

# **Collision and Overload Sensor Type OPS +63 to +201 Assembly and Operating Manual**



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Translation of the original manual

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

Table 1

## 1.3 Applicable documents

You can find the following documents on our homepage:

Document	Purpose
Catalog	Technical data or application parameters of the module and information on accessories. The last version is always valid.
General terms of business	Including notes on the warranty.

Table 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
 <b>DANGER</b>	Dangers for persons. Nonobservance causes death or serious injuries.
 <b>WARNING</b>	Dangers for persons. Nonobservance can cause death or serious injuries.
 <b>CAUTION</b>	Dangers for persons. Nonobservance can cause slight injuries.
 <b>NOTICE</b>	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.
	Component/spare part represented in a graphic.
	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.

Table 3

## **2 Basic safety notes**

### **2.1 Intended use**

The OPS is not a safety component. The module has been designed as an anti-collision and overload sensor unit with a switch-off function to warn the tool on the flange side and the robot on the OPS side from damage.

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 5, page 11 and catalog).
- ➔ Make sure that the environment is clean and the ambient temperature corresponds to the specifications per the catalog. Observe the maintenance intervals (see chapter 9.1, page 20).
- ➔ 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 2 "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 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.

### **Danger of injury due to spring forces!**

Beim Modul ist der Kolben mit einer Feder montiert, daher stehen Teile unter Federspannung.

- ➔ Modul nur von geschultem Personal zerlegen lassen.

### 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 intervals (see chapter 9.1, page 20)
- 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.

### 4 Scope of delivery

The scope of delivery includes:

- Collision and Overload Sensor OPS in the ordered model.
- Enclosed pack (Centering pins and right-angle coupling)

The following accessories are required for the module:

- Adapter plate
- ➔ Order accessories separately.
- ➔ For additional accessories, see catalog.

## 5 Technical Data

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

Type	+63	+81	+101	+125	+161	+201
weight [kg]	0,3	0,6	1,2	3,5	4,6	7,7
ambient temperature						
min. [°C (°F)]	5	5	5	5	5	5
max. [°C (°F)]	60	60	60	60	60	60
Max. payload [kg]	2	4	8	13	20	55
Axial deflection [mm]	10	12	14	16	18	20
Angular deflection [°]	14	14	16	16	16	18
Rotational deflection [°]	360	360	360	360	360	360
IP rating*	54	54	54	54	54	54
Noise emission						
in normal operation [dB(A)]	≤70	≤70	≤70	≤70	≤70	≤70
In case of deflection due to collision/overload [dB(A)]	≥70	≥70	≥70	≥100	≥100	≥100
pressure medium	compressed air, standard for quality of the compressed air according to ISO 8573-1: 6 4 4					
Operating pressure [bar]	1-6	1-6	1-6	1-6	1-6	1-6
Capacity of pressure tank [l]	0,03	0,05	0,08	0,14	0,27	0,53
Rated operating voltage UE [V DC]	24	24	24	24	24	24
Rated current input IE [mA]	0 / <8	0 / <8	0 / <8	0 / <8	0 / <8	0 / <8

Table 4

\*The OPS has protection provided ex-works in accordance with DIN 40050/ICE529/VDE0470/EN60529.

### Note

The unit is designed to withstand max. 10,000 collisions or overloads. This specification is dependent on the intensity (applied force) of the incident in question.

➔ Observe the maintenance intervals.  
(see chapter 9 from page 20)

## 6 Assembly

### 6.1 Mechanical connection

**⚠ WARNING**

Risk of injury when the machine/system moves unexpectedly!

➔ Switch off power supply.

**Check the evenness of the bolting surface**

The values relate to the entire bolting surface.

Edge length [mm]	Permissible unevenness [mm]
< 100	< 0,02
> 100	< 0,05

Table 5 Requirements for levelness of the bolting surface

#### Mounting

The OPS is mounted on the machine side and on the tool side:

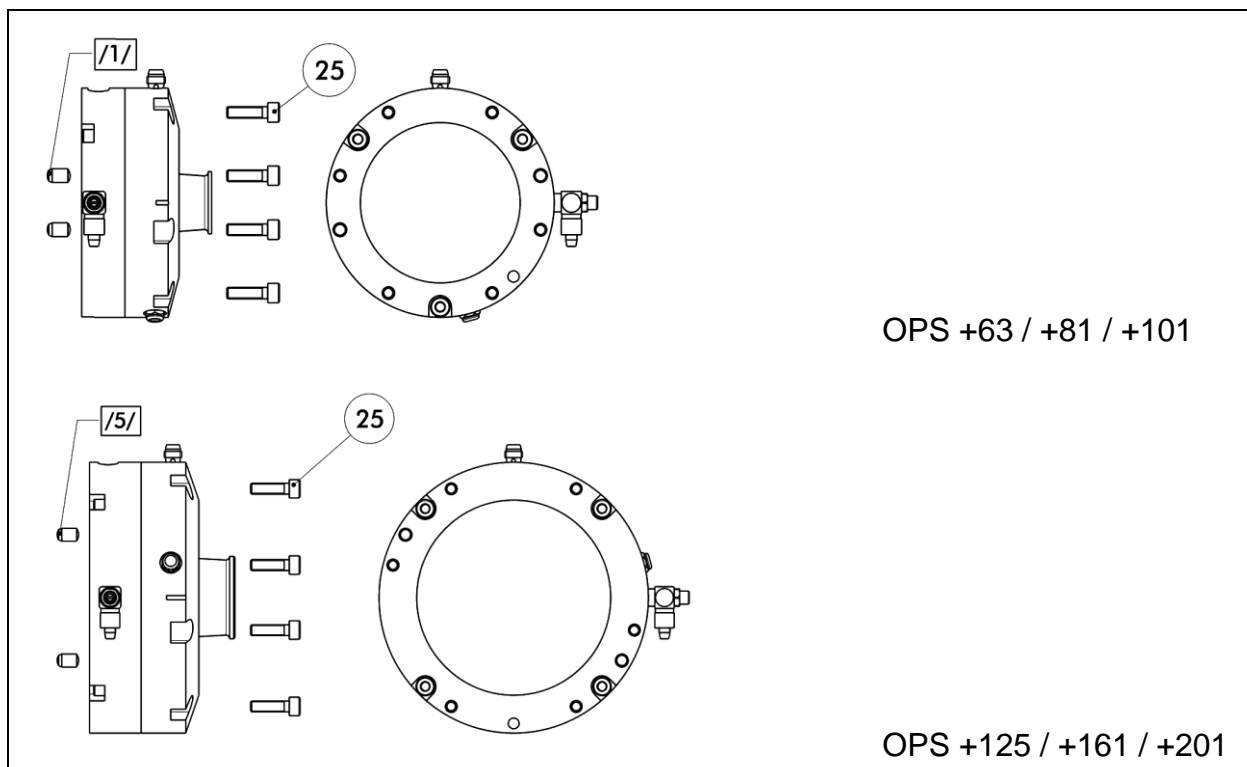


Figure 1 Machine-side joining operation

Item	Mounting	+63	+81	+101	+125	+161	+201
/1/	Bore hole for cylindrical pins (ISO 8734)	2x Ø3 / 6 deep	2x Ø 4 / 6 deep	2x Ø5 / 10 deep	-	-	-
/5/	Bore hole for cylindrical pins (ISO 8734)	-	-	-	2x Ø6 / 10 deep	2x Ø8 / 13 deep	2x Ø8 / 13 deep
25	Bore hole for bolts	3x Ø4,5	3x Ø4,5	6x Ø5,5	6x Ø5,5	6x Ø9,0	6x Ø9,0

Table 6 Mounting material (provided by customer)

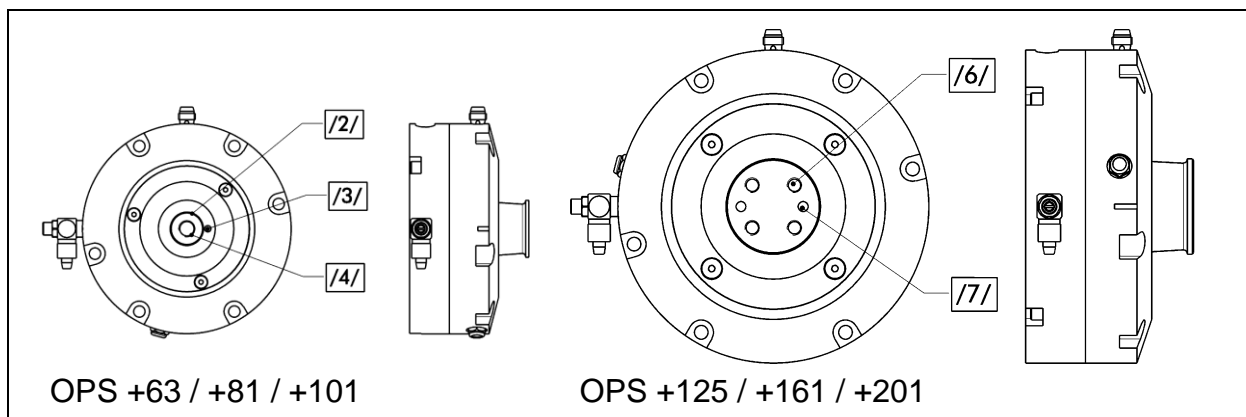


Figure 2 Tool-side joining operation

Item	Mounting	+63	+81	+101	+125	+161	+201
/2/	Fitting	Ø10	Ø12	Ø15	-	-	-
/3/	Bore hole for cylindrical pins (ISO 8734)	1x Ø1,5 / 4,5 deep	1x Ø2 / 6,5 deep	1x Ø3 / 7 deep	-	-	-
/4/	Threaded hole	1x M5 / 17,5 deep	1x M6 / 22,5 deep	1x M8 / 21,5 deep	-	-	-
/6/	Threaded hole	-	-	-	4x M6 / 9 deep	4x M8 / 18 deep	4x M10 / 20 deep
/7/	Bore hole for cylindrical pins (ISO 8734)	-	-	-	2x Ø4 / 6 deep	2x Ø10 / 16 deep	2x Ø10 / 16 deep

Table 7 Mounting material (provided by customer)

➔ For further dimensions, see the module catalog data sheet.

**Note**

Tighten all bolts and nuts with a tightening torque in compliance with DIN standards and secure with Loctite No. 242 E.

## 6.2 Air connection

### **WARNING**

**Risk of injury when the machine/system moves unexpectedly!**

➔ Switch off power supply.

### Note

- The compressed air must be filtered (10 µm), dry and unlubricated.
- Observe the requirements for the air supply (see chapter 5 page 11).

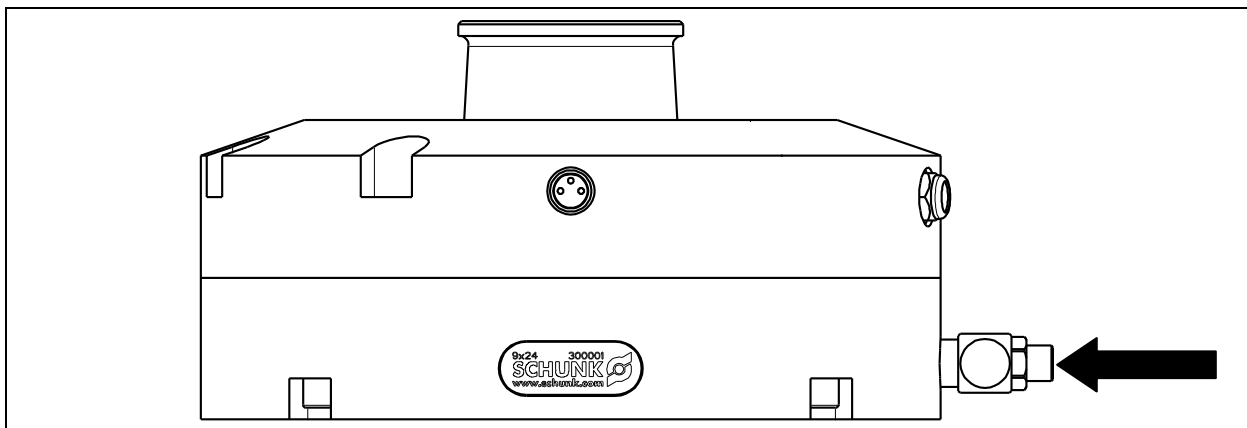


Figure 3 air connection

- ➔ Connect compressed air hose  $\varnothing 6$  to the one-way flow control valve. (See arrow in figure).

## 6.3 Electrical connection

### 6.3.1 Electrical Parameters

**Note**

- When connecting inductive loads, a recovery diode must be connected parallel to the load.
- Observe the correct polarity for the supply voltage. The electronics are temporarily safeguarded against polarity reversal.

Parameter	Value
Rated operating voltage UE [V DC]	24
Operating voltage UB [V DC]	22...26
Load resistance RL [kΩ]	≥ 2
Rated current input IE [mA] tripped/locked when RL = ∞	0 / <8
Nominal output voltage [V] UA when RL = ∞	≥ 23,2
Nominal output voltage [V] UA when RL ≥ 2kΩ	≥ 21
Nominal output current [A] UA when RL ≥ 2kΩ	≤ 12
With reverse polarity protection	yes
Short-circuit-proof	yes
Ambient temperature Ta [°C]	0 ... 60

*Table 8 Specifications for OPS +63 to OPS +201*

### 6.3.2 Wiring diagram

**⚠ WARNING**

**Risk of injury when the machine/system moves unexpectedly!**

➔ Switch off power supply.

**Note**

- Observe the maximum electrical energy values (see chapter 5 page 11).

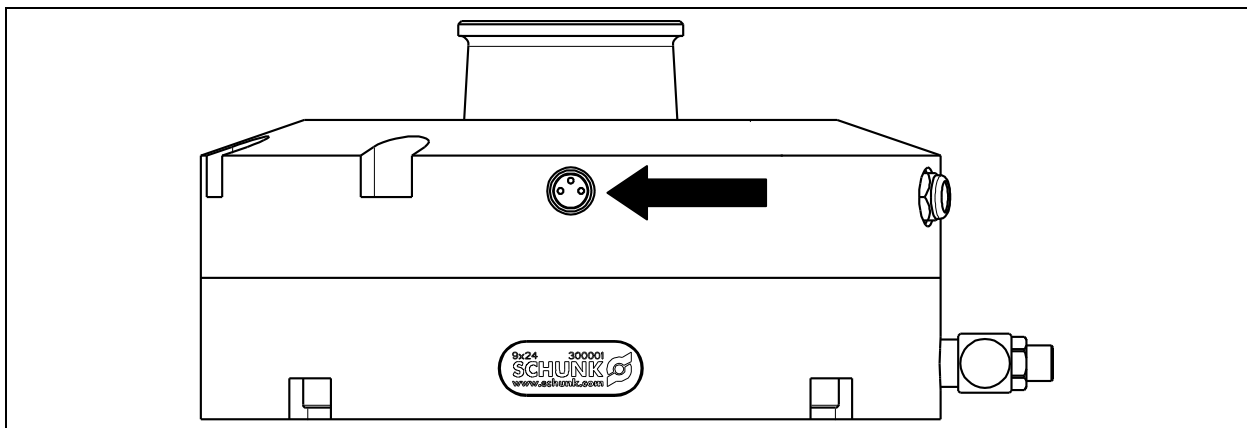


Figure 4

1. Connect plug for electrical signals. (See arrow in figure).
2. Screw the coupling ring tight.

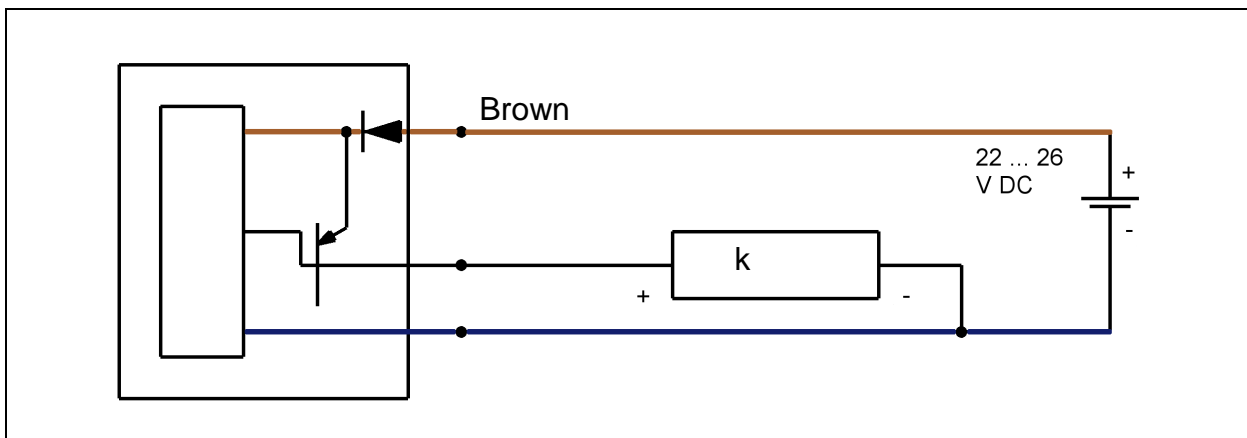


Figure 1 Output wiring diagram



## 7 Notes on commissioning and operation

### One-way flow control valve

The pressure in the OPS is maintained for a short period of time when a one-way flow control valve is used:

1. Open the one-way flow control valve by turning the set screw counter-clockwise
2. Adjust the operating pressure (1-6 bar). Observe the technical data (see catalog data sheet and chapter 5 page 11).

 <b>DANGER</b>
<b>There is a risk of damage to hearing if the OPS has to deflect in case of collisions or system overload.</b>
→ Personnel must be provided with suitable protective equipment (e.g. protective earplugs).

### Note

The following must be observed when the OPS is tripped:

→ When deflected, air constantly flows out of the OPS. If you wish to prevent this from happening, the compressed air must be diverted to an external valve during this time.

→ Dirt deposits

The following must be observed when switching off the automated system/machine:

→ The air supply of the OPS must be maintained, otherwise the OPS will deflect. Alternatively, position the OPS so that deflection is not possible. For example, the OPS can be secured using a holding device or by being put in a vertical position.

## 8 Troubleshooting

### 8.1 OPS does not deflect

Possible cause	Corrective action
One-way flow control valve not open when changes made to operating pressure.	➔ Open the one-way flow control valve. Observe the notes in chapter 7 page 17.
Operating pressure exceeded or not reached	➔ Check the air supply. (see chapter 6.2, page 14).
A component is broken, e.g. due to extreme overloading	➔ Replace parts or send module with repair order to SCHUNK. ➔ Make sure that the module was only used in the context of its defined application parameters (see chapter 5, page 11 or Catalog).

Table 9

### 8.2 OPS does not lock

Possible cause	Corrective action
Dirt deposits in the piston chamber	➔ Please send the module with a repair order to SCHUNK or disassemble it yourself (see chapter 9.2, page 20) and clean module.
Piston seal defective	➔ Disassemble the module (see chapter 9.2, page 20) and replace the piston seal or send the module to SCHUNK together with a repair order.
Operating pressure exceeded or not reached	➔ Check the air supply. (see chapter 6.2, page 14).
Bolting surface not sufficiently level	➔ Check the levelness of the bolting surface. (see chapter 6.1, page 12).
Components have come loose e.g. due to extreme overloading	➔ Replace parts or send module with repair order to SCHUNK. ➔ Make sure that the module was only used in the context of its defined application parameters (see chapter 5, page 11 or Catalog).

Table 10

### 8.3 No electrical signal present

Possible cause	Corrective action
Electrical outputs not connected correctly	➔ Check the plug connections and wiring diagram. (see chapter 6.3.2 page 16)
Installed, electrical signal transmitter defective (printed circuit board)	➔ Please get in touch with your SCHUNK contact person.
Cable breakage	➔ Replace the cable.
Dirty contact surfaces	➔ Please get in touch with your SCHUNK contact person.

Table 11

## 9 Maintenance and care

### 9.1 Maintenance intervals

Type	+63	+81	+101	+125	+161	+201
Interval [Deflection]	10.000	10.000	10.000	10.000	10.000	10.000

Table 12

### 9.2 Cleaning

- ➔ Clean the OPS carefully using a soft cloth.
- ➔ Do not use solvents.
- ➔ Once a year, clean the contact surfaces of the boards using a soft cloth. Do not use solvents.

### 9.3 Functional test

It is recommended to perform a functional test once a month:

#### Checking the function of the signal transmitters

1. Switch off the air supply to the module.
2. Raise and lower the piston several times.

The signal transmitters must function without any problems. If the piston chamber is contaminated, this can cause fluctuations in the signal:

- ➔ Disassemble the module (see chapter 9.5 page 21) and clean the contacts carefully using a soft cloth.
- ➔ If the installed, electronic signal transmitter is defective, send the OPS to SCHUNK together with a repair order.

## 9.4 Lubricants/Lubrication points (basic lubrication)

### **! NOTICE**

**Lubricants impair the conductance of the sealing ring (12). This results in interruptions to the signal transmission.**

➔ Do not grease the sealing ring (12).

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

➔ During maintenance, treat all grease areas with lubricant.

Lubrication points	Lubricant
all seal, <b>except sealing ring (12)</b>	HLT 2

Table 13

## 9.5 Disassembly of the module

### Removing the module from the machine/automated system

- ✓ The machine/automated system is in maintenance mode.
- ✓ At first, maintain the compressed air supply to the OPS.
  1. Remove the tool from the OPS.
  2. Remove the adapter plate/flange on the tool side.
  3. Remove the OPS from the machine/automated system.
  4. Switch off the compressed air supply to the OPS and carefully remove the compressed air line.

The OPS is disassembled as follows:

(Item see chapter 10 "Assembly drawing", page 24)

1. Undo the screws (20) and the clamping plate (7).
2. Remove the sealing ring (Item 9).

**Note**

Take care not to lose the spring (11), as this is installed under low initial tension.

3. Unscrew screw (22) and remove the cover (2) from the housing (1).
4. Remove the piston (4).
5. Unscrew and remove the screws (19) and remove the clamping ring (6).
6. Remove the sealing ring (12) from the groove.

**Note**

The bolts (8) must not be removed, otherwise the unit will need to be readjusted.

The printed circuit board (91) is screwed in tight and must not be removed. If the circuit board is defective, send it back to the production facility together with a repair order.

## 9.6 Servicing and assembling the module

(Item see chapter 10 "Assembly drawing", page 24)

**Servicing**

- ➔ Clean all parts thoroughly and check for damage and wear.
- ➔ Replace all seals/ wearing parts.
  - The wearing parts are listed in the spare parts list (see chapter 11, from page 25).
  - The seals are in the sealing kit.  
The ID number of the sealing kit is in the spare parts list (see chapter 11, from page 25).
- ➔ Treat all grease areas with lubricant (see chapter 9.4, page 21).

**Assembling**

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 as specified in DIN standards.
- ➔ Take care not to damage the seals during assembly. Do not use any pointed or sharp objects when mounting the sealing ring (12) in the groove of the piston (4).
- ➔ Take care not to lose the spring (11).
- ➔ Adjust/align the OPS before pressurizing it. The bolts (8) must be centered above the rings (5)/ball sockets of the piston (4). (see chapter 10 "Assembly drawing", page 24)

## 10 Assembly drawing

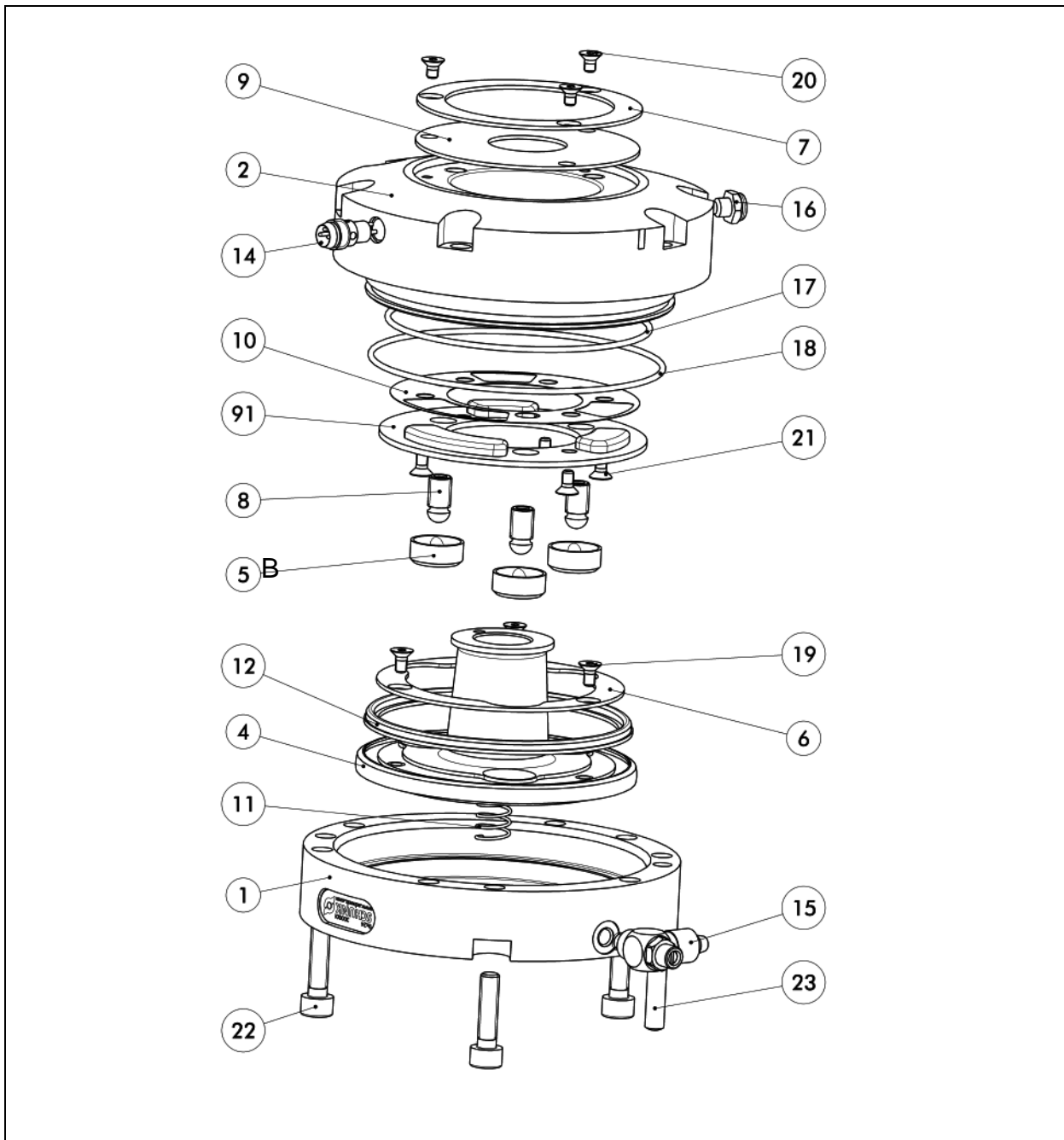


Figure 5 Assembling des OPS

\* Only OPS +63 or OPS +101 available.



## 11 Spare parts

(Item see chapter 10 "Assembly drawing", page 24)

### 11.1 OPS +63 (ID-No. 321 230)

Item	ID-No.	Quantity	Designation
1	5516 581	1	Housing
2	5516 582	1	Cover
3	5516 583	1	Piston with ring
4*	-	1	Piston
5*	-	3	Ring
6	5516 585	1	Clamping ring
7	5516 586	1	Clamping plate
8	5516 588	3	Bolt
9**	-	1	Sealing ring NBR 65
10	9942 648	1	Insulating foil
11	9618 283	1	Compression spring
12**	-	1	Sealing ring NBR 85
14	9942 576	1	Device plug, 3-pin
15	9936 171	1	Hose connection M5
16	9938 298	1	Sound absorber M5
17**	-	1	O-ring DIN3771 NBR70 39.00 x 1.00 mm
18**	-	1	O-ring DIN3771 NBR70 45.00 x 1.00 mm
19	9942 034	4	Countersunk screw M2 x 5 mm/A2
20	9664 028	4	Countersunk screw M2.5 x 6 mm/A2
21	9664 019	4	Countersunk screw M2.5 x 6 mm/10.9
22	9938 883	3	Screw M3 x 18 mm/A2
23	9682 062	1	Cylindrical pin DIN6325 3.0 M6 x 16 mm
24	0301 502	1	Angular plug with 5 m cable M8 x 1
91	9942 527	1	Printed circuit board
A	5517 033	1	Sealing kit

Table 14

\* Individual components are adapted to each other: order piston with ring (3).

\*\* Replace wearing part during maintenance: order sealing kit (A).

## 11.2 OPS +81 (ID-No. 321 231)

Item	ID-No.	Quantity	Designation
1	5516 575	1	Housing
2	5516 576	1	Cover
3	5516 577	1	Piston with ring
4*	-	1	Piston
5*	-	3	Ring
6	5516 579	1	Clamping ring
7	5516 580	1	Clamping plate
8	5501 020	3	Bolt
9**	-	1	Sealing ring NBR 65
10	9942 649	1	Insulating foil
11	9618 283	1	Compression spring
12**	-	1	Sealing ring NBR 85
14	9942 576	1	Device plug, 3-pin
15	9936 171	1	Hose connection M5
16	9938 298	1	Sound absorber M5
17**	-	1	O-ring DIN3771 NBR70 52.00 x 1.50 mm
18**	-	1	O-ring DIN3771 NBR70 62.00 x 1.50 mm
19	9942 034	4	Countersunk screw M2 x 5 mm/A2
20	9937 174	4	Countersunk screw M3 x 5 mm/A2
21	9664 000	4	Countersunk screw M3 x 6 mm/10.9
22	9660 415	3	Screw M4 x 20 mm/A2
23	9682 054	1	Cylindrical pin DIN6325 4.0 M6 x 20 mm
24	0301 502	1	Angular plug with 5 m cable M8 x 1
91	9942 528	1	Printed circuit board
A	5517 034	1	Sealing kit

Table 15

\* Individual components are adapted to each other: order piston with ring (3).

\*\* Replace wearing part during maintenance: order sealing kit (A).

### 11.3 OPS +101 (ID-No. 321 232)

Item	ID-No.	Quantity	Designation
1	5516 362	1	Housing
2	5516 363	1	Cover
3	5516 364	1	Piston with ring
4*	-	1	Piston
5*	-	3	Ring
6	5516 366	1	Clamping ring
7	5516 367	1	Clamping plate
8	5501 021	3	Bolt
9**	-	1	Sealing ring NBR 65
10	9942 650	1	Insulating foil
11	9618 283	1	Compression spring
12**	-	1	Sealing ring NBR 85
14	9942 576	1	Device plug, 3-pin
15	9936 171	1	Hose connection M5
16	9938 298	1	Sound absorber M5
17**	-	1	O-ring DIN3771 NBR70 85.00 x 1.50 mm
18**	-	1	O-ring DIN3771 NBR70 94.97 x 1.78 mm
19	9938 292	4	Countersunk screw M3 x 6 mm/A2
20	9937 174	4	Countersunk screw M4 x 8 mm/A2
21	9664 000	4	Countersunk screw M4 x 8 mm/10.9
22	9660 013	3	Screw M5 x 25 mm/A2
23	9682 018	1	Cylindrical pin DIN6325 5.0 M6 x 30 mm
24	0301 502	1	Angular plug with 5 m cable M8 x 1
91	9942 450	1	Printed circuit board
A	5517 035	1	Sealing kit

Table 16

\* Individual components are adapted to each other: order piston with ring (3).

\*\* Replace wearing part during maintenance: order sealing kit (A).

## 11.4 OPS +125 (ID-No. 321 233)

Item	ID-No.	Quantity	Designation
1	5516 921	1	Housing
2	5516 922	1	Cover
4	5516 923	1	Piston with ball socket
6	5516 924	1	Clamping ring
7	5516 925	1	Clamping plate
8	5516 926	3	Bolt
9**	-	1	Sealing ring NBR 65
10	9942 709	1	Insulating foil
11	9905 360	1	Compression spring
12**	-	1	Sealing ring NBR 85
14	9942 576	1	Device plug, 3-pin
15	9936 171	1	Hose connection M5
16	9938 298	1	Sound absorber M5
17**	-	1	O-ring DIN3771 NBR70 85.00 x 1.50 mm
18**	-	1	O-ring DIN3771 NBR70 94.97 x 1.78 mm
19	9938 292	4	Countersunk screw M3 x 6 mm/A2
20	9664 500	4	Countersunk screw M4 x 8 mm/A2
21	9664 001	4	Countersunk screw M4 x 8 mm/10.9
22	9660 416	3	Screw M5 x 25 mm/A2
23	9682 309	1	Cylindrical pin DIN6325 5.0 M6 x 30 mm
24	0301 502	1	Angular plug with 5 m cable M8 x 1
91	9942 713	1	Printed circuit board
A	5517 036	1	Sealing kit

Table 17

\* Individual components are adapted to each other: order piston with ring (3).

\*\* Replace wearing part during maintenance: order sealing kit (A).

## 11.5 OPS +161 (ID-No. 321 234)

Item	ID-No.	Quantity	Designation
1	5516 817	1	Housing
2	5516 818	1	Cover
4	5516 821	1	Piston with ball socket
6	5516 819	1	Clamping ring
7	5516 820	1	Clamping plate
8	5510 040	3	Bolt
9**	-	1	Sealing ring NBR 65
10	9942 665	1	Insulating foil
11	9905 360	1	Compression spring
12**	-	1	Sealing ring NBR 85
14	9942 576	1	Device plug, 3-pin
15	9937 152	1	Hose connection G1/8
16	9938 299	1	Sound absorber G1/8
17**	-	1	O-ring DIN3771 NBR70 110.00 x 1.50 mm
18**	-	1	O-ring DIN3771 NBR70 126.72 x 1.78 mm
19	9938 292	4	Countersunk screw M3 x 6 mm/A2
20	9664 500	4	Countersunk screw M4 x 8 mm/A2
21	9664 001	4	Countersunk screw M4 x 8 mm/10.9
22	9907 488	3	Screw M6 x 35 mm/A2
23	9682 096	1	Cylindrical pin DIN6325 3.0 M6 x 30 mm
24	0301 502	1	Angular plug with 5 m cable M8 x 1
91	9942 680	1	Printed circuit board
A	5517 037	1	Sealing kit

Table 18

\* Individual components are adapted to each other: order piston with ring (3).

\*\* Replace wearing part during maintenance: order sealing kit (A).

## 11.6 OPS +201 (ID-No. 321 235)

Item	ID-No.	Quantity	Designation
1	5516 826	1	Housing
2	5516 825	1	Cover
4	5516 824	1	Piston with ball socket
6	5516 828	1	Clamping ring
7	5516 827	1	Clamping plate
8	5510 617	3	Bolt
9**	-	1	Sealing ring NBR 65
10	9942 666	1	Insulating foil
11	9618 285	1	Compression spring
12**	-	1	Sealing ring NBR 85
14	9942 576	1	Device plug, 3-pin
15	9937 152	1	Hose connection G1/8
16	9938 299	1	Sound absorber G1/8
17**	-	1	O-ring DIN3771 NBR70 148.00 x 2.00 mm
18**	-	1	O-ring DIN3771 NBR70 165.00 x 2.00 mm
19	9664 016	4	Countersunk screw M4 x 6 mm/A2
20	9936 322	4	Countersunk screw M5 x 10 mm/A2
21	9664 018	4	Countersunk screw M5 x 10 mm/10.9
22	9907 488	3	Screw M6 x 35 mm/A2
23	9682 096	1	Cylindrical pin DIN6325 6.0 M6 x 30 mm
24	0301 502	1	Angular plug with 5 m cable M8 x 1
91	9942 680	1	Printed circuit board
A	5517 037	1	Sealing kit

Table 19

\* Individual components are adapted to each other: order piston with ring (3).

\*\* Replace wearing part during maintenance: order sealing kit (A).

## 12 Translation of original EC declaration of incorporation

In terms of the EC Machinery Directive 2006/42/EC, annex II B

Manufacturer/ distributor            SCHUNK GmbH & Co. KG.  
Spann- und Greiftechnik  
Bahnhofstr. 106 – 134  
74348 Lauffen/Neckar, Germany

We hereby declare that the following product:

**Product designation**            Collision and Overload Sensor  
**Type designation:**                OPS +63...OPS +201  
**ID number:**                         0321 230...0321 235

meets the applicable basic requirements of the Directive **Machinery (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 12100-1            Safety of machines - Basic concepts, general principles for design --  
Part 1: Basic terminology, methodology  
EN ISO 12100-2            Safety of machines - Basic concepts, general principles for design --  
Part 2: Technical principles

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. Michael Eckert, Tel.: +49(0)7133/103-2204

Location, date/signature:    Lauffen, Germany,  
January 2011

ppa. 

Title of the signatory

Director for Development

## 13 EMC test

### Note

The measurement logs and figures are not part of these assembly and operating manual.

	NKL GmbH, D-74549 Wolpertshausen, Birkichstraße 15 Tel.: 0 79 04 / 97 81 – 0 Fax.: 0 79 04 / 97 81 – 50 <a href="http://www.nkl-emv.de">www.nkl-emv.de</a> <a href="mailto:info@nkl-emv.de">info@nkl-emv.de</a>
<b><u>PRÜFBERICHT</u></b>	
Auftraggeber	: SCHUNK GmbH & Co. KG, 74348 Lauffen a.N.
Messort	: NKL GmbH, D-74549 Wolpertshausen
Messdatum	: 24. Mai 2006
Anwesend	: Hr. Scholz und Hr. Häusermann
Prüfer	: R. Irion, Fa. NKL GmbH
Prüfgegenstand	: Kollisions- u. Überlastschutz <b>OPS</b>
Betriebsspannung:	24 VDC
Betriebsart	: <i>s. jeweiliges Prüfprotokoll</i>
Prüfungen	: Störaussendung nach <b>EN 55011:1998 Klasse B</b> Störfestigkeit nach <b>EN 61000-6-2:2005</b>
Prüfergebnis	: Das Gerät erfüllt bereits im Anlieferungszustand die Anforderungen der o.a. Normen.
<p>Dieser Prüfbericht besteht, einschließlich dieser Seite, aus 10 Seiten, davon 9 Seiten Messprotokolle und 2 Bilder. Das Prüfergebnis bezieht sich ausschließlich auf den oben beschriebenen Prüfgegenstand. Dieser Prüfbericht darf ohne unsere schriftliche Genehmigung nur vollständig, aber nicht auszugsweise vervielfältigt werden. Die von uns verwendeten Prüfgeräte unterliegen einer regelmäßigen Kalibrierung.</p>	
<p>Wolpertshausen, den 24. Mai 2006</p> 	
<p>Ralf Irion EMV-Labor</p>	

Figure 2 EMC test report