RSS R1/W1

Receiver RSS R1, Transmitter RSS W1

Superior Clamping and Gripping

SCHUNK®

Imprint

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Technical changes:
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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

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Reg. No. 003496 QM08

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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 Applicable documents [▶ 6] 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.

NOTICE

Material damage!

Information about avoiding material damage.

1.1.2 Applicable documents

- General terms of business *
- Catalog data sheet of the purchased product *

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

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:

- Intended use in 1-shift operation
- Observe the applicable documents Applicable documents [▶ 6]
- Observe the ambient conditions and operating conditions Link Ungebungs- und Einsatzbedingungen

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

The warranty of the battery is valid for 36 months from the delivery date to the production facility if used appropriately.

1.3 Scope of delivery

The scope of delivery includes

- Wireless sensor technology RSS Receiver R1, Transmitter W1 in the version ordered
  - Application with RSS wireless sensor
  - RSS receiver R1 per insert
  - RSS-R-A antenna per insert
  - Repeater box
  - Coaxial cable
  - Relay with changer
  - Battery

1.4 Accessories

The following accessories, which must be ordered separately, are required for the product:

- Spare parts kit (identification number: 1150471)

Contents of spare parts kit, Assembly drawing [▶ 36].

2 Basic safety notes

2.1 Intended use

The RSS radio sensor system is used for transmitting sensor positions using a transmission path from the radio sensor box to the receiver.

NOTE

The RSS radio sensor system has FCC/IC certification and may therefore be operated in the USA or Canada.

- The product may only be used within the scope of its technical data, Technical data [▶ 12].
- 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 use.
- Appropriate use of the product includes compliance with all instructions in this manual.

2.2 Not intended use

- 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

- Make sure that the product is a sufficient size for the application.
- Ensure that the area surrounding the receiver is free of sprayed water and vapors, as well as free of dust from abrasion or processing.
- The transmission path established by the system can be disrupted by exterior influences temporarily or permanently. This means that the conditions of the sensors at the receiver are not updated for the duration of the interference. The interference is only reported by the receiver once the watchdog time has elapsed. It must be ensured that such interference cannot cause damage. The watchdog time must be set for a period of time suitable for the process.
- Within the range of 868.3 MHz, the system does not correspond to the EMC regulation for radio wave penetration immunity. A loss of wireless telegrams may occur in this range. If the antenna is at a distance of over 25 cm from the receiver, the probability of interference increases. The application must therefore be tested before it is integrated into a machine.
- Wireless switching receivers may not be used in conjunction with devices that directly or indirectly serve human, health or life saving purposes or that may endanger people, animals or property when operated! This is the result of the classification of the radio switching receiver in "Class 2 Equipment" according to ETSI EN 301 489-3 V1.4.1 (2202-08) "Specific conditions for short-range devices (SRD)".
- The time lag between measurable telegrams must be at least 50 ms.

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

Using personal protective equipment

Not wearing personal protective equipment while working with the product, may result in dangers that impact the personnel's safety and health.

- While working with the product, observe the health and safety regulations and wear the required personal safety equipment.
- Observe the valid safety and accident prevention regulations.
- In case of sharp edges and corners and rough surfaces, wear protection gloves.
- In case of hot surfaces, wear heat-resistant protection gloves.
- When dealing with hazardous substances, wear protection gloves and goggles.
- In case of moving parts, wear tight protection clothes.

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 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.

2.9 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.

2.10 Notes on particular risks

⚠ DANGER

Danger from electric voltage!

Touching live parts may result in death.

- Switch off the power supply before any assembly, adjustment or maintenance work and secure against being switched on again.
- Only qualified electricians should perform electrical installations.
- Check if de-energized, ground it and hot-wire.
- Cover live parts.

3 Technical data

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

3.1 Technical Data RSS-R1

Receiver	
ID number	0377700
Receiving frequency [MHz]	868.3
Nominal voltage [VDC]	24
Min. voltage [V]	10
Max. voltage [V]	30
Max. switching current per channel [mA]	500
Protocol	Enocean Standard
Short-circuit-proof	yes
IP rating	20
Installation type	Snapping on to DIN track (EN50022)
Dimensions	Assembly drawing
Connection method	CAGE CLAMP® connection 0.08...2.5 mm² WAGO multi-plug system series 722
Housing material	Polycarbonate
Ambient temperature [°C] Min. Max.	 0 55
Storage temperature Min. Max.	 -25 +75
Electromagnetic radiation	EN 61000-6-4
Electromagnetic interference	EN 61000-6-2
Further normalise	ETSI EN 301 489-1 (09/01), ETSI EN 301 489-3 (11/01), ETSI EN 300 220-1 (09/00)
Radio permit EnOcean Receiver RCM 100	CETECOM Test report 2_3041-01-02/02 DAR Test report P0ZNNP1P
Antenna	
ID number	0377730
Assembly	Magnetic base
Cable length [m]	2
Connection at the cable tail	SMA Mini
Use	Connection on receiver RSS-R1

3.2 Technical Data RSS-W1

ID number	0377710
Transmission frequency [MHz]	868.3
Sensor connection	Two-wire to the pressure sensor
Power supply	Lithium battery
Housing material	Aaldit cast resin
Protocol	Enocean Standard
IP rating	67
Ambient temperature [°C] Min. Max.	 0 50
Weight [kg]	0.16
Interference signals	EN 61000-6-4
Radiated interference	EN 61000-6-2
Transmission license EnOcean STM transmitter	FCC UW6-03777V2 Date of Grant: 08/03/2016
	ICC 6601A-03777V2 Date of Grant: 08/04/2016
Assembly type	Screw connection in the chuck
Dimensions [mm] length / width / height	 63 / 54 / 50
Material	42CrMo4V

3.3 Technical data snap-action switch

ID number	0377710
Switching function	Changeover switch (SPDT momentary)
Number of pins	1-pin
Connections	Cable, 300 long
Mechanical lifespan	1E6
Switching capacity IEC	2 A 24 V DC (ohmic load) 4 A 12 V DC (ohmic load)
Contact resistance (when new) [mOhm]	< 50
Insulation resistance (when new) [MOhm]	> 100 (500 V DC)
Flammability	UL 94 HB
Actuators and additional actuators	POM, standard actuator
IP rating	67
Ambient temperature [°C] Min. Max.	 -40 +85
Description of housing	PBTP, pins on right-hand side, 1.5 long

Connection surface	tin-plated
Contact material	Au
Switching force [N]	≤ 1.8
Differential movement max. [mm]	0.4
Rest position (FP) max. [mm]	10.4
Switching point (OP) [mm]	9.4 ±0.3
Permissible end position (TP) [mm]	7.9

3.4 Technical Data Battery

Battery size [A]	2/3
Capacity [Ah]	2.1
Nominal voltage [V]	3.6
Operating temperature range [°C]	- 25 / + 70
Diameter [mm]	16.5
Height [mm]	33.4
Weight [mm]	14.4

Do not charge, short-circuit, crush, dismantle overheat or burn the battery and avoid contact to water.

In case of improper use, there is a risk of fire, explosion and combustion.

3.5 Information on radio link and range

The transmitter sends telegrams with 868.3 MHz to the receiver. The receiver checks the incoming telegrams and uses them to control its outputs.

Other radio systems or systems that emit radio signals may interfere with this transmission path. For reasons of availability, it must be ensured that no radio-emitting systems, such as wireless phones, mobile phones or PCs, are in close proximity to the transmitter. We recommend a minimum distance of one meter straight-line distance between the receiver and the source of interference or the transmitter and the source of interference.

As the radio signals are electromagnetic waves, the signal is dampened on its way to the receiver. This means that the signal strength decreases as the distance between the transmitter and the receiver decreases. The radio range is limited. Particularly for radiation of over 400 MHz, the range is also significantly limited.

It must be noted that the radio range is also reduced by materials between the transmitter and receiver. For practical purposes, this means that the used construction materials in the building and the

equipment (machines) and the surrounding radio sources are important for evaluating the radio range. A few guidelines to help estimate the range:

- Line-of-sight
  - Gen. 30 m range
- Concrete or brick walls
  - Gen. 20 m range
- Steel concrete walls
  - Gen. 10 m range
- Fire protection walls, elevator shafts ...
  - Can be considered as partitioning!
- Turning centers
  - Here, the radio waves penetrate through various slots, especially through the viewing discs in an outward direction. It is difficult to draw an exact conclusion regarding the range here. In our experience, however, a range of at least 3 m can be expected.
- Portable phone at a distance of less than 1 m
  - Range approx. 25 cm

The distance from the receiver to other transmission devices that also emit high-frequency signals (computers, video systems, etc.), should amount to at least 0.5 m.

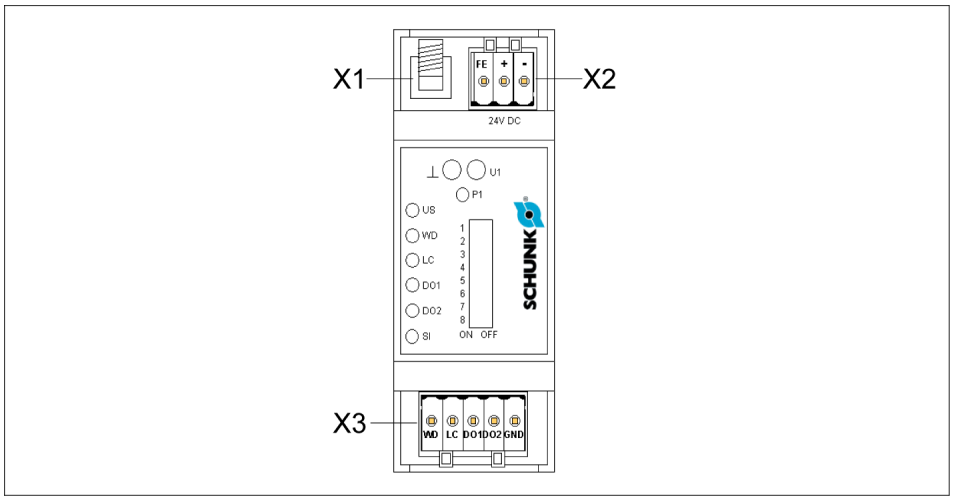
Using the reception strength LED (SI) on our receiver, it is easy to decide whether the system provides a secure transmission at the planned location or whether there is significant interference.

For optimal signal strength, the antenna must be positioned inside the machine.

- Place the antenna in the line-of-sight of the transmitter.
- The antenna must be mounted on a metal sheet that has the minimum dimensions of 25x25 cm.

4 Assembly

4.1 Mount and connect receiver RSS R1



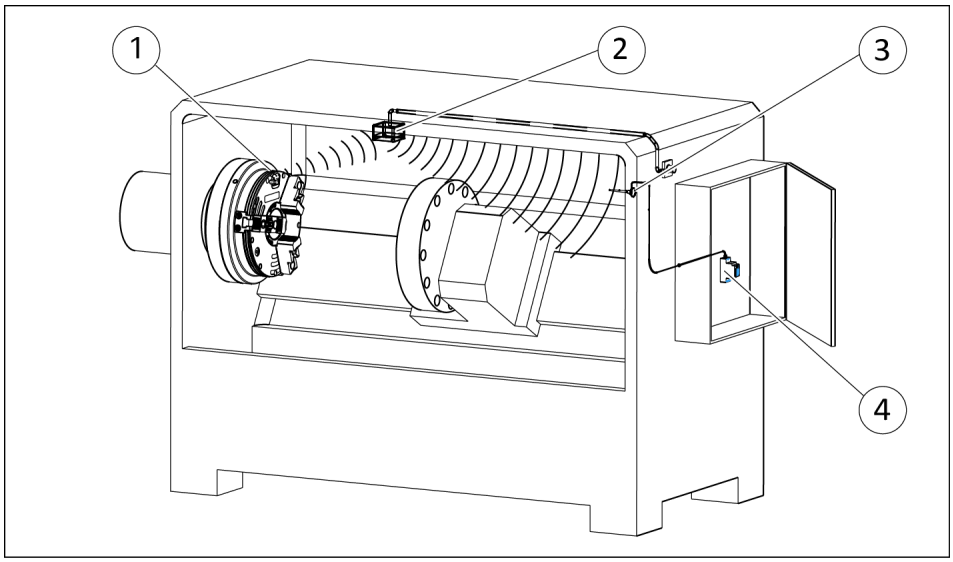
- Secure the receiver in a control cabinet less than 10 m away from the transmitter by fastening on a DIN rail (EN50022).
- Wiring receiver:
  Antenna socket X1:
  - SMA socket for external antenna (SCHUNK recommends the antenna RSS-R-A with ID no. 0377730)
  Plug connector X2:
  - X2.1 FE functional ground
  - X2.2 + supply DC24V +external
  - X2.3 - supply DC24V -external
  Plug connector X3:
  - X3.1 WD watchdog output, high signal if radio OK
  - X3.2 LC limit value output, high signal, if battery OK, i.e. has more than two weeks residual capacity.
  - X3.3 DO1 output 1, if DIP 6 = DO2 inverted.
  - X3.4 DO2 output 2, sensor signal 2, high, if clamping pressure is not sufficient.
  - X3.5 GND absolute dimension for the outputs.

NOTE

For safety reasons, the spindle must be stopped if the clamping stroke pressure is not sufficient (D02=High), or the transmission path is disrupted (WD=Low).

Plug connector: WAGO MULTI CONNECTION SYSTEM Series 722

- Secure the repeater (2) and antenna (3) using the magnetic base in the interior of the machine. For an example of the arrangement, see the following illustration.



Example of the arrangement of the antenna and the repeater

1	Pressure/path control	3	Antenna
2	Repeater	4	Recipient

4.2 Wiring proposition for connection to the system

Version 1

If the system has free digital inputs:

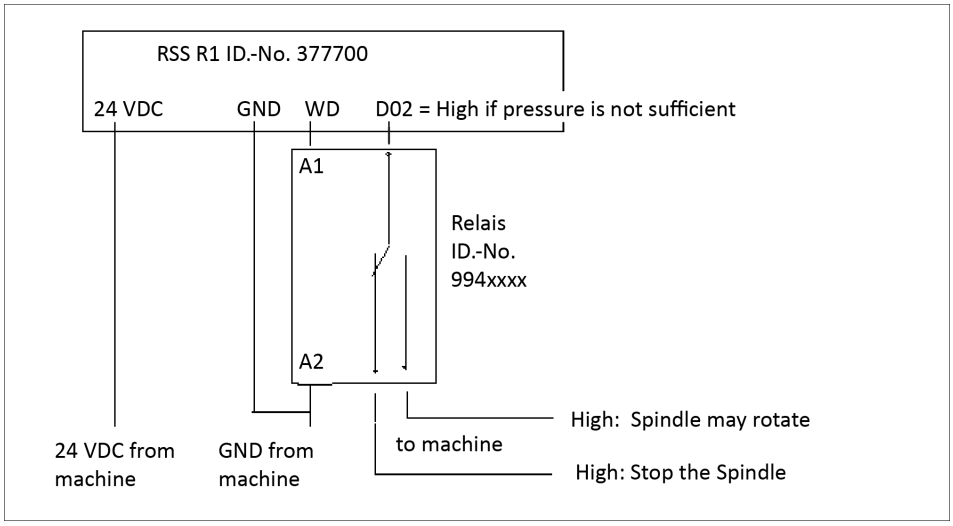
WD to input 1. This must be high, otherwise the radio communication is disrupted.
D02 to input 2. If this is high, the pressure is insufficient.

NOTE

Adjust the software of the system in such a way that the spindle can only turn in one direction, if E1= High and E2= Low. For each cycle, check that E2= High when the chuck is opened. This way, the function of the inputs and outputs can be ensured.

Variant 2

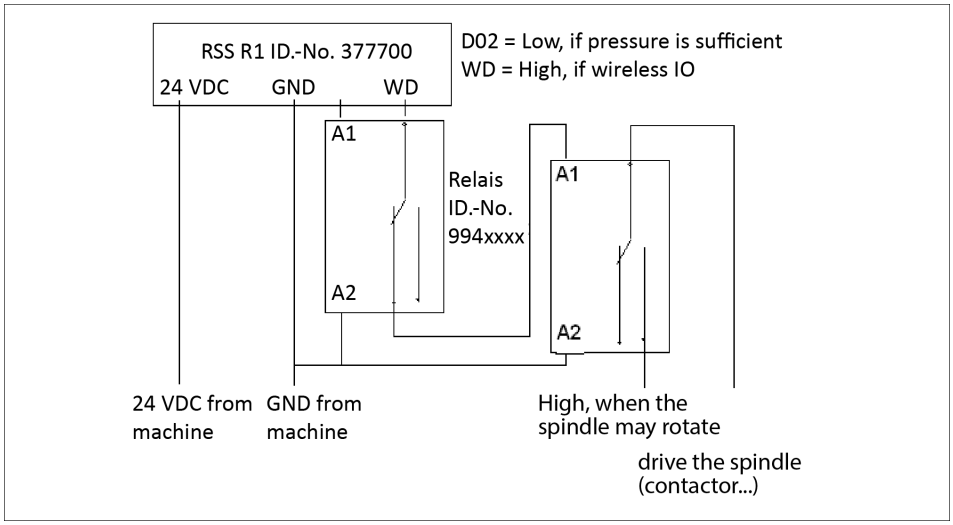
If the system only has the pre-programmed **Spindle release** input:



Circuit diagram - Variant 2

Variant 3

If the machine doesn't have any free inputs:



Circuit diagram - Variant 3

4.3 Mount transmission module RSS-W1 on lathe chuck ROTA TB/TB2/EP with fast stroke (LH)

The system is delivered fully assembled by SCHUNK. The following assembly notes are only required during maintenance work.

- Pressure monitoring kit MATCH-code "DRSS..." (stroke monitoring RSS-W1 8705505) is available

➢ Carefully press insert into the recess of the chuck.

➢ **NOTICE! Observe the specified tightening torque.**
Secure insert with two allen screws (10).

Mounting material and tightening torque

Mounting	RSS-W1
Screw size	M5
Screw quality	10.9
Tightening torque [Nm]	7.5

4.4 Changing the battery

Original spare parts

Use only original spare parts of SCHUNK when replacing spare and wear parts.

Batteries

Batteries are not included in the SCHUNK spare parts kit and must be ordered separately

Position of the item numbers Assembly drawing [▶ 36]

- Spare part kit with the MATCH-code "RSS..." (spare parts kit RSS-W1 1150471) is available
- All pressure chambers of the chuck are depressurized

➢ Remove the screws (10).

➢ Screw in screws of size M6 in the threaded holes of the screws (10).

➢ Pull out the insert (1) using the M6 screws and unscrew the M6 screws.

➢ Remove the screws (15).

➢ Remove disk (4) from the insert (1).

➢ Remove the seal (23).

➢ **NOTICE! Pay attention to the correct polarity when inserting.**
Change the battery.

➢ Clean all parts and check for damage and wear. Replace damaged and worn parts.

➢ Insert seal (23).

➢ Screw the disk (4) onto the insert (1) using the screws (15).

➢ Screw the insert (1) onto the chuck using the screws (10).

5 Start-up

5.1 General information on commissioning

Check for any damage caused during transport before commissioning the product. In the case of mechanical damage, the product may not be put into operation. Read the Assembly and Operating Manual carefully, observe the technical information and the applicable national legal requirements.

NOTE

The components are loaded with electronic components which may be destroyed by electrostatic discharge. When dealing with the components, a good earthing of the surroundings (people, workstation, packaging) must be ensured. Do not touch electrical components.

Installation notes

When installing the assembly group, antenna and antenna cable, it is imperative to avoid proximity to sources with transient interference, e. g., fluorescent tubes with a defective starter, frequency converters and power cables. These may lead to communication interference and in turn erroneous default statuses.

Information on the antenna connection

Only use suitable antennas (e.g. WAGO 758-910 incl. 2.5 m RG174 connection cable and SMA connector; see accessories). The antenna must be mounted on a metal sheet with minimum dimensions of 25 x 25 cm. The antenna and antenna cable must be at least 30 cm away from sources of interference and have at least 35 cm clearance between the side and the next wall. Under no circumstances may sharp kinks be allowed to form in the antenna cable, as this would cause irreversible damage to the antenna cable (RG174 bending radius > 15 mm).

Prerequisites for commissioning

The voltage supply and the external antenna are connected.

5.2 Program transmitter to the receiver

- Switch Dip 1 to 'on' and immediately back to 'off'.
- Completely open and close the chuck twice.
  Or: move the chuck into the position in which the switch is switched.
- Wait 15 seconds.
- The transmitter and receiver should now have been taught in. Check the transmitter by observing whether the WD LED lights up briefly approx. every 10 seconds.
  Carry out the second test by opening and closing the chuck

completely.
The WD LED should light up briefly once each time.
The status should also be displayed on the LED D02.

- Meaning of the LED D02: off, if set path is exceeded.
  Switch closed > safe to operate.
  If the LED lights up: warning, path too small or chuck open.
- If the teach-in procedure was unsuccessful, try again a second time.
  The optimal scenario is for no other RSS system close by to be transmitting during the teach-in phase.
- After commissioning, check the WD LED for flicker.
  If the WD LED flickers, a signal is constantly transmitted from the switch, which causes the battery to discharge faster.
  If this occurs, the switch must be reset.

5.3 Checking position of the antenna

- Observe LED 'SI'. The LED signalizes the current quality of the transmission path. This LED should at least light up or flash orange. Ideally, the LED would either light up or flash green (this condition cannot always be achieved).
- If necessary, position the antenna closer to the transmitter, or position the antenna in such a way so that no solid obstacles lie between the antenna and the transmitter.
- For optimal signal transmission, the antenna and the transmitter in the chuck must be in the line-of-sight. Failing to ensure this may lead to a reduction in signal strength or to loss of the signal.
- The antenna must be mounted on a metal sheet with minimum dimensions of 25 x 25 cm.

5.4 Setting watchdog time on the receiver

Adjust the watchdog time to best suit the process. The transmitter transmits a presence signal every 10 seconds to monitor the transmission path. If no signal is received for longer than the set watchdog time, the "WD" LED lights up until the next signal is received. The "WD" output then signals the down-time of the transmission path through 0 VDC.

The time is preset at approx. 30 seconds. The preset should be an optimal value for radio system applications in the chuck.

- Switch Dip 4 to on.
- Turn the potentiometer clockwise to extend the time. The time set can be determined from the flash rate of the WD LED. When the DIP 8 is switched off, the time varies between 0 and 1 seconds, when the DIP 8 is switched on, the time varies between 0 and 30 seconds.
- Switch DIP 4 to 'off' and leave DIP 8 in the selected position.

6 Functional description

6.1 RSS-R1

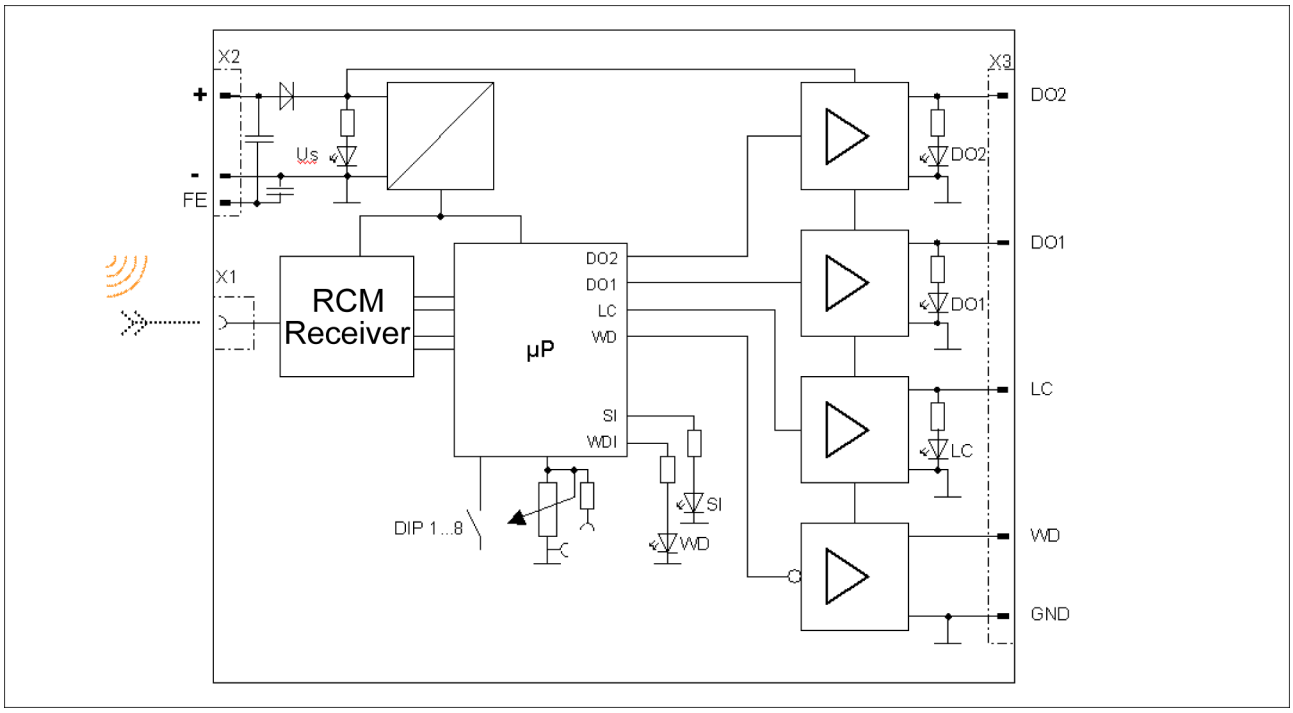
6.1.1 LED

LED (color)	Status	Meaning
US (green)	Off On	Power supply status • no power supply available • 24 V DC OK
WD (red)	Off / flash 0.5 Hz flashing 2 Hz On	Status system check and operating mode • Operating condition active (reception active) 15 ms "flash" indicates reception of a "taught" telegram • Learning state • Missing allocation; sensor must be "taught" • Watchdog activated (not storing), no reception of the 2 data telegrams from the taught-in sensor within the monitoring period (output is inverted!)
LC/BL (yellow)	Off On 0.5 Hz flashing	Status of limit alarm/battery monitoring (MIN detector) • Value below minimum limit output LOW • Limit value not reached output HIGH • Teach-in mode via DIP 3 and DIP 4 active
DO1 (yellow)	Off On	Status Sensor 1 • Status 0 output LOW • Status 1 output HIGH
DO2 (yellow)	Off On	Status Sensor 2 • Status 0 output LOW • Status 1 output HIGH
SI (yellow/red)	Continuous green LED Flashing green LED Continuous orange LED Flashing orange LED Continuous red LED Flashing red LED	Signal strength display Optimal signal Very good signal Good signal Medium signal Poor signal Critical signal Definition of flashing: 200 ms on, then 200 ms off

6.1.2 Measuring jacks

Designation	Type	Meaning
P1	Potentiometer	Adjustment of time and limit value (value accepted with DIP switch)
U1	Jack	Measuring jack to adjust the watchdog and limit values ac-cording to voltage diagram
⏚	Jack	Reference potential

6.1.3 General discription



Block diagram of the receiver

A power supply of 12 to 24 V DC is required to operate the wireless receiver. It is connected using plug connectors with Cage Clamp® connections. An external magnetic antenna is required to receive wireless telegrams for the frequency range of 868 MHz.

The wireless receiver is based on the EnOcean STM 300 wireless receiver, whose received data are processed with a downstream micro-controller.

The program in the micro-controller can be divided into the teach-in and operating modes.

Teach-in mode

In teach-in mode (activated by DIP 1 ON/OFF), the ID of a detected EnOcean telegram is stored in the receiver and the teach-in mode is automatically ended. If no valid telegram from a transmitter is received in the teach-in mode after 15 s have elapsed, this is signaled as a faulty status. Alternatively, the transmitter ID can be taught manually in the INACTIVE status by actuating the DIP switch 3 & 4 (simultaneously!).

The monitoring time and limit value can either be set by specifying the default values or by means of a potentiometer using a diagram. The diagrams and DIP switches are described in the subsequent chapters.

Operating mode

In operating mode, the receiver monitors the incoming signals of the transmitter using the watchdog function. The watchdog LED (WD) displays each incoming telegram of the taught-in transmitter with a short flicker. If the watchdog time is exceeded, the WS LED signals a fault with a continuous light; the WD output goes to LOW status.

The DO1 and DO2 LEDs and outputs directly display the condition of the two-channel sensor. For each telegram, the current battery level is monitored using the level control to an adjustable limit value. If the minimum limit value is not reached, the output goes into the LOW status and the LED is OFF.

The signal strength of incoming telegrams is displayed by flashing codes using SI LED, which can be used to establish an optimal radio connection during commissioning.

6.1.4 Function description delivery condition

After first switching on the voltage supply, the receiver module is in the “INACTIVE” mode. For the commissioning, the ID of a transmitter needs to be “LEARNING”.

NOTE

A transmission needs to be activated at the transmitter during the “Learning phase”. During the learning phase, telegrams from EnOcean sensors are evaluated on STM basis. The transmitter with the largest signal strength is trained.

None or only a few transmissions of other transmitters should therefore take place in the reception range of the module to prevent faulty teaching.

6.1.5 Status definition

Status	Description
INACTIVE	During commissioning, the switching actuator signals a missing assignment (status: inactive) to the sensor by a blinking watchdog LED (2Hz). No ID of a sensor has been “learned" yet. The “inactive” status can be restored by switching on the DIP switch “Delete ID” if no ID has been learned within the 15-second learning time following actuation.
LEARNING	**In the learning mode, the receiving range is reduced to approx. 5 m (if DIP 5 = OFF) to exclude the learning of other receivers as much as possible.** To teach a new radio sensor, the “learn switch” (DIP 1) must be actuated on the receiver. The learning status is signalled by a slow (0.5 Hz) blinking watchdog LED. The DIP switch should be reset immediately. After a telegram has been received from a transmitter, its ID is stored in the receiver, safe from power failures, and the learning mode is subsequently exited. In the learning mode, each received (detected) signal of any ID is indicated on the SI LED. The signal strength of a telegram is indicated until the next telegram is received. If no new sensor is learned within 15 seconds, the switching actuator returns to the “active” or “inactive” status.
ACTIVE	In the “active” status, the switching actuator monitors all IDs received and compares them with the ID learned. If the sensor is detected as "assigned", the data bytes received (Data_Byte 0…3) are processed and output. In the operating status “active”, only signals from taught transmitters are indicated on the SI and WD LED.
System monitoring / WATCHDOG	The system check is only switched on in the "active" state. A timer (watchdog abbrev. WD) is used to monitor whether new data telegrams of the taught sensor have been received within the system time set. The system time can be adjusted with the system check potentiometer or the DIP switch. If the time between two telegrams is greater than the monitoring time, the system LED signals this fact with a continuous light. The associated output of the system monitoring (output WD) switches to the LOW status. The status outputs of the sensor maintain the last status. The output behaviour with addressed system monitoring is non-saving. When the WD is addressed, the last value of the signal strength is not saved (SI LED); the current signal strength of the taught sensor continues to be evaluated.

6.1.6 Time response

The time lag between measurable telegrams must be at least 50 ms.

6.1.7 Function of the DIP switch

Switch Type / function / code designation	Meaning
8-pin DIP switch 1 OFF / ON	Delete transmitter ID and activate teach-in mode = ON *
2 OFF / ON	OFF = SI LED displays distance between signals ON = SI LED shows signal levels Delivery status: distance between signals
3 OFF / ON	Adjust battery limit ON= ACTIVE; set transmitter ID DIP (3+4)
4 OFF / ON	Adjust watchdog time ON= ACTIVE; set transmitter ID (DIP 3+4)
5 OFF / ON	OFF = teaching in with reduced reception range ON = teaching in with full reception range
6 OFF / ON	OFF = DI1 is transmitted from the transmitter to the receiver and issued on receiver output D01; DI2 is transmitted from the transmitter to the receiver and issued on receiver output D02. ON = DI2 is transmitted from the transmitter to the receiver and issued on receiver output D01; The receiver ignores incoming radio data relating to D01. The receiver sets its output D02 as a negation of the signal D02.
7 OFF / ON	Apply current battery value –0.5V as a limit *
8 OFF / ON	Setting the system time OFF = 1 SECOND / ON = 35 SECONDS (preferred) 0-2.5V = 0 to 1s / 0-2.5V = 0 to 35s

* edge-controlled

DIP 6	Transmitter DI1	DI2	Receiver D01	D02
OFF	0 1 0 1	0 0 1 1	0 1 0 1	0 0 1 1
ON	0 1 0 1	0 0 1 1	0 0 1 1	1 1 0 0

6.1.8 Delete transmitter ID

To learn a new transmitter, the DIP 1 must be momentarily switched to “ON” (assignment function). Any previously learned transmitter will be deleted and cannot be learned for approx. 30 minutes thereafter (☞ see list of deleted transmitters). For further behaviour, see ☞ “Status definition / LEARNING”.

When actuating DIP 1, the ID of the transmitter last learned is stored in a list comprising a maximum of 10 entries “List of deleted transmitters”. These IDs are stored in the RAM for up to 30 minutes. The purpose of this is to prevent repeated learning for up to 30 minutes after an incorrect learning followed by deletion.

The “list of deleted transmitters” is reset (i.e. deleted) either by switching off the supply voltage or if no other transmitters have been deleted for 30 minutes (retriggerable timer).

6.1.9 Signaling the distance between signals or the signal strength

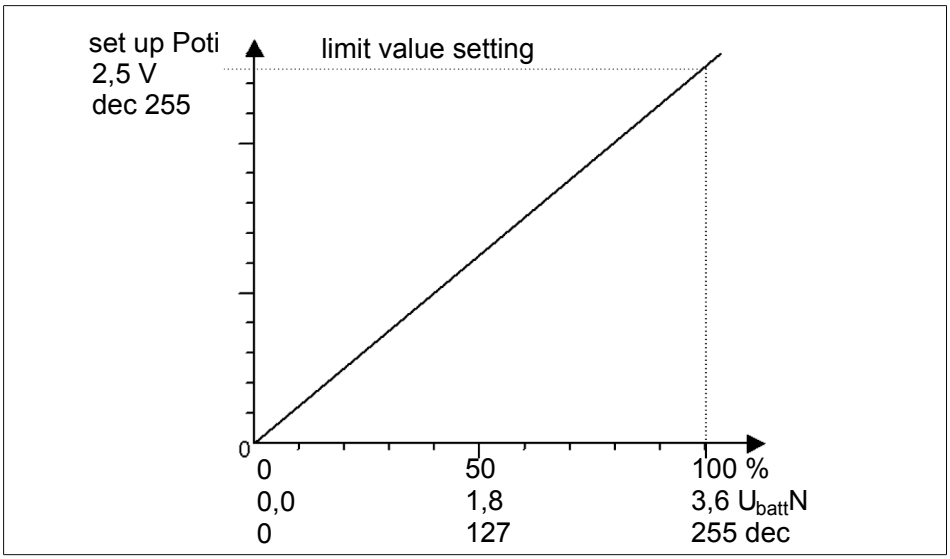
In the delivery condition (DIP 2 =OFF“) the flashing SI LED indicates the signal distance from the useful signal and the noise signal. The measurement of the 'noise level' is taken every 20 ms (watchdog time 0 to 1s), or approx. every t = (set watchdog time / 64 measurements) (watchdog time 0 to 35s).

An averaging process for the noise signal is carried out when there is a new telegram.

LED	Signaling	Signal strength	Planned function extension (DIP 2 = OFF)	Signal level RSSI * (DIP 2 = ON)
			-	V
SI (green/ red)	Continuous green LED	Optimal signal	No functionality stored	> 2.5
	Flashing green LED	Very good signal		2.43 < RSSI*1 < 2.5
	Flashing green/orange LED	Good signal		2.37 < RSSI < 2.43
	Flashing orange/red LED	Medium signal		2.00 < RSSI < 2.37
	Continuous red LED	Poor signal		1.60 < RSSI < 2.00
	Flashing red LED	Critical signal		< 1.6

* RSSI means "Received Signal Strength Indication" and serves as an indicator for the reception field strength of wireless communication applications.

6.1.10 Setting the limit value for battery monitoring



Limit value setting

The current potentiometer value is stored when switching on DIP switch 3 at status of “ACTIVE” and “Watchdog”. During the setup mode (DIP 3 ON), the LED responds directly to a changing potentiometer value.

Hint on setting the limit value to approx. 5% below the current battery level:

- Turn potentiometer until the LED extinguishes.
- Set DIP 3 to OFF.

A 3-step hysteresis (approx. 1 %) ensures a steady function of the indicator in the limit value range.

If the DIP switch is switched back without the POTI value having changed outside of its ‘oscillation range’, no new value is accepted as system time or limit value (to avoid faulty operations).

6.1.11 Setting the output behaviour

Functional change of the output signal D01

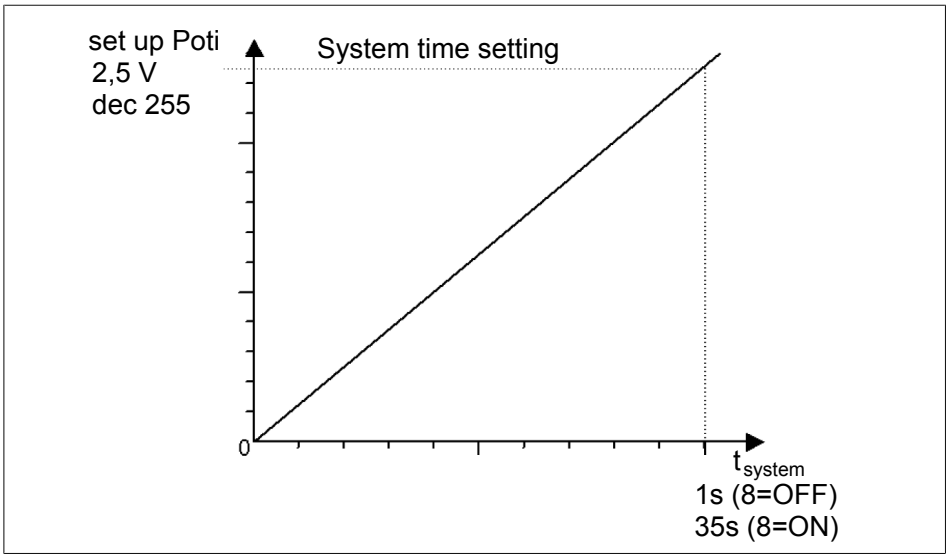
DIP6 = ON: Output D01 will not be received as at radio transmitter, but is “NOT D02”.

6.1.12 Teaching the limit value (teaching threshold)

Analog value currently sent – 0.5V

DIP7: The current value of the analog value minus 0.5 V is accepted as limit value for the battery monitoring.

6.1.13 Setting the watchdog time



Setting the watchdog time

The POTI value is saved by turning on of the DIP switch 4 at status “ACTIVE” and “WATCHDOG”. During the set-up mode (DIP 4 moved), the LED responds directly to a changing POTI value (and DIP 8 setting) by changing the blinking frequency.

The setting occurs using the “System time setting” characteristic curve. System time = f (DIP8 and POTI value). The acceptance occurs only when DIP 4 is switched back.

If the DIP switch is switched back without the POTI value having changed outside of its ‘oscillation range’, no new value is accepted as system time or limit value (to avoid faulty operations).

6.1.14 Function of the DIP 5 Extension of the reception range during the learning procedure

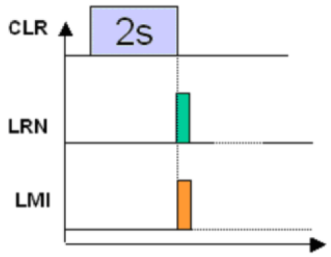
By switching on DIP 5, the range reduction to 5 m in learning mode can be switched off, i.e. the full reception range of the receiver is then used for learning, e.g. in order to learn more remote transmitters with a good signal strength.

NOTE

All incoming EnOcean telegrams are (internally) transferred via the serial inter-face. The response time of the receiver can thereby be permanently reduced. (special function of the RCM121DB is not used during this)

It is therefore imperative to switch the DIP 5 back to OFF after the learning!

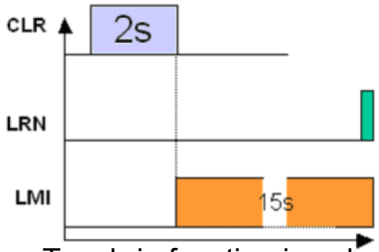
DIP 5= ON (>5 m range with LRN)



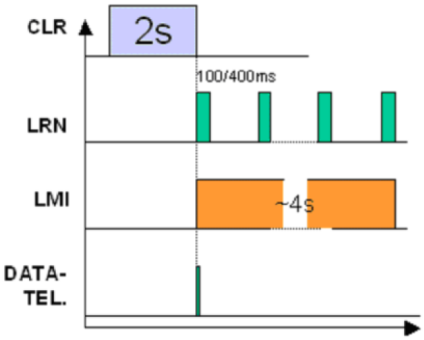
Teach-in function is only processed by the RSS-R1

Telegram during LMI active

DIP 5= OFF (<5 m range with LRN)



Teach-in function is only processed by the RCM Only telegrams from taught-in transmitters are output to the serial interface.



If a telegram arrives at this time, the transmitter is taught in the RCM. No more telegrams come via the RS232 interface, as the RCM is blocked for 4 s after being taught in.
The controller attempts to disengage the RCM from the teach-in mode as quickly as possible.

6.1.15 Manual setting of transmitter ID (programming)

If DIP 3 and DIP 4 are activated at the same time in the INACTIVE status, the switching actuator is set in the programming mode.

When setting the first ID byte (ID0), the LC-LED flashes red (incl. output) with 0.5 Hz for 10 s. After this, the LC-LED illuminates for 2 s to assume the DIP combination

The ID bytes 1, 2 and 3 are entered in the same way, whereby the LC-LED illuminates for 10 s at the end (adoption ID3), in order to have sufficient time to set the output DIP combination.

Example ID: 00 | 00| 09 | 88 = 00000000 | 00000000 | 00001001 | 10001000
ID3 ID2 ID1 ID0
DIP 1|2|3|4|5|6|7|8

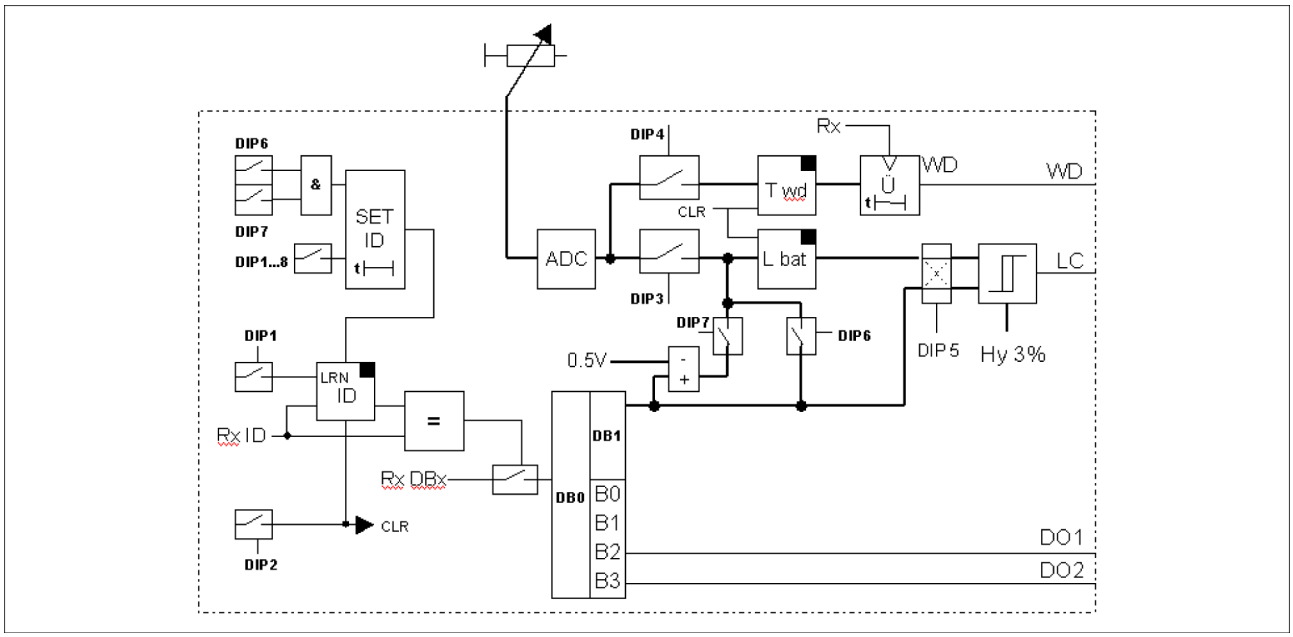
NOTE

When teaching in the sequence of ID0... Observe ID3.

6.1.16 Output behaviour of the watchdog

Operating mode	Possible cause	Behaviour (Output S)	LED
Operation	Watchdog addressed	Output LOW	On
	Watchdog not addressed	Output HIGH	Off
Learning		Output LOW	On
Inactive		Output LOW	On

6.1.17 Software block diagram



6.2 RSS-W1

6.2.1 Operation

The transmitter module is not equipped with control elements. It independently sends a signal every 10 seconds. Anymore if the state of the input is changed, it immediately sends a signal.

NOTICE

If the red LED WD lights up longer than 0,2 seconds, the radio contact is disturbed. The adjustment work must be interrupted and it should be checked what disturbs the radio contact.

6.2.2 Setting switching point on the snap-action switch

- All pressure chambers of the chuck are depressurized

➢ Remove the screws (10).

➢ Screw in screws of size M6 in the threaded holes of the screws (10).

➢ Pull out the insert (1) using the M6 screws and unscrew the M6 screws.

➢ Set the switching point through the bore of the piston (3) using a hexagon socket wrench.
Wrench size: 1.5 mm

➢ Screw the insert (1) using the screws (10) onto the chuck.

6.2.3 Checking function

➢ When the chuck is closed and enters the operating range, LED D02 lights up after a brief period.

➢ If the chuck is opened and leaves the operating range, LED D02 should go out after a brief period.

6.2.4 LED - Display

DesignationLED	Meaning
D01 light luminous	The sensor 1 is actuated.The contact of the sensor is closed.
D02 light luminous	The sensor 2 is actuated.The contact of the sensor is closed.
D02 dark luminous	Test mode is activated and battery voltage is existing.
TX	A radiogram is sent just now.

7 Troubleshooting

Possible cause	Corrective action
Battery empty	Change the battery, Changing the battery [▶ 19].
Unit contaminated	Dismantle the entire unit and check the function of the switch. When the piston is actuated, the switch will either click audibly or the receiver will receive a signal.
The switch switches continuously	Adjust the set screw on the piston.

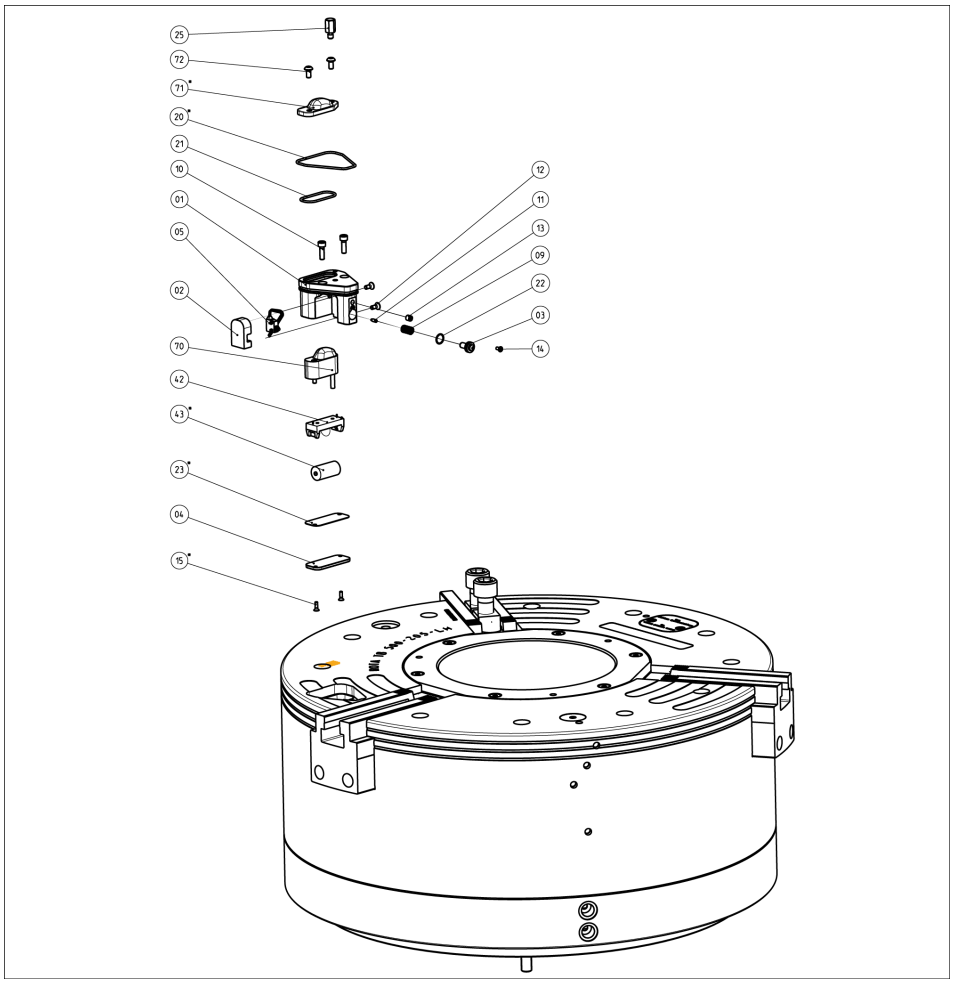
8 Maintenance and care

The system is maintenance-free.

The life span of the transmitter is only limited by the battery installed Technical data [▶ 12].

To replace the battery, Changing the battery [▶ 19].

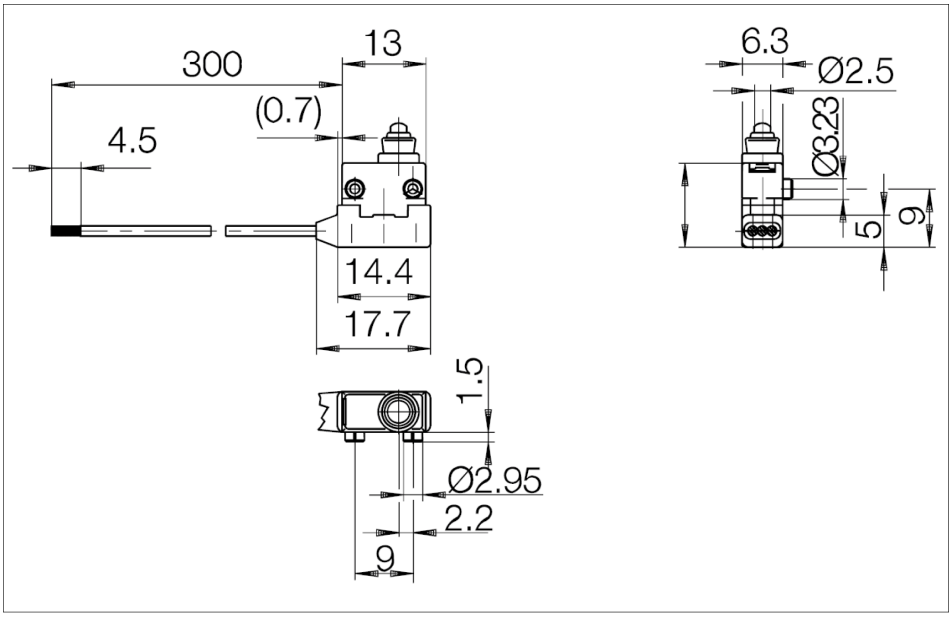
9 Assembly drawing



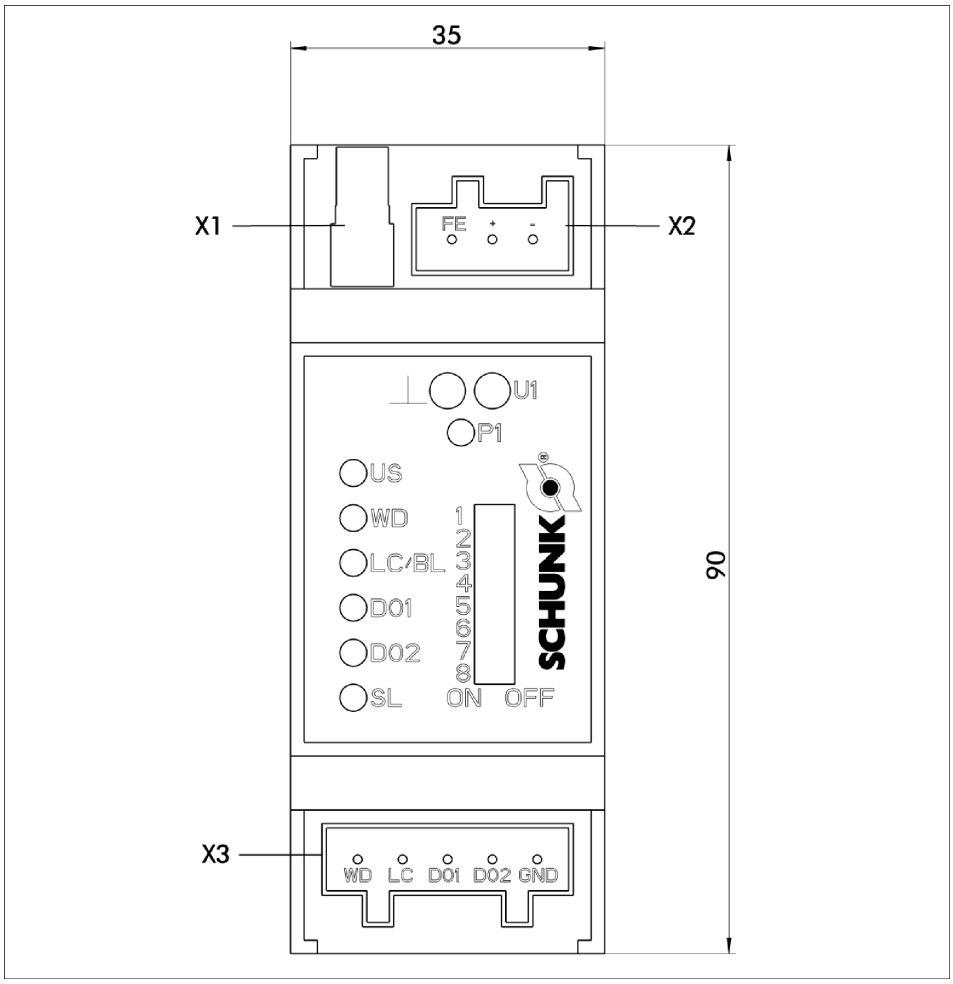
Assembly ROTA TB/EP

Item	ID number	Designation	Quantity
1	8705506	Path control housing	1
2	8705507	Cover	1
3	8704100	Path control piston	1
4	8705508	Cover for battery compartment	1
5	9984844	Snap-action switch	1
9	9900140	Compression spring	1
10	9905212	Screws	2
11	9670004	Set-screw	1
12	9941643	Screw	2
14	9662511	Screw	1
15*	9664020	Screw	2
20*	9611058	O-ring	1
21	9936336	O-ring	1
22	9611044	O-ring	1

Item	ID number	Designation	Quantity
23*	1150481	Flat gasket	1
25	122164	Workpiece bolt	1
42	9988952	Battery bracket	1
43*	9988953	Battery	1
70	8705401	Transmission unit	1
71*	8704194	Cover	1
72	9982315	Screw	2
* - replacement part kit ID. No. 1150471			



Snap-action switch IP 67



Wireless receiver RSS R1

10 Information FCC certification

This device complies with Part 15 of the FCC Rules and with Industry Canada licence-exempt RSS standard(s).
Operation is subject to the following two conditions:
(1) this device may not cause harmful interference,
and (2) this device must accept any interference received, including interference that may cause undesired operation.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence.
L'exploitation est autorisée aux deux conditions suivantes:
(1) l'appareil ne doit pas produire de brouillage,
et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

The RSS is used in chucks.

A drop in pressure on the chuck during processing can cause the clamped workpiece to come loose from the clamping and to continue to move uncontrollably. This can lead to serious property damage and/or severe personal injury.

In order to detect this drop in pressure during processing, a pressure sensor connected to the RSS monitors the pressure. If the corresponding threshold value set is not reached, this causes a change to the signal, resulting in a radio signal.

In order to ensure that the radio connection is available, a cyclical transmission is required every 10 seconds.

Note:
This product was tested and conforms to the limit values for Class A digital equipment in accordance with Section 15 of the FCC regulations. These limit values are intended to provide sufficient protection from harmful interference if the product is operated in an industrial environment.

This product generates, uses and emits high-frequency energy and can therefore lead to interference in radio communications if not installed and used as outlined in the operating manual. Operating this product in a residential area is likely to cause interference, in which case the user is obligated to eliminate the interference at their own cost.

11 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 D-74348 Lauffen/Neckar

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

Product designation:	Wireless sensor technology RSS / Receiver R1, Transmitter W1 /
ID number	8705554

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
EN 13849-1:2008-12	Safety of machines - Safety-relevant parts of control systems - Part 1: General design approaches
EN 60204-1: 2006	Safety of machinery – Electrical equipment of machines, Part 1: General requirements
47 CFR Part 15	Title 47 of the Code of Federal Regulations; Chapter I; Part 15-Radio frenquency devices
RSS - 210 Issue 8	December 2010; Spectrum Management and Telecommunications Radio Standards Specification - Licence-exempt Radio Apparatus (All Frequency Bands): Category I Equipment
RSS - 210 Issue 8	February 2015; Rss-210, Amendment 1-Licence-Exempt, Low-Power Radio Apparatus Operating in the Television Bands

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:
Philipp Schräder, Address: see manufacturer's address

Signature: see original declaration

Lauffen/Neckar, March2017 p.p. Philipp Schräder; Head of Engineering Design

12 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	Wireless sensor technology RSS
Type designation	Receiver R1, Transmitter W1
ID number	8705554

To be provided by the System Integrator for the overall machine			⇓
Fulfilled for the scope of the incomplete 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	Protection against mechanical hazards			
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		