

Rotary module

RM 50 - 310

Assembly and Operating Manual



Imprint

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Technical changes:

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

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Dear customer,

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

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

SCHUNK products are inspiring.

Our detailed assembly and operation manual will support you.

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

Kindest Regards

Yours SCHUNK GmbH & Co. KG

Spann- und Greiftechnik

Bahnhofstr. 106 – 134

D-74348 Lauffen/Neckar

Tel. +49-7133-103-0

Fax +49-7133-103-2399

info@de.schunk.com

www.schunk.com



Reg. No. 003496 QM08



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1 About this manual

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

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

1.1 Warnings

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

1.1.1 Key words

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

1.1.2 Symbols



Warning about a danger point



Warning about hot surfaces



Warning about hand injuries



General mandatory sign to prevent material damage

1.2 Applicable documents

- General terms of business
- SCHUNK catalog Modular Assembly Automation
- Assembly and Operating Manuals of the accessories
- "Gemotec Toolbox Rotation" program

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

2 Basic safety notes

2.1 Intended use

The module was designed to swivel permissible attachments or workpieces.

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

The module may be used only in the context of its defined application parameters ([👉 6, Page 11](#)).

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

2.2 Not intended use

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

2.3 Environmental and operating conditions

- The module may be used only within its defined application parameters.
- Ensure that the environment is clean. Observe the lubrication intervals ([👉 10.2, Page 20](#)).
- 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.
- 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.

2.4 Product safety

Dangers arise from the module, if:

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

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

Wear protective equipment.

NOTE

More information are contained in the relevant chapters.

2.4.1 Protective equipment

Provide protective equipment per EC Machinery Directive.

2.4.2 Constructional changes, attachments, or modifications

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

2.5 Personnel qualification

The assembly, initial commissioning, maintenance, and repair of the module may be performed only by trained specialist personnel. Every person called upon by the operator to work on the module must have read and understood the complete assembly and operating manual, especially the chapter "Basic safety notes" ([👉 2, Page 6](#)). This applies particularly to personnel only used occasionally, such as maintenance personnel.

2.6 Using personal protective equipment



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



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

2.7 Notes on particular risks

Generally valid:

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

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

	 WARNING
	<p>Risk of injury due to rotating components!</p> <p><i>Avoidance:</i> The danger zone must be surrounded by a safety fence during operation.</p>

3 Warranty

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

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

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

4 Scope of delivery


The scope of delivery includes:

- Rotary Actuator RM in the ordered model.
- Exhaust air throttles
- Accessory pack

5 Accessories

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


- End-position monitoring
- Sensors

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

5.1 Sensors


Overview of the compatible sensors

Designation	Type
Inductive proximity switches	NI
Monitoring set	RMNS...

- 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

Module type	RM50-310 W90	RM50-310 W180
Standard angle of rotation [°] *	90	180
End position adjustability [°]	± 5	
Ambient temperature [°C]	5 - 60	
IP rating	40	
Noise emission [dB(A)]	≤ 70	
Pressure medium	Compressed air, standard for quality of the compressed air according to ISO 8573-1: 6 4 4	
Min. pressure [bar]	3	
Max. pressure [bar]	8	
Nominal working pressure [bar]	6	

* All other angles of rotation between 5 and 180 degrees can be selected – specify when ordering –  catalog.

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

7 Assembly and settings

	NOTICE
	<p>Assembly measures</p> <ul style="list-style-type: none"> 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.


7.1 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)

Diameter	Permissible unevenness
< 100	< 0.02
> 100	< 0.05


The connection geometries are above, below and at the side of the rotary module.


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

Mounting **NOTE**

- When mounting the module from the rear or on the side, mount the module using the fixing bores provided.
- Mount the modules using the fixing bores provided.

7.2 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 11) "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.

7.3 Adjusting the end positions

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

- Counter nut (10)
- Stop coupling (13)
- Rod (14)
- Shock absorber (22)
- Counter nut (23)

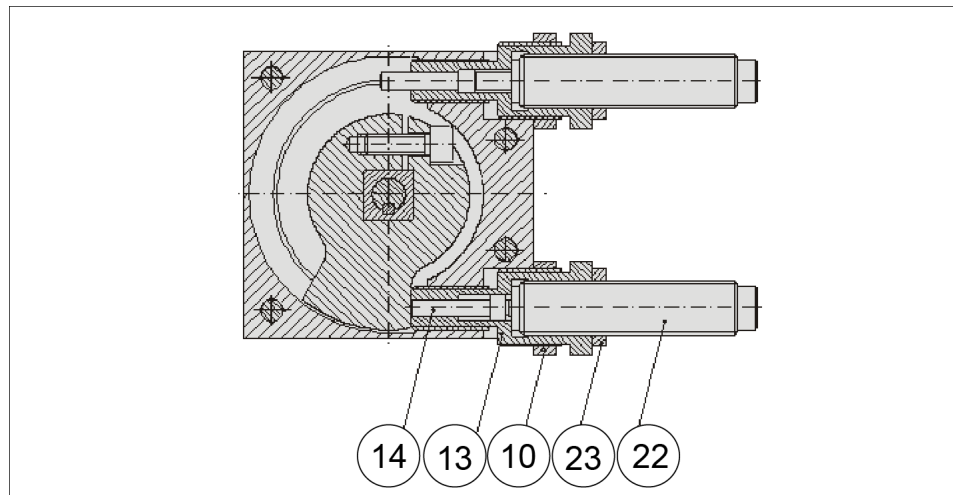



Fig. 1 Adjusting the end positions

7.3.1 Angle of rotation fine adjustment

- 1 Release counter nut (10).
- 2 By twisting the stop coupling (13) with the rod (14) and shock absorber (22) that are integrated in it, the angle of rotation in both end positions can be set by $\pm 5^\circ$ from the nominal angle of rotation. The nominal rotation angle has to be specified for the order and can be selected without steps between 5° and 180° . Standard angles are 90° and 180° .
- 3 Tighten the stop coupling again with the counter nut.

7.3.2 Dampening adjustment

	<p>NOTICE</p> <p>Use the shock absorber! Operation without the shock absorber included within the scope of delivery is not permitted.</p> <ul style="list-style-type: none"> • Observe the maximum mass moment of inertia (☞ catalog data). • Adjust the dampening at the mass moment of inertia.
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- ✓ The desired angle of rotation has been set ([☞ 7.3.1, Page 15](#)).
- 1 Release counter nut (23).
 - 2 By turning the shock absorber (22) 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.

7.4 End position monitoring

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

The stop level that is integrated in the rotary module is directly monitored.

Proximity switch monitoring: GMNS-...

Scope of delivery of the monitoring set:

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

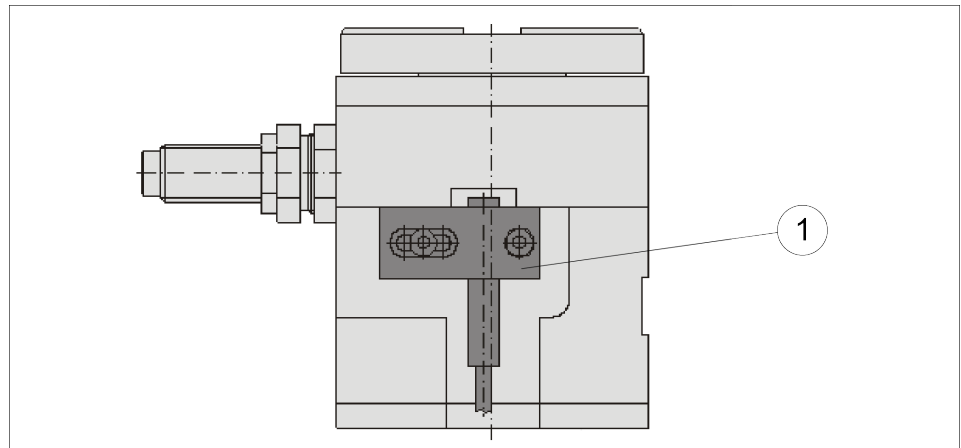


Fig. 2 Position of the proximity switches

1	Proximity switch (GMNS-... installation on both sides)
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- Setting the monitoring**
- 1 Undo the attachment screw.
 - 2 Set the sensor via the retainer plate.
 - 3 Fix the sensor via the attachment screw.

8 Start-up

- Check the technical specifications ([↗ 6, Page 11](#)).
- 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.
- Set the speed of the movement in such a way that the permitted swiveling time is not exceeded. Use the "Gemotec Toolbox" program for calculation (www.schunk.com).
- The movement speed is ideally regulated via throttle check valves ([↗ 7.2, Page 13](#)). 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 (www.schunk.com).

9 Troubleshooting

9.1 Modul does not move?

Possible cause	Corrective action
Pressure drops below minimum.	Check the air supply. (↖ 7.2, Page 13)
Compressed air lines switched	Check compressed air lines.
Proximity switch defective or set incorrect.	Repair the proximity switch.
Unused air connections not closed.	Close the unused air connections.
Choke valve closed.	Open the choke valve.

9.2 Does the module not travel through the rotating angle?

Possible cause	Corrective action
The end positions are incorrectly adjusted	Readjust the end positions (↖ 7.3, Page 14)
Pressure drops below minimum.	Check the air supply. (↖ 7.2, Page 13)
Mounting surface is not even enough	Check the levelness of the bolting surface. (↖ 7.1, Page 12)
Component is broken, e.g. through overloading	Send the module to SCHUNK with a repair order or disassemble module
Shock absorber defective	Check or, if need be, replace the shock absorber (↖ 7.3, Page 14)

9.3 End position signal not present?

Possible cause	Corrective action
Precisely adjust the sensor for the stop	Readjust the sensor (↖ 7.4, Page 16)
Proximity switch defective or set incorrect.	Repair the proximity switch.
Cable breakage	Replacing the sensor cable

9.4 Is torque dropping?

Possible cause	Corrective action
Seals of the drive piston defective	Send the module to SCHUNK with a repair order (recommended). Replace the seals of the drive piston.
Positioning of the swivel table defective	Send the module to SCHUNK with a repair order.
Compressed air lines are blocked	Check the compressed air lines for pinching or damage.
Pressure drops below minimum.	Check the air supply. (↗ 7.2, Page 13).

9.5 Does the module rotate abruptly?


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

9.6 Does the module move hard against the end positions?


Possible cause	Corrective action
Fine adjustment of the absorber stroke is faulty	Readjust absorber stroke (↗ 7.3, Page 14).
Absorber defective	Replace and readjust absorbers, (↗ 7.3, Page 14).
The exhaust air throttle is defective	Replace the exhaust air throttle.
Speed of rotation too high	Setting the exhaust air throttle (↗ 8, Page 17).

10 Maintenance and care

10.1 Shock absorber

	NOTICE
	<p>Serious mechanical damage due to failure of the shock absorbers.</p> <p>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.</p> <ul style="list-style-type: none"> • Determine the swiveling times and the permitted stroke frequency with "Gemotec Toolbox". • Regularly check the shock absorber. • Observe the recommended maintenance intervals.

10.2 Maintenance and lubrication intervals

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

Size	50 - 310
Interval [Mio. cycles]	2

10.3 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.

We recommend the lubricants listed.


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


Greasing areas, grease

Lubrication point	Lubricant
Rolling element and sliding surfaces of the bearings *	Isoflex-Topas NCA 52 (from Klüber)

* Only after disassembling the module for repairs

10.4 Dismantling the module

	NOTICE
	<p>A high degree of expertise is required for the disassembly and assembly of the module, (↗ 2.5, Page 7).</p> <p>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.</p> <ul style="list-style-type: none"> • It is recommended to have SCHUNK repair damaged and defective modules.

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

- Disassemble the module as shown in the "Assembly drawings", ([↗ 12, Page 23](#)).
- **Only disassemble the rotation module for repair purposes.**

10.5 Assembling the module

- Maintenance**
- Clean all parts thoroughly and check for damage and wear.
 - Treat all grease areas with lubricant.
[\(👉 10.3, Page 21\)](#)
 - Oil or grease bare outside 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.

11 Spare parts

11.1 Sealing kit

ID.-No. of the seal kit

Sealing kit for	ID number
RM 50	0313437
RM 110	0313438
RM 200	0313439
RM 300	0313440
RM 310	0313441

12 Assembly drawing

The following figure is an example image.
 It serves for illustration and assignment of the spare parts.
 Variations are possible depending on size and variant.

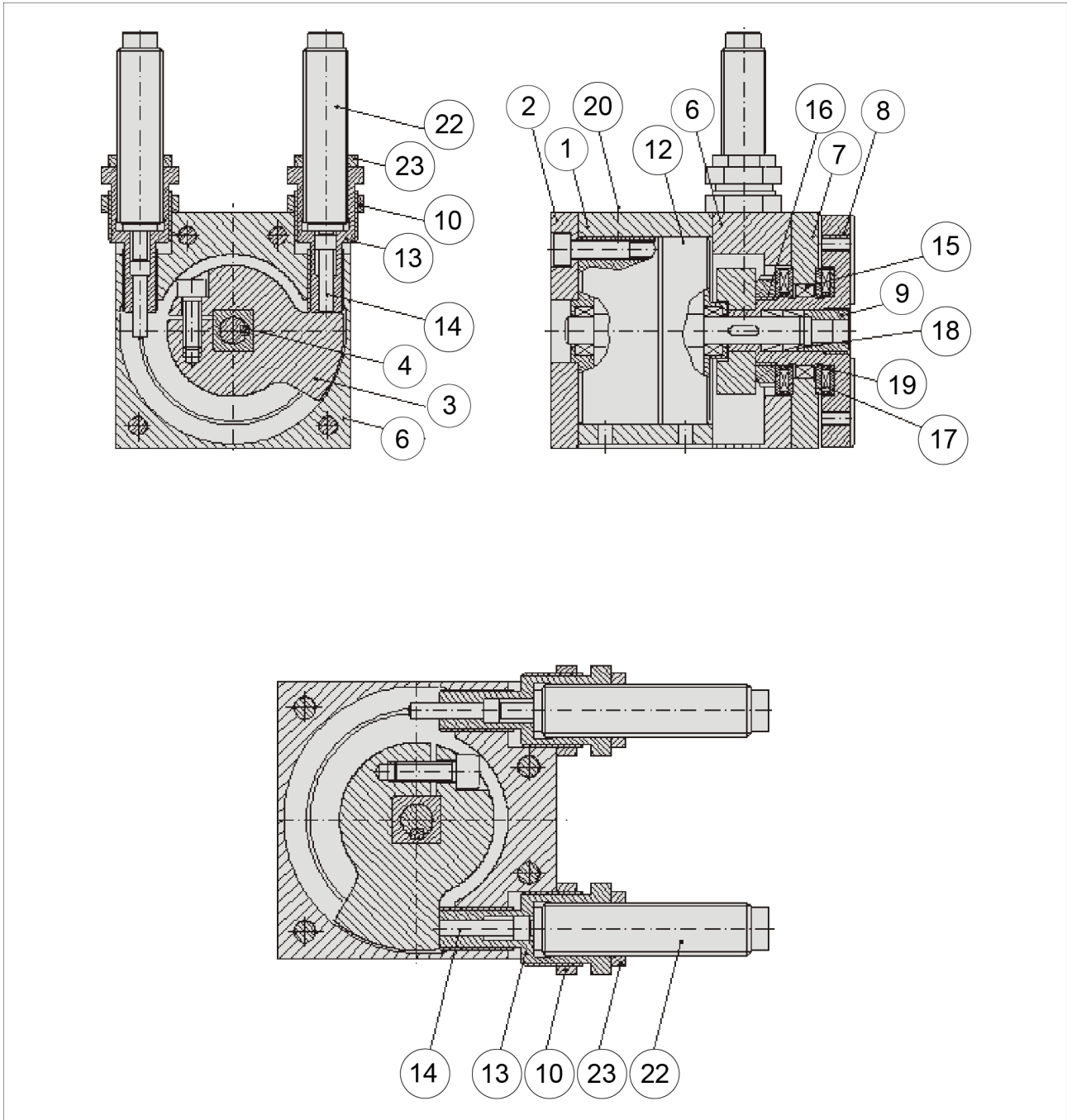


Fig. 3 Assembly of RM 06

13 Translation of original declaration of incorporation

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

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

We hereby declare that the following product:

Product designation: Rotary module / RM 50 - 310 / pneumatic
ID number 0313003 ... 0313997

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

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

Applied harmonized standards, especially:

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

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

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

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

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

Lauffen/Neckar, March 2013



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