

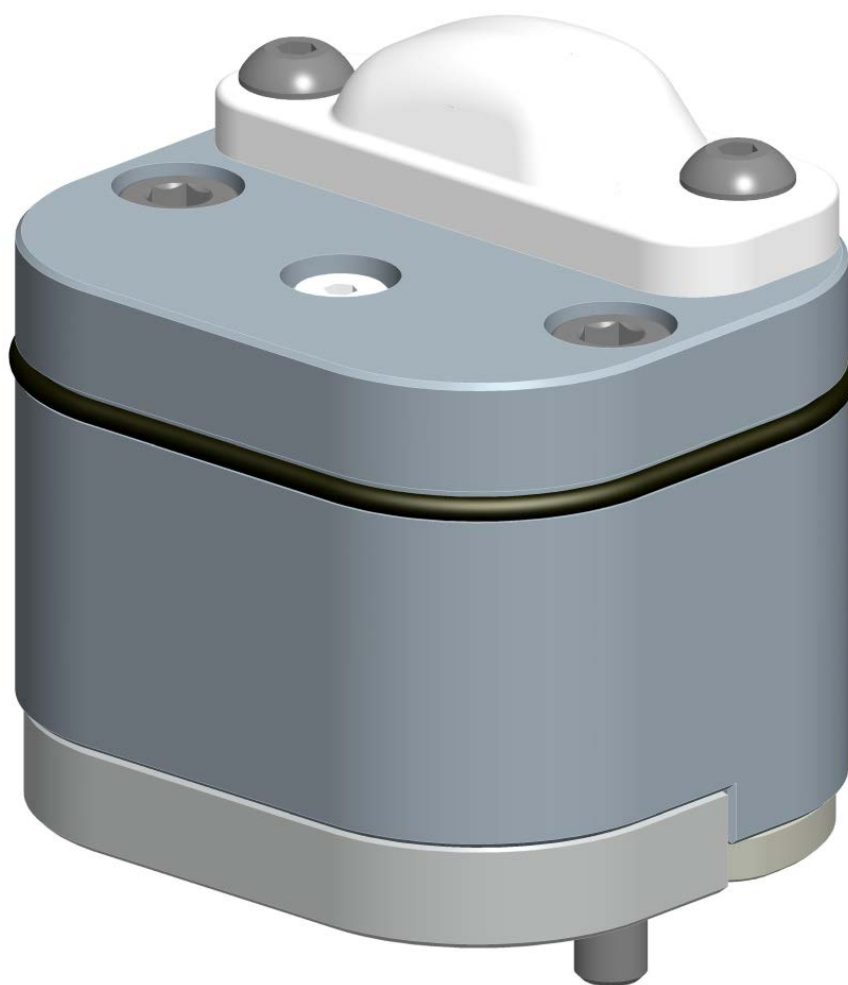
Wireless sensor technology RSS

Receiver RSS R1, transmitter RSS P1-US/CA

Id. Nr. 8705401

Frequenz 868,3 MHz

Assembly and Operating Manual



Imprint

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

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

Kindest Regards

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Table of contents

1	About this manual	5
1.1	Presentation of Warning Labels	5
1.2	Applicable documents	5
2	Basic safety notes	6
2.1	Intended use	6
2.2	Environmental and operating conditions.....	6
2.3	Product safety.....	7
2.3.1	Protective equipment	7
2.3.2	Constructional changes.....	7
2.4	Personnel qualification.....	7
2.5	Notes on particular risks.....	8
3	Warranty	10
4	Scope of delivery	11
5	Accessories	12
6	Technical data	13
6.1	Technical Data RSS-R1	13
6.2	Technical Data RSS-P1	14
6.3	Technical Data Pressure Switch.....	14
6.4	Information on radio link and range	15
7	Assembly	17
7.1	Installing the RSS-P1 transmission module with ROTA TB/EP pneumatic front-end chuck.....	17
7.2	Change the battery	17
7.3	Assembly and electrical connection of the RSS R1 receiver	18
7.4	Wiring proposition for connection to the system.....	19
8	Start-up	21
8.1	General information on commissioning.....	21
8.2	Programming the transmitter to the receiver	21
8.3	Testing the antenna position	22
8.4	Adjusting the watchdog time at the receiver	23
9	Functional description	24
9.1	RSS-R1.....	24
9.1.1	LED.....	24
9.1.2	Measuring jacks.....	25
9.1.3	General discription.....	26

9.1.4	Function description delivery condition	27
9.1.5	Status definition	28
9.1.6	Time response	29
9.1.7	Function of the DIP switches	29
9.1.8	Delete transmitter ID	30
9.1.9	Signaling the distance between signals or the signal strength.....	31
9.1.10	Setting the limit value for battery monitoring.....	32
9.1.11	Setting the output behaviour.....	32
9.1.12	Teaching the limit value (teaching threshold)	32
9.1.13	Setting the watchdog time.....	33
9.1.14	Function of the DIP 5 Extension of the reception range during the learning procedure	33
9.1.15	Manual setting of transmitter ID (programming).....	34
9.1.16	Output behaviour of the watchdog	35
9.1.17	Software block diagram	35
9.2	RSS-P1.....	35
9.2.1	Operation	35
9.2.2	Installed pressure switch, setting the switching point.	35
9.2.3	Setting a defined minimum pressure, method 1.....	36
9.2.4	Setting a minimum pressure that is not precisely defined, method 2	37
9.2.5	Checking the function	37
10	Maintenance and care	39
11	Assembly drawing	40
12	Information FCC certification.....	43








1 About this manual

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

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

1.1 Presentation of Warning Labels

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

	<p> DANGER</p> <p>Danger for persons! Non-observance will inevitably cause irreversible injury or death.</p>
	<p> WARNING</p> <p>Dangers for persons! Non-observance can lead to irreversible injury and even death.</p>
	<p> CAUTION</p> <p>Dangers for persons! Non-observance can cause minor injuries.</p>
	<p>NOTICE</p> <p>Material damage! Information about avoiding material damage.</p>

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 www.schunk.com.

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 no FCC/IC certification and therefore may not be operated in the USA or Canada.

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

The product may be used only in the context of its defined application parameters ([👉 6, Page 13](#)).

The product is designed for industrial use.

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

2.2 Environmental and operating conditions

- Make sure that the product has a sufficient size for the application.
- Make sure that the environment is free from splash water and vapors as well as from abrasion or processing dust.
- The radio link established by the system can experience temporary or permanent interference through external influences. As a result, the states of the sensors are not updated at the receiver for the duration of the interference. The interference is only reported by the receiver after the watchdog time has lapsed. Ensure that such interferences cannot cause any damage. Adjust the watchdog time to a time suitable for your process.
- In the 868.3 MHz range, the system does not comply with the EMC regulation for interference immunity to incoming radio waves. Losses of radio telegrams may occur in this range. Disturbances become more likely if the antenna is further than 25 cm away from the receiver. The application must therefore be tested each time before being integrated.

- The radio switch receiver must not be used in combination with devices that are directly or indirectly used to safeguard the health or life of persons, or devices which, when in operation, could cause danger to persons, animals or property! This is due to the radio switch receiver's classification as "Class 2 Equipment" in accordance with ETSI EN 301 489-3 V1.4.1 (2202-08) "Specific conditions for short-range devices (SRD)".
- The time between evaluable telegrams must be at least 50ms.

2.3 Product safety

Dangers arise from the product, if:

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

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

Wear protective equipment.

NOTE

More information is contained in the relevant chapters.

2.3.1 Protective equipment

Provide protective equipment per EC Machinery Directive.

2.3.2 Constructional changes

Making constructional changes

Modifications, constructional changes and subsequent work, e.g. additional threads, drill holes and safety devices may impair the operation and safety or damage the product.

- Constructional changes may only be done with SCHUNK's permission.

2.4 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.

Pneumatics specialist Pneumatics specialists have been trained for this particular area of responsibility and know the relevant standards and regulations.

Hydraulic specialist Hydraulic specialists have been trained for this particular area of responsibility and knows 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.

2.5 Notes on particular risks

Generally valid:

- Remove the energy supplies before installation, modification, maintenance, or adjustment work.
- Make sure that no residual energy remains in the system.
- Do not move parts by hand when the energy supply is connected.
- Do not reach into the open mechanism or the movement area of the module.

- Perform maintenance, modifications, and additions outside of the danger zone.
- For all work, secure the unit against accidental operation.
- Take a precautionary approach by maintenance and disassembly.
- Only specially trained staff should disassemble the module.

**⚠ CAUTION****Possible risk of injury due to electrostatic energy!**

Components or assembly groups may become electrostatically charged. When touched, the electrostatic discharge can trigger a startle response, which can result in injuries.

- The operator must ensure that all components and assembly groups are included in the local equipotential bonding in line with the applicable regulations.

NOTE

- The equipotential bonding must be installed by a specialist electrician in line with the applicable regulations, paying particular attention to the actual conditions in the working environment.
- The effectiveness of the equipotential bonding must be verified by a specialist electrician through regular safety measurements.

3 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 ([👉 1.2, Page 5](#))
- Observe the ambient conditions and operating conditions Link [Umgebungs- und Einsatzbedingungen](#)

Parts touching the workpiece and wearing 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.

4 Scope of delivery

The scope of delivery includes

- Wireless sensor technology RSS Receiver R1, transmitter P1 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
- Accessory pack

5 Accessories

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

- Sensors: 2 pieces per gripper
 - either RMS 80 plus gripper-specific mounting kit
 - or RMS 22
 - or other sensors as closers, without their own energy consumption

A wide range of accessories are available for this product

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

6 Technical data

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

6.1 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 mm ² WAGO multi-plug system series 722
Housing material	Polycarbonate
Ambient temperature [°C]	
Min.	0
Max.	55
Storage temperature	
Min.	-25
Max.	+75
Electromagnetic compatibility	CE conforming with EMC- guideline 89/336/EWG and R&TTE
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

6.2 Technical Data RSS-P1

ID number	8705553
Transmission frequency [MHz]	868.3
Sensor connection	Two-wire to the pressure sensor
Integrated power supply	Lithium battery
Housing material	Aaldir cast resin
Protocol	EnOcean Standard
IP rating	67
Ambient temperature [°C]	
Min.	0
Max.	50
Weight [kg]	0.16
Electromagnetic compatibility (EMC)	CE compliant to EMC Directive 89/336/EEC and R&TTE
Interference signals	EN 61000-6-4
Radiated interference	EN 61000-6-2
Transmission license EnOcean STM transmitter	
Assembly type	Screw connection in the chuck

6.3 Technical Data Pressure Switch

Pressure range [bar]	1-10
Pressure type	Positive overpressure
Pressure connection	G1/8
Measuring principle	Spring-loaded membrane
Load reversal	1 mil. pressure cycles
Switching output	1 closer
Hysteresis	< 10% from set value
Reproducibility	< 5% from set value

Ambient temperature [°C]	
Min.	-5
Max.	+75
Burst pressure [bar]	20
Weight [kg]	0.03

6.4 Information on radio link and range

The transmitter sends telegrams with 868 MHz to the receiver. The receiver checks the incoming telegrams and uses them to control its outputs.

This radio link is principally prone to interferences by other radio systems or systems emitting radio signals. For reasons of availability, the presence of systems emitting radio waves – such as wireless or mobile phones or PCs – in the immediate proximity of the transmitter is to be avoided. We recommend observing a minimum air distance of at least one meter between receiver and interference source or between transmitter and interference source.

Since the radio signals represent electromagnetic waves, the signal is damped on its route to the receiver. This means, the signal strength decreases with increasing distance between transmitter and receiver. Thus, the radio range is limited. In particular, the range will also be significantly limited in case of irradiation above 400 MHz.

It must also be noted that the radio range is reduced by materials between transmitter and receiver. For the practical application, this means that the construction materials used in buildings and facilities (machines) play an important role for the evaluation of the radio range. Some reference values that can be used to estimate the range are:

- Line of sight
 - Typically 30 m range
- Concrete or brick walls
 - Typically 20 m range
- Steel-reinforced concrete walls
 - Typically 10 m range
- Fire protection walls, elevator shafts ..
 - Can be considered blockages.
- Turning centres

- The radio waves penetrate to the outside through various slots and especially through the viewing glasses. It is difficult here to make an exact statement on the range. Based on our experience, a range of at least 3 m must be expected.
- Cordless telephone at a distance of less than 1m
 - Range approx. 25 cm

The distance from the receiver to other transmitting devices also radiating high-frequency signals (computers, video systems, etc.) should be at least 0.5 m.

Using the receiving strength LED (SI) to our receiver it is easy to decide whether the system provides secure transmission for the intended location or if strong interferences are present.

For the optimum signal strength, the antenna have to be placed in the interior of the machine.

- Place the antenna in the eye contact of the transmitter.
- The antenna must be fixed on a plate with the minimum dimensions of 25 cm x 25 cm.

7 Assembly

7.1 Installing the RSS-P1 transmission module with ROTA TB/EP pneumatic front-end chuck

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

- 1 Remove pressure monitoring kit MATCH-code „RSS...“ (RSS-P1 8705397 pressure monitoring).
- 2 Carefully press the insert module into the recess in the chuck. Screw on the two hexagon socket screws (item 11) to the specified torque.

Mounting material and tightening torque

Mounting	RSS-P1
Screw quality	10.9
Screw size	M6
Tightening torque [Nm]	13.0

7.2 Change the battery

Position of the item numbers ([👉 11, Page 40](#))

NOTE

Before changing the battery, all pressure chambers of the chuck must be depressurized.

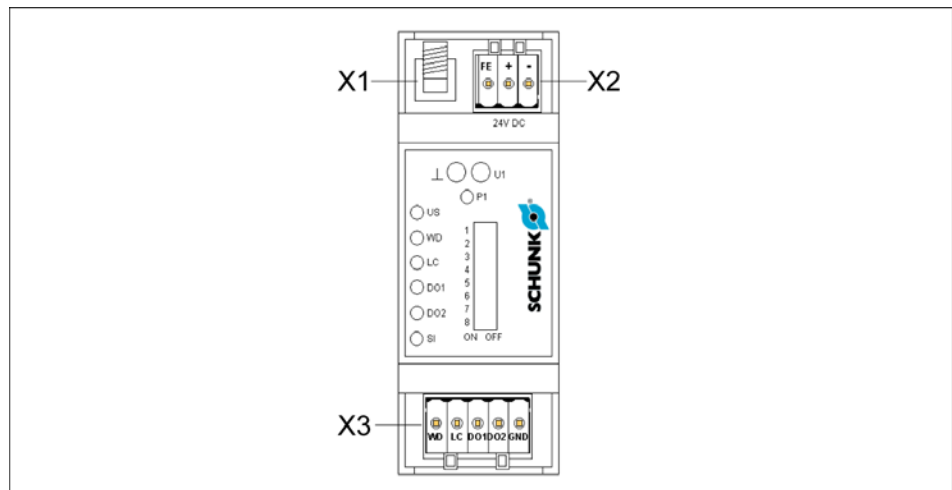
- 1 Unscrew screws (11).
- 2 Remove insert (1).
- 3 Screw in screws of size M8 in the threaded holes of the screws (11).
- 4 Pull out the insert (1) using the M8 screws unscrew the M8 screws.
- 5 Unscrew screws (19).
- 6 Remove disk (3) from the insert (1).
- 7 Change the battery.
NOTICE! Pay attention to the correct polarity when inserting the new battery.
- 8 Clean all parts and check for damage and wear. Replace damaged and worn parts.
- 9 Screw the disk (3) using the screws (19) onto the insert (1).

10 Screw the insert (1) using the screws (11) onto the chuck (1).

Original spare parts

When replacing damaged parts (wearing parts/spare parts) only use SCHUNK original spares.

7.3 Assembly and electrical connection of the RSS R1 receiver



- 1 Mount the receiver in a switching cabinet located less than 10 m from the transmitter by snapping it onto a DIN track (EN50022).
- 2 Connect the receiver:
 - Antenna socket X1:**
 - SMA socket for external antenna (we recommend our RSS-R-A antenna, ID No. 0377730)
 - Connector X2:**
 - X2.1 FE Function ground
 - X2.2 + Supply DC 24V+external
 - X2.3 Supply DC 24V+external
 - Connector X3:**
 - X3.1 WD Output watchdog, high signal, if radio IO
 - X3.2 LC Output limit value, high signal, if battery IO, i.e. has still more than 2 weeks capacity remaining.
 - X3.3 DO1 Output 1, if DIP6=D02 inverted.
 - X3.4 DO2 Output 2, sensor signal 2, High, if clamping pressure not sufficient.
 - X3.5 GND Reference ground for the outputs

NOTE

If the clamping pressure is not sufficient (D02=High), or if the radio range is disrupted, the spindle should be decommissioned for safety reasons.

Connector: WAGO MULTI-PLUG SYSTEM series 722.

- 3 Mount the antenna in the interior of the machine using the magnetic base.

7.4 Wiring proposition for connection to the system

Variant 1 if the system has got free digital inputs :

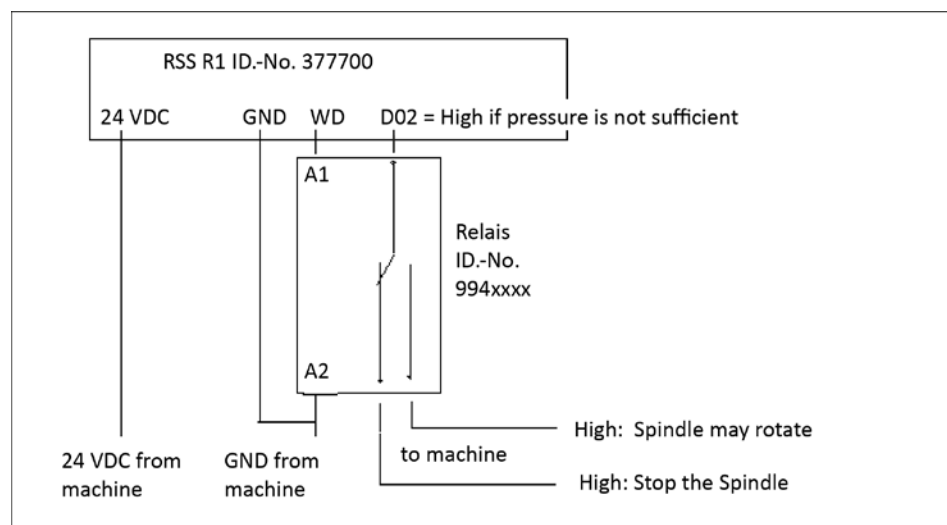
WD on input 1. This have to be high, otherwise the radio traffic is interrupted.

D02 on input 2. If this one is high, the pressure is not sufficient.

NOTE

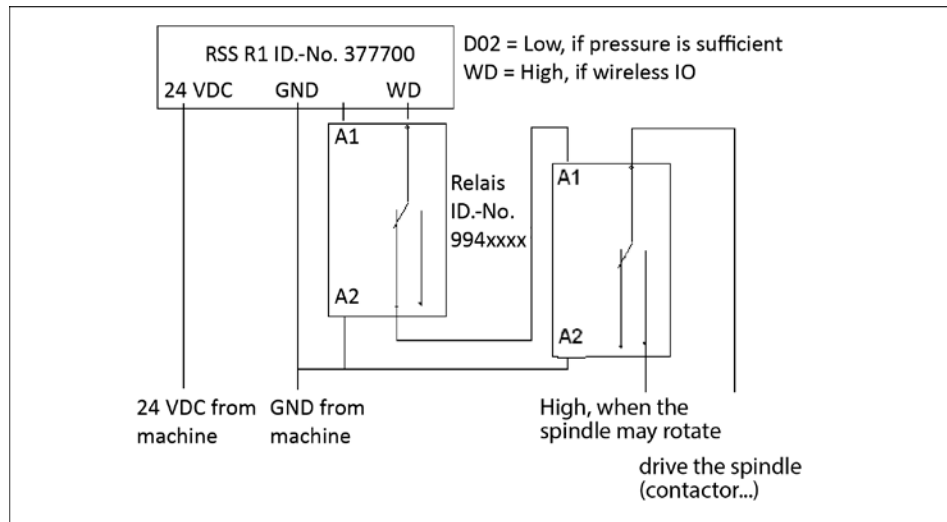
Please adapt the software of the system, so that the spindle only can rotate if E1=High and E2=low. Anymore check at every cycle, that E2=high, if the chuck is open. As a result the function of the in- and outputs can be guaranteed.

Variant 2 if the system only has the preprogrammed input **release spindle**:



Circuit diagram - variant 2

Variant 3 if the machine has no free inputs:



Circuit diagram - variant 3

8 Start-up

8.1 General information on commissioning

Before commissioning, please check the device for any transport damages. Do not start up the device if it is mechanically damaged. Please read this assembly and operating manual carefully and observe the technical information as well as the legal requirements relevant to your country.

NOTE

The components are equipped with electronic elements which could be destroyed in case of an electrostatic discharge. When handling the components, it must be ensured that environment (persons, workstation and packaging) are properly grounded. Do not touch conductive elements.

Notes on installation

When installing the antenna and antenna cable assembly group, it is imperative to avoid any proximity to sources with transient disturbances such as fluorescent tubes with a faulty starter, frequency converters or power cables. They could result in interrupted communication and therefore lead to incorrect initial states.

Notes on connecting the antenna

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 fixed on a plate with the minimum dimensions of 25 cm x 25 cm. The antenna and the antenna cable must be at least 30 cm away from sources of interference and the antenna must be at least 35 cm away from the next wall at the side. The antenna cable must under no circumstances be bent sharply as this could result in permanent damage to the antenna cable (RG174 bending radius > 15 mm).

Preconditions for commissioning

The voltage supply must be applied and the external antenna must be connected prior to commissioning.

8.2 Programming the transmitter to the receiver

- 1 Switch Dip 1 to 'on' and immediately back to 'off'.

- 2 Open and close the chuck completely two times.
Or: Move the chuck into the position in which the pressure switch is switched.
- 3 Wait 15 seconds.
- 4 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 then light up briefly once each time.
The status should also be displayed on the LED D02.
- 5 Meaning of LED D02: Off, if set pressure is exceeded.
Pressure switch closed > safe to operate.
When the LED is lit: Warning, pressure too low or chuck open.
- 6 If the teach-in procedure was unsuccessful, please try again a second time.
The optimal scenario is for no other RSS system close by to be transmitting during the teach-in phase.
- 7 After commissioning, check the WD LED for flicker.
If the WD LED flickers, a signal is constantly transmitted from the pressure switch, which causes the battery to discharge faster.
If this occurs, the pressure switch must be reset.

8.3 Testing the antenna position

- 1 Observe the LED 'SI'. This LED signals the current quality of the radio link. This LED should light up or blink orange at least. This LED (this state is not always available) should preferably light up or blink green.
- 2 If necessary, move the antenna closer to the transmitter or reposition the antenna to avoid any solid obstacles between antenna and transmitter.
- 3 For the optimum signal transmission, the transmitter inside the lathe chuck and the antenna should have a line-of-sight. Is this not guaranteed, this can result in a drop of the signal strength or in a signal loss.
- 4 The antenna must be fixed on a plate with the minimum dimensions of 25 cm x 25 cm.

8.4 Adjusting the watchdog time at the receiver

- 1 Adapt the watchdog time to your process in a useful manner. Every 10 seconds, the transmitter transmits a presence signal to control the radio link. If no signal is received after the watchdog time set has elapsed, the LED 'WD' lights until the next signal is received. The 'WD' output then signals the failure of the radio link through 0 VDC.
- 2 A time of approx. 15 seconds is preset at the factory. This should be a optimal value for operation of the radio system inside the chucks.
- 3 Switch DIP 4 to 'on'.
- 4 - To increase the time, turn the potentiometer clockwise. The time set can be identified by the blinking frequency of the WD LED. When DIP 8 has been switched off, the time can be adjusted between 0 and 1 second; when DIP 8 has been switched on, the time can be adjusted between 0 and 30 seconds.
- 5 Switch DIP 4 to 'off'. (Keep DIP 8 in the position selected.)

9 Functional description


9.1 RSS-R1

9.1.1 LED

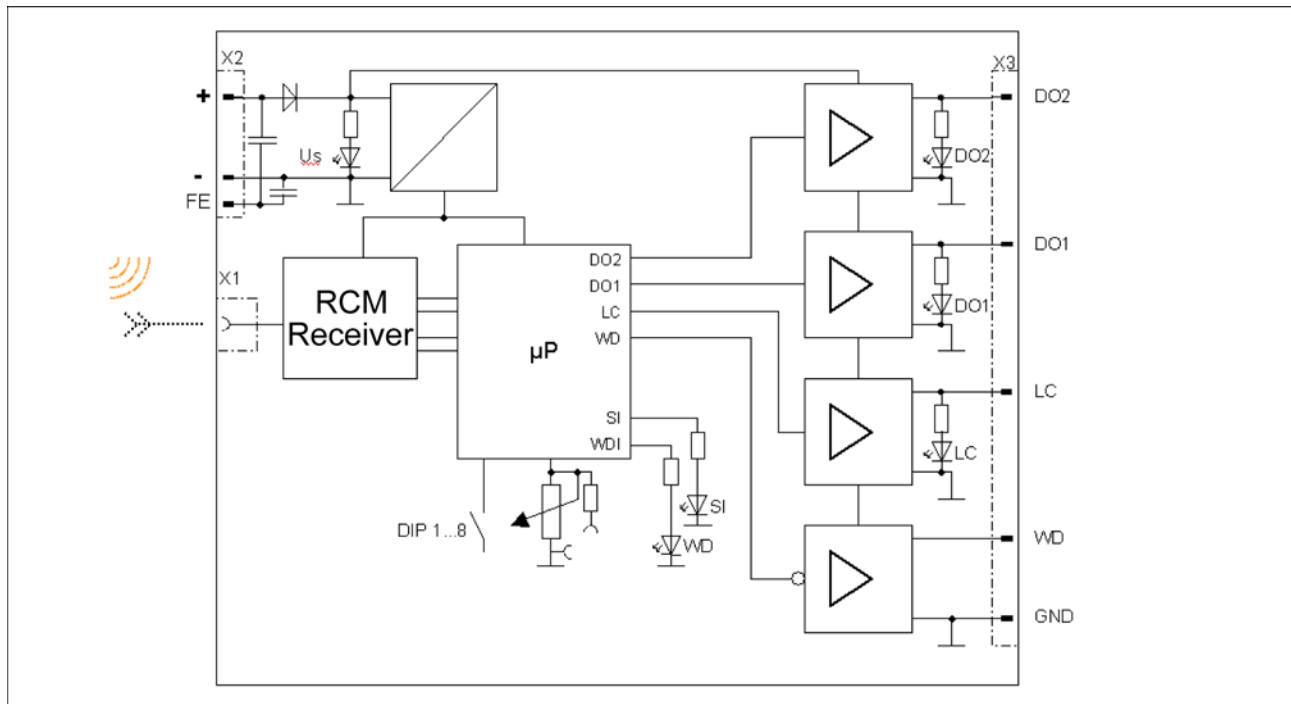
LED color	Status	Meaning
US (green)	Off On	Status of voltage supply <ul style="list-style-type: none"> • No voltage supply present • 24 V DC OK
WD (red)	Off / Flash 0.5 Hz blinking 2 Hz On	Status system check and operating mode <ul style="list-style-type: none"> • Operating status active (reception active) “Flashing” of 15 ms indicates reception of a “taught” telegram • Learning status • Missing assignment; Sensor must be “taught” • Watchdog addressed (non-saving), neither of 2 data telegrams of the taught sensor were received within the monitoring time. (The output behaves inversely.)
LC (yellow)	Off On 0.5 Hz blinking	Status of limit value message (MIN indicator) <ul style="list-style-type: none"> • Limit value fallen below - output LOW • Limit value not reached - output HIGH • Learning mode active via DIP3 and DIP4

LED color	Status	Meaning
DO1 (yellow)	Off On	Status of Sensor 1 <ul style="list-style-type: none"> • Status 0 output LOW • Status 1 output HIGH
DO2 (yellow)	Off On	Status of Sensor 2 <ul style="list-style-type: none"> • Status 0 output LOW • Status 1 output HIGH
SI (yellow/ red)	LED green continuous light LED green blinking LED orange continuous light LED orange blinking LED red continuous light LED red blinking	Indication of the signal strength Signal optimal Signal excellent Signal good Signal medium Signal poor Signal critical Definition of 'blinking': 200 ms on and 200 ms off, alternating

9.1.2 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 according to voltage diagram
	Jack	Reference potential

9.1.3 General discription



Block diagram of the receiver

A supply voltage of 12 – 24 VDC is required to operate the radio receiver. The connection is established using Cage Clamp® connectors. An external magnetic antenna for the frequency range of 868 MHz is required to receive the radio telegrams.

The radio receiver is based on the EnOcean radio receiver RCM 121, whose received data is processed with a downstream microcontroller.

The program in the microcontroller can be divided into the learning mode and the operating mode.

Learning mode

In the learning mode (activated by DIP 1 ON/OFF), the ID of a detected EnOcean telegrams is stored in the receiver and the learning mode is automatically closed. If no valid telegram of a transmitter is received in the learning mode, this is signaled as a faulty status after 15 s. Alternatively, at Status of “INACTIVE” the transmitter ID can be taught manually by actuating the DIP switches 3 and 4 (simultaneously).

The adjustment of the monitoring time and the limit value is done by specifying default values or adjustments with the potentiometer based on a diagram. The diagrams and the DIP switches are described in the following chapters.

Operating mode

In the operating mode, the receiver monitors the incoming signals of the transmitter with the watchdog function. The watchdog LED (WD) indicates each incoming telegram of the taught transmitter by blinking briefly. When the watchdog time set is exceeded, the WD LED signals an error by staying lit continuously; the WD output switches to the LOW status.

The LEDs and Outputs DO1 and DO2 directly indicate the status of the two-channel sensor. The level control monitors the current battery status for an adjustable limit value with each telegram. When the limit value is fallen short of, the output switches to the LOW status and the LED is OFF.

The signal strength of incoming telegrams is indicated by blinking codes of the SI LED; this allows an optimum radio connection to be established already during commissioning.

9.1.4 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.

9.1.5 Status definition

Status	Description
<p>INACTIVE</p>	<p>During commissioning, the switching actuator signals a missing assignment (status: inactive) to the sensor by a blinking watchdog LED (2Hz).</p> <p>No ID of a sensor has been "learned" yet.</p> <p>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.</p>
<p>LEARNING</p>	<p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>If no new sensor is learned within 15 seconds, the switching actuator returns to the "active" or "inactive" status.</p>
<p>ACTIVE</p>	<p>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.</p> <p>In the operating status "active", only signals from taught transmitters are indicated on the SI and WD LED.</p>
<p>System monitoring / WATCHDOG</p>	<p>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.</p> <p>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</p>

Status	Description
	<p>status.</p> <p>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.</p>

9.1.6 Time response

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

9.1.7 Function of the DIP switches

Switch Type / function / code designation	Meaning
DIP switch 8-pin 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 state: 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

Switch Type / function / code designation	Meaning
6 OFF / ON	<p>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.</p> <p>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.</p>
7 OFF / ON	Apply current battery value –0.5V as a limit *
8 OFF / ON	<p>Setting the system time</p> <p>OFF = 1 SECOND / ON = 35 SECONDS (preferred)</p> <p>0-2.5V = 0...1s / 0-2.5V = 0...35s</p>

* edge-controlled

DIP6	Transmitter DI1	DI2	Receiver D01	D02
OFF	0	0	0	0
	1	0	1	0
	0	1	0	1
	1	1	1	1
ON	0	0	0	1
	1	0	0	1
	0	1	1	0
	1	1	1	0

9.1.8 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).

9.1.9 Signaling the distance between signals or the signal strength

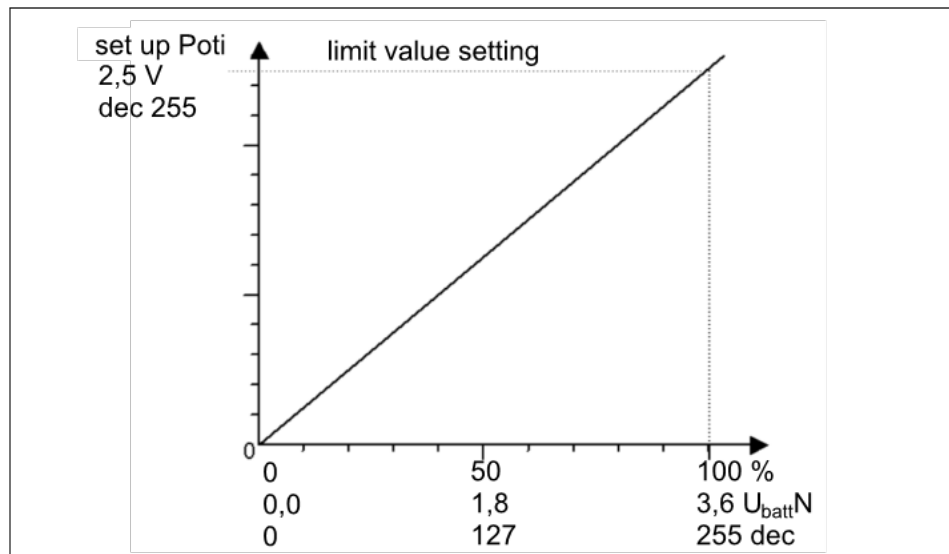
In the as-delivered condition (DIP 2 = "OFF"), the signal distance of the useful signal and the noise signal is displayed by the blinking SI LED. The 'noise level' is measured every 20 ms (watchdog time 0..1 s), or approx. every $t = (\text{adjusted watchdog time} / 64 \text{ measurements})$ (watchdog time 0..35 s).

The average determination for the noise signal is carried out once a new telegram is available.

LED	Signalling	Signal strength	Planned functional extension (DIP 2 = OFF)	Signal level RSSI * (DIP2 = ON)
			-	V
SI (green/red)	LED green continuous light LED green blinking LED green/orange blinking LED orange/red blinking LED red continuous light LED red blinking	Signal optimal Signal excellent Signal good Signal medium Signal bad Signal critical	No functionality	> 2,5 $2,43 < \text{RSSI}^* < 2,5$ $2,37 < \text{RSSI} < 2,43$ $2,00 < \text{RSSI} < 2,37$ $1,60 < \text{RSSI} < 2,00$ < 1,6

* RSSI means "Received Signal Strength Indication" and is an indicator for the received radio signal strength of wireless communication applications.

9.1.10 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:

- 1 Turn potentiometer until the LED extinguishes.
- 2 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).

9.1.11 Setting the output behaviour

Functional change of the output signal D01

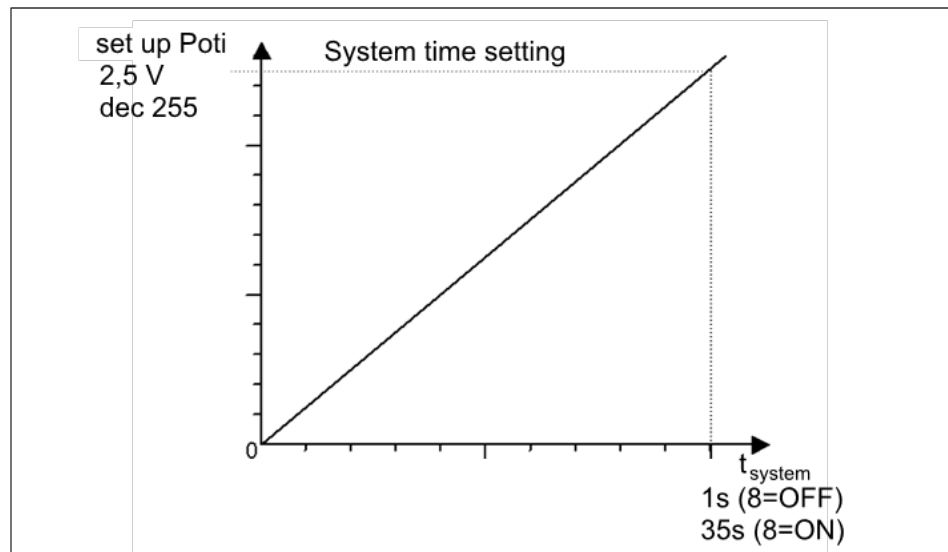
DIP6 = ON: Output D01 will not be received as at radio transmitter, but is “NOT D02”.

9.1.12 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.

9.1.13 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).

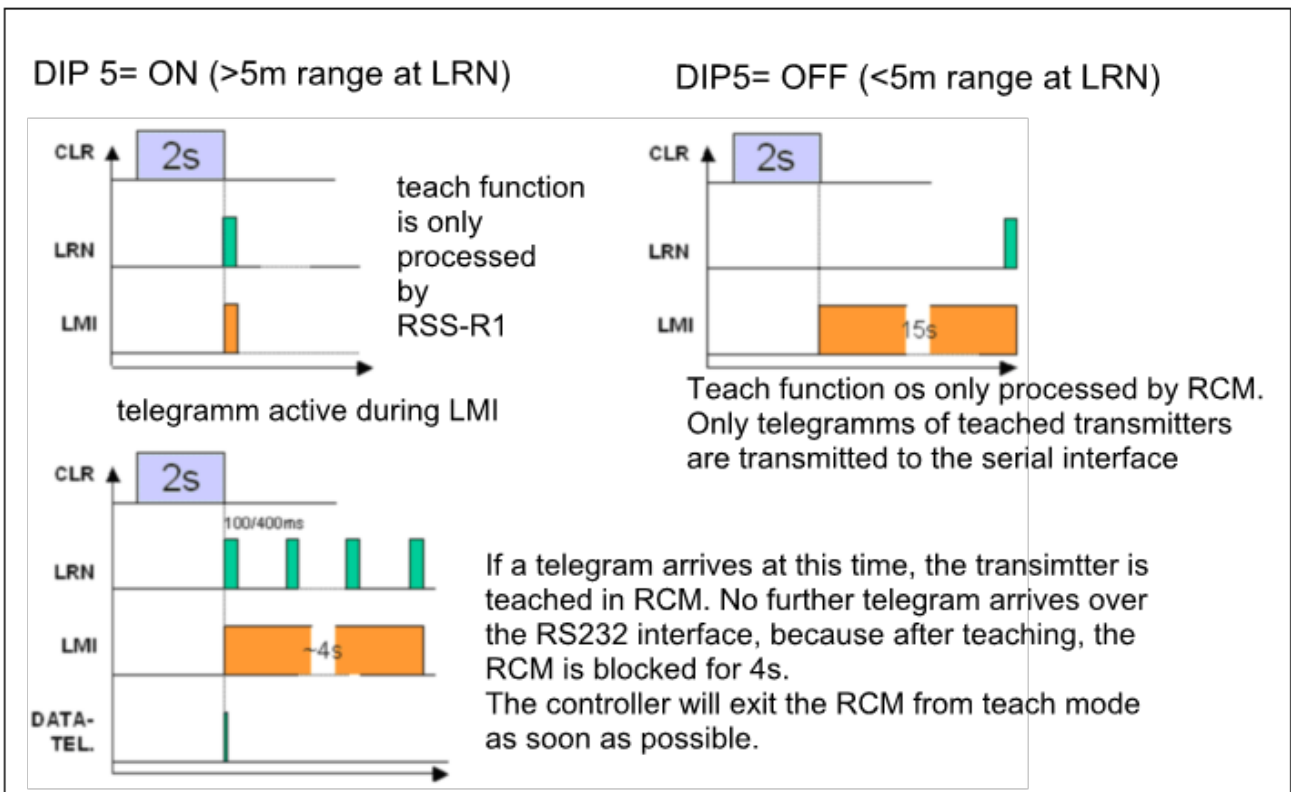
9.1.14 Function of the DIP 5 Extension of the reception range during the learning procedure

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!



9.1.15 Manual setting of transmitter ID (programming)

By simultaneously activating DIP3 and DIP4 at status “INACTIVE”, the switching actuator is placed in the programming mode.

While setting the first ID byte (ID0), the LC LED (incl. output) blinks for 10 s with 0.5 Hz. The LC LED then lights for 2 s to accept the DIP combination.

The input of the ID bytes 1, 2 and 3 is done in the same manner, whereby at the end (accepting ID3) the LC LED lights for 10 s 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

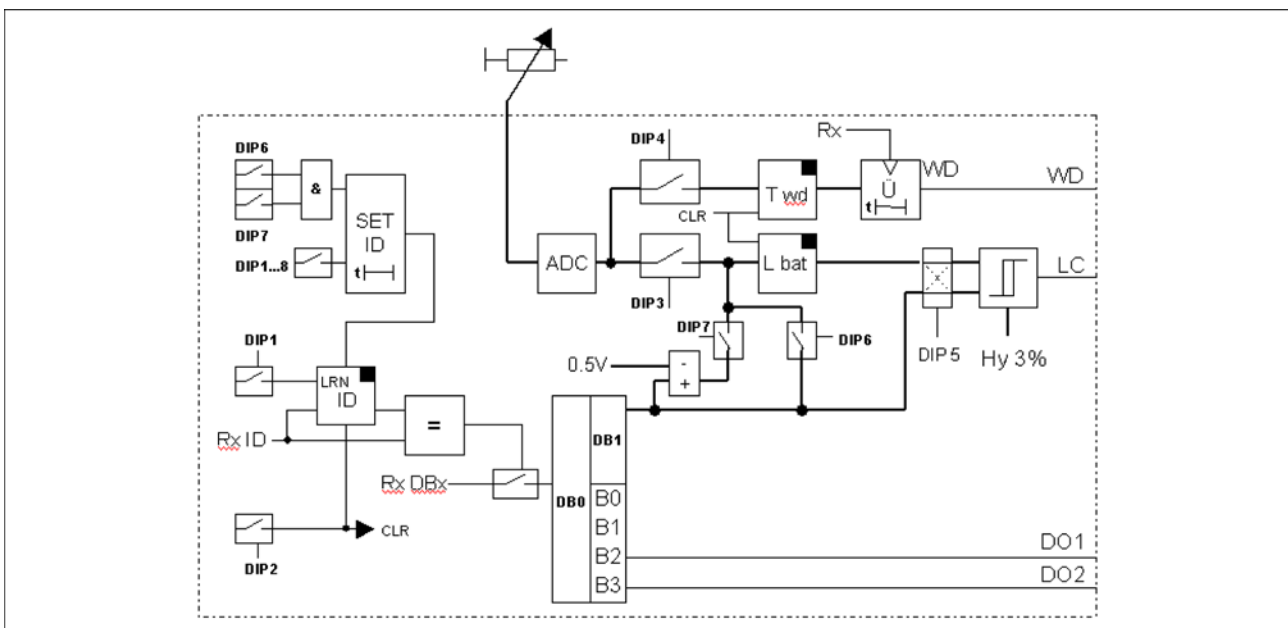
NOTE

Observe the sequence of ID0... ID3 while teaching.

9.1.16 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

9.1.17 Software block diagram



9.2 RSS-P1

9.2.1 Operation

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

9.2.2 Installed pressure switch, setting the switching point.

The installed pressure switch must be set according to the working pressure:

To set the working pressure, the screw (item 10) must be removed. A hexagon socket wrench with a wrench size of 1.5 mm can be used to set the working pressure through the bore hole.

- 1 Turning clockwise sets the switching point to a point with a higher pressure level!
- 2 Turning counterclockwise sets the switching point to a point with a lower pressure level!
- 3 If the pressure is higher than the set switching point on the pressure switch, the LED D02 does not light up > securely clamped.
The output behaves identically:
Low if pressure o.k. ;
High if pressure too low.
- 4 If the pressure in the chuck is too low (lower than the set switching point on the pressure switch), the LED D02 lights up!
> pressure warning or chuck open.



NOTICE

If the red LED WD on the wireless receiver lights up for longer than 0.2 seconds, there is a problem with the wireless contact. The setting work must be interrupted and a check carried out to determine what is causing the problem with the wireless contact.

9.2.3 Setting a defined minimum pressure, method 1

- 1 Set the desired minimum pressure on the maintenance unit! A warning will be issued (LED D02 lights up, output is set) if this pressure is not reached in the process.
- 2 If the LED D02 is not off, the socket screw on the pressure switch must be turned counterclockwise until the LED D02 is off!
- 3 Now turn the socket screw on the pressure switch slowly clockwise until the LED D02 comes on again!
- 4 The pressure on the maintenance unit can now be increased to its normal working pressure again!
- 5 **Checking the function:** If the chuck is now closed with its working pressure, the LED D02 must go out after a short time. If the chuck is now opened again, the LED D02 must light up again after a short time. If the pressure is now set to a value

smaller than the minimum pressure and the chuck is then closed, the LED D02 must not go out even when the chuck is closed.

9.2.4 Setting a minimum pressure that is not precisely defined, method 2

- 1 Set the normal working pressure and close the chuck.
- 2 If the LED D02 is not off, the socket screw on the pressure switch must be turned counterclockwise until the LED D02 is off!
- 3 Now turn the socket screw on the pressure switch slowly clockwise until the LED D02 comes on again!
- 4 The socket screw on the pressure switch can now be turned counterclockwise until the LED goes out and then a 'little bit' further.

NOTE

Unfortunately, the ratio of rotations on the socket screw is not linear to the changes on the switching point in bar. As a reference point, at 6 bar output pressure, it can be assumed that the switching pressure will change by approx. 0.9 bar per $\frac{1}{4}$ counterclockwise rotation.

9.2.5 Checking the function

- 1 If the chuck is now closed with its working pressure, the LED D02 must light up after a short time.
- 2 If the chuck is now opened again, the LED D02 must go out again after a short time.
- 3 If the pressure is now set to a value smaller than the minimum pressure and the chuck is then closed, the LED D02 must not light up even when the chuck is closed.
- 4 Now fix the screw on the pressure switch with an adhesive if necessary and screw the cover of the chuck seal in place over the pressure switch.
- 5 To adjust the switching pressure, simply remove the middle screw from the cover and the screw on the pressure switch can now be adjusted with a suitable hexagon socket wrench through the exposed hole.

NOTE

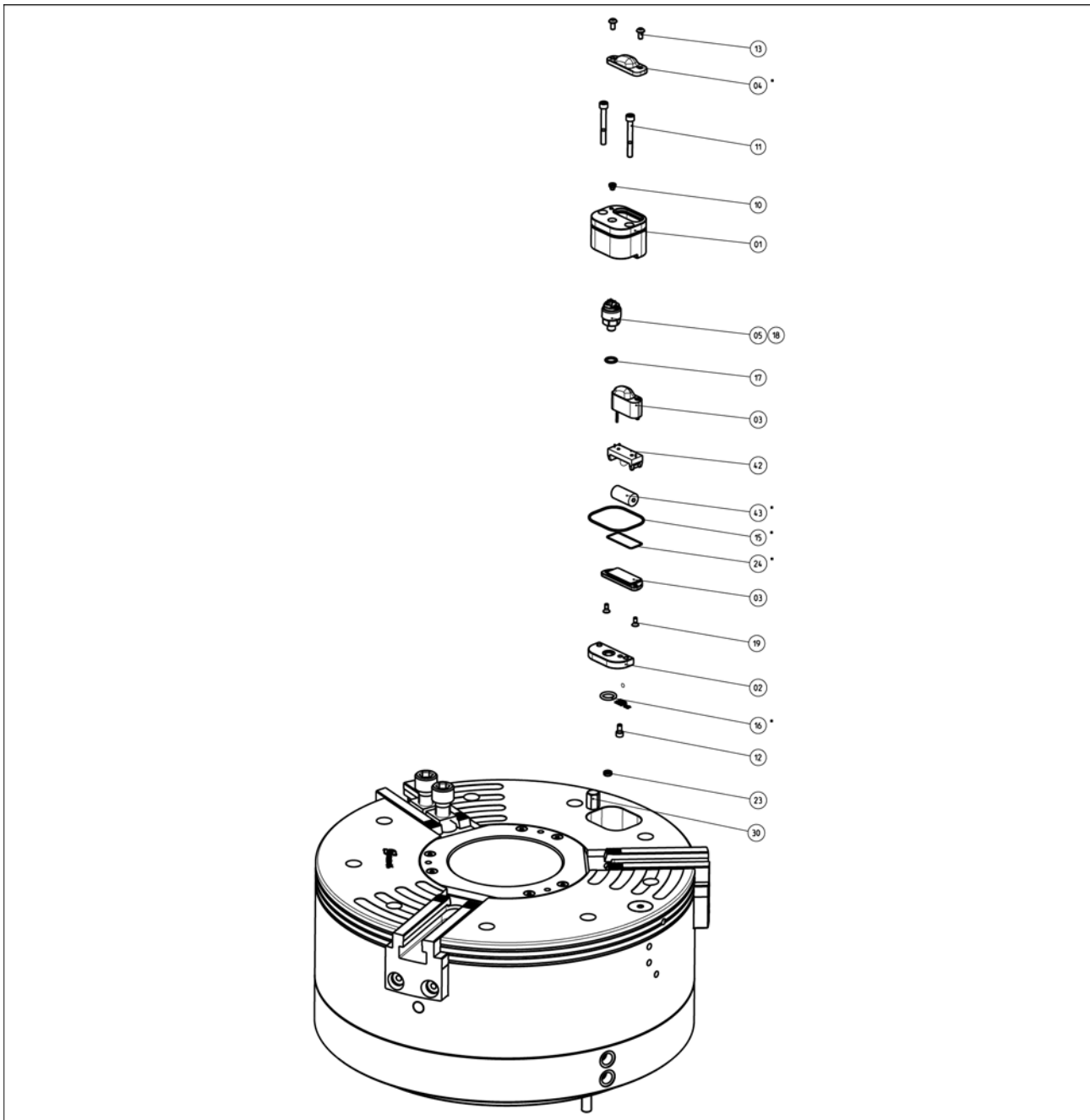
The locking screw in the cover must be air-tight, otherwise the cooling lubricant can enter the system.

10 Maintenance and care

The system is maintenance-free.

Only the life span of the transmitter is limited by the installed battery ([↗ 6, Page 13](#)) and ([↗ 7.2, Page 17](#)).

11 Assembly drawing

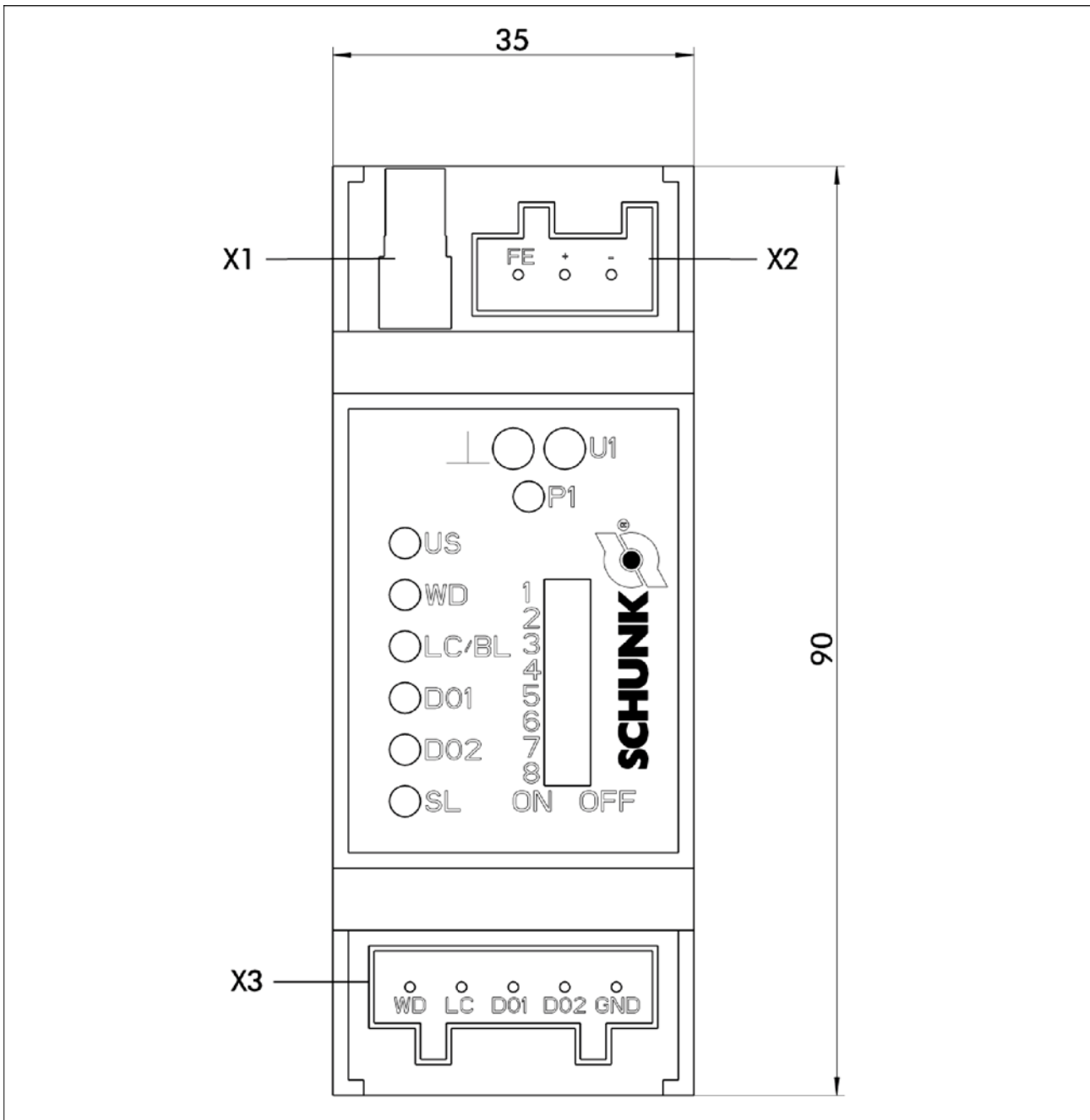


Assembly ROTA TB/EP

* Wearing part

Item	ID number	Designation	Quantity
1	8705398	Housing	1
2	8705399	Plate	1
3	8705400	Plate	1
4	8704194	Cover	1
5	9983337	Pressure switch	1
6	8705401	Transmission unit	1

Item	ID number	Designation	Quantity
10	9659005	Locking screw	1
11	9907277	Screw	2
12	9905212	Screw	1
13	9982315	Screw	2
14	9936336	O-ring	1
15	9611058	O-ring	1
16	9980224	O-ring	1
17	9900574	O-ring	1
18	9983429	Cable lug	2
19	9941643	Screw	2
20	0377700	RSS-R1	1
21	0377730	RSS-R-A	1
22	9982765	Relay with changer	2
23	9983607	Sound absorber	1
24	9964929	O-ring	1
30	0122165	Workpiece bolt	1
40	8704935	Repeater box	1
41	9986183	Coaxial cable	1
42	9988952	Battery bracket	1
43	9988953	Battery	1



Assembly wireless receiver RSS R1

12 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-P1 is used in lathe chucks.

Pressure loss at the lathe chuck during machining may cause the clamped workpiece to loosen itself from the clamping device and to move uncontrollably. As a result there may be significant material damage and/or serious personal injury.

To detect the pressure loss during machining, a pressure sensor connected to the RSS-P1 is checking the pressure. Dropping below a predefined threshold value leads to a change of the signal resulting in a radio signal.

To ensure there is a radio contact, cyclical sending is required every 10 seconds.

NOTE:

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.