

2-Finger Parallel Gripper HGN

Assembly and operating manual



Imprint

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Technical changes:

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Document number: 0389139

Edition: 01.00 | 04/08/2014 | en

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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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Table of Contents

1	About this manual	5
1.1	Warnhinweise.....	5
1.2	Variants.....	6
1.3	Applicable documents	6
2	Basic safety notes	7
2.1	Intended use.....	7
2.2	Environmental and operating conditions.....	7
2.3	Not intended use	7
2.4	Product safety.....	8
2.4.1	Protective equipment	8
2.4.2	Demands on the top jaws	8
2.4.3	Constructional changes, attachments, or modifications.....	8
2.5	Personnel qualification.....	8
2.6	Using personal protective equipment.....	9
2.7	Notes on particular risks.....	9
2.7.1	Variant gripping force maintenance	10
3	Warranty	11
4	Scope of delivery	11
5	Accessories	11
5.1	Sensors.....	11
6	Technical data	12
7	Assembly	13
7.1	Mechanical connection	13
7.2	Oil supply	15
7.3	Sensors.....	17
7.3.1	Inductive proximity switch IN 80	17
8	Troubleshooting	21
8.1	Module does not move?	21
8.2	The module does not travel through the entire stroke?	21
8.3	Module opens or closes abruptly?	22
8.4	The gripping force drops?	22
8.5	Module does not achieve the opening and closing times?	23
9	Maintenance and Care	24
9.1	Notes.....	24
9.2	Maintenance and lubrication intervals	24

9.3	Lubricants/Lubrication points (basic lubrication)	24
9.4	Disassembly of the module	25
9.4.1	Version without gripping force maintenance.....	25
9.4.2	Maintenance of module with gripping force maintenance "O.D. gripping" (O.D.)	25
9.5	Servicing and assembling the module.....	27
9.5.1	Assembly and calibration of seals.....	27
9.5.2	Screw tightening torques.....	28
9.6	Mounting devices	29
10	Assembly drawing	31
11	Seal kit	32
12	Translation of original declaration of incorporation.....	33

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 Warnhinweise

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

	<p> DANGER</p> <p>Danger for persons. Non-compliance will inevitably cause irreversible injury or death.</p>
	<p> WARNING</p> <p>Dangers for persons. Ignoring a safety note like this can lead to irreversible injury and even death.</p>
	<p> CAUTION</p> <p>Dangers for persons. Non-observance can cause minor injuries.</p>
	<p>NOTICE</p> <p>Material damage Information about avoiding material damage.</p>
	<p> WARNING</p> <p>Warning about hand injuries</p>

1.2 Variants

This operating manual applies for the following variations

- HGN without gripping force maintenance
- HGN with gripping force maintenance "O.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 product was designed to grip and to temporarily and securely hold workpieces and objects.

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

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

The product is designed 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 Environmental and operating conditions

- Make sure that the product and the top jaws are a sufficient size for the application.
- Observe Maintenance and lubrication intervals ([↗ 9.2, Page 24](#)).
- Make sure that the environment is free from splash water and vapors as well as from abrasion or processing dust. Exceptions are products that are designed especially for contaminated environments.

2.3 Not intended use

Use which is not specified as an intended use is for instance when the product is for example used as a pressing tool, stamping tool, lifting tool, guide for tools, cutting tool, tensioning mean, boring tool.

2.4 Product safety

Dangers arise from the product, if:

- the product is not used in accordance with its intended purpose.
- the product 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 product.

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 product 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 product may be performed only by trained specialist personnel. Every person called upon by the operator to work on the product 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 unit.
- Perform maintenance, modifications, and additions outside the danger zone.
- Secure the product during all operations against uncontrolled activation.
- Take a precautionary approach by maintenance and disassembly.
- Only specially trained staff should disassemble the product.



	 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 Products 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 product 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

If the product is used as intended, the warranty is valid for 24 months from the date of delivery from the production facility under the following conditions:

- Observance of the ambient conditions and operating conditions ([↗ 2.2, Page 7](#))
- Observance of the maintenance and lubrication intervals ([↗ 9, Page 24](#))

Parts touching the workpiece and wearing parts are not part of the warranty.

4 Scope of delivery

The scope of delivery includes:

- 2-Finger Parallel Gripper HGN in the ordered model.
- Accessory pack

5 Accessories

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
Inductive proximity switches	IN

- 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.

6 Technical data

Nominal working pressure [bar]	45
Pressure medium	hydraulic oil, filtered (10 microns), viscosity 46 mm ² /s at 40°C in accordance with ISO VG
Min. pressure [bar]	30
Max. pressure [bar]	45
Noise emission [dB(A)]	≤ 70
max. admissible volume of current [l/min]	2
Max. oil leakage [mg/Zyklus]	0.5

NOTE



Don't fall below the min. closing-/ and opening times

Designation	HGN							
	80	80 AS	100	100 AS	125	125 AS	160	160 AS
Closing time [s]	0.15	0.15	0.2	0.2	0.3		0.4	
Opening time [s]	0.15	0.2	0.2	0.3	0.3		0.4	

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

7 Assembly

7.1 Mechanical connection

	 WARNING
	<p>Risk of injury when the machine/system moves unexpectedly, due to moving of gripping jaws.</p> <ul style="list-style-type: none"> • Before starting mounting of the gripper, the hydraulic connection must be switched off.

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, from the rear or on the side.

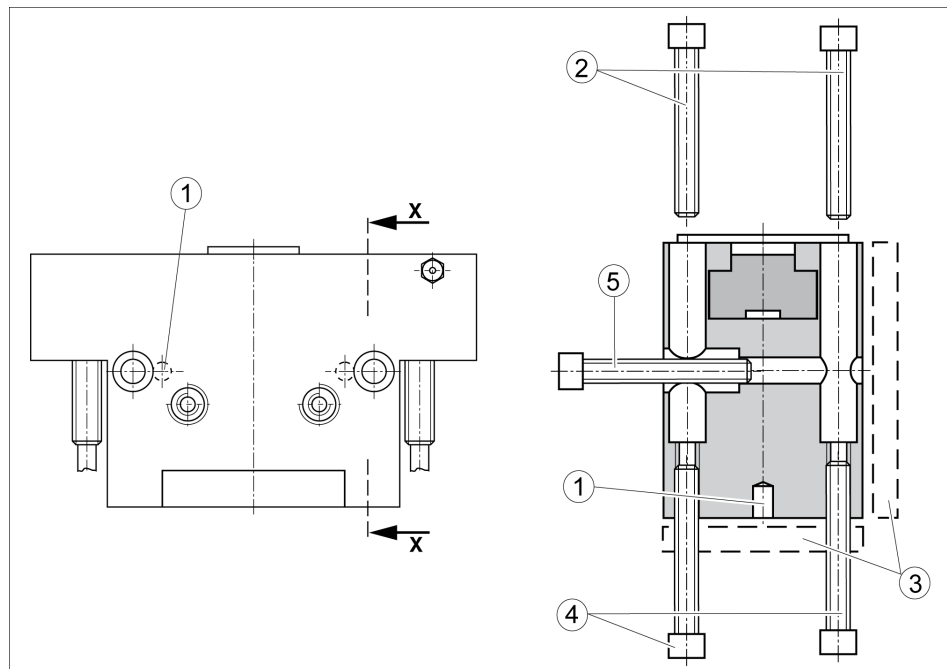


Fig. 1 mounting possibilities

1	2x cylindrical pins DIN EN ISO 8734	2/4	4x Socket head cap screws DIN EN ISO 4762
3	Adapter plate	5	2x Socket head cap screws DIN EN ISO 4762

Mounting material

Item	Mounting	HGN			
		80	100	125	160
2	Module from rear	M5	M6	M8	M8
4	Module from the front				
5	Module laterally				

Note

- For installation from rear, fix the module using the fixing holes provided.
- Mount the module using the mounting bores provided.
- Attach the top jaws using the mounting bores provided.

7.2 Oil supply

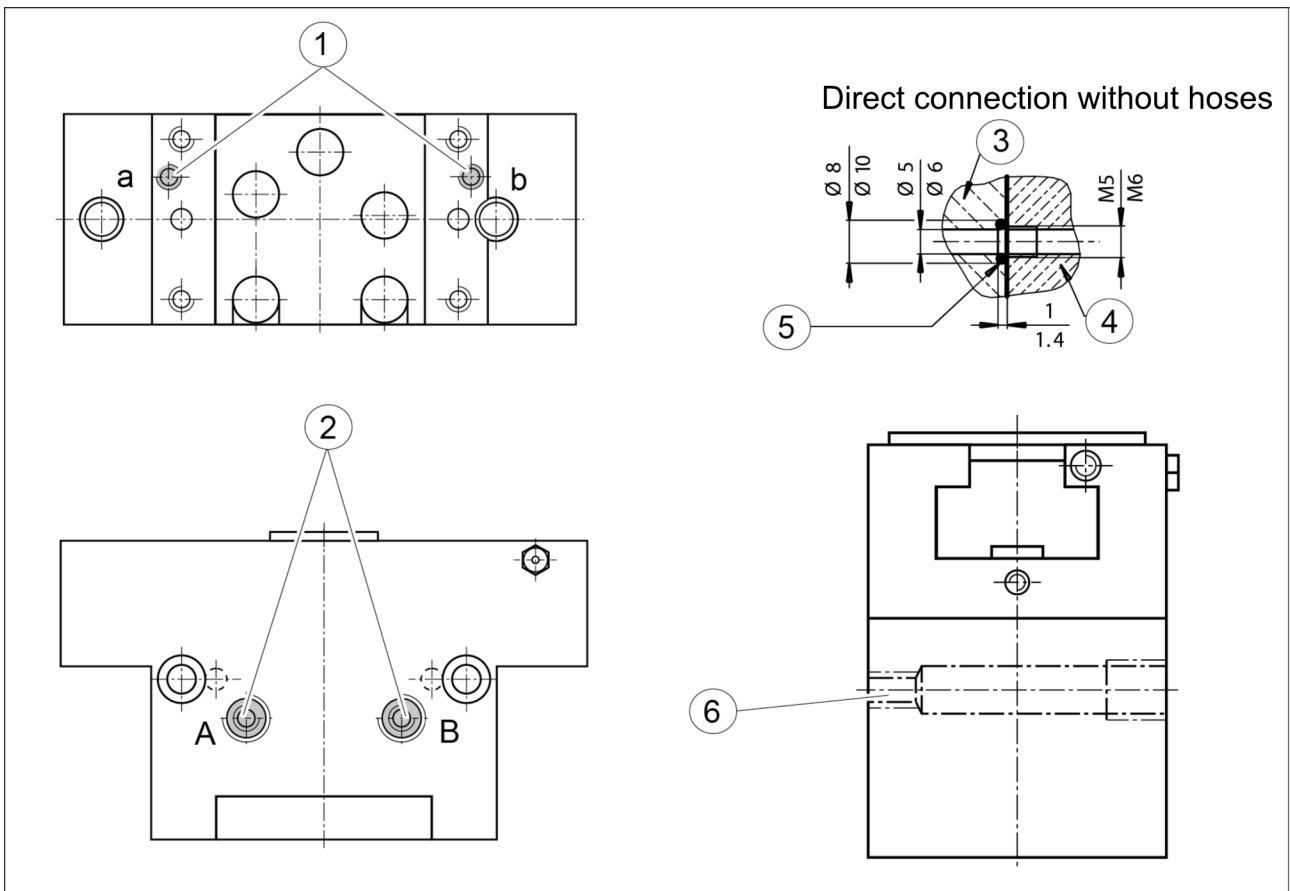


Fig. 2

1	Hose-free direct connection (a= open, b = closed)	5	laterally O-ring $\varnothing 6 \times 2$
2	Hose connection R 1/8" (A= open, B = closed)		at the bottom HGN 100/125/160: O-ring $\varnothing 6 \times 2$ HGN 80: O-ring $\varnothing 5 \times 1.5$
3	Adapter	6	2× M6 for direct connection without hoses
4	Gripper		

NOTE

The max. volume of current is 2 l/min.

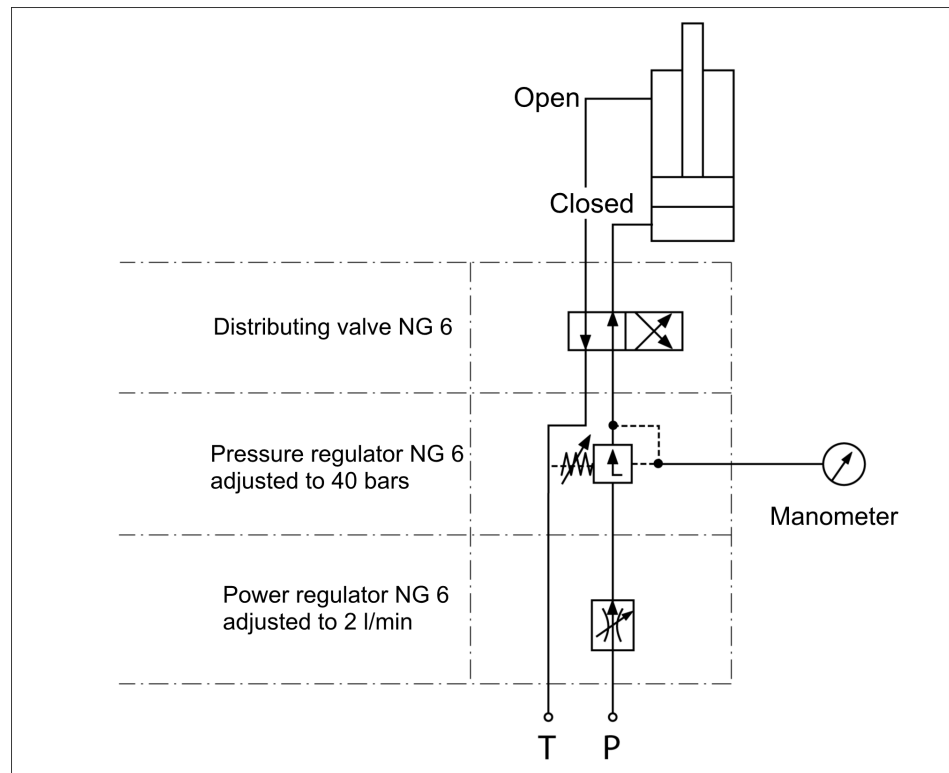


Fig. 3 Switching diagram

- 1 For the assembly without hoses, use 2 O-rings and seal the oil feeding.
- 2 Close the oil feedings which you don't use for your application with a suitable welsh plug.

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 Inductive proximity switch IN 80

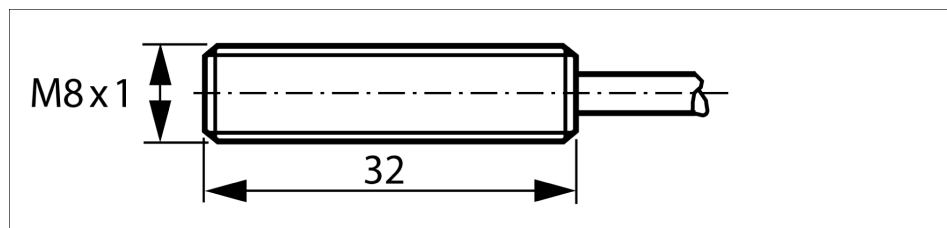


Fig. 4

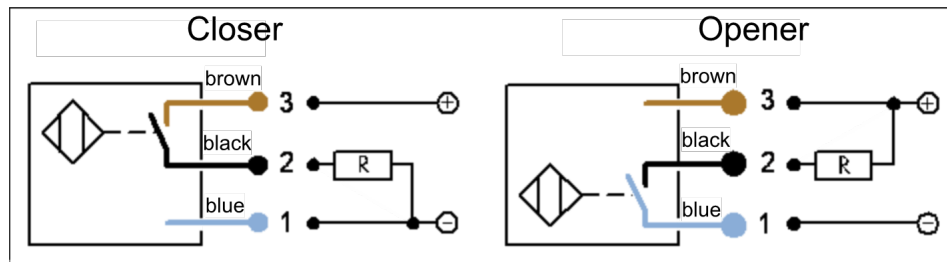


Fig. 5 Output: drawn in non-actuated condition

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 (ca. 2 mA) is cumulative.

Assembly and adjustment of the proximity switch

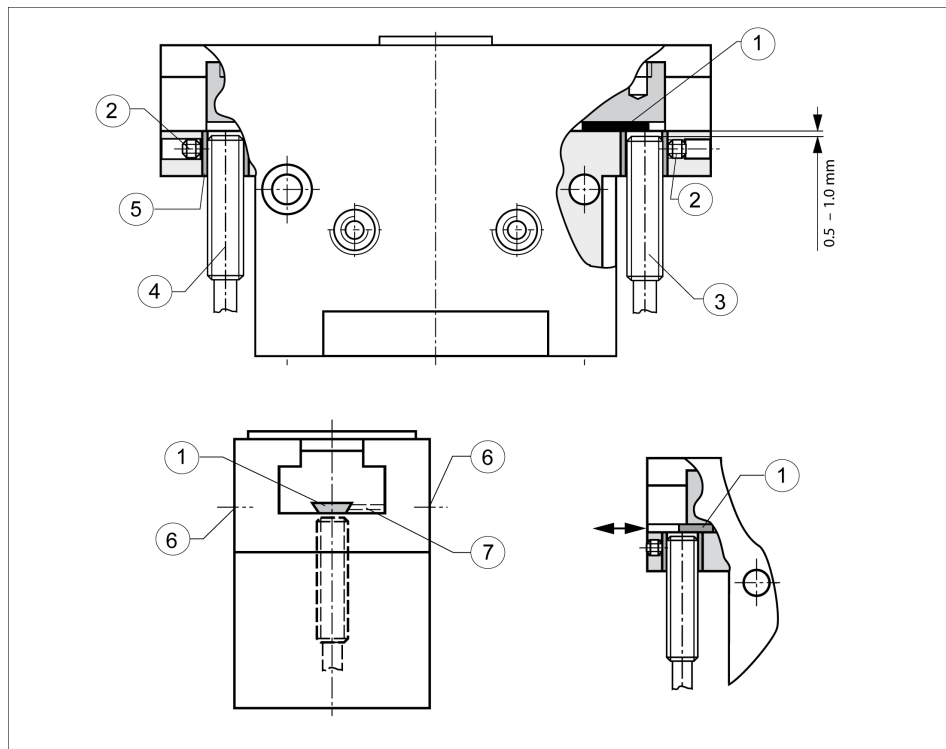


Fig. 6

1	Control-cam (magnetic)	2	set screw (24) for clamping of the control cam
3	proximity switch closed (closer)	4	proximity switch open (opener)
5	clamping sleeve	6	Sealing set screw
7	Set screw for clamping of the control cam		

NOTE

- The proximity switches are an accessory and must be ordered separately.
- The control cams for gripper "Open" and "Closed" are already assembled.
- The control cams for intermediate positions are enclosed in the accessories pack.

NOTE

The max. tightening torque for the fastening screws of the proximity switch is 1 Nm.

Gripper open:

- 1 Set the gripper to the "Open" position.
- 2 Carefully move the opener into the clamping sleeve until the proximity switch contacts the control cam.
- 3 Draw back the proximity switch by appr. 0.5 mm.
- 4 Fasten the proximity switch with the lateral set-screw. (observe max. tightening torque).
- 5 Connect the proximity switch.
- 6 Check proper function by closing and opening the gripper.

Gripper closed:

- 1 Set the gripper to the "Closed" position.
- 2 Carefully move the opener into the clamping sleeve until the proximity switch contacts the control cam.
- 3 Draw back the proximity switch by appr. 0.5 mm.
- 4 Fasten the proximity switch with the lateral set-screw. (observe max. tightening torque).
- 5 Connect the proximity switch.
- 6 Check proper function by closing and opening the gripper.

Part gripped (O.D. gripping)

- 1 Assemble the proximity switch as previously described.
- 2 Set the gripper to the "Closed" position.
- 3 Loosen the set-screw which jams the control cam (therefore remove the lateral sealing set-screw in the housing, 2 pieces on each side).
- 4 Clamp the part to be gripped.
- 5 Push the control cam until the proximity switch is switching.
- 6 Carefully set the gripper into "Closed" position.
- 7 Fasten the control cam and check on proper function.
- 8 Now close the lateral thread of the housing again with a sealing set-screw.

NOTE

Consider the range of function of the control cams. Exchange them if necessary

Chart of control cams:

Length of the control cams	HGN			
	80 Stroke 1	100 Stroke 1	125 Stroke 1	160 Stroke 1
9.2 mm	0 - 5 mm	0 - 6 mm	0 - 4 mm	0 - 2 mm
14 mm	5 - 8 mm	6 - 10 mm	4 - 8.5 mm	2 - 6.5 mm
18 mm	-	-	8.5 - 13 mm	6.5 - 11.5 mm
24.5 mm	-	-	-	11.5 - 16 mm

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 oil supply (☞ 7.2, Page 15)
Oil- or control feedings are wrongly attached	Check oil- or control feedings
Proximity switch defective or set incorrect.	Repair the proximity switch.
Oil feedings which are not used for the application are not closed.	Close the oil feedings which are not used.
Flow control valve closed.	Open the flow control 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.

8.2 The module does not travel through the entire stroke?

Possible cause	Corrective action
Dirt deposits between the cover and the piston	Remove the cover, clean the module and relubricate it. (☞ 9, Page 24)
Dirt deposits between the base jaws and the guide	Disassemble and clean module.
Pressure drops below minimum.	Check oil supply (☞ 7.2, Page 15)
Mounting surface is not even enough	Check the levelness of the bolting surface. (☞ 7.1, Page 13)
Component is broken, e.g. through overloading	Send the module to SCHUNK with a repair order or disassemble module.

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 24)
Oil- or control feedings are blocked	Check oil- or control feedings for pinching 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 13)

8.4 The gripping force drops?

Possible cause	Corrective action
Oil 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 24)
Pressure drops below minimum.	check oil supply (👉 7.2, Page 15)

8.5 Module does not achieve the opening and closing times?

Possible cause	Corrective action
<p>Oil- or control feedings 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 oil- or control feedings</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 oil consumption.</p> <p>NOTICE! Das Drosselrückschlagventil muss nicht entfernt werden, selbst wenn der Greifer die Öffnungs- und Schließzeiten nicht erreicht.</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.

Maintenance of module with gripping force maintenance "A.D. gripping" (A.D.)

The pistons have to be aligned using an assembly device. Therefore we recommend to have the module serviced and the seals replaced by SCHUNK.

If this is not possible, you can carry out the maintenance and replace the seals yourself.

9.2 Maintenance and lubrication intervals

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

Maintenance- and lubrication interval

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.

Lubricant point	Lubricant
Metallic sliding surfaces	Renolit HLT 2
All seals	Renolit HLT 2

9.4 Disassembly of the module

9.4.1 Version without gripping force maintenance

Position of the position numbers ([👉 10, Page 31](#))



	 WARNING
	<p>Risk of injury when the machine/system moves unexpectedly! Remove the energy supplies. Make sure that no residual energy remains in the system.</p>



- 1 Remove all oil feedings.
- 2 Remove the cover sheet plate (5).
- 3 Mark the installation position of the base jaws (2) and the piston (3) inside the housing (1).
- 4 Turn the socket head cap screws (11) out and remove the cover (4).
- 5 Remove the socket head cap screws (10) and remove the cylinder piston (6).
- 6 Draw out the base jaws of the guidances and press out the piston.



The seals (14 and 15) have to be assembled on mounting devices ([👉 9.6, Page 29](#)).

9.4.2 Maintenance of module with gripping force maintenance "O.D. gripping" (O.D.)

Position of the position numbers ([👉 10, Page 31](#))

	 WARNING
	<p>Risk of injury when the machine/system moves unexpectedly! Remove the energy supplies. Make sure that no residual energy remains in the system.</p>

	 WARNING
	Risk of injury due to spring forces! The lid is under spring tension. Carefully disassemble the module.

	 WARNING
	Risk of injury due to spring forces! The cylinder piston is under spring tension. Carefully disassemble the module.

- 1 Remove oil feedings.
- 2 Remove the cover sheet plate (5).
- 3 Mark the installation position of the base jaws (2) and of the pistons (3) inside the housing (1).
- 4 Remove the helical spring device (32).
- 5 **WARNING! In case of a damage the components may be spring-packaged! Therefore clamp in the gripper before un-tightening the screws between »a« and »b«. Then carefully unclamp, until the spring has lost its power.**
- 6 Remove the socket head cap screw (34).
- 7 **WARNING! The components are spring-packed! Therefore clamp in the gripper before untightening the screw between »a« and »b«. Then carefully unclamp, until the spring has lost its power.**
- 8 Remove the spring guidance (31) and the spring (33).
- 9 Remove the cover (item 30).
- 10 Take out the the cylinder piston (item 6).
- 11 Draw out the base jaws (item 2) from the guidances and press out the piston (item 3).

The seals (14 and 15) have to be assembled on mounting devices ([👉 9.6, Page 29](#)),

9.5 Servicing and assembling the module

- Maintenance**
- Clean all parts thoroughly and check for damage and wear.
 - Treat all greased areas with lubricant.
([↩ 9.3, Page 24](#))
 - Oil or grease bare external steel parts.
 - Replace all wear parts / seals.
 - Position of the wearing parts ([↩ 10, Page 31](#))
 - Seal kit ([↩ 11, Page 32](#))

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. ([↩ 9.5.2, Page 28](#))

9.5.1 Assembly and calibration of seals

Position of the position numbers ([↩ 10, Page 31](#))

Assembly and calibration of the piston seal (14)

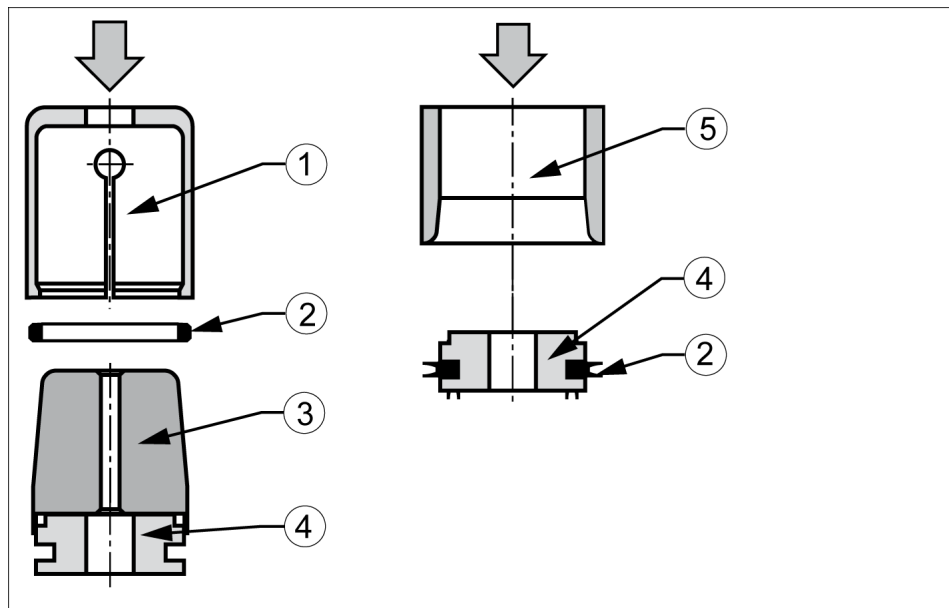


Fig. 7

1	Expansion sleeve	2	Seal (14)
2	Mounting taper	4	Cylinder piston (6)
5	Calibration sleeve		

Position of the position numbers ([↗ 10, Page 31](#))

Assembly and calibration of the bar seal (15) inside the housing

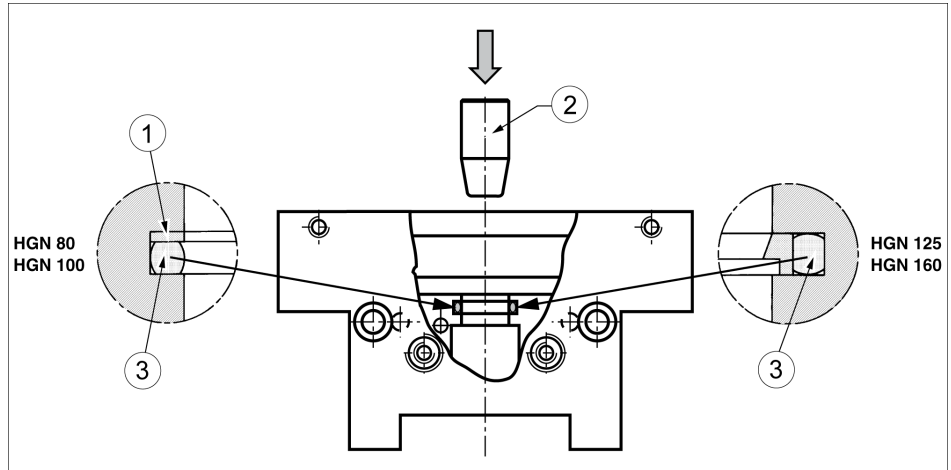


Fig. 8

1	Supporting ring (65)	2	Calibration arbor (only for HGN 125/160)
3	Seal (15)		

Compress the seal kidney shaped together (avoid sharp buckling). Consider the position of installation! Calibrate after installation.

9.5.2 Screw tightening torques

Position of the position numbers ([↗ 10, Page 31](#))

Item	HGN			
	80	100	125	160
10	21 Nm	21 Nm	42 Nm	100 Nm
11	6 Nm	21 Nm	21 Nm	21 Nm
34	21 Nm	21 Nm	42 Nm	100 Nm

9.6 Mounting devices

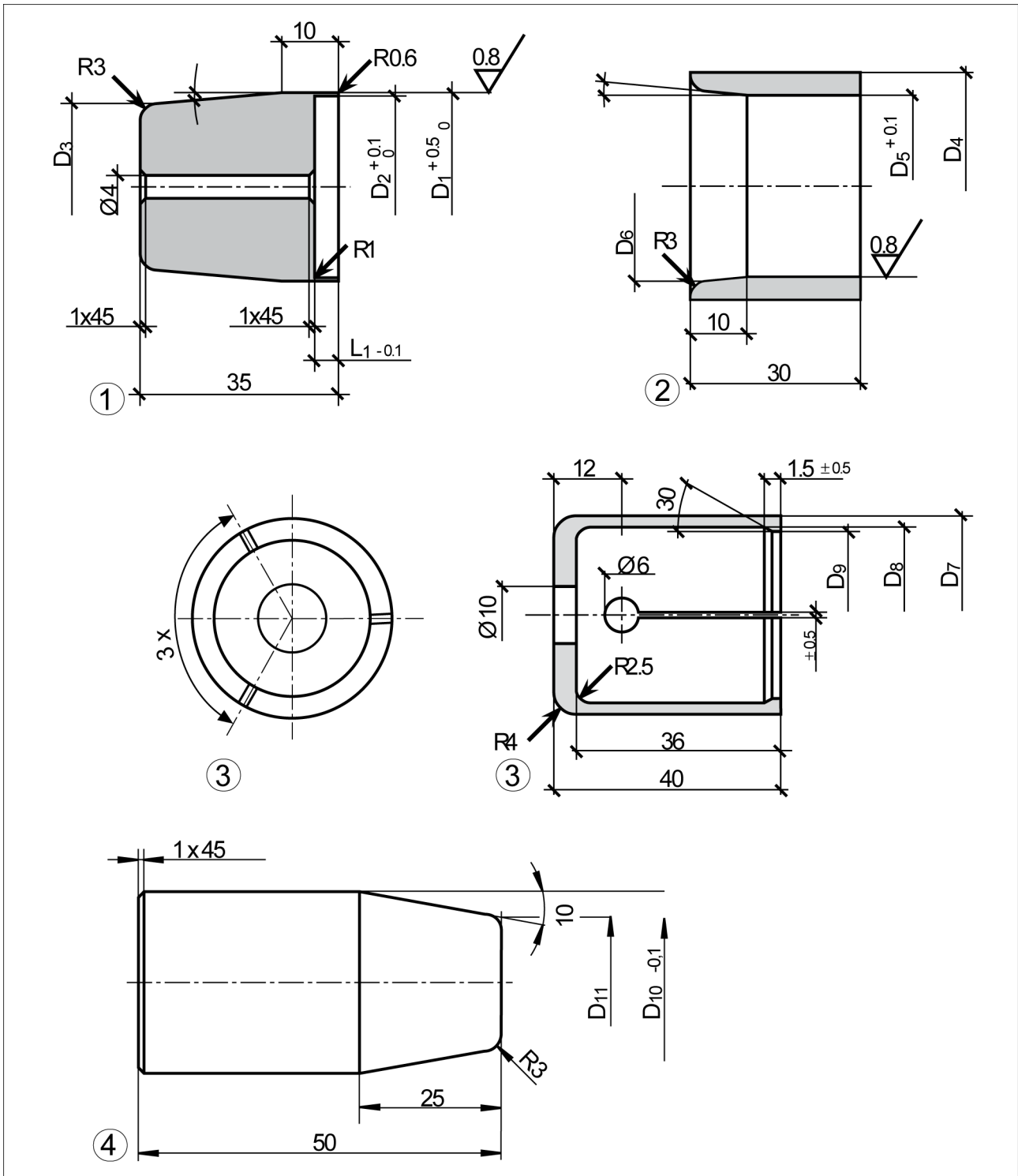


Fig. 9

1	Mounting taper	2	Calibration sleeve
3	Expansion sleeve	4	Calibration arbor (only applies for HGN 125/160)

Material of all assembly devices:: POM oder PA

Designation	Dimension	HGN			
		80	100	125	160
Mounting taper	D ₁	17.2	21.2	27.2	33.2
	D ₂	16	20	26	32
	D ₃	12.83	16.83	22.83	28.83
	L ₁	2.8	2.7	2.5	1.9
Calibration sleeve	D ₄	24	30	34	40
	D ₅	16.05	20.05	26.05	32.05
	D ₆	17.8	21.8	27.8	33.8
Expansion sleeve	D ₇	19	23	29	35
	D ₈	15	19	25	31
	D ₉	12.5	16.5	22.5	29.5
Calibration arb	D ₁₀	-	-	15.95	19.95
	D ₁₁	-	-	7.15	11.15

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.

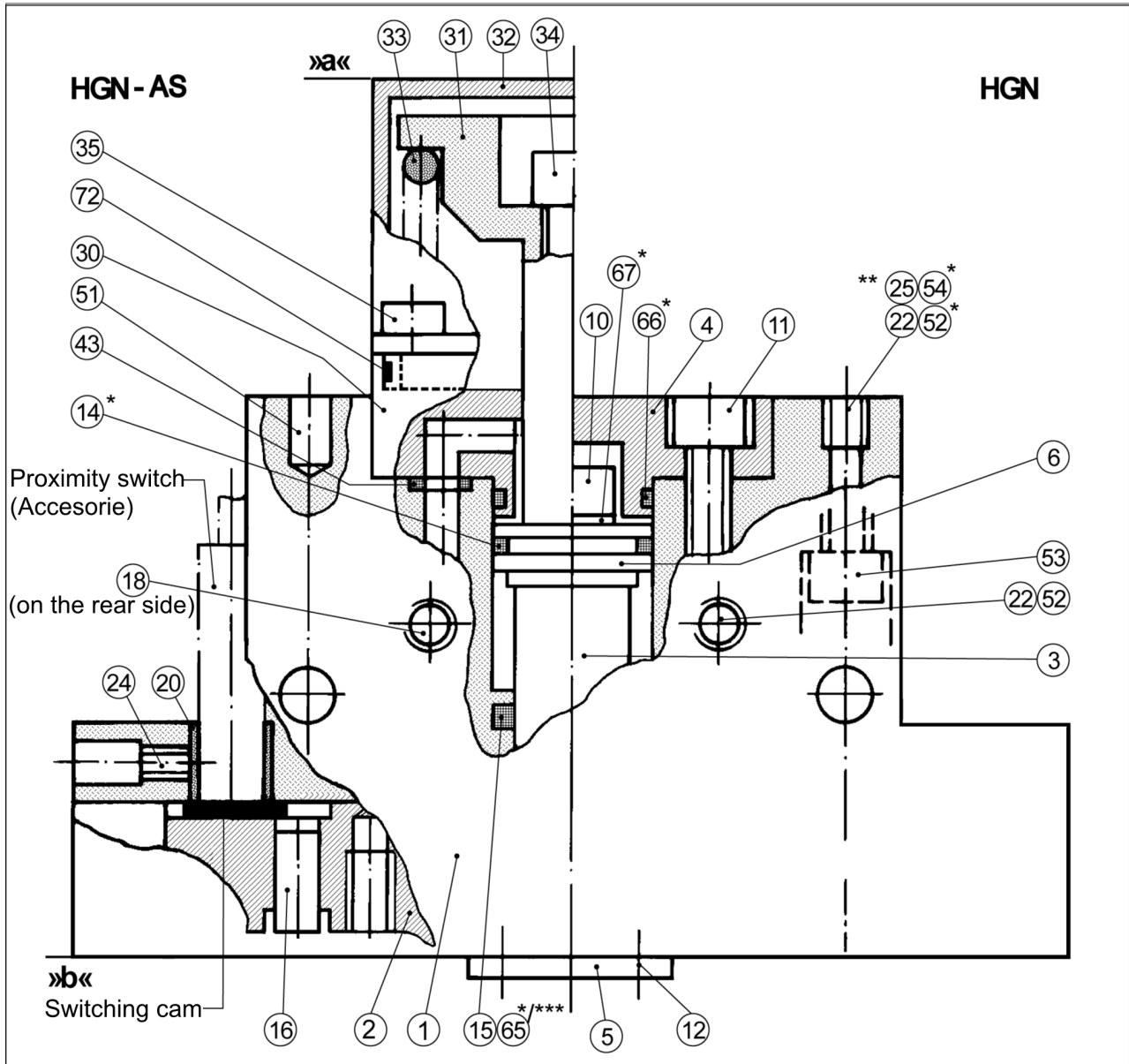


Fig. 10

- * Wearing part, replace during maintenance.
Included in the seal kit. Seal kit can only be ordered completely.
- ** only HGN 80
- *** only for HGN 80 and 100

11 Seal kit

ID.-No. of the seal kit

Seal kit for	ID number
HGN 80	0370580
HGN 80 AS	0370711
HGN 100	0370581
HGN 100 AS	0370712
HGN 125	0370611
HGN 125 AS	0370712
HGN 160	0370612
HGN 160 AS	0370714

Contents of the seal kit ([👉 10, Page 31](#)).

12 Translation of 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.

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Distributor Bahnhofstr. 106 – 134
D-74348 Lauffen/Neckar

We hereby declare that on the date of the declaration the following incomplete 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 Parallel Gripper / HGN / hydraulic
ID number 0370201...0370224

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

The manufacturer agrees to forward on demand the relevant technical documentation for the partly completed machinery to state offices.

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

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



Lauffen/Neckar, January 2014

p.p. Ralf Winkler,
Head of Gripping Systems Development



