 mm			

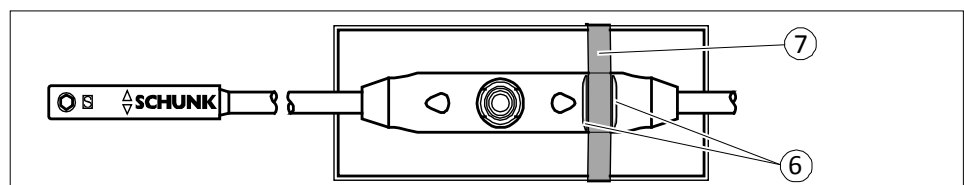


Fig. 6

- 1 To relieve the cable, the electronics have to be fixed in place using cable ties (7). There are ribs (6) in place on the electronics for mounting purposes.

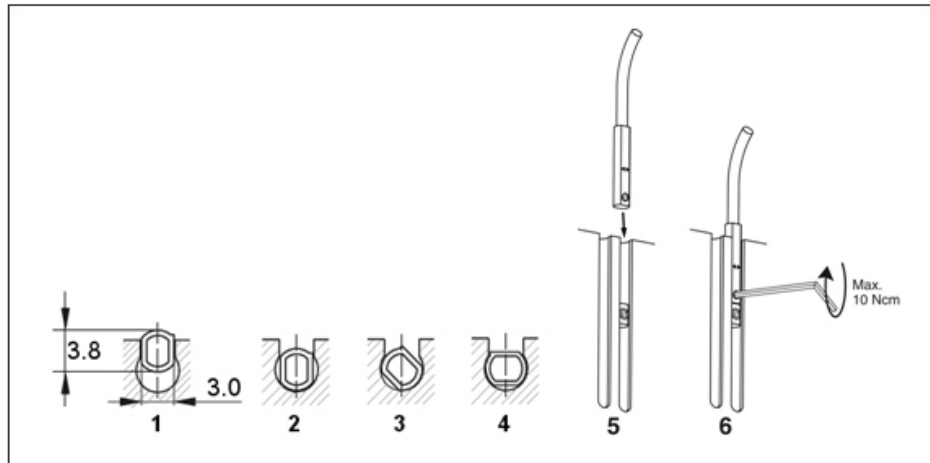


Fig. 7

- 2 Turn in the sensor (1 - 4).
OR
Push the sensor axially into the slot until it contacts the stop (5).
- 3 Fix the sensor with an Allen wrench (6).

Adjustment of the switching points

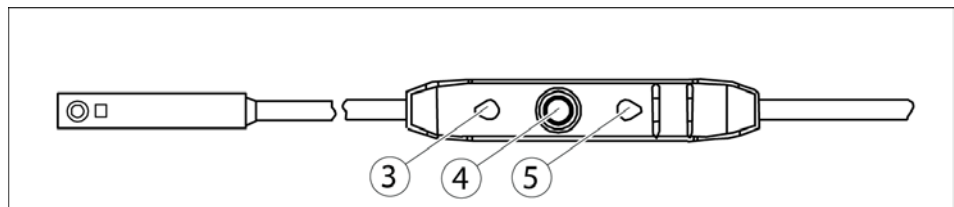


Fig. 8

- 1 Press the "Teach" button (4) for 2 seconds.
After 2 seconds, LED 1 (3) flashes.
 - 2 Move the gripper to position 1 (e.g. "Open").
 - 3 Briefly press the "Teach" button (4).
LED 1 (3) lights up and LED 2 (5) flashes.
 - 4 Put the gripper in position 2.
LED 1 (3) should go out as soon as switching point 1 is left.
 - 5 Briefly press the "Teach" button (4).
LED 2 (5) lights up.
- The switching points are set.

Adjusting the hysteresis The hysteresis to both switching points will be adjusted automatically corresponding to the characteristics of the magnetic field. The user can set the switching and triggering points of each position a little bit closer than for the automatic mode. The triggering point is closer to the switching point. At the same time the susceptibility to trouble and damage increases. In the mode of the lowest hysteresis, an error signal (such as jitter or untimely switch off) can be avoided, if the sensor is protected against all types of disturbances (i.e. by shielding). Frequent types of disturbances are change in temperature and electro-magnetic influences. Within the closest fine-teach mode, SCHUNK cannot guarantee EMC-compatibility any more. The hysteresis adjustment is used for the manual adjustment of the switching points (if necessary). In case that the hysteresis automatically determined by the sensor should be too high or too low after “the adjustment of the switching points”, you may correct the value as follows. The sensor avoids a too small hysteresis during hysteresis adjustment. The smallest detectable difference in stroke is defined in the following table:

The smallest detectable difference in stroke based on the nominal stroke

For Grippers with X mm nominal stroke per jaw	Min. query range per jaw / min. queried stroke difference per jaw
X ≤ 5mm	30% of the nominal stroke per jaw
X = 5 to 10mm	20% of the nominal stroke per jaw
X ≥ 10mm	10% of the nominal stroke per jaw

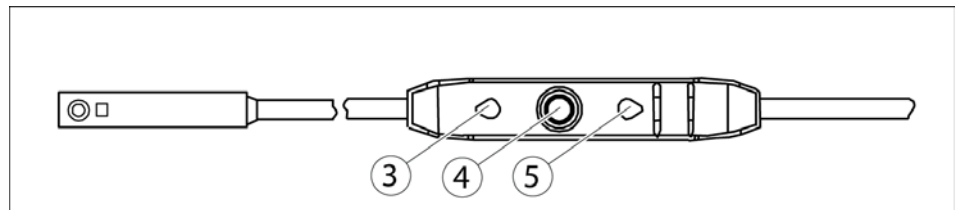


Fig. 9

- 1 Press the "Teach" button (4) for 5 seconds.
LED 1 (3) flashes from the second to the fifth second.
LED 1 goes out after 5 seconds.
- 2 Release the "Teach" button.
- 3 Move the gripper to the "switch off point for switching point 1" position.
- 4 Briefly press the "Teach" button (4).
LED 1 (3) flashes 2x.
- 5 Move the gripper to the "switch off point for switching point 2" position.
- 6 Briefly press the "Teach" button (4).
LED 2 (5) flashes 2x.

The assembly of the MMS-P sensor is completed.

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 15) Loosen the mounting screws for the gripper and actuate the gripper again.
Pressure drops below minimum.	Check the air supply. (👉 7.2, Page 17)
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 over-loading	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 base jaws and the guide	Disassemble and clean module.
Pressure drops below minimum.	Check the air supply. (👉 7.2, Page 17)
Mounting surface is not even enough	Check the levelness of the bolting surface. (👉 7.1, Page 15)
Component is broken, e.g. through over-loading	Send the module to SCHUNK with a repair order or disassemble module.

8.3 Module opens or closes abruptly?

Possible cause	Corrective action
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.
Flow control valve is missing or not set correctly	Install and adjust flow control valve.
Load too high	Review permissible weight and length of the jaws. (👉 7.1, Page 15)

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 Link Wartung
Pressure drops below minimum.	Check the air supply. (👉 7.2, Page 17)

8.5 Electric signals are not transmitted?

Possible cause	Corrective action
Use steel screws to mount the gripper.	Use stainless steel screws.
Mounting plates, brackets, etc. from non magnetic materials.	If possible, use aluminium or plastic.

8.6 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

The 3-finger centric gripper LGZ is not intended for maintenance. Disassembly for maintenance or repair purposes is not possible. A damaged gripper has to be replaced completely.

10 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: 3-Finger Centric Gripper / LGZ 16 - 50 / electro-pneumatic
ID number 0312930 ... 0312938

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 Safety of machinery - General principles for design - Risk assessment
12100:2011-03 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, October 2013

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