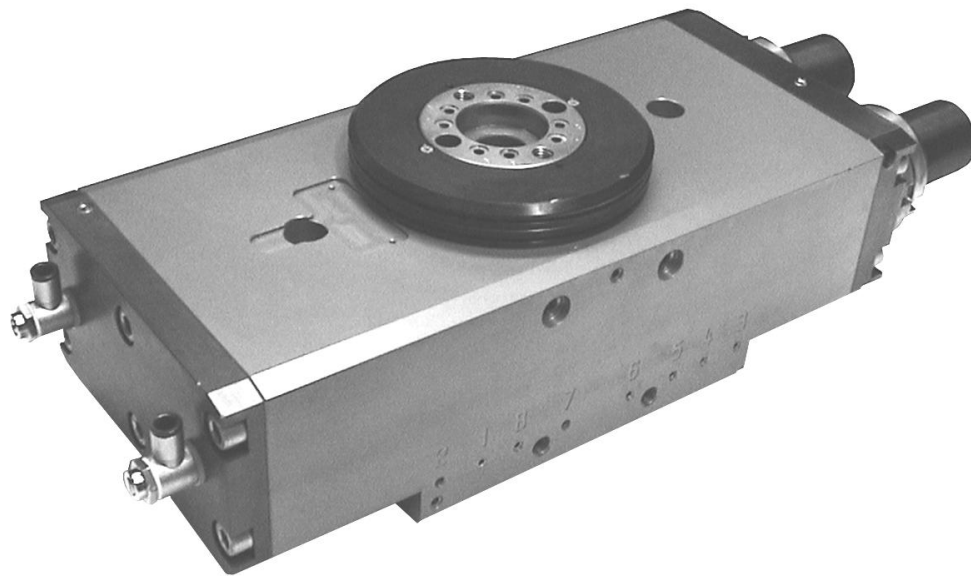


Pneumatic Swivel Unit Type SRU-plus 63

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. You can reach us directly at the mentioned addresses in the last chapter of these instructions.

Kindest Regards,

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1 About this manual

1.1 Purpose/validity

This manual is part of the module and describes the safe and proper use during all phases of operation.

This manual is valid only for the module specified on the front page.

1.2 Target groups

Target groups	Task
Manufacturer, operator	<ul style="list-style-type: none"> ➔ Keep this manual available for the personnel at all times. ➔ Require personnel to read and observe this manual and the applicable documents, especially the safety notes and warnings.
Skilled personnel, fitter	<ul style="list-style-type: none"> ➔ Read, observe and follow this manual and the applicable documents, especially the safety notes and warnings.

Tab. 1

1.3 Applicable documents







You can find the following documents on our homepage:

Document	Purpose
Calculation program for gripping modules (SSG)	Selection of the module according to the application. Avail-able free of charge.
Catalog	Technical data or application parameters of the module and information on accessories. The last version is always valid.
Assembly and Operating Manuals for sensors	Detailed information about assembly, adjustment and commissioning of the sensors.
General terms of business	Including notes on the warranty.

Tab. 2

1.4 Symbols in this manual

To give you quick access to information, the following symbols will be used in this guide:

Symbol	Meaning
 DANGER	Dangers for persons. Nonobservance causes death or serious injuries.
 WARNING	Dangers for persons. Nonobservance can cause death or serious injuries.
 CAUTION	Dangers for persons. Nonobservance can cause slight injuries.
 NOTICE	Information on avoiding material damage.
✓	Prerequisite for a handling instruction.
→	Handling instruction, also measures in a warning or note.
1. 2. 3. ...	Step-by-step handling instruction. → Observe the order.
 10	Component/spare part represented in a graphic.
 /10/	Part/detail shown in a graphic which is part of a spare part or which must be provided by the customer.
(10), (/10/)	Reference in the text or in a handling instruction to a part that is represented in a graphic.

Tab. 3

2 Basic safety notes

2.1 Indented use

The module was designed to swivel permissible attachments or workpieces.

The module is intended for installation in a machine. 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.

Any other use or use exceeding that specified is an infringement of use for intended purpose. The manufacturer bears no liability for damage resulting from such use.

2.2 Environmental and operating conditions

- ➔ The module may be used only in the context of its defined application parameters (see chapter 6, page 11 and catalog).
- ➔ Make sure that the environment is clean and the ambient temperature corresponds to the specifications per the catalog. Maintenance and lubrication intervals (see chapter 11.1, page 25).
- ➔ Make sure that the environment is free from splash water and vapors as well as from abrasion or processing dust. Excepted are modules that are designed specially for contaminated environments.

2.3 Controlled production

The module represents the state of the art and the recognized safety rules at the time of delivery. However, it can present risks if, for example:

- The module is not used in accordance with its intended purpose.
- The module is not installed or maintained properly.
- The EC Machinery Directive, the VDE directives, the safety and accident-prevention regulations valid at the usage site, or the safety and installation notes are not observed.

2.3.1 Protective equipment

➔ Provide protective equipment per EC Machinery Directive.

2.3.2 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.

2.4 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 chapter 7 "Basic safety notes". This applies particularly to occasional personnel such as maintenance personnel.

2.5 Safety-conscious working

- ➔ Avoid any manner of working that may interfere with the function and operational safety of the module.
- ➔ Observe the safety and accident-prevention regulations valid at the usage site.

2.6 Notes on particular risks

Risk of injury from objects falling and being ejected!

- ➔ Provide protective equipment to prevent objects from falling or being ejected, such as processed workpieces, tools, chips, fragments, rejects.

Risk of injury from objects falling during energy supply failure!

Modules can still move independently if the power supply fails.

- ➔ Secure the modules with pressure maintenance valves. (e.g. SCHUNK SDV-P pressure maintenance valves for short term holding of every limit position).

Risk of injury when the machine/system moves unexpectedly!

- ➔ 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.
- ➔ Remove the energy supplies before installation, modification, maintenance, or adjustment work.
- ➔ Perform maintenance, modifications, and additions outside the danger zone.
- ➔ For all work, secure the module against accidental operation.

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
- Observation of the maintenance and lubrication intervals (see chapter 11.1, page 25)
- Observation of the ambient conditions and operating conditions (see chapter 2.2, page 7)

Parts touching the workpiece and wearing parts are not part of the warranty. Also observe our general terms of business.

The module is considered defective when the basic rotary function is inoperable.

4 Scope of delivery

The scope of delivery includes:

- Pneumatic Swivel Unit SRU-plus in ordered model.
- Enclosed pack (for contents, see chapter 13 at page 29)

5 Accessories

The following accessories are available for the module:

- Double check safety valve, type SDV-P
- Sensors

➔ Order accessories separately.

For additional accessories, see catalog.

5.1 Sensors

See the catalog for exact type designations of compatible sensors.

Designation	Type
Inductive proximity switch	IN
Magnetic switch	MMS

Tab. 4 Overview of compatible sensors

6 Technical Data

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

Type	SRU-plus 63.2-180-3-8	SRU-plus 63.2-90-3-8-R	SRU-plus 63.2-90-3-8-L
Mechanical operating data			
Weight [kg]	26.5	26.5	26.5
Ambient temperature [°C]			
Min.	5	5	5
Max.	60	60	60
Nominal torque [Nm]	115	115	115
Max. torque [°]	180	90	90
Angle of rotation		Right	Left
End position adjustability [°]	2.0	2.0	2.0
Number of feedthroughs	8	8	8
IP rating	54	54	54
Fluid consumption per cycle (2 x nominal angle) [ccm]	950	475.0	475.0
Rotation time at medium load structure [s]	2.1	1.9	1.9
Noise level [dB] (A)	70	70	70
Pneumatical / Fluidic operating data			
Pressure medium	Compressed air, standard for quality of the compressed air according to ISO 8573-1: 6 4 4		
Nominal pressure [bar]	6.0	6.0	6.0
Min. pressure [bar]	4.5	4.5	4.5
Max. pressure [bar]	8.0	8.0	8.0

Tab. 5

7 Assembly and installation

7.1 Mechanical connection

⚠ WARNING

Risk of injury when the machine/system moves unexpectedly

→ Switch off power supply.

Mounting The module can be mounted on the base side:

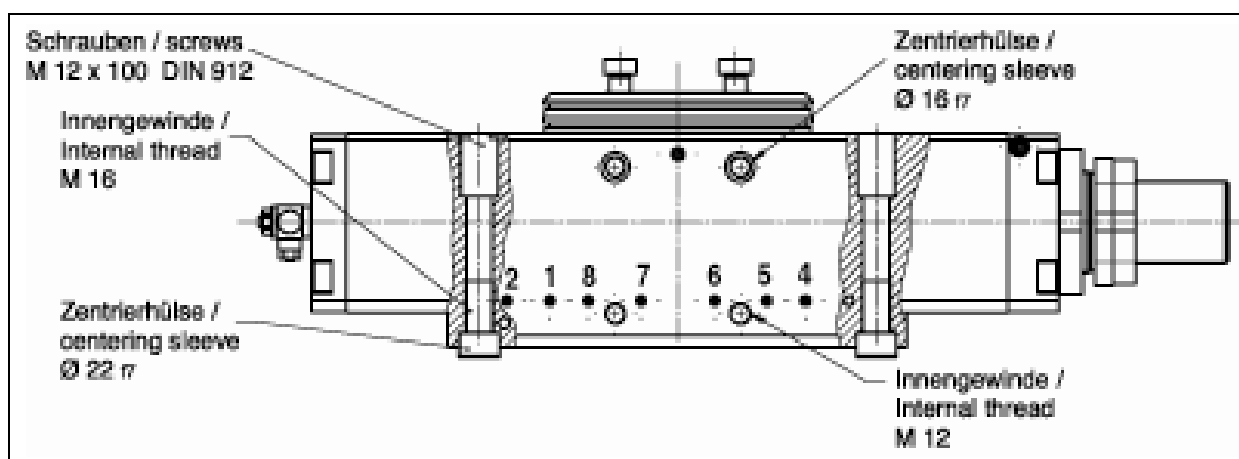


Fig. 1 Möglichkeiten der Montage von unten und oben

Attach to the two internal threads or screws M12 x 100 and use for centering the pins from the enclosed pack (71).

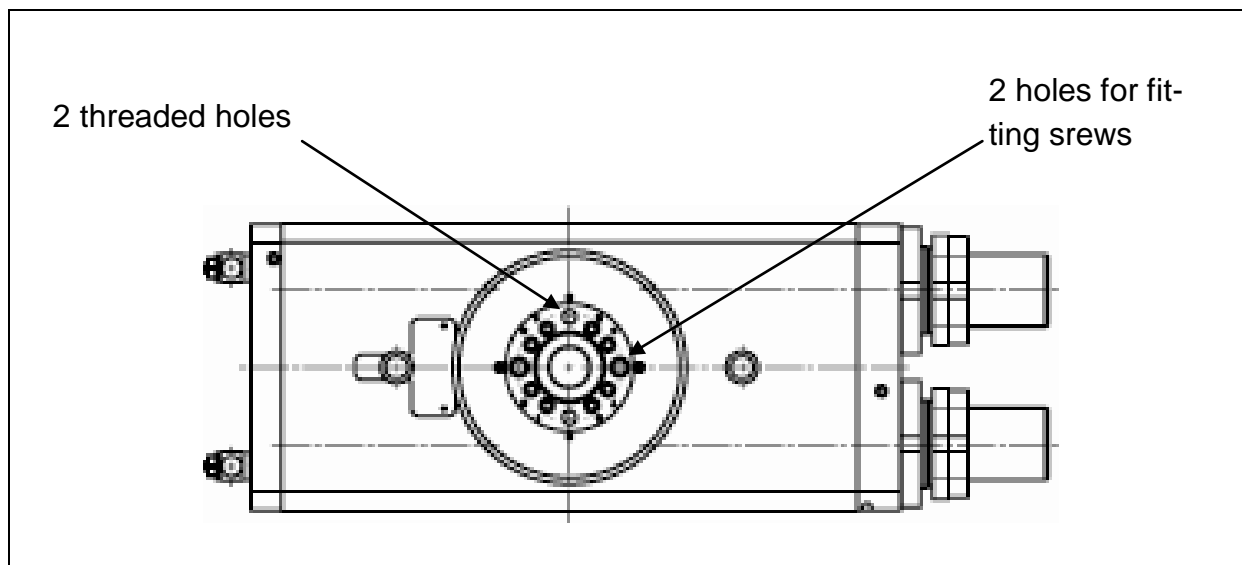


Fig. 2: Mounting options with an adapter plate

Use the 2- fitting screws (77) and the 2 cap screws (75) from the pack.

Mount at the bottom end on the internal threads of the pinion.

7.2 Air connection

WARNING

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 flow control valves and shock absorbers must be used.
- Please observe the information in the catalog pages.

WARNING

Risk of injury when the machine/system moves unexpectedly

- ➔ Switch off power supply.

CAUTION

If the max. permissible mass on each jaw set:

- ➔ Module attach fittings on the throttle.

Note

- Observe the requirements for the air supply (see Chapter°6, Page 11 and the module data sheet).
- ➔ The air connections in all blocks are arranged in the front side at the same position for the pivotal movement.
- ➔ These connectors are equipped with flow control valves from the pack.
- ➔ Optionally the units could be connected directly tubeless from the ground or out of a side surface.
- ➔ Use generally throttle check valves for the connection.
- ➔ Open only the necessary air connections.

- ➔ Seal unused air connections with the screw-cap from the pack.
- ➔ Use for the tubeless direct connection the two O-rings (73) from the pack.

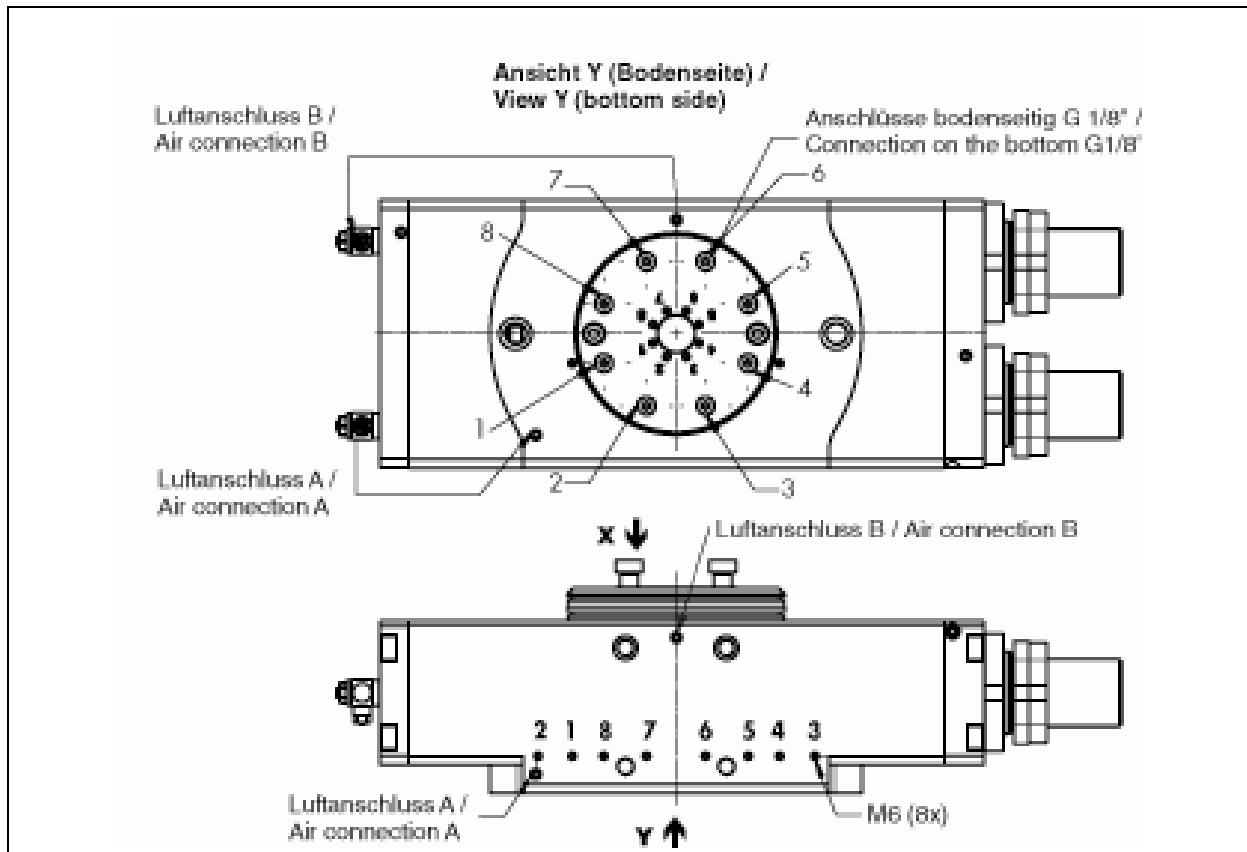


Fig. 3 Air connections

7.2.1 Rotary feedthrough

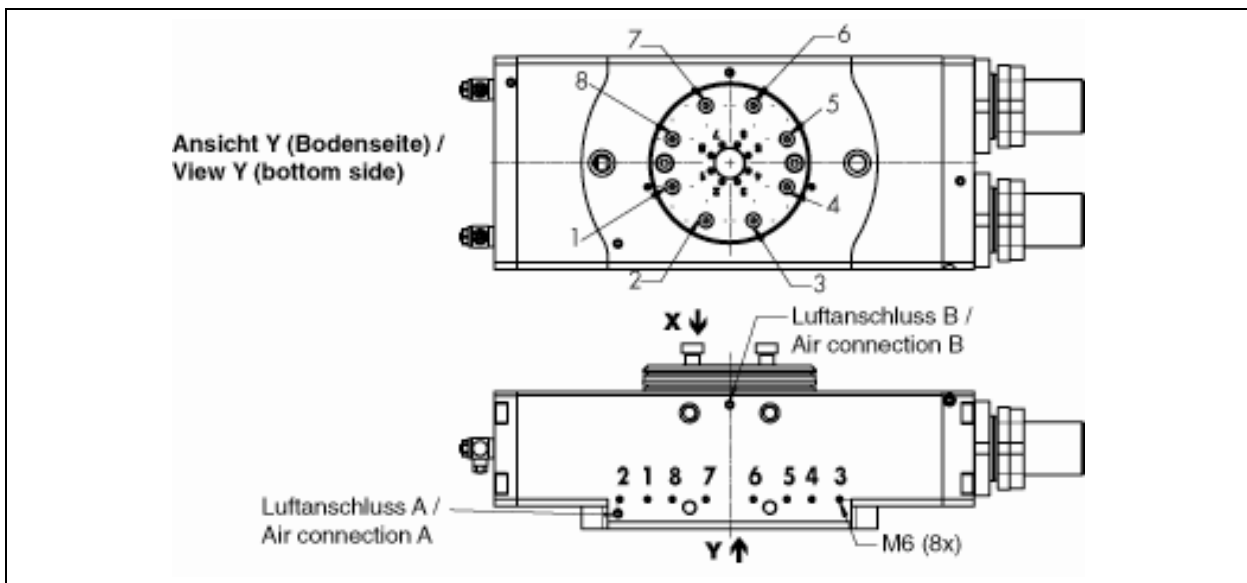


Fig. 4 Measurements for tubeless pinion side direct connection

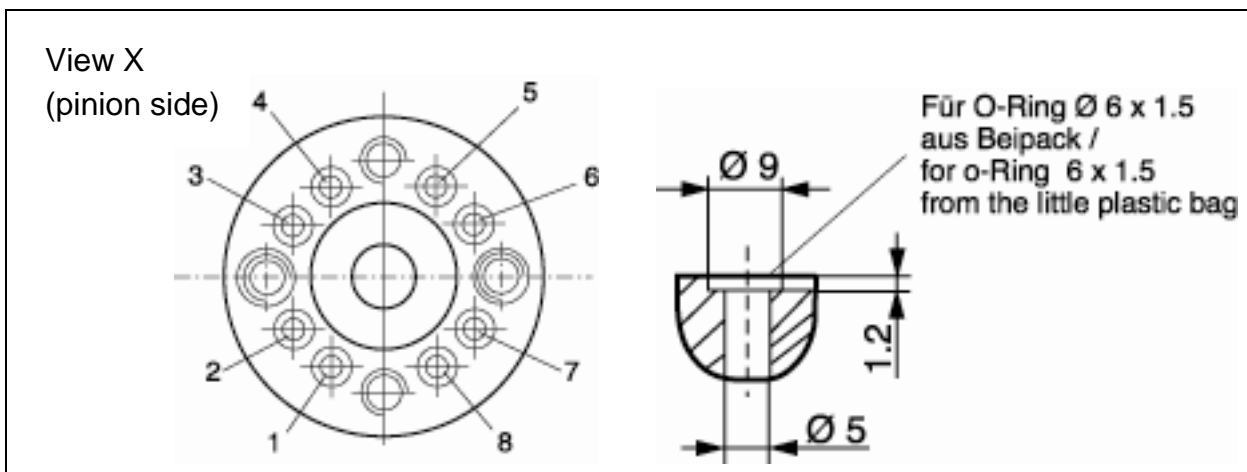
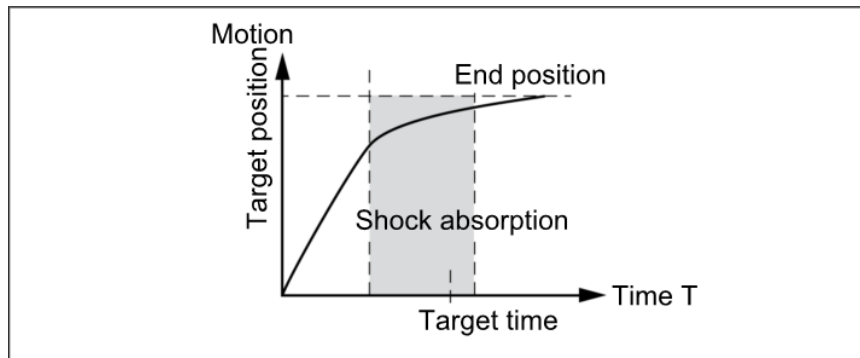


Fig. 5 View from sprocket to stop (CCW), air connection left.

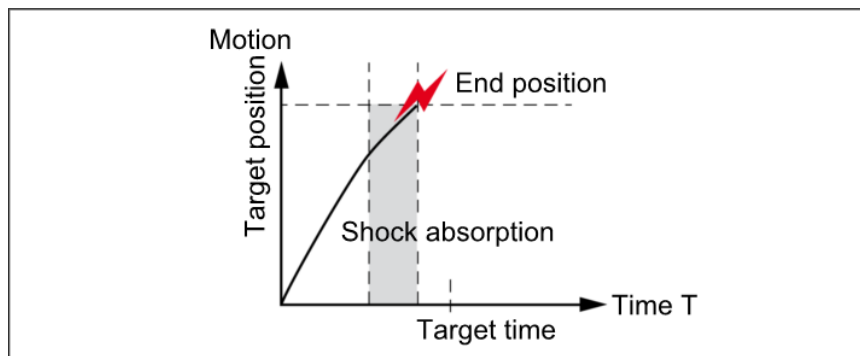
8 Adjustment of the shock absorber stroke

NOTE

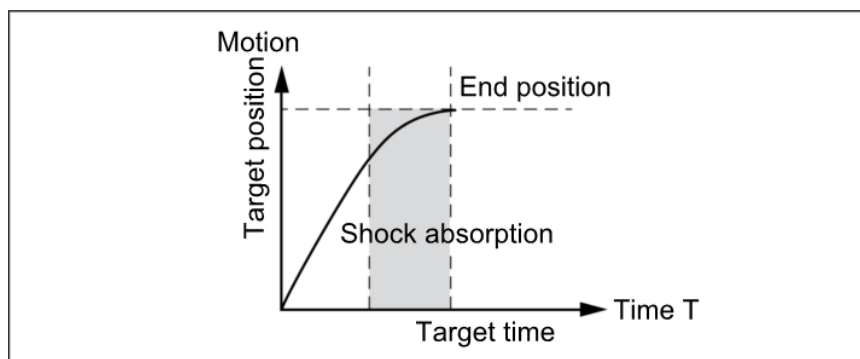
When received from the factory, the unit is set to utilize the maximum shock absorber stroke.



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.

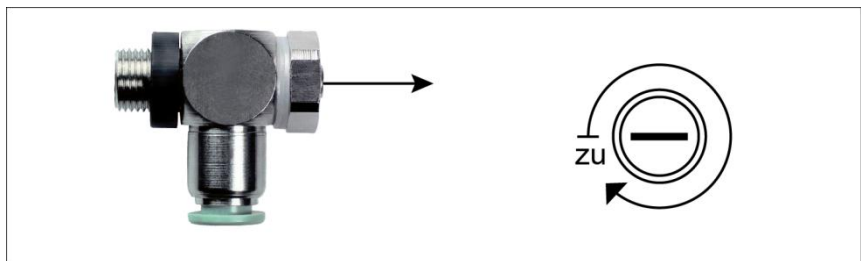
9 Setting the speed

CAUTION

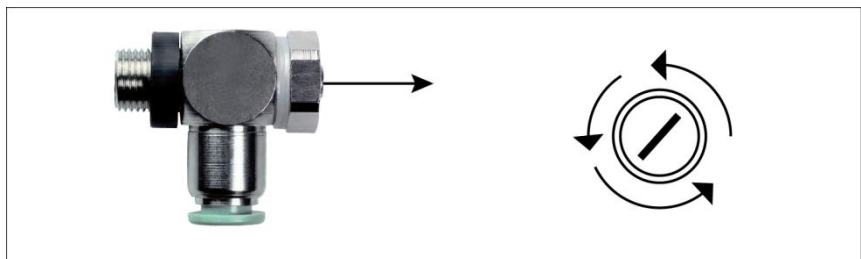
Damage to the product is possible!

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

- The exhaust flow control valves and the shock absorbers must be adjusted so that the rotation gradually and smoothly decelerates.



- 1 Completely close the exhaust flow control valves.



- 2 Slowly and gradually open the exhaust flow control valves and rotate the load.
- 3 Further open the exhaust flow control valves until the rotation gradually and smoothly decelerates.
 - ⇒ If the speed is too low the swivel unit brakes too soon and the end position is reached too slowly.
 - ⇒ If the speed is too high the swivel unit impacts in the end position and the shock absorber will be overloaded.

NOTE

NOTE In most cases the rotation will still be too slow. Further adjustment and optimization of the swivel time is achieved via adjusting the shock absorber stroke.

10 Swivel angle adjustment

10.1 Fine adjustment of end positions 0° und 180°

(See chapter 12 Assembly drawing for sectional view of the position number)

1. Act upon connection A until the Rotary Actuator has reached its final position.
2. Solve now the nut (53) for B and adjust the final position of the adjusting sleeve (10).
3. Tighten the locknut (53) to counterattack and to review the end position.

Proceed exactly in the same way for the second end stop.

10.2 Sensors

The gripper is prepared for the designed use of the sensors IN 80 and MMS 30.

- ➔ If you require further information on sensor operation, contact your SCHUNK contact person or download information from our homepage.
- ➔ Technical data of the sensors can be found in the data sheets (included in the scope of delivery).

CAUTION

Damaging the sensor during installation is possible

- ➔ Note, the max. torque for the screw is 0.2 Nm.

10.2.1 Inductive proximity switches IN 80

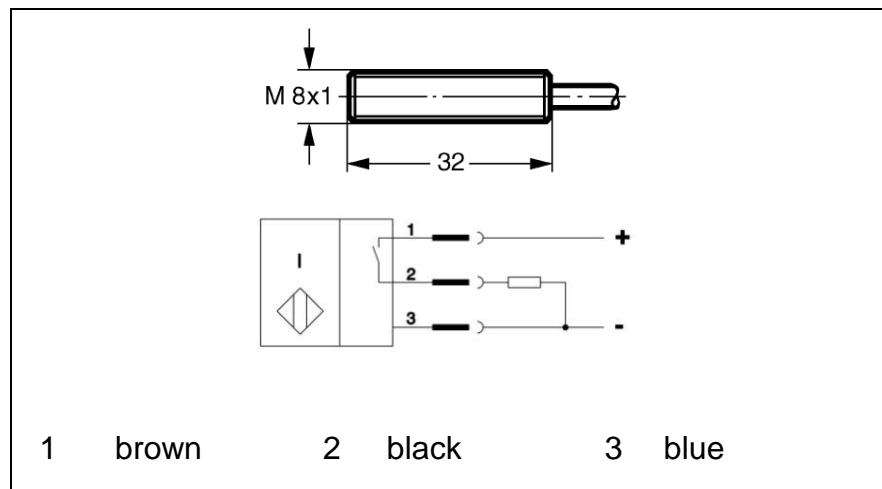


Fig. 6 Inductive proximity switch IN 80

Available types:

- IN 80-S-M8 (switching function: NOC)
- IN 80-S-M12 (switching function: NOC)

The installed inductive proximity switch is polarity protected and short circuit protected.

During proper usage of the proximity switch, note the following:

- Do not pull on the cable of the sensor.
- Do not allow the sensor to dangle from the cable.
- Do not overtighten the mounting screw or the clamp mounting.
- Comply the allowable bending radius of the cable (see catalog).
- Avoid contact of the proximity switch with hard objects, as well as chemicals, in particular nitric acid, chromic acid and sulfuric acid.

The inductive proximity switches are electronic components, which can react sensitively to high-frequency interference or electromagnetic fields.

- Check to make sure that the cable is fastened and installed correctly. Provide for sufficient clearance to sources of high-frequency interference and their supply cables.
- Parallel switching of several sensor outputs of the same type (npn, pnp) is permissible, but does not increase the permissible load current.
- Note that the leakage current of the individual sensors (ca. 2 mA) is cumulative.

Installation and adjustment of the proximity switch**Block A and B:**

1. Set the quick clamping sleeve (92) so, that the pivoting cam (94) has passed about 0.5 mm spacing.
2. Clamp then the sleeve with the threaded pin (93) easily.
3. Turn the set screw (94-3) about $\frac{1}{2}$ at the switch cam (94), so the cam can be moved.
4. The connection at A pressurize until the gripper head has reached its final position.
5. Now slide the puck until the switch is applied at B.
6. Tighten the pinion and the set screw (94-3) again from this position
The setting for the other end position is the same.

10.2.2 Magnetic switch MMS 30

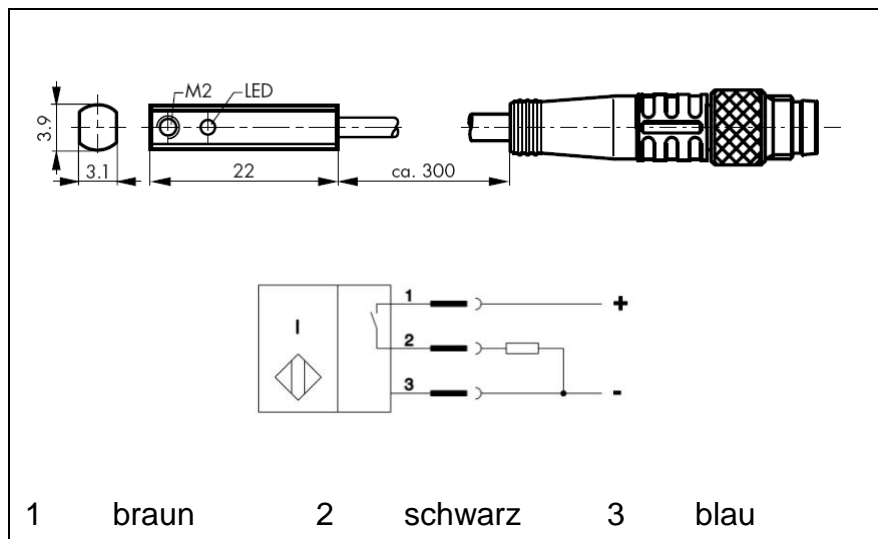


Fig. 7

Note

With the use of adapter plates from ferromagnetic material (eg. ordinary structural steel), the module must first be mounted on the adapter plate, before the positions of the magnetic switches. This is necessary because the use of magnetizable material of the sensor changes the shifting points.

RMS sensors have a greater hysteresis than the MMS sensors. Thus it may be that short gripper strokes with the RMS sensors are not retrievable..

Installation and adjustment of the proximity switch

1. Pressurize a connection of the rotary unit until it reached one of their settings.
2. Push a button on one of the T-slots and position it so that its make contact addresses and transmits the sensor signal.
3. Fix the switch by tightening the set screw (SW 1.5)
4. Pressurize the unit through the second connection and fix it in the other end position. The second proximity switch procedure is analogous.

11 Maintenance and care

11.1 Maintenance and lubrication intervals

! CAUTION
Environmental temperatures of more than 60 °C/ 140 °F can harden the used lubricants faster!
➔ Lubrication and maintenance works have to be carried out more often.

Type	63
Interval [Mio. cycles]	1

Tab. 6

11.2 Lubricants/Lubrication points (basic lubrication)

We recommend the lubricants listed. Provably equivalent lubricants can also be used.

➔ During maintenance, treat all grease areas with lubricant.

Lubrication points	Lubricant
Serration and pinions	Molykote BR 2 plus
meta sliding surfaces	Renolit HLT 2
All seals	

Tab. 7

11.3 Dismantling the module

! CAUTION
Damage to the O-rings during installation is possible.
➔ Caution when mounting the rotary feedthrough (3).

1. Remove all pressure lines
2. Unscrew the cover A (16) cover (11).

3. Mark during the installation the position of the pinion (2), the piston (5) and for the version with integrated air the passage of the rotary joint (3).
4. Dismantle the piston (5) at one point.
5. Remove the distributor flange (3) and the locking ring (52).
6. Press the pinion (2) of the housing.
7. Slide the rack (30) and the piston (5) out of the housing.
Remove all seals.

11.4 Servicing and assembling the module

(For item see chapter 12 Assembly drawing, page 28)

 WARNING
Risk of injury due to spring forces. → Carefully disassemble the module.

Servicing

- Alle Teile gründlich reinigen und auf Beschädigung bzw. Verschleiß prüfen.
- Replace all wearing parts / seals.
 - The wearing parts are listed in the spare part and sealing kit list (see chapter 13, from page 29).
 - The seals are in the sealing kit.
The ID number of the sealing kit is in the wearing part and sealing kit list (see chapter 13, from page 29).
- Treat all grease areas with lubricant (see chapter 11.2, page 25).
- 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® 243 and tighten with the appropriate tightening torque.

11.5 Replacing and adjusting the shock absorber

Note

The shock absorbers are specially tested and can only be sourced from SCHUNK. The shock absorbers have a restricted lifetime, depending on the load.

- ➔ Test the shock absorbers for function regularly.
The shock absorbers function correctly when the module moves smoothly into the limit positions.

CAUTION

Rotary actuator SRU-plus 63 has no adjusting screw for the shock absorber.

- ➔ Adjust the shock absorber properly.

Replacement of shock absorber

1. Fix the swivel with the hock wrench (79) and loosening the sealing nut (54) of the shock absorber.
2. Turn the shock absorber (32) from the thread.
3. Fasten the new shock absorber until it stops.
4. Mount the O-ring (49) on the shock absorber.
5. Set the shock absorber by unscrewing the shock absorber stroke.
6. Fix the swivel with the hock wrench (79) and tighten the sealing nut (54) of the shock absorber.
7. Check the setting by repeatedly swiveling.

12 Assembly drawing

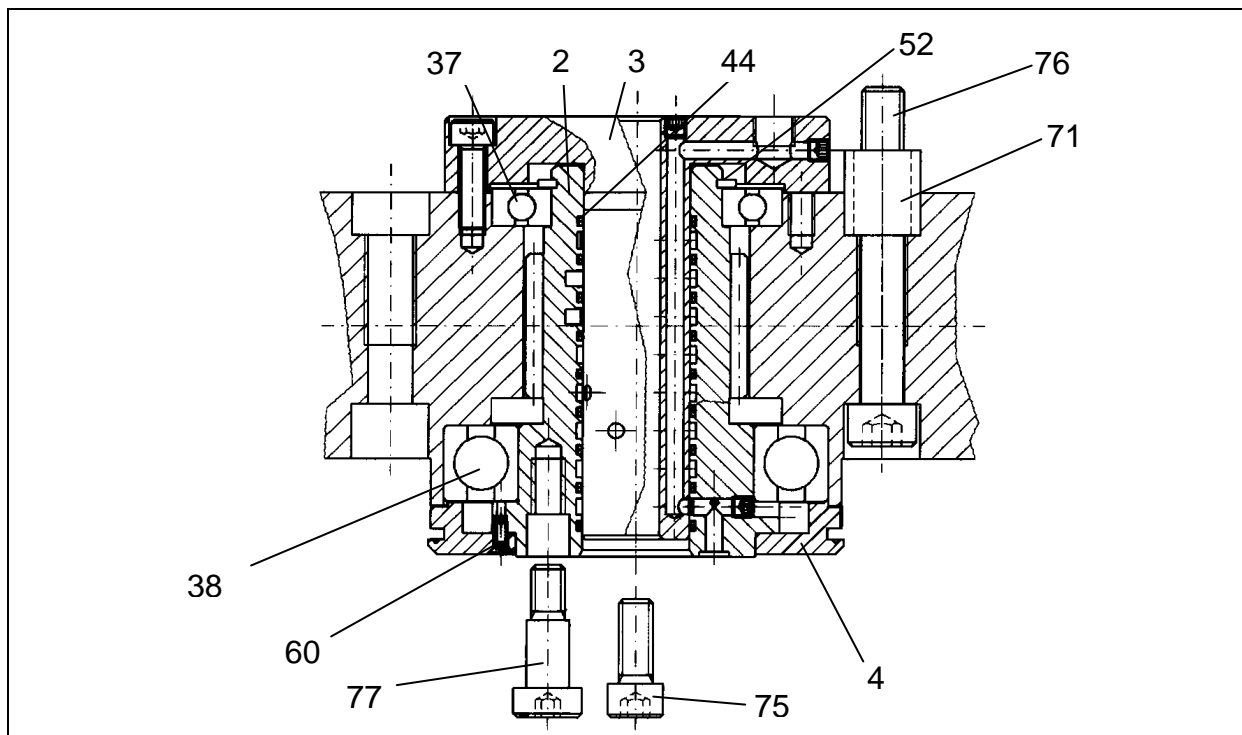


Fig. 8 section illustration

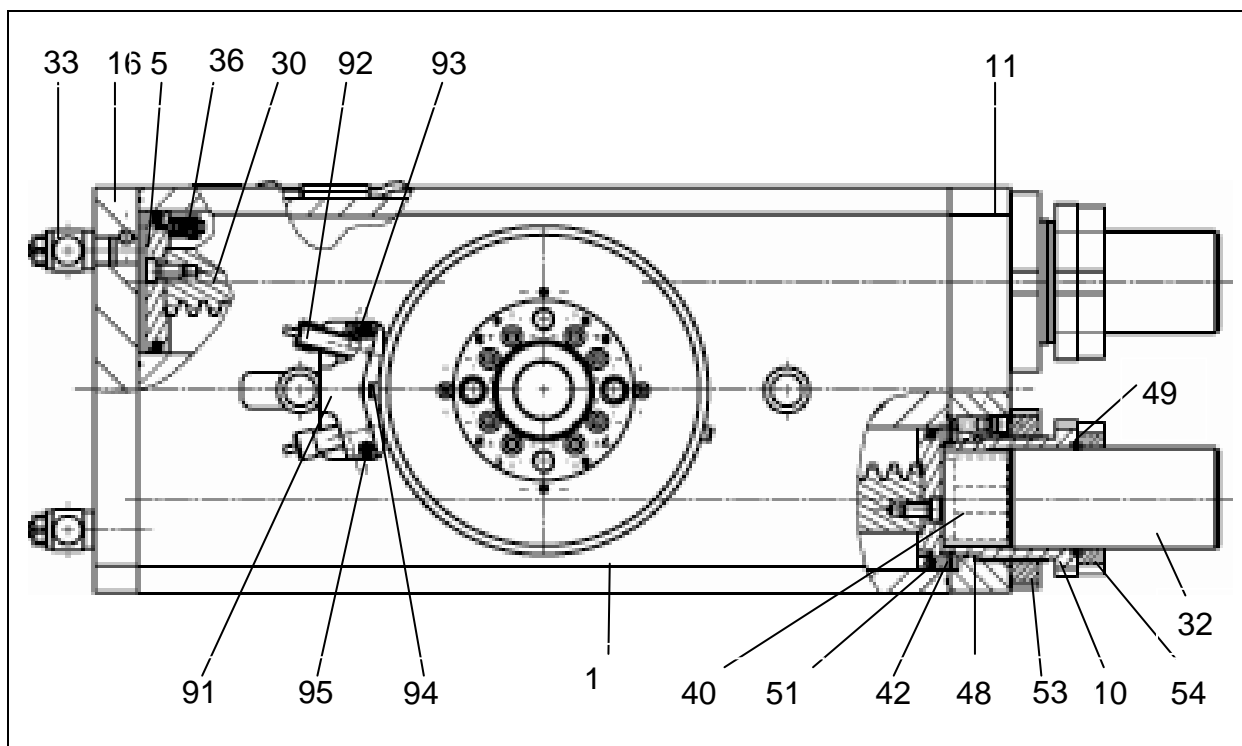


Fig. 9 Version A

13 Spare parts

(For item see chapter 12 Assembly drawing, page 28)

Pos.	Ident.-Nr.	amount	description
1	5511023	1	Housing
2	5511024	1	Pinion
3	5511025	1	Distributor flange
4	5511026	1	Cam holder ring
5	5511027	4	Piston
10	5520650	2	Adjustment sleeve
11	5511033	1	Cover
16	5511036	1	Cover A
30	5511035	2	Rack
31	9659012	8	Locking screw R1/8"
32*	9955215	2	Shock absorber WP-M 1,5X2-166
33***	9937258	2	Throttle check valve G1/4"
34	9937266	4	Guide sleeve SINTB 30/35x20
36	9936899	1	Ring magnet 3,1x10x5
37	9632008	1	Deep groove ball bearings 6011 2RS1 55x90x18
38	9937259	1	Deep groove ball bearings 6016 2RS1 80x125x22
40*	9612662	4	Cylinder gasket 63x53x4.2 Z8
40**		4	Cylinder gasket 63x53x4.2 Z8
42*	9935792	4	O-ring DIN 3771 NBR 71,5x1,5
42**		4	O-ring DIN 3771 NBR 71,5x1,5
44*	9611146	9	O-ring DIN 3771 NBR 44,17x1,78
44**		9	O-ring DIN 3771 NBR 44.17x1.78
45*	9611090	1	O-ring DIN 3771 NBR 126,72x1,78
45**		1	O-ring DIN 3771 NBR 126,72x1.78
46*	9611228	4	O-ring DIN 3771 NBR 7x1,5
46**		4	O-ring DIN 3771 NBR 7x1,5
47**		12	O-ring DIN 3771 NBR 6x1,5
48*	9611118	2	O-ring DIN 3771 NBR 50x1,5
48**		2	O-ring DIN 3771 NBR 50 x1,5
49*	9611043	2	O-ring DIN 3771 NBR 36,09x3,53

Pos.	Ident.-Nr.	amount	description
49**		2	O-ring DIN 3771 NBR 36,09x3,53
51*	9937260	2	Safety ring DIN 471 A 50x2
52	9620013	1	Safety ring DIN 471 A 55x2
53	9937261	2	Locknut DIN 1804 M55x1,5
54	9955888	2	Locknut DIN 1804 M45x1,5
55	99420210	26	Setscrew DIN EN ISO 4026/A2
56	9670521	14	Setscrew DIN EN ISO 4026/A2
57	9937262	1	Spacer 6x12
58	9650023	1	Fitting disc DIN 988
59	9650427	1	Fitting disc DIN 988
60	9664501	2	Countersunk screw DIN EN ISO 10642/A2 M3x8
61	9936469	1	Screw DIN EN ISO 4762/A2 M2.5x20
62	9660432	2	Screw DIN EN ISO 4762/A2 M8x20
63	9935460	6	Screw DIN EN ISO 4762/A2 M10x20
64	9661012	4	Screw DIN 7984/8.8 M6x12
65	9660450	6	Screw DIN EN ISO 4762/A2 M10x30
70***	9939382	2	Centering sleeve
71***	9939383	2	Centering sleeve
73***	9611081	16	O-ring DIN 3771 NBR 6x1,5
73**		16	O-ring DIN 3771 NBR 6x1.5
74***	9611055	2	O-ring DIN 3771 NBR 8x2
74**		2	O-ring DIN 3771 NBR 8x2
75***	9937263	2	Screw DIN EN ISO 4762/A2 M10x25
77***	9937265	2	Fitting screw 12.9 12 M10x20
78***	9659004	2	Locking screw DIN 908 R1/4"
79***	9201051	2	Hook wrench 68-75
99	5511 038	1	Accessories pack
A	0370702	1	Seal kit

Tab. 8

* Replace spare parts for maintenance: not included in gasket set (A)

** Replace spare parts for maintenance: Order gasket set (A).

*** Contain in the accessories pack (99).

14 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.
Spann- und Greiftechnik
Bahnhofstr. 106 – 134
74348 Lauffen/Neckar, Germany

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: Pneumatic Swivel Unit / SRU-plus 63
ID number: 0354801; 0354841; 0354851

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:

DIN 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 in electronic form 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, June 2016

Signature: see original declaration

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

