Assembly and Operating Manual
RP / RW / RC
Gripping rotary modules

Superior Clamping and Gripping

SCHUNK®

Imprint

Technical changes:

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

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Dear Customer,

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

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

Best regards,

Your SCHUNK team

Customer Management

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

Table of Contents

1 General

1.1 About this manual

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

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

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

Illustrations in this manual are provided for basic understanding and may differ from the actual product design.

In addition to these instructions, the documents listed under Link Mitgeltende Unterlagen are applicable.

1.1.1 Presentation of Warning Labels

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

⚠ DANGER

Danger for persons!

Non-observance will inevitably cause irreversible injury or death.

⚠ WARNING

Dangers for persons!

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

⚠ CAUTION

Dangers for persons!

Non-observance can cause minor injuries.

CAUTION

Material damage!

Information about avoiding material damage.

1.1.2 Symbol definition

The following symbols are used in this manual:

- Prerequisite for an action

1. Action 1
2. Action 2
   - ✓ Intermediate results

- ✓ Final results

▸ 1.1.2 [🗋 6]: chapter number and [page number] in hyperlinks

1.1.3 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 *
- "GEMOTCE-TOOLBOX Rotation" program *
- "GEMOTEC-KOMBIBOX" program *
  (-> for selection of parts list for adaptation of RP/W/C modules to other modules of the modular system)

The documents marked with an asterisk (*) can be downloaded on our homepage **schunk.com**

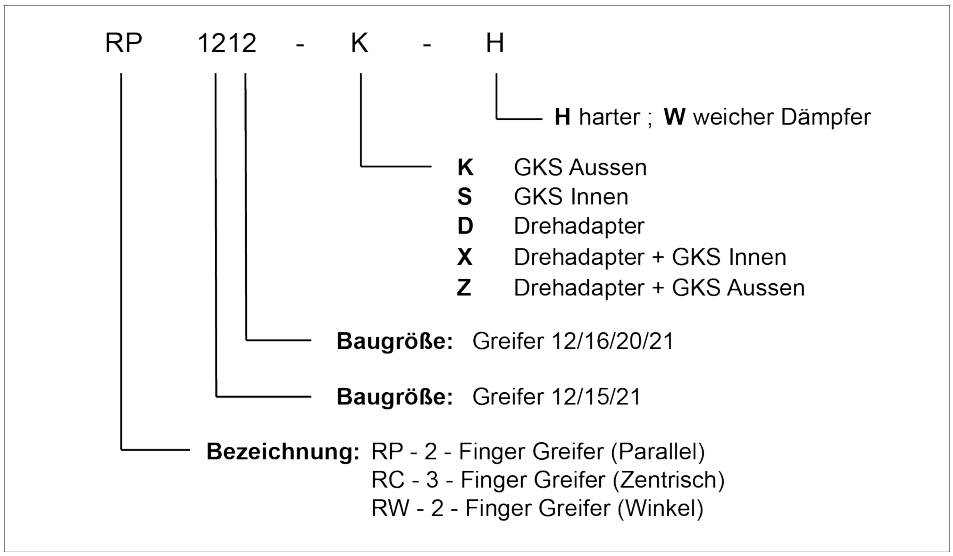
1.1.4 Variants

This operating manual applies to 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...)



Type key

1.2 Warranty

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

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

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

1.3 Scope of delivery

The scope of delivery includes

- Gripping rotary modules RP / RW / RC in the version ordered
- Exhaust air throttles
- Accessory pack

1.4 Accessories

A wide range of accessories are available for this product

For information regarding which accessory articles can be used with the corresponding product variants, see catalog data sheet.

1.4.1 Sensors

Overview of the compatible sensors

Designation	Type
Inductive proximity switches	IN
Gripping movement monitoring set	GMNS-...
Rotary movement monitoring set	RMNS...
Magnetic switch	MMS

- Exact type designation of the compatible sensors see catalog.
- Information on handling sensors is available at schunk.com or from SCHUNK contact persons.

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 may only be used within the scope of its technical data, ▶ 3 [🗋 17].
- When implementing and operating components in safety-related parts of the control systems, the basic safety principles in accordance with DIN EN ISO 13849-2 apply. The proven safety principles in accordance with DIN EN ISO 13849-2 also apply to categories 1, 2, 3 and 4.
- The product is intended for installation in a machine/system. The applicable guidelines must be observed and complied with.
- The product is intended for industrial and industry-oriented use.
- Appropriate use of the product includes compliance with all instructions in this manual.

2.2 Not intended use

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

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

2.3 Constructional changes

Implementation of structural changes

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

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

2.4 Environmental and operating conditions

Required ambient conditions and operating conditions

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

- Make sure that the product is not exposed to excessive vibrations and/or strokes.
- Ensure that no strong magnetic fields impair the function of the product.
  Contact your SCHUNK partner if the product is to be used in strong magnetic fields.
- Make sure that the module and the top jaws are a sufficient size for the application.

2.5 Personnel qualification

Inadequate qualifications of the personnel

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

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

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

Trained electrician	Due to their technical training, knowledge and experience, trained electricians are able to work on electrical systems, recognize and avoid possible dangers and know the relevant standards and regulations.
Qualified personnel	Due to its technical training, knowledge and experience, qualified personnel is able to perform the delegated tasks, recognize and avoid possible dangers and knows the relevant standards and regulations.
Instructed person	Instructed persons were instructed by the operator about the delegated tasks and possible dangers due to improper behaviour.
Service personnel of the manufacturer	Due to its technical training, knowledge and experience, service personnel of the manufacturer is able to perform the delegated tasks and to recognize and avoid possible dangers.

2.6 Personal protective equipment

Use of personal protective equipment

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

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

2.7 Notes on safe operation

Incorrect handling of the personnel

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

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

2.8 Transport

Handling during transport

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

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

2.9 Malfunctions

Behavior in case of malfunctions

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

2.10 Disposal

Handling of disposal

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

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

2.11 Fundamental dangers

General

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

2.11.1 Protection during handling and assembly

Incorrect handling and assembly

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

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

Incorrect lifting of loads

Falling loads may cause serious injuries and even death.

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

2.11.2 Protection during commissioning and operation

Falling or violently ejected components

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

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

2.11.3 Protection against dangerous movements

Unexpected movements

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

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

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

2.11.4 Protection against electric shock

Possible electrostatic energy

Components or assembly groups may become electrostatically charged. When the electrostatic charge is touched, the discharge may trigger a shock reaction leading to injuries.

- The operator must ensure that all components and assembly groups are included in the local potential equalisation in accordance with the applicable regulations.
- While paying attention to the actual conditions of the working environment, the potential equalisation must be implemented by a specialist electrician according to the applicable regulations.
- The effectiveness of the potential equalisation must be verified by executing regular safety measurements.

2.12 Notes on particular risks

⚠ WARNING

Risk of injury from crushing and impacts!

Serious injury could occur during the base jaw procedure and when breaking or loosening the gripper fingers.

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

⚠ WARNING

Risk of injury from objects falling and being ejected!

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

- Take appropriate protective measures to secure the danger zone.

⚠ WARNING

Risk of injury from unexpected movements!

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

- Switch off the energy supply.
- Make sure no residual energy is in the system.

⚠ WARNING

Risk of injury from rotating components!

In the case of swivel units or rotary tables with a rotary drive, serious injuries can be caused by rotating components.

- Take appropriate protective measures to secure the danger zone.

2.12.1 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 uncontrolled movements!

While disassembling uncontrolled movements of the gripper's individual parts of grippers with gripping force maintenance may cause serious injuries.

- Switch off the energy supply.
- Ensure there is no residual energy in the system.
- Disassemble the gripper carefully.

3 Technical data

Designation	RP / RW / RC ...	RP / RW / RC ... - K / S
Angle of rotation [°]	- 5 ... 185	
Pressure medium	Compressed air, compressed air quality according to ISO 8573-1:7 4 4	
Min. pressure [bar]	3	5
Max. pressure [bar]	8	
Nominal working pressure [bar]	6	

Max. permissible finger length [mm]

RP / RW / RC	Size			
	... 12	... 16	... 20	... 28
Max. permissible finger length [mm]				
RP...	40	50	75	100
RW...	25	30	35	40
RC...	40	50	75	100

Max. permitted weight per finger [kg]

RP / RW / RC	Size			
	... 12	... 16	... 20	... 28
Max. permitted weight per finger [kg]				
RP...	0.06	0.1	0.18	0.35
RW...	0.05	0.075	0.1	0.13
RC...	0.06	0.1	0.18	0.35

The pneumatic piston of the gripper has different piston surface designs for opening and closing the gripper. This results in different gripping forces during opening and closing. This must be taken into account when implementing and operating the gripper.

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

Ambient conditions and operating conditions

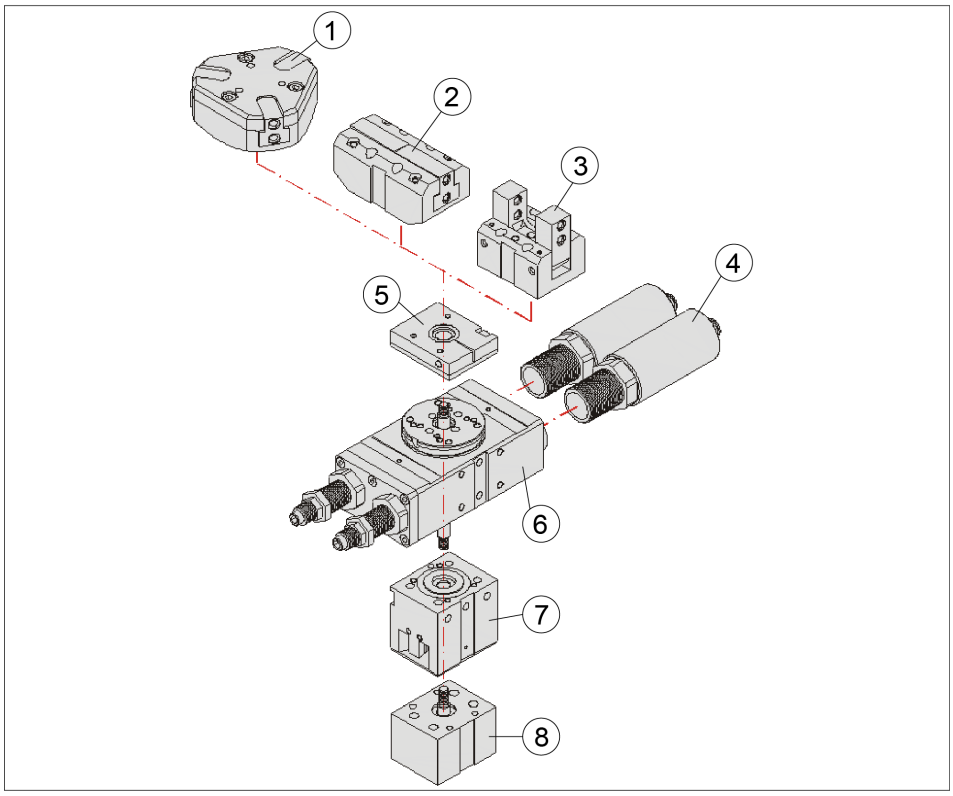
Designation	RP / RW / RC
Ambient temperature [°C] min. max.	 +5 +60
Protection class IP *	40
Noise emission [dB(A)]	≤ 70

* For use in dirty ambient conditions (e.g. sprayed water, vapors, abrasion or processing dust) SCHUNK offers corresponding product options as standard. SCHUNK also offers customized solutions for special applications in dirty ambient conditions.

4 Design and description

4.1 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.



Modular design

1	3-jaw gripper kit (GCB)	5	Rotation adapter (GMD)
2	Parallel gripper kit (GPB)	6	Rotary module (RM)
3	Angle gripper kit (GWB)	7	Drive unit (GMA)
4	Intermediate stop (RZ)	8	Gripping force maintenance unit (GKS)

4.2 Description

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)
- Flat Swivel Unit RM-F

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" ▶ 4.1 [🗋 18].

5 Assembly and settings

CAUTION

Material damage due to improper assembly!

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

5.1 Mechanical connection

Evenness of the mounting surface

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

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

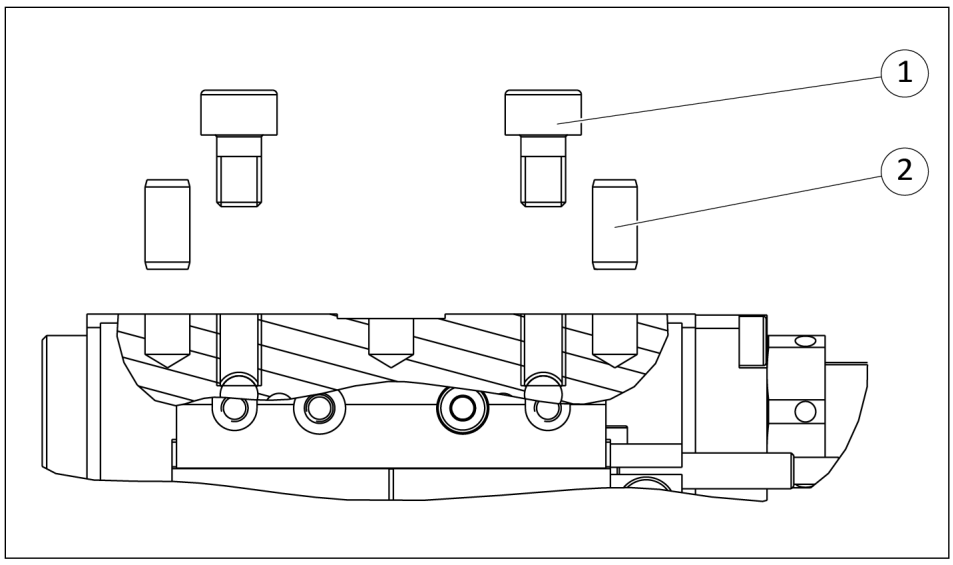
Edge length	Permissible unevenness
< 100	< 0.02
> 100	< 0.05

Connections at the housing

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 of the product .



Connections at the housing

Item	Mounting	RP / RW / RC				
		1212	1216	1520	2120	2128
1	Mounting screw	M5	M5	M5	M5	M5
	Max. depth of engagement from locating surface [mm]	6	6	6	6	6
2	Centering pin	Ø5	Ø5	Ø5	Ø5	Ø5

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.

5.2 Pneumatic connection

CAUTION

Damage to the rotary module possible!

The rotary module can be damaged if it arrives too abruptly in the end position.

- The rotary motion must reach the end position without jerk or bounce.
- Therefore, shock absorbers must be used ▶ 5.4.4 [🗋 28].
- Please observe the information in the catalog pages.

CAUTION

Pressure medium:

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

CAUTION

One-way flow control valves must be installed at the air connections for operation.

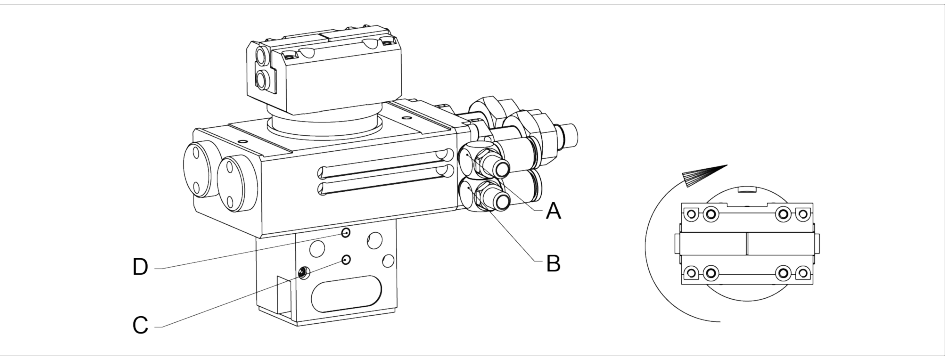
Alternatively, hose throttles can also be used.

NOTE

- Observe the requirements for the compressed air supply, ▶ 3 [🗋 17].
- In case of compressed air loss (cutting off the energy line), the components lose their dynamic effects and do not remain in a secure position. However, the use of a SDV-P pressure maintenance valve is recommended in this case in order to maintain the dynamic effect for some time. Product variants are also offered with mechanical gripping force via springs, which also ensure a minimum clamping force in the event of a pressure drop.

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.



Air connections

Connection	Function
A	Clockwise rotation (direction of arrow)
B	Counterclockwise rotation
C	Open gripper
D	Close gripper

5.3 Settings and options of the GM gripping module...

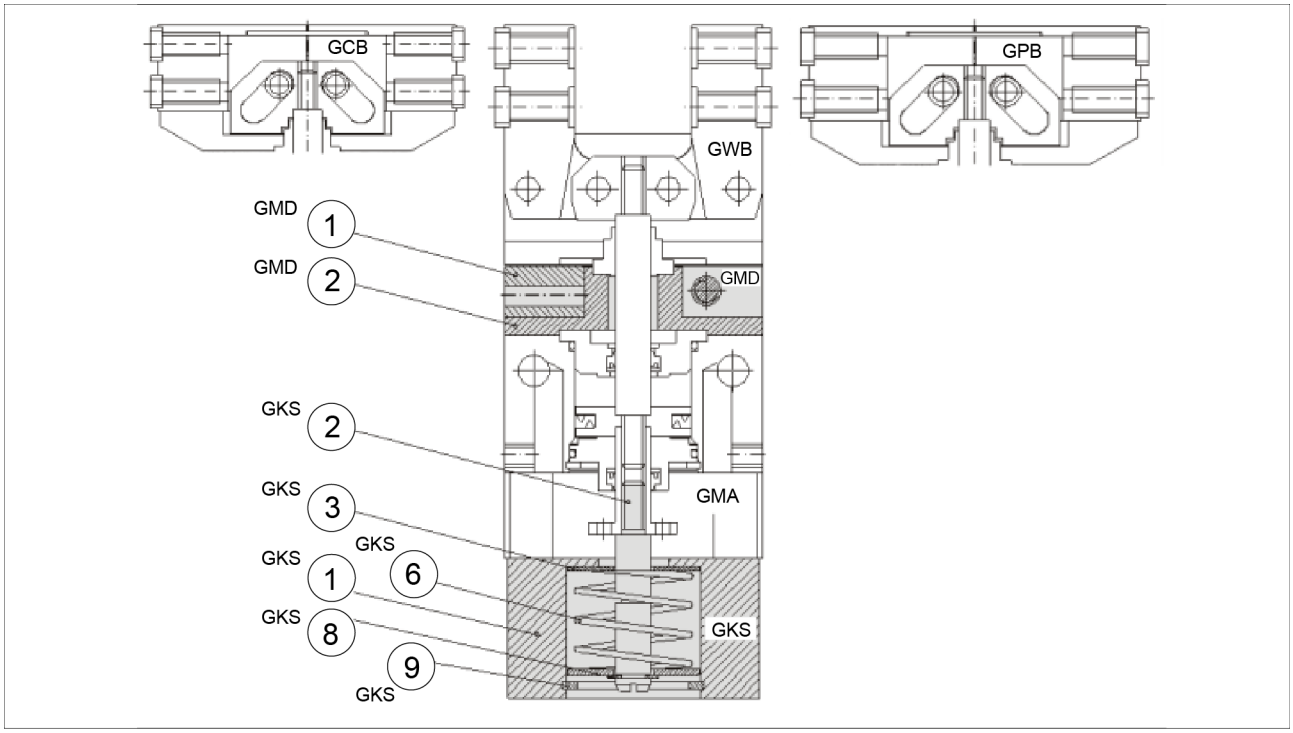
5.3.1 GMW / GMP/ GMC modular design

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.



Design of the GM.... modules

GWB	Angle gripper kit	GMD	Rotation adapter
GPB	Parallel gripper kit	GMA	Drive unit
GCB	2-jaw gripper kit	GKS	Gripping force maintenance device

5.3.2 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 maintance of gripping force unit is available in the direction of clamping or spreading.

Modifying from clamping direction to spreading direction

The GKS is completely seperated (GKS1...9) from the gripper.

1. Remove the rod (2)**downwards.**
2. Mount the safety disc (8) in the lower 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 seperated (GKS1...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.

5.3.3 Rotation adapter

A GMD-...rotation adapter is available for step-less turning of the GWB / GWP / GWC gripper kit and drive out.

This is installed between the gripper kit and drive unit.

ID no. of the rotation adapter

Rotation adapter for	Designation	ID number
GMW / GMP / GMC 12	GMD 12	5507895
GMW / GMP / GMC 16	GMD 16	5507896
GMW / GMP / GMC 20	GMD 20	5507897
GMW / GMP / GMC 28	GMD 28	5507898

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

Bore out position

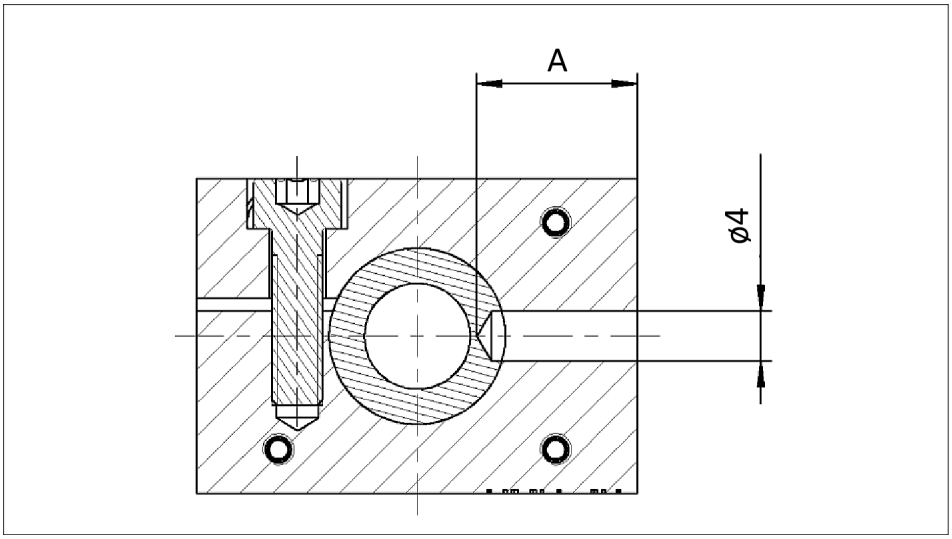
In addition to clamping with the clamping screw, the position of the adapter can secured by drilling with ø4 and pinning.

For this purpose the plate of the adapter is pre-drilled

CAUTION

Risk of damage to the piston rod if the rotary adapter is drilled and pinned.

- Observe drilling depth – see table.



Drilling depth

Adapter	drilling depth A
GMD 12	12.3 mm
GMD 16	15.3 mm
GMD 20	16.0 mm
GMD 28	20.0 mm

5.3.4 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.

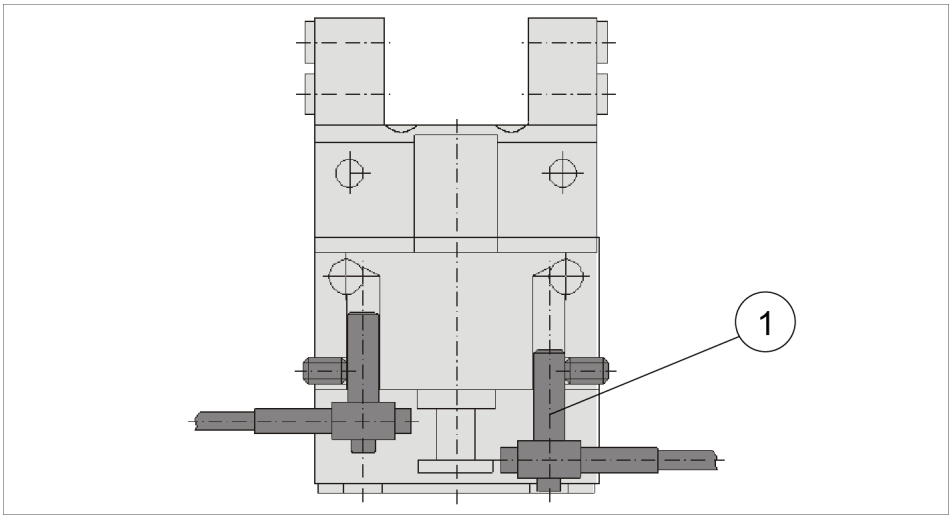
For the GMW/P/C 12 type, only **two** monitoring sets can be installed.

The end-to-end piston rod in the GMA drive unit ▶ 5.3.1 [🗋 22] is monitored.

Proximity switch - monitoring set: GMNS-...

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

- 1x retaining plate
- 1x proximity switch
- 1x connection cable



Position of the proximity switches on 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 retaining element 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 retaining element and clamp it there with the fixing screw. This is also accessible when the cover is mounted or when the maintenance of gripping force unit is installed.

Adjusting the monitoring

1. Undo the attachment screw in the drive unit.
2. Adjust the sensor via the retaining element.
3. Fix the sensor via the attachment screw again.

5.4 Settings and options of the RM... rotary module

5.4.1 Setting the swiveling time

The catalog data sheet contains data for the swiveling time.

The swiveling time is set with exhaust air throttles, these can be found in the accessory pack.

CAUTION

The required swiveling time cannot usually be achieved through merely adjusting the throttles!

To achieve the swiveling time, you always need to set/adjust the end position dampening, too.

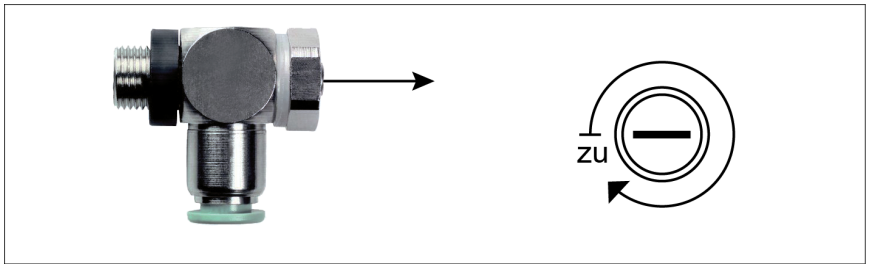
5.4.2 Setting the speed

CAUTION

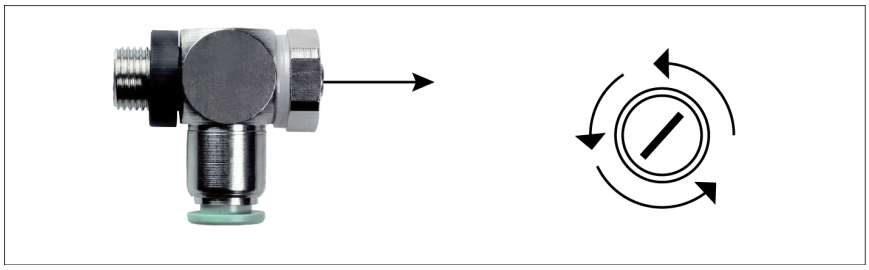
Material damage due to erroneous settings!

If the end position is approached too hard, the product may be damaged.

- Adjust exhaust throttle valve and shock absorber so that the movement is braked smoothly.



1. Close exhaust throttle valve completely.



2. Open exhaust throttle valve until the product starts to move.
3. Continue to open the exhaust throttle valve incrementally until the movement decelerates smoothly.
   - ✓ If the speed is too low, the product will brake too soon and the end position will be reached too slowly.
   - ✓ If the speed is too high, the product will impact against the end position and the shock absorber will be overloaded.

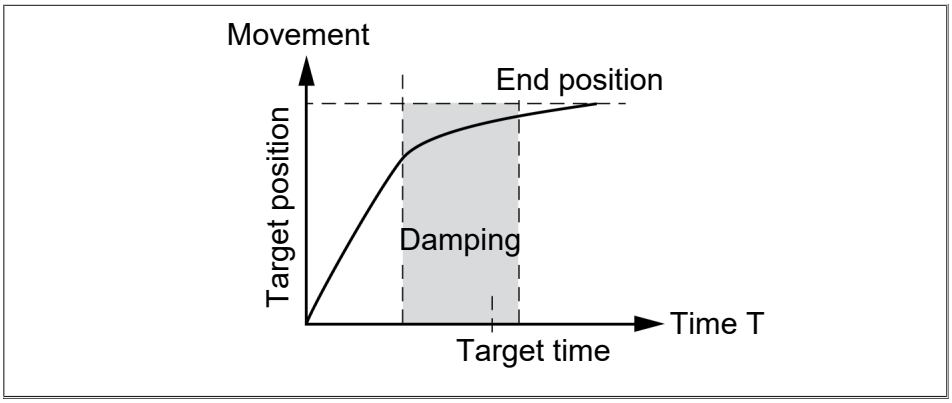
NOTE

A smooth motion may also be too slow in many use-cases. Further settings can be made via the shock absorbers, ▶ 5.4.3 [🗋 27].

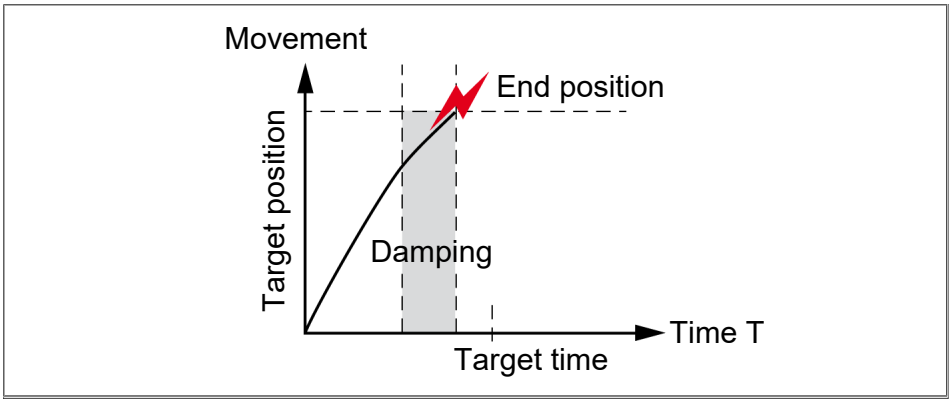
5.4.3 Setting the shock absorber stroke

NOTE

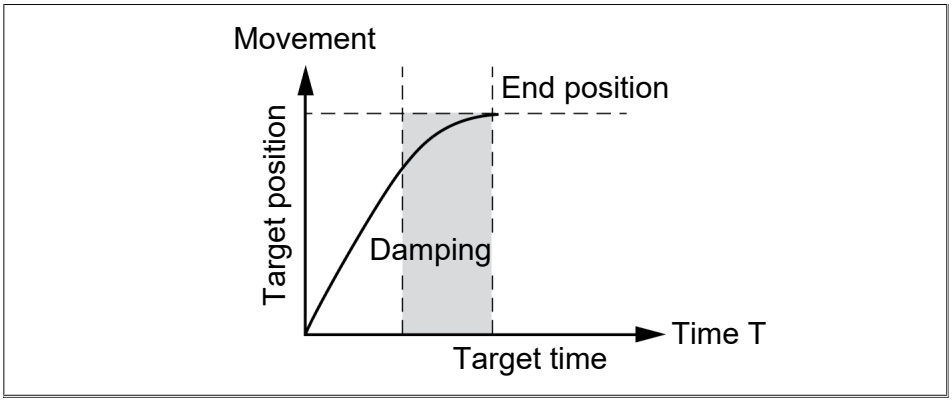
When received from the factory, the unit is set to utilize the maximum shock absorber stroke.



The shock absorber stroke is too long and the end position is reached too slowly.



The shock absorber stroke is too short and the unit arrives in the end position too abruptly.

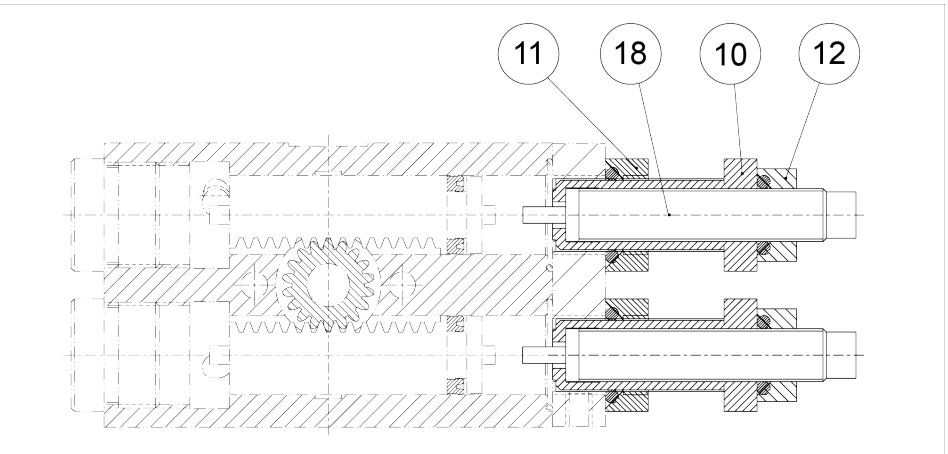


Optimal shock absorber stroke.

5.4.4 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)



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

CAUTION

Use the shock absorber!

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

- Ocserve the maximum mass moment of inertia (see catalog).
- Adjust the dampening at the mass moment of inertia.
- See chapter▸ 5.4.1 [🗋 26].

■ 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.

5.4.5 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

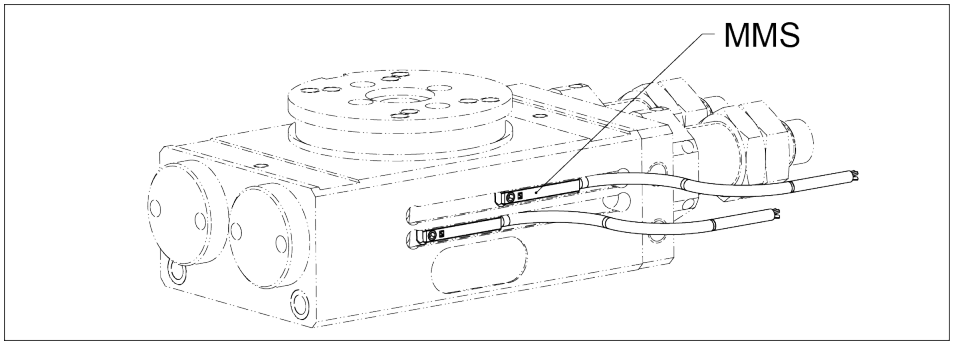
With the MMS sensor, the magnet integrated in the piston is monitored.

CAUTION

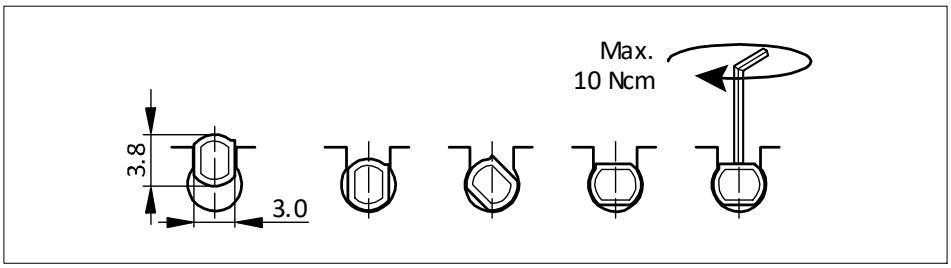
Material damage due to an incorrect tightening torque!

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

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



MQL sensor attachment



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

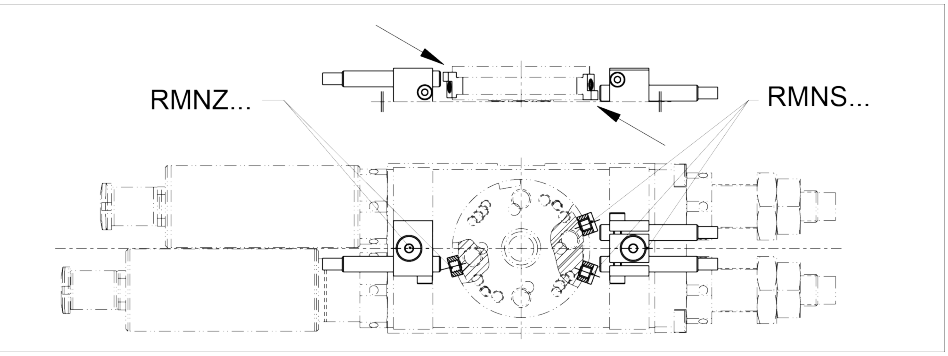
- Piston is in the respective end position.

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.

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

Attachment / adjustment of the RMNS and RMNZ monitoring sets

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



RMNS-12

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...

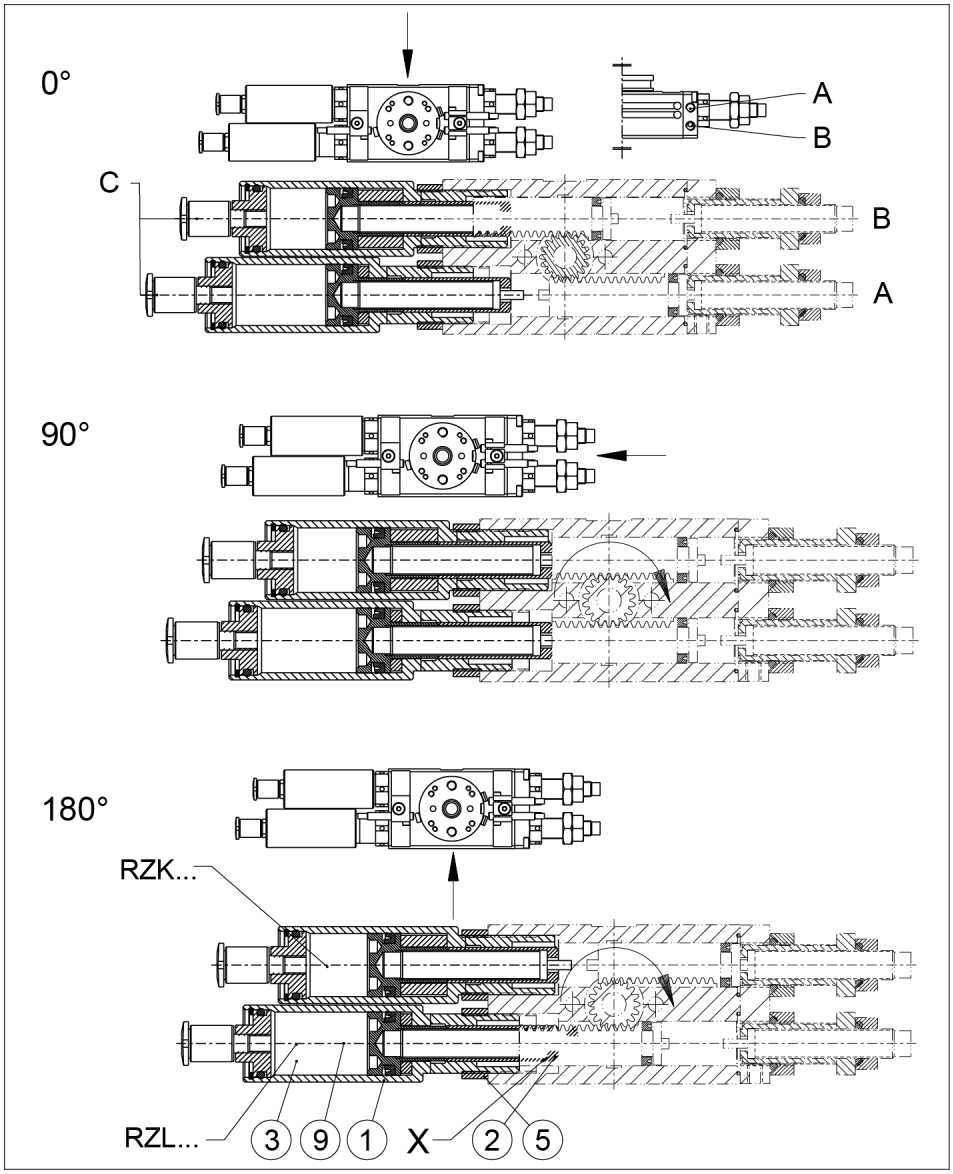
1. Undo the attachment screw.
2. Push the control cam in the prism slot of the rotary table until the signal is present.
3. Fix the control cam via the attachment screw.

5.4.6 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.



Intermediate stop

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.

5.4.6.1 Adjustment RZ...

- The stop pistons are mounted as shown in the respective chapter "RZ12/15/21 intermediate stop" ▶ 5.4.6 [🗋 31] (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.

5.4.6.2 Control RZ...

- The intermediate stop is set.

1. The positions can be controlled in accordance with the following table.
2. Check the positions in accordance with the recess at the rotary table (Fig. "intermediate stop", black arrows ▶ 5.4.6 [🗋 31]).

Possible control

Rotating motion	Air connections		
	A	B	C
0° -> 180°	1	0	0
180° -> 0°	0	1	0
0° -> 90°	0	1	1
90° -> 0°	0	1	0
0° -> 90°	0	1	1
90° -> 180°	1	0	0 *
180° -> 90°	1	0	1
90° -> 180°	1	0	0
180° -> 90°	1	0	1
90° -> 0°	0	1	0 *

* after about 0.1 s

5.4.6.3 Dampening adjustment RZ...

The dampening adjustment is done by insertion of disk ("X") under the shock absorber (9) ▸ 5.4.6 [🗋 31].

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 **IMPORTANT! Observe the maximum distance.**.
3. Reinstall the components ▸ 5.4.6 [🗋 31].

Distances for dampening adjustment

Module	RZ12	RZ15	RZ21
Disk "X"	DIN 433-3.2-St.	DIN 433-3.2-St.	DIN 126-5.5-St.
Max. distance [mm]	2	2	5

5.4.6.4 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.

6 Start-up

- Check the Technical Specifications▶ 3 [🗋 17].
- 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 is ideally regulated via throttle check valves . The speed is always set so that it starts at a low speed and increases to a higher speed until the desired operating spe▶ 5.2 [🗋 20]ed has been reached.
- The movement speed is ideally regulated via throttle check valves ▶ 5.2 [🗋 20]. 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.
- Operate the device in such a way that the permissible cycle number per minute is not exceeded. Use the "Gemotec Toolbox" program for calculation (schunk.com).

CAUTION

Risk of mechanical damage of the module!

The module must always be adjusted so that no mechanical impacts are produced when reaching the end position.

Dies gilt sowohl für den Betrieb der Schwenkeinheit als auch für den Betrieb des Greifers (entgegen der Greifrichtung).

7 Troubleshooting

7.1 Gripper

7.1.1 Modul does not move?

Possible cause	Corrective action
Base jaws jam in housing, e.g. mounting surface is not sufficiently even.	Check the evenness of the mounting surface. ▶ 5.1 [🗋 19].
	Loosen the mounting screws of the product and actuate the product again.
Pressure drops below minimum.	Check air supply. ▶ 5.2 [🗋 20]
Compressed air lines switched.	Check compressed air lines.
Proximity switch defective or set incorrect.	Readjust or change sensor.
Component part defective.	Replace component or send it to SCHUNK for repair.

7.1.2 The module does not travel through the entire stroke?

Possible cause	Corrective action
Dirt deposits in the mechanical elements.	Clean and lubricate product. ▶ 8 [🗋 39]
Pressure drops below minimum.	Check air supply. ▶ 5.2 [🗋 20]
Mounting surface is not sufficiently flat.	Check the evenness of the mounting surface. ▶ 5.1 [🗋 19]
Component part defective.	Send product with a SCHUNK repair order or dismantle product.

7.1.3 Module opens or closes abruptly?

Possible cause	Corrective action
Too little grease in the mechanical guiding areas.	Clean and lubricate product. ▶ 8 [🗋 39]
Compressed air lines blocked.	Check compressed air lines of damage.
Mounting surface is not sufficiently flat.	Check the evenness of the mounting surface. ▶ 5.1 [🗋 19]
Pressure drops below minimum.	Check air supply. ▶ 5.2 [🗋 20]

7.1.4 Module opens / does it grip the workpiece hard?

Possible cause	Corrective action
Exhaust throttle defective.	Replacing the exhaust air throttle.
Stroke speed too high.	Setting the exhaust air throttle.

7.1.5 Gripping force is dropping

Possible cause	Corrective action
Compressed air can escape.	Check seals, if necessary, disassemble the product and replace seals.
Too much grease in the mechanical movement space.	Clean and lubricate product.
Pressure drops below minimum.	Check air supply. ▶ 3 [🗋 17]
Component part defective.	Replace component or send it to SCHUNK for repair.

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

Possible cause	Corrective action
The workpiece weighs too much	Use a larger gripping module
The gripper jaws are too long	Place the gripping point further inside
Non-optimal engineering design	Adapt the engineering design – form-fit gripping

7.1.7 Module does not achieve the opening and closing times?

Possible cause	Corrective action
Compressed air lines are not installed optimally.	Check compressed air lines.
	Inner diameters of compressed air lines are of sufficient size in relation to compressed air consumption.
	Keep compressed air lines between the product and directional control valve as short as possible.
	Flow rate of valve is sufficiently large relative to the compressed air consumption.

7.2 Rotary module

7.2.1 End position signal not present?

Possible cause	Corrective action
Precisely adjust the sensor for the stop	Readjust the sensor
Proximity switch defective or set incorrect.	Replace sensor
Cable breakage	Replacing the sensor cable

7.2.2 Does the module not travel through the rotating angle?

Possible cause	Corrective action
The end positions are incorrectly adjusted	Readjust the end positions
Pressure drops below minimum.	Check air supply. ▶ 5.2 [🗋 20]
Mounting surface is not sufficiently flat.	Check the evenness of the mounting surface. ▶ 5.1 [🗋 19]
Component part defective.	Send product with a SCHUNK repair order or dismantle product.
Shock absorber defective	Check or, if need be, replace the shock absorber

7.2.3 Torque is diminishing

Possible cause	Corrective action
Seals of the drive piston defective.	Send product with a SCHUNK repair order or dismantle product.
	Replace the seals.
Positioning of the swivel table defective.	Send product with a SCHUNK repair order or dismantle product.
Compressed air lines blocked.	Check compressed air lines of damage.
Pressure drops below minimum.	Check air supply. ▶ 5.2 [🗋 20]

7.2.4 Product rotates abruptly

Possible cause	Corrective action
Seals of the drive piston defective.	Send product with a SCHUNK repair order or dismantle product.
	Replace the seals of the drive piston.
Positioning of the swivel table defective.	Send product with a SCHUNK repair order or dismantle product.
Compressed air lines blocked.	Check compressed air lines of damage.

7.2.5 Product does not move smoothly to the end positions

Possible cause	Corrective action
Fine adjustment of the absorber stroke is faulty.	Adjust absorber stroke. ▶ 5.4.4 [🗋 28]
Absorber defective.	Replace and readjust absorbers. ▶ 5.4.4 [🗋 28]
Exhaust throttle defective.	Replacing the exhaust air throttle.
Speed of rotation too high.	Setting the exhaust air throttle.

7.2.6 End position signal not present?

Possible cause	Corrective action
Precisely adjust the sensor for the stop	Readjust the sensor Link Endlagen Abfrage
Proximity switch defective or set incorrect.	Readjust or change sensor.
Cable breakage	Replacing the sensor cable

8 Maintenance

8.1 Maintenance and lubrication, gripping module GM...

8.1.1 Maintenance interval

CAUTION

Material damage due to hardening lubricants!

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

- Reduce the lubricant intervals accordingly.

Interval [Mio. cycles]	2

8.1.2 Lubricants/Lubrication points (basic lubrication)

SCHUNK recommends the lubricants listed.

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

Lubricant point	Lubricant
Lever mechanism, connecting member, other mechanical sliding points	Isoflex-Topas NCA 52 Klüber
All seals *	
Bore hole at the piston *	

* Only after disassembling the module for repairs

8.2 Maintenance and lubrication, rotary module RM...

8.2.1 Shock absorber

CAUTION

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.

8.2.2 Maintenance and lubrication intervals

CAUTION

Material damage due to hardening lubricants!

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

- Reduce the lubricant intervals accordingly.

Interval (million cycles)		Maintenance work
2		Check for leaks
4 (recommendation)		Re-lubricate the gear rack and pinion unit (RM-F 15, RM-F 21)
2	Variant for sizes 12 and 15: 6	Replace shock absorber
Recommendation for safe operation		

8.2.3 Lubricants/Lubrication points

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

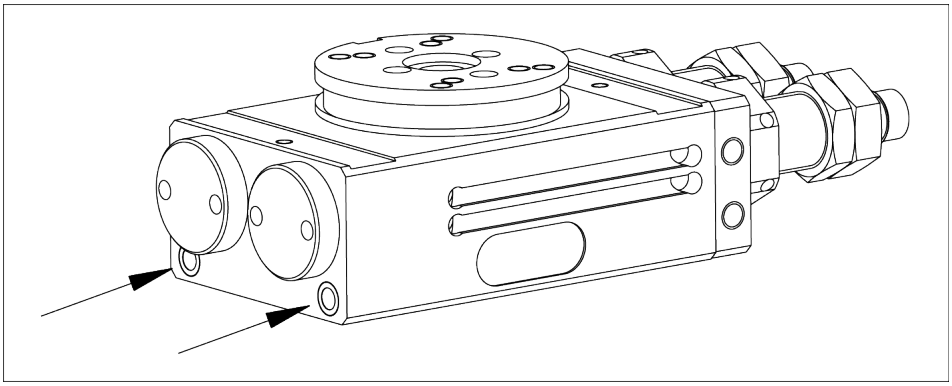
Lubrication point, Lubricant

Lubricant point	Lubricant
Gear rack and pinion unit *	Isoflex-Topas NCA 52 (from Klüber)
All seals **	
Rolling element and sliding surfaces of the bearings **	

* For RM06/08/10/12, only after disassembly of the prodct for repairs

** All products, only after disassembly of the product for repairs

Gear rack and pinion unit greasing area (RM15, RM21 only)



- Lubricate the product at the designated areas.

8.3 Dismantling the module

CAUTION

A high degree of expertise is required for the disassembly and assembly of the module, ▶ 2.5 [🗋 10].

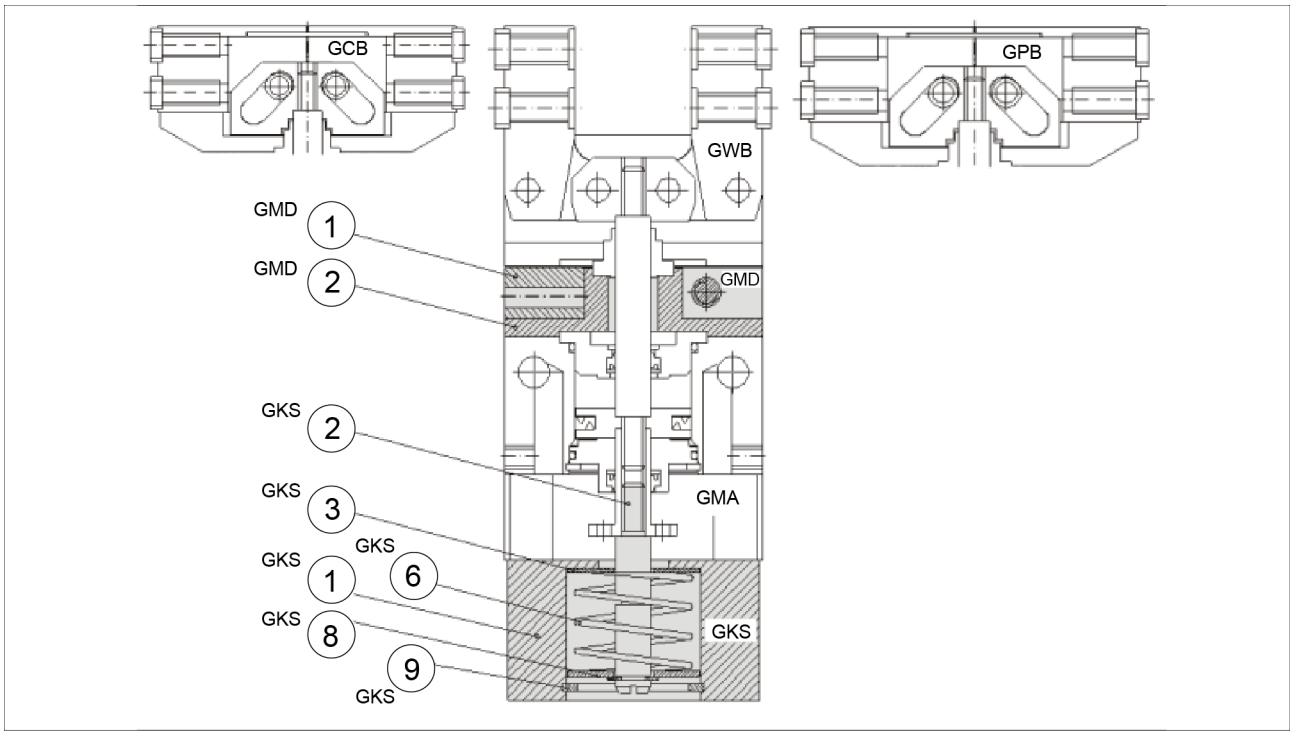
The repair or elimination of defects by the customer on the module results in the termination of the warranty and liability for all resulting warranty and subsequent damage.

- 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.



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", ▶ 9 [🗋 43].
- **Only disassemble the rotation module for repair purposes.**

8.4 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. ▶ 8.2.3 [🗋 40]
- 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 Loctite 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.

9 Assembly / spare parts

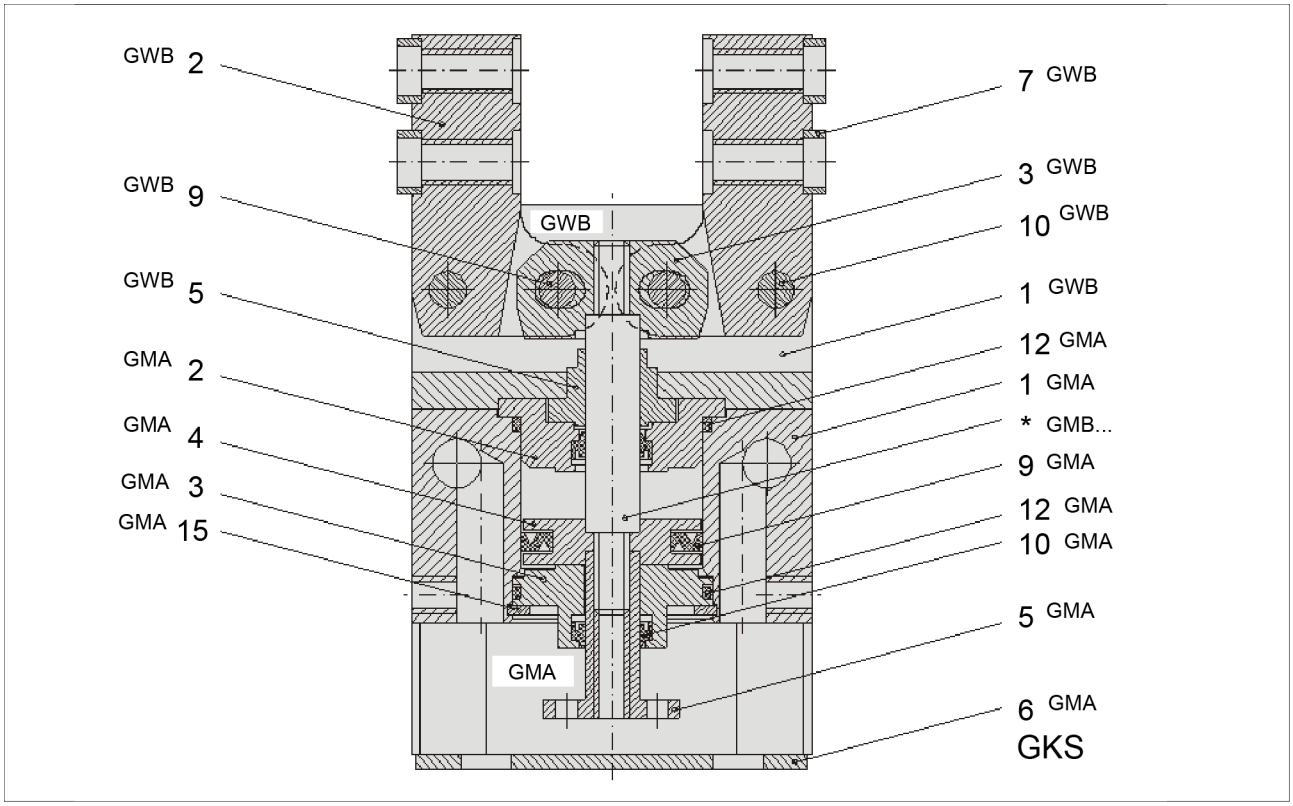
9.1 Gripping module GM...

9.1.1 GMWPC assembly drawing

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

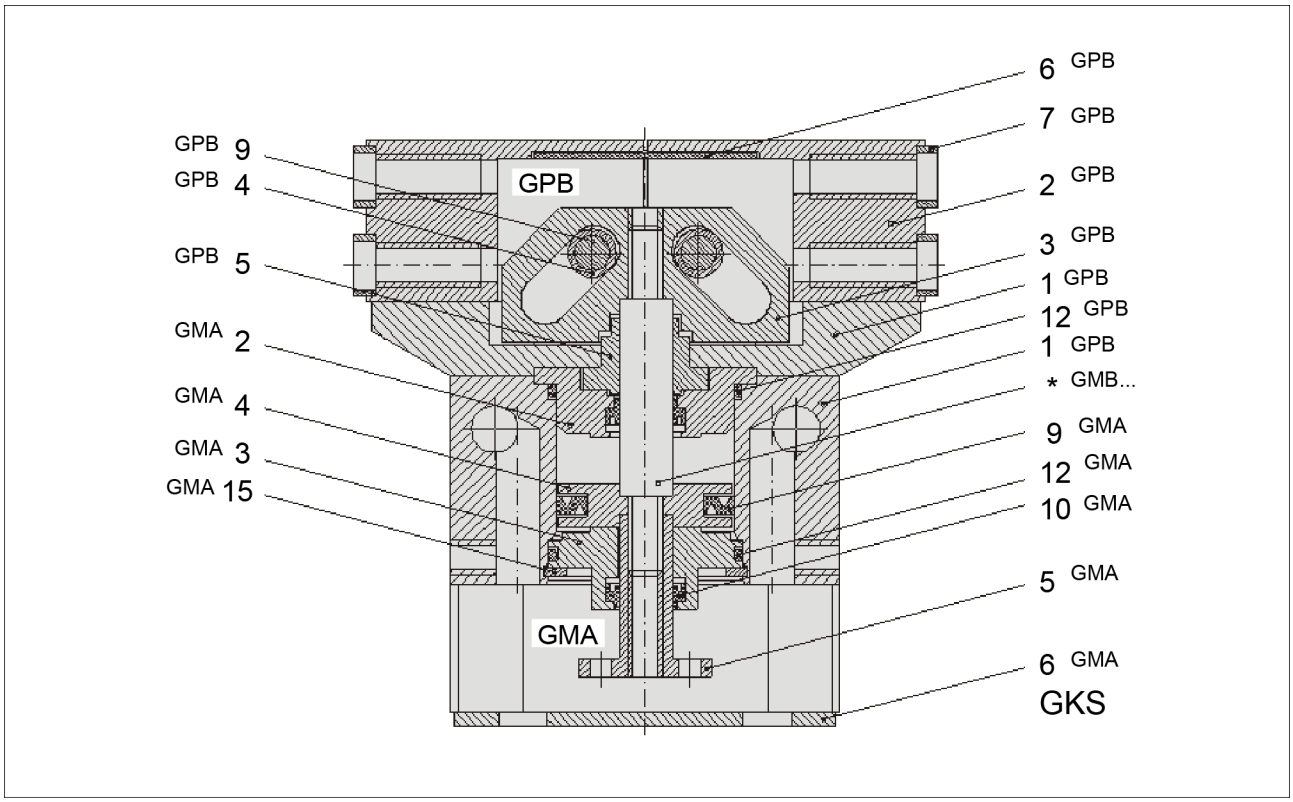
Order numbers are composed as in the following example:

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



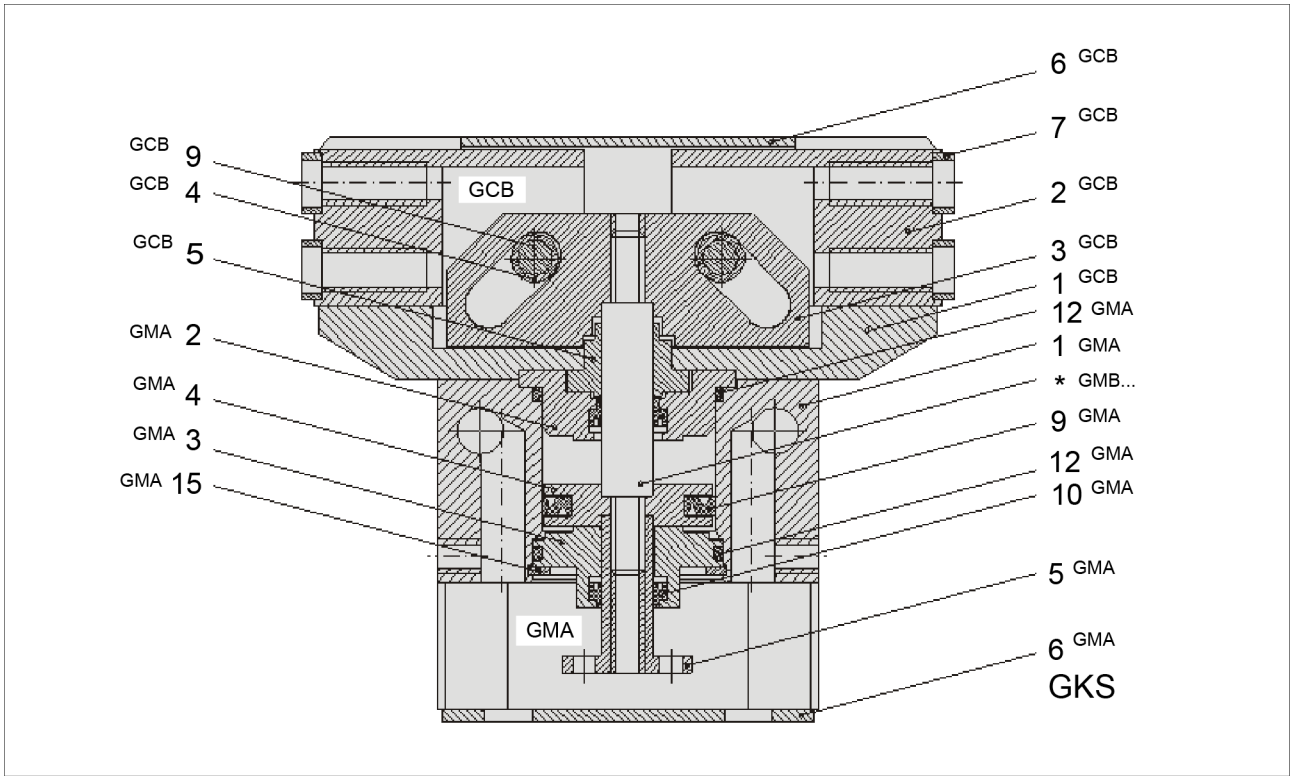
Sectional drawings of the GMW series

* Component dependent on modular design; consult SCHUNK contact partner about this.



Sectional drawings of the GMP series

* Component dependent on modular design; consult SCHUNK contact partner about this.



Sectional drawing of the GMC series

* Component dependent on modular design; consult SCHUNK contact partner about this.

9.1.2 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

Seal kit for	Designation	ID number
GMW/P/C 12	GMDI 12	0313444
GMW/P/C 16	GMDI 16	0313445
GMW/P/C 20	GMDI 20	0313446
GMW/P/C 28	GMDI 28	0313447

Contents of the sealing kit, ▶ 9.1.1 [🗋 43].

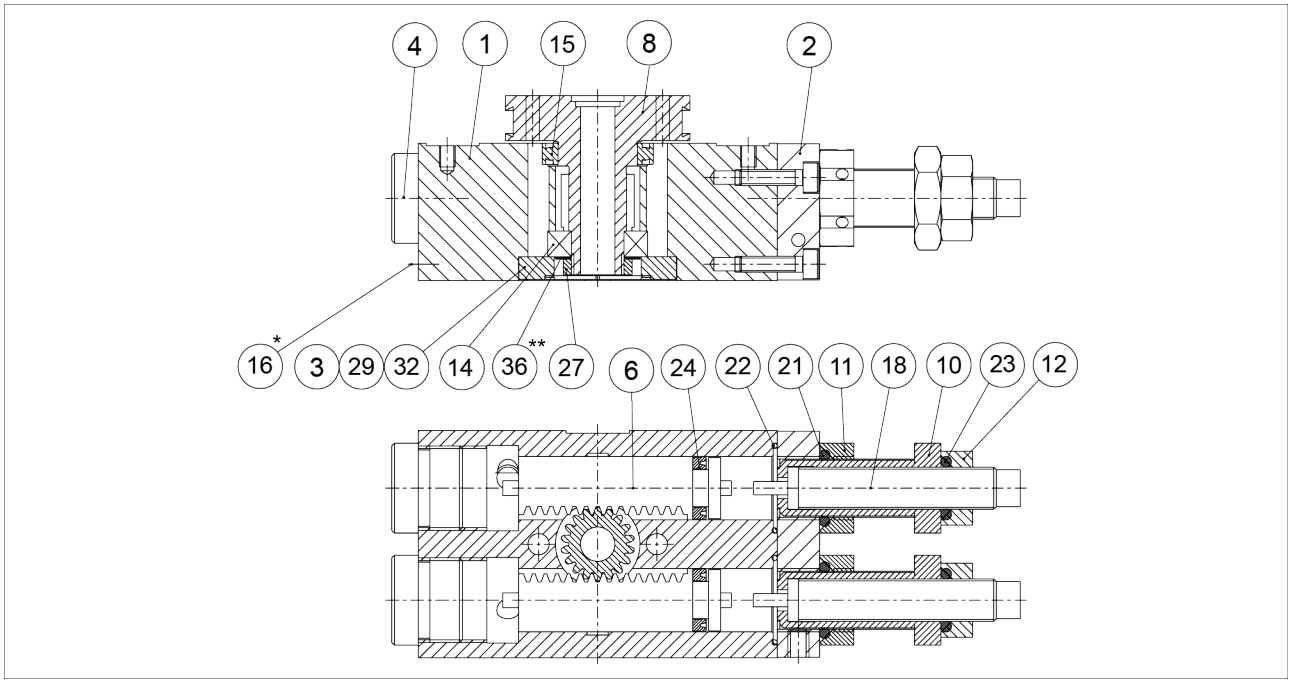
9.2 RM rotary module...

9.2.1 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)



Assembly of RM 12, 15, 21

* RM 15, RM21

** RM 12, RM15

9.2.2 Sealing kit

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

ID.-No. of the seal kit

Seal kit for	ID number
RM 06	0313465
RM 08	0313420
RM 10	0313421
RM 12	0313434
RM 15	0313435
RM 21	0313436

9.2.3 Shock absorber

ID no. of the shock absorber

Shock absorber for	ID number
RP / RW / RC 1212-H	9953561
RP / RW / RC 1216-H	
RP / RW / RC 1212-W	1347865
RP / RW / RC 1216-W	
RP / RW / RC 1520-H	9953562
RP / RW / RC 1520-W	1008669
RP / RW / RC 2120-W	9953560
RP / RW / RC 2128-W	

10 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.

Manufacturer/ Distributor	SCHUNK GmbH & Co. KG Clamping and gripping technology Bahnhofstr. 106 - 134 D-74348 Lauffen/Neckar

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

Product designation:	Gripping rotary modules / RP / RW / RC / pneumatic
ID number	0313220 ... 0313325, 0314650 ... 0314999

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

Applied harmonized standards, especially:

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

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

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

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

Signature: see original declaration

Lauffen/Neckar, August 2021

p.p. Ralf Winkler; Head of Technology & Engineering, Mechanics Gripping Systems

11 Annex to Declaration of Incorporation

according 2006/42/EG, Annex II, No. 1 B

1.Description of the essential health and safety requirements pursuant to 2006/42/EC, Annex I that are applicable and that have been fulfilled with:

Product designation	Gripping rotary modules
Type designation	RP / RW / RC
ID number	0313220 ... 0313325, 0314650 ... 0314999

To be provided by the System Integrator for the overall machine		⇓
Fulfilled for the scope of the partly completed machine	⇓	
Not relevant	⇓	

1.1	**Essential Requirements**			
1.1.1	Definitions		X	
1.1.2	Principles of safety integration		X	
1.1.3	Materials and products		X	
1.1.4	Lighting		X	
1.1.5	Design of machinery to facilitate its handling		X	
1.1.6	Ergonomics		X	
1.1.7	Operating positions			X
1.1.8	Seating			X

1.2	**Control Systems**			
1.2.1	Safety and reliability of control systems		X	
1.2.2	Control devices		X	
1.2.3	Starting		X	
1.2.4	Stopping		X	
1.2.4.1	Normal stop		X	
1.2.4.2	Operational stop		X	
1.2.4.3	Emergency stop		X	
1.2.4.4	Assembly of machinery		X	
1.2.5	Selection of control or operating modes		X	
1.2.6	Failure of the power supply			X

1.3	Protection against mechanical hazards			
1.3.1	Risk of loss of stability			X
1.3.2	Risk of break-up during operation			X
1.3.3	Risks due to falling or ejected objects			X
1.3.4	Risks due to surfaces, edges or angles		X	
1.3.5	Risks related to combined machinery			X
1.3.6	Risks related to variations in operating conditions			X
1.3.7	Risks related to moving parts		X	
1.3.8	Choice of protection against risks arising from moving parts			X
1.3.8.1	Moving transmission parts		X	
1.3.8.2	Moving parts involved in the process			X
1.3.9	Risks of uncontrolled movements			X

1.4	Required characteristics of guards and protective devices			
1.4.1	General requirements			X
1.4.2	Special requirements for guards			X
1.4.2.1	Fixed guards			X
1.4.2.2	Interlocking movable guards			X
1.4.2.3	Adjustable guards restricting access			X
1.4.3	Special requirements for protective devices			X

1.5	Risks due to other hazards			
1.5.1	Electricity supply		X	
1.5.2	Static electricity		X	
1.5.3	Energy supply other than electricity		X	
1.5.4	Errors of fitting		X	
1.5.5	Extreme temperatures			X
1.5.6	Fire			X
1.5.7	Explosion			X
1.5.8	Noise			X
1.5.9	Vibrations			X
1.5.10	Radiation	X		
1.5.11	External radiation	X		
1.5.12	Laser radiation	X		
1.5.13	Emissions of hazardous materials and substances			X
1.5.14	Risk of being trapped in a machine	X		
1.5.15	Risk of slipping, tripping or falling	X		
1.5.16	Lightning			X

1.6	Maintenance			
1.6.1	Machinery maintenance		X	
1.6.2	Access to operating positions and servicing points		X	
1.6.3	Isolation of energy sources		X	
1.6.4	Operator intervention		X	
1.6.5	Cleaning of internal parts		X	

1.7	Information			
1.7.1	Information and warnings on the machinery		X	
1.7.1.1	Information and information devices		X	
1.7.1.2	Warning devices		X	
1.7.2	Warning of residual risks		X	
1.7.3	Marking of machinery	X		
1.7.4	Instructions	X		
1.7.4.1	General principles for the drafting of instructions	X		
1.7.4.2	Contents of the instructions	X		
1.7.4.3	Sales literature	X		

	The classification from Annex 1 is to be supplemented from here forward.			
2	Supplementary essential health and safety requirements for certain categories of machinery			X
2.1	Foodstuffs machinery and machinery for cosmetics or pharmaceutical products			X
2.2	Portable hand-held and/or guided machinery			X
2.2.1	Portable fixing and other impact machinery			X
2.3	Machinery for working wood and material with similar physical characteristics			X
3	Supplementary essential health and safety requirements to offset hazards due to the mobility of machinery		X	
4	Supplementary essential health and safety requirements to offset hazards due to lifting operations		X	
5	Supplementary essential health and safety requirements for machinery intended for underground work			X
6	Supplementary essential health and safety requirements for machinery presenting particular hazards due to the lifting of persons		X	

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