Gripping rotary modules
RP / RW / RC 1212-2128
Assembly and Operating Manual
Imprint

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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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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 hot surfaces

⚠️ Warning about hand injuries

⚠️ General mandatory sign to prevent material damage
1.2 Variants

This operating manual applies for the following variations:

- RP / RW / RC without gripping force maintenance
- RP / RW / RC with gripping force maintenance (...-K)
- RP / RW / RC with gripping force maintenance (...-S)

Two versions are also available for the RW type:

- Gripper stroke mainly inwards (RWI...)
- Gripper stroke mainly outwards (RWA...)

---

**Fig. 1 Type key**

<table>
<thead>
<tr>
<th>RP</th>
<th>1212</th>
<th>K</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>harter; W weicher Dämpfer</td>
</tr>
</tbody>
</table>

K  GKS Außen
S  GKS Innen
D  Drehadapter
X  Drehadapter + GKS Innen
Z  Drehadapter + GKS Außen

**Baugröße:** Greifer 12/16/20/21

**Bezeichnung:**
- RP - 2 - Finger Greifer (Parallel)
- RC - 3 - Finger Greifer (Zentrisch)
- RW - 2 - Finger Greifer (Winkel)
1.3 Applicable documents

- General terms of business
- Catalog data sheet of the purchased product
- Assembly and Operating manuals of the accessories
- Assembly and operating manual for RM rotary modules
- Assembly and operating manual for GM W/P/C gripping modules
- "Toolbox Rotation" program
- "Kombibox" program
  (- for selection of parts list for adaptation of RP/W/C modules to other modules of the modular system)

The documents listed here, can be downloaded on our homepage [www.schunk.com](http://www.schunk.com)
2 Basic safety notes

2.1 Intended use

The module is designed solely for the gripping and swiveling of useful loads into any desired position, where the load does not react in a manner endangering persons, property or the environment as a result of this manipulation.

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 14).

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 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.

2.3 Environmental and operating conditions

• The module may be used only within its defined application parameters.

• Ensure that the environment is clean. Observe the lubrication intervals (☞ 11.1.1, Page 35).

• Ensure that the environment is free of splashing water and vapors, and also of abrasive dust and process dust. This does not apply to modules designed especially for unclean environments.

• Do not subject the module to excessive vibrations and/or mechanical shocks.
Basic safety notes

• Strong magnetic fields can impair the function of the module. If the product is to be used in strong magnetic fields, contact your SCHUNK partner.
• Make sure that the module and the top jaws are a sufficient size for the application.

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 8). 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
Risk of injury due to squeezing and bumping during movement of the gripper jaws and breaking or loosening of the gripper fingers!

### WARNING
Risk of injury from objects falling and being ejected
- The danger zone must be surrounded by a safety fence during operation.

### WARNING
While disassembling uncontrollable moves of parts of the gripper possible!

### WARNING
Risk of injury due to rotating components!
**Avoidance:** The danger zone must be surrounded by a safety fence during operation.

### 2.7.1 Variant gripping force maintenance

### WARNING
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.
- Secure the end positions of the product with SCHUNK SDV-P pressure maintenance valves.

### WARNING
Risk of injury due to residual energy in the gripper because of gripping force maintenance by springs!
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.

4 Scope of delivery
The scope of delivery includes:

- Gripping rotary modules RP / RW / RC in the ordered model.
- Exhaust air throttles
- 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

<table>
<thead>
<tr>
<th>Designation</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inductive proximity switches</td>
<td>IN</td>
</tr>
<tr>
<td>Gripping movement monitoring set</td>
<td>GMNS-...</td>
</tr>
<tr>
<td>Rotary movement monitoring set</td>
<td>RMNS...</td>
</tr>
<tr>
<td>Magnetic switch</td>
<td>MMS</td>
</tr>
</tbody>
</table>

• 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

<table>
<thead>
<tr>
<th>Module type</th>
<th>RP/W/C ...</th>
<th>RP/W/C ... - K / S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Angle of rotation [°]</td>
<td>- 5 ... 185</td>
<td></td>
</tr>
<tr>
<td>Ambient temperature [°C]</td>
<td>5 - 60</td>
<td></td>
</tr>
<tr>
<td>IP rating</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>Noise emission [dB(A)]</td>
<td>≤ 70</td>
<td></td>
</tr>
<tr>
<td>Pressure medium</td>
<td>Compressed air, compressed air quality according to ISO 8573-1:7 4 4</td>
<td></td>
</tr>
<tr>
<td>Min. pressure [bar]</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Max. pressure [bar]</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Nominal working pressure [bar]</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Size</th>
<th>... 12</th>
<th>... 16</th>
<th>... 20</th>
<th>... 28</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. permissible finger length [mm]</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RP...</td>
<td>40</td>
<td>50</td>
<td>75</td>
<td>100</td>
</tr>
<tr>
<td>RW...</td>
<td>25</td>
<td>30</td>
<td>35</td>
<td>40</td>
</tr>
<tr>
<td>RC...</td>
<td>40</td>
<td>50</td>
<td>75</td>
<td>100</td>
</tr>
</tbody>
</table>

Further technical data can be found in the catalog data sheet. The most recent version applies.
7 Module design and options

Gripping rotary modules of this series have a module design:

- GMW/P/C gripper, consisting of
  - Gripper kit G...B
  - GMD rotation adapter (optional)
  - GMA drive unit
  - Gripping force safety device, GKS (optional)
- RM 12 to 21 rotary modules

All components are separated by function; all characteristics of the individual modules are maintained.

- Additional details Catalog data sheet.
- The design is shown in the chapter "Complete design" (\ref{12.1}, Page 40).
8 Assembly and settings

**NOTICE**

Assembly measures
- When mounting loads, do not allow impermissible forces and moments to be exerted (see catalog data).
- Select the suitable screw tightening torque when assembling the module or loads at the module in accordance with the generally accepted guidelines for screw connections.
- Secure all screws using a suitable chemical screw lock.

8.1 Mechanical connection

**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)

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Permissible unevenness</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 100</td>
<td>&lt; 0.02</td>
</tr>
<tr>
<td>&gt; 100</td>
<td>&lt; 0.05</td>
</tr>
</tbody>
</table>

RP/W/C ... Gripper rotary modules are fastened at the side on the base body.
Furthermore, connection geometries for the top jaws can be found on the base jaws.

Dimensions for the position and size of the connection geometries, ☞ Catalog data sheet.

**Mounting**
1. Mount the module using the fixing bores provided.
2. Mount the modules using the fixing bores provided.
3. Attach the top jaws using the mounting bores provided.
8.2 Air connections

**NOTICE**

**Pressure medium:**
The unit must not under any circumstances be operated with oiled air before operation with unoiled air (washing out of factory lubrication).

**NOTICE**

Observe the requirements for the air supply.

(☞ 6, Page 14) "Technical Data"

Use connecting wires with the same or a larger cross-section as the connection thread.

See the catalog for precise information about the position and size of the connection geometries.

**Fig. 2 Air connections**

**RP air connection**

<table>
<thead>
<tr>
<th>Connection</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Clockwise rotation (direction of arrow)</td>
</tr>
<tr>
<td>B</td>
<td>Counterclockwise rotation</td>
</tr>
<tr>
<td>C</td>
<td>Open the gripper</td>
</tr>
<tr>
<td>D</td>
<td>Close the gripper</td>
</tr>
</tbody>
</table>
8.3 Settings and options of the GM gripping module...

8.3.1 GMW / GMP/ GMC modular design

The GM modules have a modular design. The main window consists of:
- Gripper kit: GWB / GCB / GPB
- Drive unit: GMA

The basis module can be expanded by ordering options and accessories.

<table>
<thead>
<tr>
<th>GWB</th>
<th>Angle gripper kit</th>
<th>GMD</th>
<th>Rotation adapter</th>
</tr>
</thead>
<tbody>
<tr>
<td>GPB</td>
<td>Parallel gripper kit</td>
<td>GMA</td>
<td>Drive unit</td>
</tr>
<tr>
<td>GCB</td>
<td>2-jaw gripper kit</td>
<td>GKS</td>
<td>Gripping force maintenance device</td>
</tr>
</tbody>
</table>
8.3.2 Maintenance of gripping force unit

To maintain secure the gripping force in case of a drop in pressure, an additional module can be integrated without any additional parts.

Optionally, the maintenance of gripping force unit is available in the direction of clamping or spreading.

**Modifying from clamping direction to spreading direction**

The GKS is completely separated (GKS 1 ... 9) from the gripper.
1. Remove the rod (2) **downwards**.
2. Mount the safety disc (8) in the upper groove of the rod.
3. Insert the rod from **above** into the GKS.

**Modifying from spreading direction to the clamping direction**

The GKS is completely separated (GKS 1 ... 9) from the gripper.
1. Remove the rod (2) **upwards**.
2. Mount the safety disc (8) in the lower groove of the rod.
3. Insert the rod from **below** into the GKS.

**Order numbers of the maintenance of gripping force unit:**
- GKE 12 for GMW / GMP / GMC 12 gripping module
- GKE 16 for GMW / GMP / GMC 16 gripping module
- GKE 20 for GMW / GMP / GMC 20 gripping module
- GKE 28 for GMW / GMP / GMC 28 gripping module

When ordering a gripping module including a gripping force maintenance unit as described in the catalog, the gripping force maintenance unit will have already been installed by SCHUNK.
8.3.3 Rotation adapter

A GMD-... rotation adapter is available for step-less turning of the GWB / GWP / GWC gripper kit on the GMA-... drive unit. This is installed between the gripper kit and drive unit.

<table>
<thead>
<tr>
<th>Rotation adapter for</th>
<th>Designation</th>
<th>ID number</th>
</tr>
</thead>
<tbody>
<tr>
<td>GMW / GMP / GMC 12</td>
<td>GMD 12</td>
<td>5507895</td>
</tr>
<tr>
<td>GMW / GMP / GMC 16</td>
<td>GMD 16</td>
<td>5507896</td>
</tr>
<tr>
<td>GMW / GMP / GMC 20</td>
<td>GMD 20</td>
<td>5507897</td>
</tr>
<tr>
<td>GMW / GMP / GMC 28</td>
<td>GMD 28</td>
<td>5507898</td>
</tr>
</tbody>
</table>

When ordering a gripping module including a rotation adapter as described in the catalog, the rotation adapter will have already been installed by SCHUNK.

8.3.4 End position monitoring

To monitor the end positions, standardized monitoring sets for direct installation are available.

The installation of up to four monitoring sets is possible for the GMW/P/C 16, GMW/P/C 20, and GMW/P/C 28 types, whereby four gripper jaws positions can be monitored.

For the GMW/P/C 12 type, only two monitoring sets can be installed.

The end-to-end piston rod in the GMA drive unit (8.3.1, Page 18) is monitored.

Proximity switch monitoring: GMNS-...

The monitoring set's scope of delivery includes the following:

- 1x retaining plate
- 1x proximity switch
- 1x connection cable
Assembly and settings

Fig. 4: Position of the proximity switches at the GMW is analogous to the GMC and GMP

1 Proximity switch (GMNS-...)

Assembly of the end-position monitoring

1 Disassemble the drive unit or, if need be, the maintenance of gripping force unit.
2 Push the holding piece into the drive unit.
3 Reassemble the drive unit or, if need be, the maintenance of gripping force unit.
4 Push the sensor into the holding piece and clamp with the fixing screw in the holding piece. This is also accessible when the cover is mounted or when the maintenance of gripping force unit is installed.

Setting the monitoring

1 Undo the attachment screw in the drive unit.
2 Set the sensor via the holding piece.
3 Fix the sensor via the attachment screw.
8.4 Settings and options of the RM... rotary module

8.4.1 Adjusting the end positions

The following parts are included within the scope of delivery for angle of rotation fine adjustment and adjustment of the end position dampening to the mass moment of inertia occurring in operation.

- Stop coupling (10)
- Counter nut (11)
- Counter nut (12)
- Shock absorber (18)

Fig. 5 Adjustment of end position RM12/15/21

Angle of rotation fine adjustment

1. Release counter nut (11).
2. Each end position can be adjusted to any angle between -5° and +90° by twisting the stop coupling (10) with the shock absorber (18) integrated in it.
3. Tighten the stop coupling again with the counter nut.
Dampening adjustment

**NOTICE**

**Use the shock absorber!**
Operation without the shock absorber included within the scope of delivery is not permitted.

- Observe the maximum mass moment of inertia (see catalog).
- Adjust the dampening at the mass moment of inertia.

✓ The desired angle of rotation has been set.

1 Release counter nut (12).
2 By turning the shock absorber (18) in and out, the stroke of the shock absorber (and therefore the shock absorber characteristic curve) can be adjusted to the mass moment of inertia occurring in operation.
   ⇒ The previously adjusted angle of rotation is not influenced by this.
3 Tighten the absorber again with the counter nut.
8.4.2 End position monitoring

Two options are available for the end positions monitoring:

- By magnet sensors MMS
- By inductive sensors via standardized monitoring sets

Attachment / adjustment MMS magnet sensors

With the MMS sensor, the magnet integrated in the piston is monitored.

**NOTICE**

Sensor can be damaged during assembly.
Do not exceed the maximum tightening torque of 10 Ncm for the set screws.

**Fig. 6 MQL sensor attachment**

For monitoring of the two end positions, one sensor each is installed.

- Piston is in the respective end position.
- 1 Turn the sensor into the groove.
- 2 Push the sensor into the groove until the signal is present at the output.
- 3 Fix the magnetic switch into this position by tightening the set-screw with the Allen key.

**Fig. 7**
4 If need be, repeat the procedure with the second sensor and the opposing piston position.

For the RMNS and RMNZ monitoring sets, the control cam integrated in the rotary table is inductively monitored.

**Attachment / adjustment of the RMNS and RMNZ monitoring sets**

Proximity switch monitoring sets for:
- RM rotary module...: RMNS-12
- Intermediate stop, RZ...: RMNZ-12*

Scope of delivery of the monitoring sets:
- 1x retaining plate
- 2x (1x*) control cam
- 2x (1x*) proximity switch
- 2x (1x*) connection cable

**Setting the monitoring**

✓ Piston is at the respective end or intermediate position.
✓ The proximity switch is set to the switching condition.
When the RMNZ is used, the cam is offset to the RMNS cam...

1 Undo the attachment screw.
2 Push the control cam in the prism slot of the rotary table until the signal is present.
3 Fix the control cam via the attachment screw.
8.4.3 Intermediate stop RZ12/15/21

Intermediate stops are additional modules for rotation modules and are available for the sizes RM12, RM15 and RM21.

The intermediate position can be adjusted over the entire range of rotation of the rotary module.

The intermediate stop is installed in the delivery state as shown.

The RZL... and RZK... stop pistons are used as stops and for play-free clamping of the intermediate position.

- For the intermediate position 0°-90°, RZK... and RZL... stop pistons are as shown.
- For the intermediate position 90°-180°, RZK... and RZL... stop pistons are swapped.
8.4.3.1 Adjustment RZ...

✓ The stop pistons are mounted as shown in the respective chapter "RZ12/15/21 intermediate stop" (☞ 8.4.3, Page 26) (Attention! Ranges 0°-90°; 90°-180°).

1 Apply pressure to connections A and C.
2 Loosen the counter nuts of both stops (5).
3 Set the stop to the desired position by rotating the RZL... stop (at 1).
4 By turning the RZK...(at 1) stop, adjust until the stop clamps the intermediate position without play.
5 Secure both stops again with the counter nut.

8.4.3.2 Control RZ...

The intermediate stop is set.

• The positions can now be controlled in accordance with the following chart.

• Check the positions in accordance with the recess at the rotary table (shown in the chapter "RZ12/15/21 intermediate stop" (☞ 8.4.3, Page 26) with the black arrow).

Possible control

<table>
<thead>
<tr>
<th>Rotating motion</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>0° -&gt; 180°</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>180° -&gt; 0°</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>0° -&gt; 90°</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>90° -&gt; 0°</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>0° -&gt; 90°</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>90° -&gt; 180°</td>
<td>1</td>
<td>0</td>
<td>0 *</td>
</tr>
<tr>
<td>180° -&gt; 90°</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>90° -&gt; 180°</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>180° -&gt; 90°</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>90° -&gt; 0°</td>
<td>0</td>
<td>1</td>
<td>0 *</td>
</tr>
</tbody>
</table>

* after about 0.1 s
8.4.3.3 Dampening adjustment RZ...

The dampening adjustment is done by insertion of disk ("X") under the shock absorber (9).

1 Disassemble the piston (3), stop sleeve (2) and shock absorber (9).
2 Insert disks in accordance with the following table between the piston and the stop sleeve until the desired dampening adjustment has been reached (Attention! Observe the maximum.).
3 Reinstall the components (see 8.4.3, Page 26).

Distances for dampening adjustment

<table>
<thead>
<tr>
<th>Module</th>
<th>RZ12</th>
<th>RZ15</th>
<th>RZ21</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disk &quot;X&quot;</td>
<td>DIN 433-3.2-St.</td>
<td>DIN 433-3.2-St.</td>
<td>DIN 126-5.5-St.</td>
</tr>
<tr>
<td>Max. distance [mm]</td>
<td>2</td>
<td>2</td>
<td>5</td>
</tr>
</tbody>
</table>

8.4.3.4 Position monitoring RZ...

For monitoring of the intermediate position, the RMNZ-... monitoring set is available.

This monitoring set is identical with the RMNS-... end positions monitoring set but it has only control cam.
9 Start-up

- Check the technical specifications (☞ 6, Page 14).
- Check the permissible loading specifications (see catalog).
- Do not use the module until trouble-free operation has been checked taking all permissible operating parameters into account.
- The movement speed of the gripping and also the rotary movement is ideally regulated via throttle check valves (☞ 8.2, Page 17). The speed is always set so that it starts at a low speed and increases to a higher speed until the desired operating speed has been reached.
- Set the speed of the swivel movement in such a way that the permitted swiveling time is not exceeded. For calculations, use our "Toolbox" program (www.schunk.com).
- Operate the device in such a way that the permissible number of swiveling cycles per minute is not exceeded. For calculations, use our "Toolbox" program (www.schunk.com).
10 Troubleshooting

10.1 Modul does not move?

<table>
<thead>
<tr>
<th>Possible cause</th>
<th>Corrective action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base jaws jam in housing, possible cause: bolting surface not sufficiently level.</td>
<td>Check the levelness of the bolting surface. (8.1, Page 16). Loosen the mounting screws for the gripper and actuate the gripper again.</td>
</tr>
<tr>
<td>Pressure drops below minimum.</td>
<td>Check the air supply. (8.2, Page 17)</td>
</tr>
<tr>
<td>Compressed air lines switched</td>
<td>Check compressed air lines.</td>
</tr>
<tr>
<td>Proximity switch defective or set incorrect.</td>
<td>Repair the proximity switch.</td>
</tr>
<tr>
<td>Component is broken, e.g. through over-loading</td>
<td>Replace component or send the module with a repair order to SCHUNK. Ensure that the module was only used within its defined application parameters.</td>
</tr>
</tbody>
</table>

10.2 The module does not travel through the entire stroke?

<table>
<thead>
<tr>
<th>Possible cause</th>
<th>Corrective action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deposits of dirt in the mechanical elements</td>
<td>Clean the module and relubricate it. (11, Page 35)</td>
</tr>
<tr>
<td>Pressure drops below minimum.</td>
<td>Check the air supply. (8.2, Page 17)</td>
</tr>
<tr>
<td>Mounting surface is not even enough</td>
<td>Check the levelness of the bolting surface. (8.1, Page 16)</td>
</tr>
<tr>
<td>Component is broken, e.g. through over-loading</td>
<td>Send the module to SCHUNK with a repair order or disassemble module.</td>
</tr>
</tbody>
</table>
### 10.3 Module opens or closes abruptly?

<table>
<thead>
<tr>
<th>Possible cause</th>
<th>Corrective action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Too little grease in the mechanical guiding areas of the module</td>
<td>Clean the module and relubricate it. (☞ 11, Page 35)</td>
</tr>
<tr>
<td>Compressed air lines are blocked</td>
<td>Check the compressed air lines for crushing or damage.</td>
</tr>
<tr>
<td>Mounting surface is not even enough</td>
<td>Check the levelness of the bolting surface. (☞ 8.1, Page 16)</td>
</tr>
<tr>
<td>Pressure drops below minimum.</td>
<td>Check the air supply. (☞ 8.2, Page 17)</td>
</tr>
</tbody>
</table>

### 10.4 Module opens / does it grip the workpiece hard?

<table>
<thead>
<tr>
<th>Possible cause</th>
<th>Corrective action</th>
</tr>
</thead>
<tbody>
<tr>
<td>The exhaust air throttle is defective</td>
<td>Replacing the exhaust air throttle</td>
</tr>
<tr>
<td>Operating pressure too high</td>
<td>Setting the exhaust air throttle</td>
</tr>
</tbody>
</table>

### 10.5 The gripping force drops?

<table>
<thead>
<tr>
<th>Possible cause</th>
<th>Corrective action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compressed air can escape</td>
<td>Check seals, if necessary disassemble module and replace seals.</td>
</tr>
<tr>
<td>Too much grease in the mechanical motion spaces of the module</td>
<td>Clean the module and relubricate it. (☞ 11, Page 35)</td>
</tr>
<tr>
<td>Pressure drops below minimum.</td>
<td>Check the air supply. (☞ 8.2, Page 17)</td>
</tr>
</tbody>
</table>

### 10.6 Is the gripper not able to grip or hold on to the workpiece?

<table>
<thead>
<tr>
<th>Possible cause</th>
<th>Corrective action</th>
</tr>
</thead>
<tbody>
<tr>
<td>The workpiece weighs too much</td>
<td>Use a larger gripping module</td>
</tr>
<tr>
<td>The gripper jaws are too long</td>
<td>Place the gripping point further inside</td>
</tr>
<tr>
<td>Non-optimal engineering design</td>
<td>Adapt the engineering design – form-fit gripping</td>
</tr>
</tbody>
</table>
**10.7 Module does not achieve the opening and closing times?**

<table>
<thead>
<tr>
<th>Possible cause</th>
<th>Corrective action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compressed air lines are not installed optimally.</td>
<td>Check compressed air lines.</td>
</tr>
<tr>
<td></td>
<td>• Inner diameter of the compressed air lines are sufficiently large relative to the compressed air consumption</td>
</tr>
<tr>
<td></td>
<td>• Compressed air lines between module and control valve shoud be kept as short as possible.</td>
</tr>
<tr>
<td></td>
<td>• Flow rate of valve is sufficiently large relative to the compressed air consumption.</td>
</tr>
</tbody>
</table>

**10.8 End position signal not present?**

<table>
<thead>
<tr>
<th>Possible cause</th>
<th>Corrective action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Precisely adjust the sensor for the stop</td>
<td>Readjust the sensor</td>
</tr>
<tr>
<td>Proximity switch defective or set incorrect.</td>
<td>Replace sensor</td>
</tr>
<tr>
<td>Cable breakage</td>
<td>Replacing the sensor cable</td>
</tr>
</tbody>
</table>

**10.9 Does the module not travel through the rotating angle?**

<table>
<thead>
<tr>
<th>Possible cause</th>
<th>Corrective action</th>
</tr>
</thead>
<tbody>
<tr>
<td>The end positions are incorrectly adjusted</td>
<td>Readjust the end positions</td>
</tr>
<tr>
<td>Pressure drops below minimum.</td>
<td>Check the air supply.</td>
</tr>
<tr>
<td></td>
<td>(<a href="#">8.2, Page 17</a>)</td>
</tr>
<tr>
<td>Mounting surface is not even enough</td>
<td>Check the levelness of the bolting surface.</td>
</tr>
<tr>
<td></td>
<td>(<a href="#">8.1, Page 16</a>)</td>
</tr>
<tr>
<td>Component is broken, e.g. through over-loading</td>
<td>Send the module to SCHUNK with a repair order or disassemble module.</td>
</tr>
<tr>
<td>Shock absorber defective</td>
<td>Check or, if need be, replace the shock absorber</td>
</tr>
</tbody>
</table>
### 10.10 Is torque dropping?

<table>
<thead>
<tr>
<th>Possible cause</th>
<th>Corrective action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seals of the drive piston defective</td>
<td>Send the module to SCHUNK with a repair order (recommended). Replace the seals of the drive piston.</td>
</tr>
<tr>
<td>Positioning of the swivel table defective</td>
<td>Send the module to SCHUNK with a repair order.</td>
</tr>
<tr>
<td>Compressed air lines are blocked</td>
<td>Check the compressed air lines for pinching or damage.</td>
</tr>
<tr>
<td>Pressure drops below minimum.</td>
<td>Check the air supply. (☞ 8.2, Page 17).</td>
</tr>
</tbody>
</table>

### 10.11 Does the module rotate abruptly?

<table>
<thead>
<tr>
<th>Possible cause</th>
<th>Corrective action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seals of the drive piston defective</td>
<td>Send the module to SCHUNK with a repair order (recommended). Replace the seals of the drive piston.</td>
</tr>
<tr>
<td>Positioning of the swivel table defective</td>
<td>Send the module to SCHUNK with a repair order.</td>
</tr>
<tr>
<td>Compressed air lines are blocked</td>
<td>Check the compressed air lines for pinching or damage.</td>
</tr>
</tbody>
</table>

### 10.12 Does the module move hard against the end positions?

<table>
<thead>
<tr>
<th>Possible cause</th>
<th>Corrective action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fine adjustment of the absorber stroke is faulty</td>
<td>Readjust absorber stroke.</td>
</tr>
<tr>
<td>Absorber defective</td>
<td>Replace and readjust absorbers.</td>
</tr>
<tr>
<td>The exhaust air throttle is defective</td>
<td>Replace the exhaust air throttle.</td>
</tr>
<tr>
<td>Speed of rotation too high</td>
<td>Setting the exhaust air throttle (☞ 9, Page 29).</td>
</tr>
</tbody>
</table>
## 10.13 End position signal not present?

<table>
<thead>
<tr>
<th>Possible cause</th>
<th>Corrective action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Precisely adjust the sensor for the stop</td>
<td>Readjust the sensor</td>
</tr>
<tr>
<td>Proximity switch defective or set incorrect.</td>
<td>Repair the proximity switch.</td>
</tr>
<tr>
<td>Cable breakage</td>
<td>Replacing the sensor cable</td>
</tr>
</tbody>
</table>

www.comoso.com
11 Maintenance and care

11.1 Maintenance and lubrication, gripping module GM...

11.1.1 Maintenance and lubrication intervals

**NOTICE**

At ambient temperature above 60°C the lubricants can harden faster.

- Interval decrease accordingly.

| Interval [Mio. cycles] | 2 |

11.1.2 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.

<table>
<thead>
<tr>
<th>Lubricant point</th>
<th>Lubricant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lever mechanism, connecting member, other mechanical sliding points</td>
<td>Isoflex-Topas NCA 52 Klüber</td>
</tr>
<tr>
<td>All seals *</td>
<td></td>
</tr>
<tr>
<td>Bores on the piston *</td>
<td></td>
</tr>
</tbody>
</table>

* Only after disassembling the module for repairs
11.2 Maintenance and lubrication, rotary module RM...

11.2.1 Shock absorber

**NOTICE**

Serious mechanical damage due to failure of the shock absorbers.
The shock absorbers have a limited service life span. A shock absorber failure can lead to serious mechanical damage; for this reason, they must be checked regularly for proper function. The shock absorber is working correctly if the device reaches its end position swiftly without any mechanical impact. Overloading of the unit or exceeding the permitted swivel speed can lead to drastic reduction of the service life.

- Determine the swiveling times and the permitted stroke frequency with "Gemotec Toolbox".
- Regularly check the shock absorber.
- Observe the recommended maintenance intervals.

11.2.2 Maintenance and lubrication intervals

**NOTICE**

At ambient temperature above 60°C the lubricants can harden faster.
- Interval decrease accordingly.

<table>
<thead>
<tr>
<th>Maintenance measures</th>
<th>Interval [Mio. cycles]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check for leaks</td>
<td>2</td>
</tr>
<tr>
<td>Replace shock absorber</td>
<td>2 (recommendation for safe operation)</td>
</tr>
<tr>
<td>Re-lubricate the gear rack and pinion unit (RM15, RM21)</td>
<td>4 (recommendation)</td>
</tr>
</tbody>
</table>
11.2.3 Lubricants/Lubrication points (basic lubrication)

- All module bearings are life-time lubricated and do not need to be re-lubricated.
- When disassembling the module for repairs, all bearings have to be cleaned and re-lubricated.

![Gear rack and pinion unit greasing area (RM15, RM21)](image)

-> Lubricate the rotary module at the designated areas.

We recommend the lubricants listed.

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

<table>
<thead>
<tr>
<th>Lubricant point</th>
<th>Lubricant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gear rack and pinion unit *</td>
<td>Isoflex-Topas NCA 52</td>
</tr>
<tr>
<td>All seals **</td>
<td>(from Klüber)</td>
</tr>
<tr>
<td>Rolling element and sliding surfaces</td>
<td></td>
</tr>
<tr>
<td>of the bearings **</td>
<td></td>
</tr>
</tbody>
</table>

* For RM06/08/10/12, only after disassembly of the module for repairs
** All modules, only after disassembly of the module for repairs
11.3 Dismantling the module

**NOTICE**

A high degree of expertise is required for the disassembly and assembly of the module, ([2.5, Page 9]). The repair or elimination of defects by the customer on the module results in the termination of the warranty and liability for all resulting warranty and subsequent damage.

- It is recommended to have SCHUNK repair damaged and defective modules.

**WARNING**

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

*Fig. 11 Design of the GM... modules*
**WARNING**

Components for the maintenance of gripping force unit are under spring tension (except for the GKS rod, item 2)

- It is recommended to have damaged and defective modules repaired in the production facility. Please consult your SCHUNK contact person.
- To remove the GKS spring, secure the lock washer and circlip (GKS items 6, 8 and 9) with a suitable device against jumping out.

- Disassemble the module as shown in the "Assembly drawings", (☞ 12, Page 40).
- Only disassemble the rotation module for repair purposes.

### 11.4 Assembling the module

**WARNING**

Risk of injury due to spring forces during the assembly of a completely disassembled GKS!

Install the spring, lock washer and circlip (GKS items 6, 8 and 9) with an appropriate device.

**Maintenance**

- Clean all parts thoroughly and check for damage and wear.
- Treat all greased areas with lubricant. (☞ 11.2.3, Page 37)
- Oil or grease bare external steel parts.

**Assembly**

Assembly takes place in the opposite order to disassembly. Observe the following:

- Unless otherwise specified, secure all screws and nuts with Loc-tite no. 243 and tighten with the appropriate tightening torque. Select suitable tightening torques for screws when assembling the module in accordance with generally accepted guidelines for screw connections.
12 Assembly / spare parts

12.1 Complete design

The entire modular system for the production of parallel gripping rotary modules RP-... and angular gripping rotary modules RW-... as well as three-jaw gripping rotary modules RC-... is illustrated in the following.

![Diagram of modular system](image)

**Fig. 12 Modular design**

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3-jaw gripper kit (GCB)</td>
<td>5</td>
<td>Rotation adapter (GMD)</td>
</tr>
<tr>
<td>2</td>
<td>Parallel gripper kit (GPB)</td>
<td>6</td>
<td>Rotary module (RM)</td>
</tr>
<tr>
<td>3</td>
<td>Angle gripper kit (GWB)</td>
<td>7</td>
<td>Drive unit (GMA)</td>
</tr>
<tr>
<td>4</td>
<td>Intermediate stop (RZ)</td>
<td>8</td>
<td>Gripping force maintenance unit (GKS)</td>
</tr>
</tbody>
</table>
### 12.1.1 Shock absorber

**ID no. of the shock absorber**

<table>
<thead>
<tr>
<th>Shock absorber for</th>
<th>ID number</th>
</tr>
</thead>
<tbody>
<tr>
<td>RP / RW / RC 1212-H</td>
<td>9953561</td>
</tr>
<tr>
<td>RP / RW / RC 1216-H</td>
<td></td>
</tr>
<tr>
<td>RP / RW / RC 1212-W</td>
<td>9953558</td>
</tr>
<tr>
<td>RP / RW / RC 1216-W</td>
<td></td>
</tr>
<tr>
<td>RP / RW / RC 1520-H</td>
<td>9953562</td>
</tr>
<tr>
<td>RP / RW / RC 1520-W</td>
<td>9957673</td>
</tr>
<tr>
<td>RP / RW / RC 2120-W</td>
<td>9953560</td>
</tr>
<tr>
<td>RP / RW / RC 2128-W</td>
<td></td>
</tr>
</tbody>
</table>
12.2 Gripping module GM...

12.2.1 GMWPC assembly drawing

All other wearing parts and individual components are available individually according to the following sectional drawings. Order numbers are composed as in the following example:

- GMA part no. 1 GMA 20-01
- GWB part no. 2 GWB 20-02

* Component dependent on modular design; consult your SCHUNK contact partner about this.
* Component dependent on modular design; consult your SCHUNK contact partner about this.
12.2.2 Seal kit

Standardized sealing sets for replacement are available for the integrated rotary module. All the seals are included in their scope of delivery.

ID.-No. of the seal kit

<table>
<thead>
<tr>
<th>Seal kit for</th>
<th>Designation</th>
<th>ID number</th>
</tr>
</thead>
<tbody>
<tr>
<td>GMW/P/C 12</td>
<td>GMDI 12</td>
<td>0313444</td>
</tr>
<tr>
<td>GMW/P/C 16</td>
<td>GMDI 16</td>
<td>0313445</td>
</tr>
<tr>
<td>GMW/P/C 20</td>
<td>GMDI 20</td>
<td>0313446</td>
</tr>
<tr>
<td>GMW/P/C 28</td>
<td>GMDI 28</td>
<td>0313447</td>
</tr>
</tbody>
</table>

Contents of the seal kit ([12.2.1, Page 42]).
12.3 RM rotary module...

12.3.1 Assembly drawing

All other wearing parts and individual components are available individually according to the following sectional drawings.

Order numbers are composed as in the following example:

- Part no. 1 RM 06-01 (for RM06 rotary module)

* RM 15, RM21

** RM 12, RM15
### 12.3.2 Sealing kit

Standardized sealing sets for replacement are available for the integrated rotary module. All the seals are included in their scope of delivery.

<table>
<thead>
<tr>
<th>Seal kit for</th>
<th>ID number</th>
</tr>
</thead>
<tbody>
<tr>
<td>RM 06</td>
<td>0313465</td>
</tr>
<tr>
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13 Translation of original declaration of incorporation


Manufacturer/Distributor
SCHUNK GmbH & Co. KG Spann- und Greiftechnik
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: Gripping rotary modules / RP / RW / RC 1212-2128 /
ID number 0313220 ... 0313325, 0314650 ... 0314999

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

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