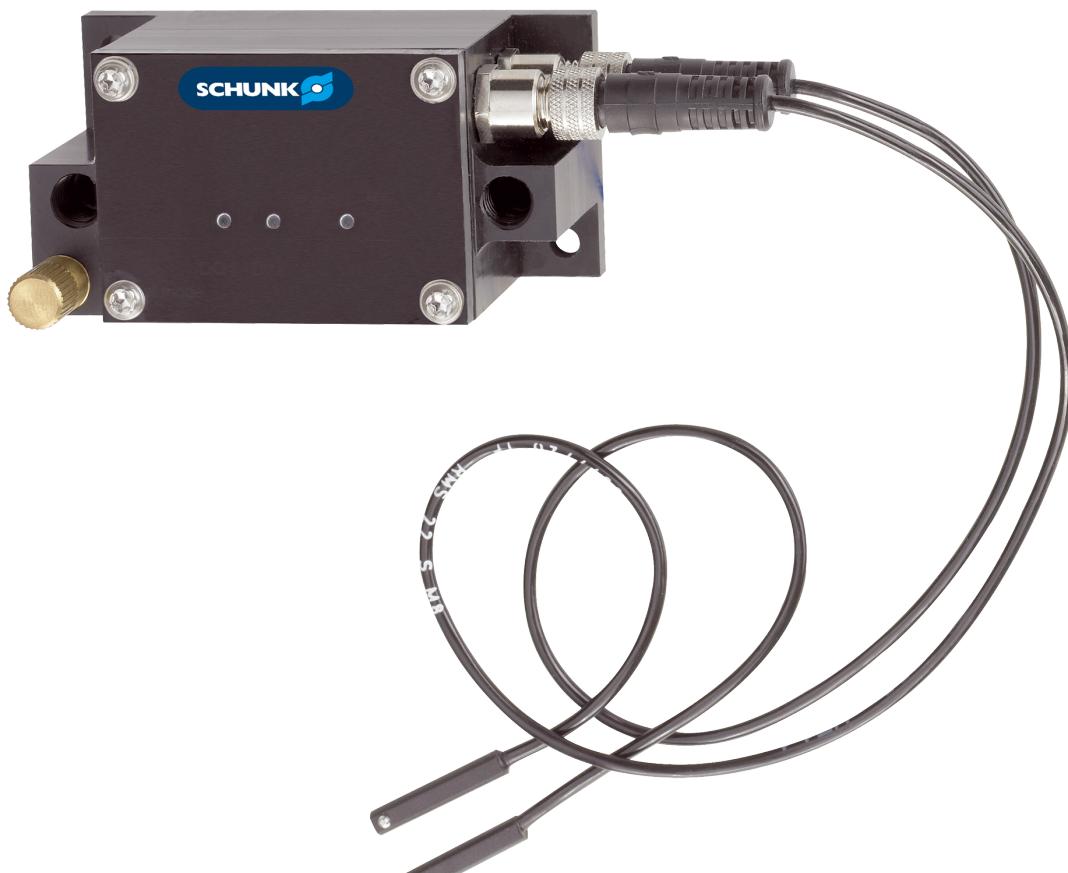


# Assembly and Operating Manual

## RSS R1 receiver, RSS T2-US/CA transmitter

RSS radio sensor system with FCC/IC certification



## Imprint

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Dear Customer,

Thank you for trusting our products and our family-owned company, the leading technology supplier of robots and production machines.

Our team is always available to answer any questions on this product and other solutions. Ask us questions and challenge us. We will find a solution!

Best regards,

Your SCHUNK team

Customer Management

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**Please read the operating manual in full and keep it close to the product.**

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## 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.

In addition to these instructions, the documents listed under ► 1.1.2 [ 5] are applicable.

**NOTE:** The illustrations in this manual are intended to provide a basic understanding and may deviate from the actual version.

#### 1.1.1 Presentation of Warning Labels

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



#### **⚠ DANGER**

**Dangers 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 labeled with an asterisk (\*) can be downloaded from [schunk.com](https://www.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:

- Observe the applicable documents, ▶ 1.1.2 [5]
- Observe the ambient conditions and operating conditions, ▶ 2.3 [7]

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

## 1.3 Scope of delivery

The scope of delivery includes

- Receiver RSS-R1 with FCC/IC-certification
- Transmitter RSS-T2 US/CA with FCC/IC-certification

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### NOTE

**Transmitter and receiver must be ordered separately, see catalog for ID numbers.**

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## 1.4 Accessories

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

For Transmitter RSS-T2-US/CA

- Sensors (max. 2 pieces per RSS-T2)
  - either RMS 80, plus specific adapter kit of gripper
  - or RMS 22
  - or other sensors for normally open contact, without own power consumption

For Receiver RSS-R1

- one antenna RSS-R-A

The complete system consists of:

- RSS-T2-US/CA with two sensors
- Receiver RSS-R1 with antenna RSS-R-A

For information regarding which accessory articles can be used with the corresponding product variants, see catalog data sheet.

## 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.

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#### NOTE

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

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- The product may only be used within the scope of its technical data, ▶ 3 [12].
- The product is intended for installation in a machine/automated system. The applicable guidelines for the machine/automated system must be observed and complied with.
- The product is intended for industrial and industry-oriented use.
- Appropriate use of the product includes compliance with all instructions in this manual.

### 2.2 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.

### 2.3 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.
- 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.

## 2.4 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.

#### 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 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.

## 2.6 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.

## 2.7 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.



## **2.8 Fundamental dangers**

### **General**

- Observe safety distances.
- Never deactivate safety devices.
- Before commissioning the product, take appropriate protective measures to secure the danger zone.
- Disconnect power sources before installation, modification, maintenance, or calibration. Ensure that no residual energy remains in the system.
- If the energy supply is connected, do not move any parts by hand.
- Do not reach into the open mechanism or movement area of the product during operation.

### **2.8.1 Protection against electric shock**

#### **Work on electrical equipment**

Touching live parts may result in death.

- Work on the electrical equipment may only be carried out by qualified electricians in accordance with the electrical engineering regulations.
- Lay electrical cables properly, e. g. in a cable duct or a cable bridge. Observe standards.
- Before connecting or disconnecting electrical cables, switch off the power supply and check that the cables are free of voltage. Secure the power supply against being switched on again.
- Before switching on the product, check that the protective earth conductor is correctly attached to all electrical components according to the wiring diagram.
- Check whether covers and protective devices are fitted to prevent contact with live components.
- Do not touch the product's terminals when the power supply is switched on.

**Possible electrostatic energy**

Components or assembly groups may become electrostatically charged. When the electrostatic charge is touched, the discharge may trigger a shock reaction leading to injuries.

- The operator must ensure that all components and assembly groups are included in the local potential equalisation in accordance with the applicable regulations.
- While paying attention to the actual conditions of the working environment, the potential equalisation must be implemented by a specialist electrician according to the applicable regulations.
- The effectiveness of the potential equalisation must be verified by executing regular safety measurements.

### 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
receive frequency [MHz]	868,3
Nominal voltage [VDC]	24
min. voltage [V]	10
max. voltage [V]	30
max. switching current per canal [mA]	500
protocol	EnOcean Standard
short circuit proof	yes
IP rating	20
assembly type	attachment to DIN track (EN50022)
measurements	Assembly drawing
connection technology	CAGE CLAMP® connection 0,08...2,5mm <sup>2</sup> WAGO multi connector system series 722
housing material	polycarbonate
Ambient temperature [°C]	
Min.	0
Max.	55
storage temperature [°C]	
Min.	-25
Max.	+75
electromagnetic compatibility (EMC)	CE mark for EMC-directive 89/336/EEG and R&TTE
interference emission	EN 61000-6-4
interference immunity	EN 61000-6-2
other norms	ETSI EN 301 489-1 (09/01), ETSI EN 301 489-3 (11/01), ETSI EN 300 220-1 (09/00)
radio permit En Ocean Receiver RCM 100	CETECOM test report 2_3041-01-02/02 DAR test report POZNNP1P
Antenna	
ID number	0377730
assembly	magnetic base
cable length [m]	2.5
connection at cable end	SMA mini
usage	connection to receiver RSS-R1

### 3.2 Technical data - RSS T2

ID number	0377717
Transmission frequency [MHz]	868.3
Sensor connection	2x M8
Integrated power supply	Lithium battery
Housing material	PUR
Protocol	EnOcean Standard
IP rating	67
Ambient temperature [°C]	
Min.	0
Max.	50
Weight [kg]	0.16
Radio permit	FCC UW6-03777V2 Date of Grant: 08/03/2016
	ICC 6601A-03777V2 Date of Grant: 08/04/2016

### 3.3 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.

## 4 Assembly

### 4.1 Assembly of the transmitter RSS T2

1. Install the housing in a suitable position next to the sensor fastening using two screws M4.
2. - Install the sensor (closer) at the gripper.
3. Fasten the M8 sensor plugs with screws to the transmitter.
4. For adjustment of the sensors the magnetic brackets of the transmitter can be plugged into 'test mode' position. Now you can see the individual sensors' status on the LEDs. Position the sensors at a suitable position and finally screw the magnetic switch onto the 'normal mode' position.
5. Never leave the magnetic bracket in 'test mode' position, otherwise the battery of the transmitter will be discharged within a few days!

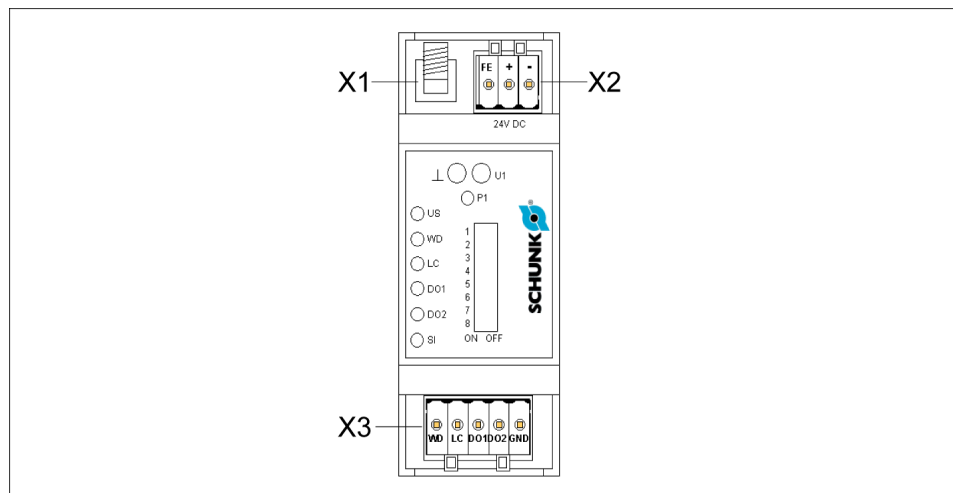
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#### NOTE

**Always use closers. Otherwise the system cannot recognize a changing status of the sensors, i.e. if a sensor is open while the signal of another sensor changes.**

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## 4.2 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 24DCV+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 1 week capacity remaining.
    - X3.3 DO1 Output 1, sensor signal 1, Low, if sensor actuated.
    - X3.4 DO2 Output 2, sensor signal 2, Low, if sensor actuated.
    - X3.5 GND Reference ground for the outputs
3. Mount the antenna on the top of the switching cabinet using the magnetic base.



## 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.

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#### 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.**

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#### 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 Programming the transmitter to the receiver

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### NOTE

Programming may fail in the event of an unfavorable combination of transmitter and receiver or due to external interference. The programming may therefore need to be repeated multiple times.

---

1. Unscrew the antenna of the RSS-R1 (receiver).
2. For the best possible programming, deactivate all other RSS-T2 (transmitters) within 15 meters.
3. Place the RSS-T2 (transmitter) 0.5 meters away from the RSS-R1 (receiver).
4. Put the RSS-T2 (transmitter) into test mode (recommended by SCHUNK) or normal mode.
5. Change DIP switch 1 on the RSS-R1 (receiver) to "ON" and then immediately back to "OFF".  
✓ The receiver is now in Teach mode.
6. Toggle the input D01 on the RSS-T2 (transmitter) to establish a connection between transmitter and receiver (e.g. by moving the product to be received multiple times).

### Register in the RSS-R1 (receiver)

The RSS-R1 (receiver) has an integrated register. It is used to save learned transmission units. This can be deleted upon a battery change, or as required. To do this, disconnect the voltage supply of the receiver for at least one minute.

## 5.3 Testing the antenna position

1. Observe the LED 'SI'. This LED signals the current quality of the radio link. This LED 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.

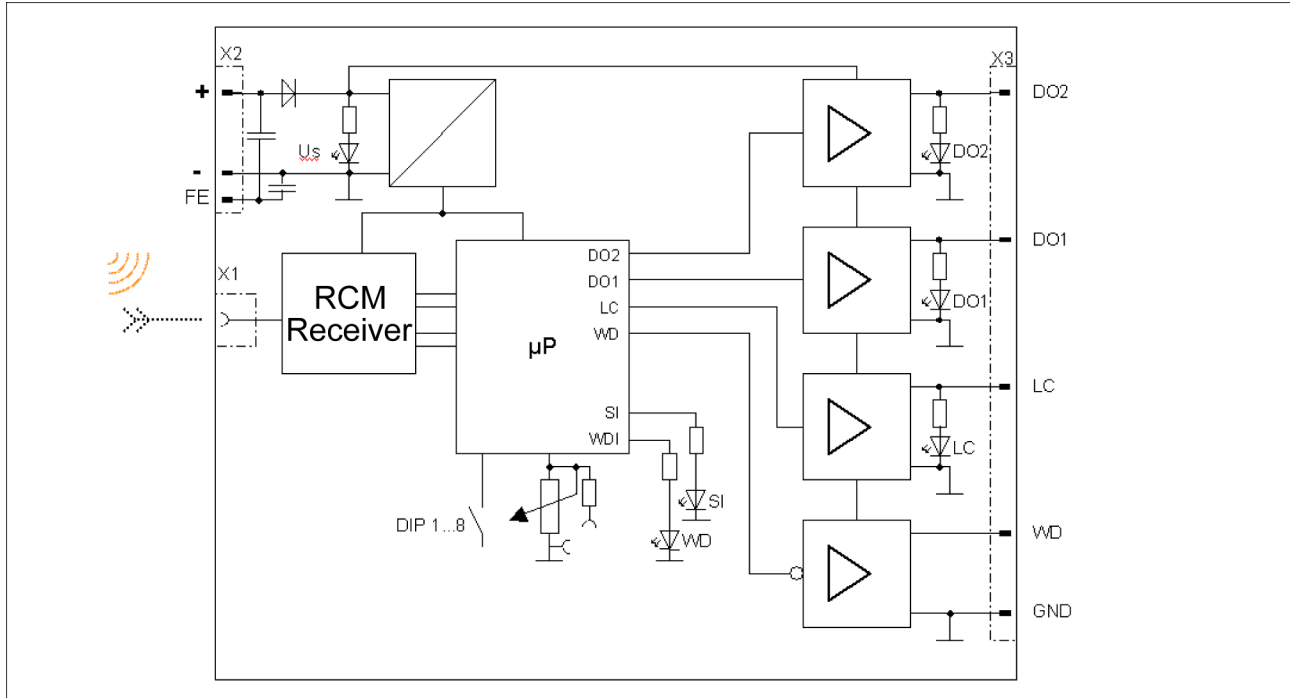
## 5.4 Adjusting the watchdog time at the receiver

1. Adjust watchdog time to best suit your 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 through 0 VDC the down-time of the transmission path.
2. Switch Dip 4 to on.
3. Turn the potentiometer clockwise to extend the time. The set time can be determined from the flash rate of the WD LED. With DIP 8 switched off, the time can be varied between 0 and one second. SCHUNK recommends setting the time to 15 seconds with DIP 8 switched on. SCHUNK recommends setting the time to 15 seconds with DIP 8 switched on.
4. Switch DIP 4 to 'off' (leave DIP 8 in the selected position!).

## 6 Functional description

### 6.1 RSS-R1

#### 6.1.1 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.

### 6.1.2 LED

LED (color)	Status	Meaning
US (green)	Off On	Power supply status <ul style="list-style-type: none"> <li>no power supply available</li> <li>24 V DC OK</li> </ul>
WD (red)	Off / flash  0.5 Hz flashing 2 Hz On	Status system check and operating mode <ul style="list-style-type: none"> <li>Operating condition active (reception active) 15 ms "flash" indicates reception of a "taught" telegram</li> <li>Learning state</li> <li>Missing allocation; sensor must be "taught"</li> <li>Watchdog activated (not storing), no reception of the 2 data telegrams from the taught-in sensor within the monitoring period (output is inverted!)</li> </ul>
LC/BL (yellow)	Off On 0.5 Hz flashing	Status of limit alarm/battery monitoring (MIN detector) <ul style="list-style-type: none"> <li>Value below minimum limit output LOW</li> <li>Limit value not reached output HIGH</li> <li>Teach-in mode via DIP 3 and DIP 4 active</li> </ul>
DO1 (yellow)	Off On	Status Sensor 1 <ul style="list-style-type: none"> <li>Status 0 output LOW</li> <li>Status 1 output HIGH</li> </ul>
DO2 (yellow)	Off On	Status Sensor 2 <ul style="list-style-type: none"> <li>Status 0 output LOW</li> <li>Status 1 output HIGH</li> </ul>
SI (yellow/red)	Continuous green LED Flashing green LED Continuous orange LED Flashing orange LED Continuous red LED Flashing red LED	Signal strength display <p>Optimal signal</p> <p>Very good signal</p> <p>Good signal</p> <p>Medium signal</p> <p>Poor signal</p> <p>Critical signal</p> <p>Definition of flashing: 200 ms on, then 200 ms off</p>

### 6.1.3 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

### 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	<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>
LEARNING	<p><b>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.</b></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>
ACTIVE	<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>
System monitoring / WATCHDOG	<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 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>



### 6.1.6 Time response

The time lag between measurable telegrams must be at least 50 ms. For small grippers, the time between 'Gripper open' and 'Gripper closed' is considerably shorter. However, it is possible here to set a sensor for 'Gripper open' and the other sensor for 'Gripper closed'. As the gripper usually either opens or grips a part, but very rarely closes completely, the system can be programmed as with cable-based sensors.

If the gripper now closes completely due to a missing component, the gripper closed message comes ten seconds late.

### 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	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

#### 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

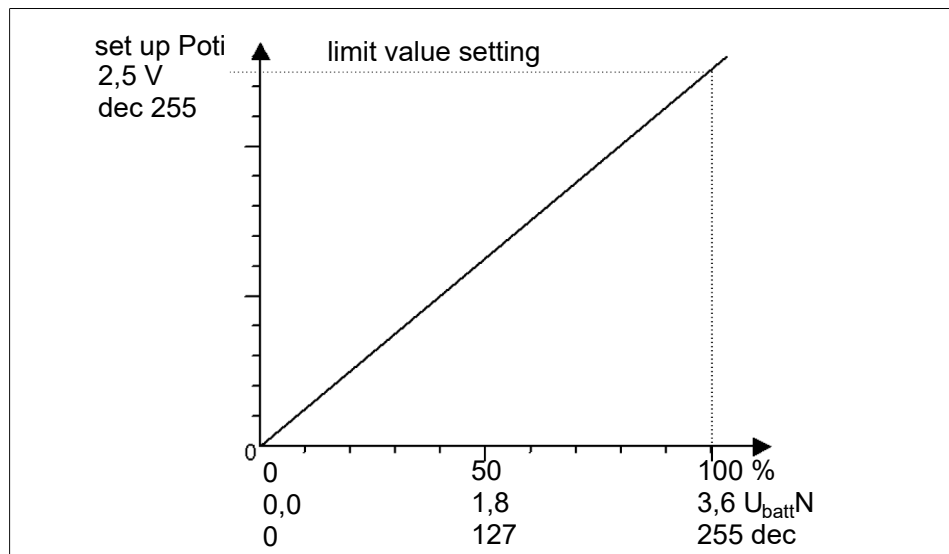
In the delivery condition (DIP 2 =OFF“) the flashing SI LED indicates the signal distance from the useful signal and the noise signal. The measurement of the 'noise level' is taken every 20 ms (watchdog time 0 to 1s), or approx. every  $t = (\text{set watchdog time} / 64 \text{ measurements})$  (watchdog 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		$2.43 < \text{RSSI} \leq 2.5$
	Flashing green/orange LED	Good signal		$2.37 < \text{RSSI} < 2.43$
	Flashing orange/red LED	Medium signal		$2.00 < \text{RSSI} < 2.37$
	Continuous red LED	Poor signal		$1.60 < \text{RSSI} < 2.00$
	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:

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).

### 6.1.11 Setting the output behaviour

#### Functional change of the output signal D01

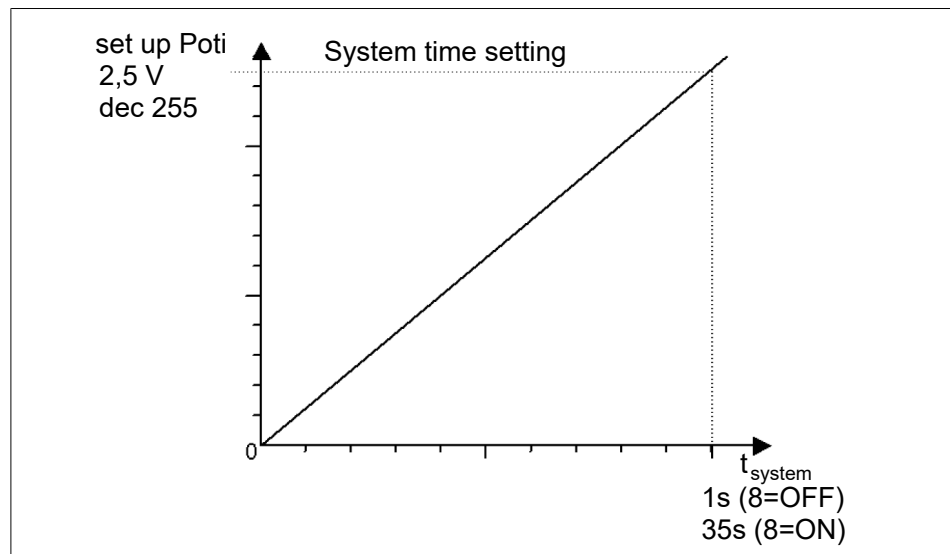
**DIP6 = ON:** Output D01 will not be received as at radio transmitter, but is “NOT D02”.

### 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).

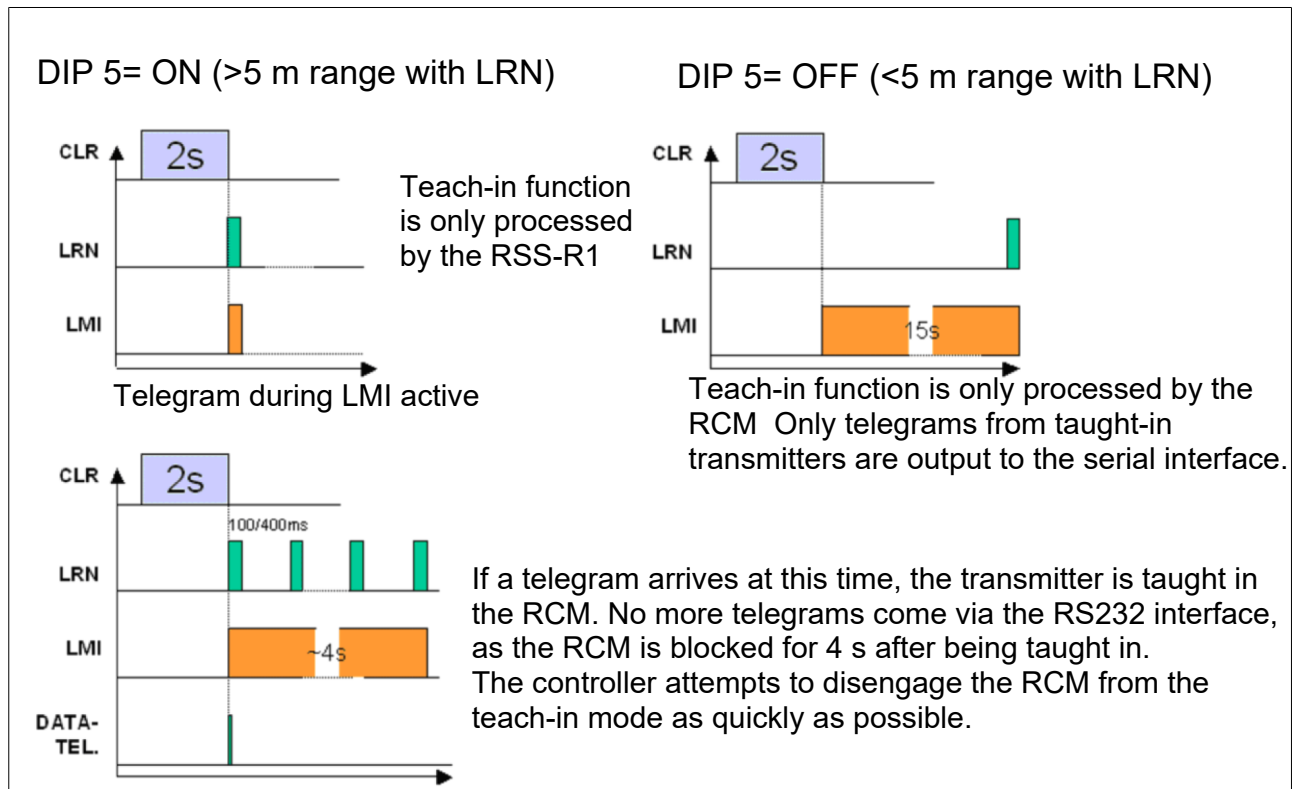
#### 6.1.14 Function of the DIP 5 Extension of the reception range during the learning procedure

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!



### 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

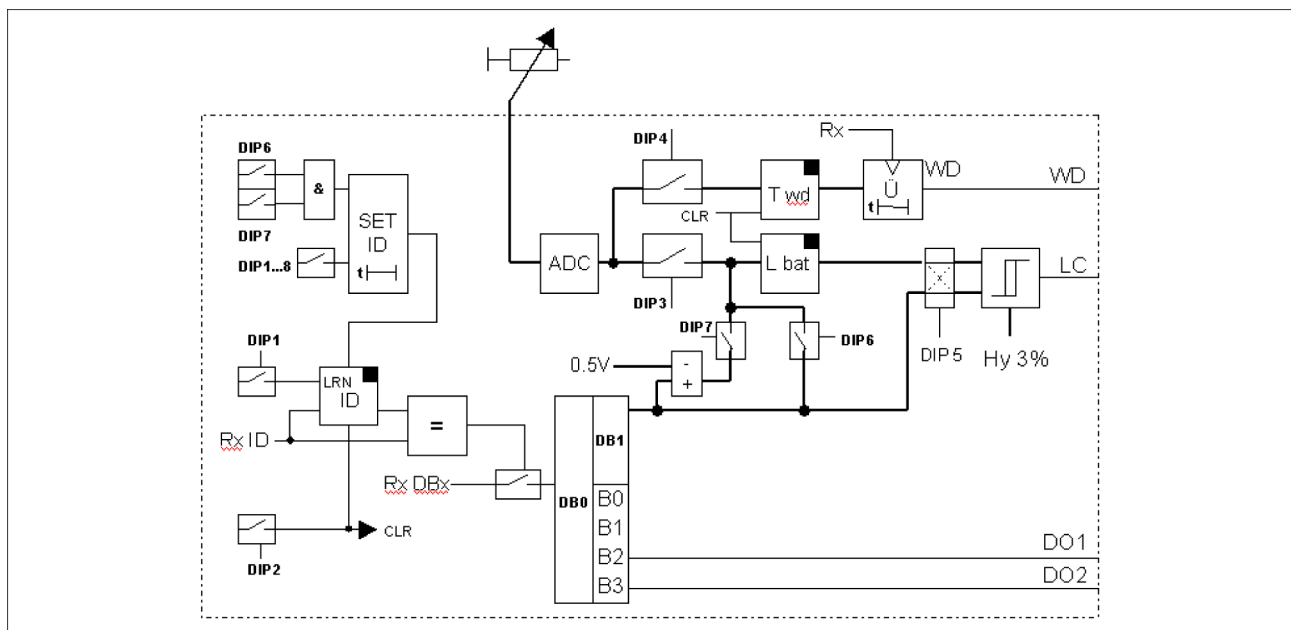
## NOTE

**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-T2-US/CA

### 6.2.1 Operation

The transmitter module is not equipped with conventional control elements. Two reed switches are integrated instead, which can be operated via screw fastened magnetic brackets. Unscrew the magnetic bracket of its present position. Screw in the magnetic bracket into the desired position again.

If the magnetic bracket should not be screwed in somewhere, this will correspond to the „normal mode“.

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 Operation mode

#### **Storage mode:**

This is the delivery and storage state of the transmitter. The advantage here is the low energy consumption. The life span of the battery is hardly shortened during storage.

The transmitter reacts to changes in the two sensor inputs with a wireless telegram, but doesn't transmit any presence signal.

#### **Normal mode:**

The transmitter is operated in this mode

Der Sender sendet alle 10 sek ein Watchdogsignal. Zusätzlich wird bei einer Änderung der Sensorsignale ein Präsenzsinal gesendet. Die Anzeigeelemente am Sender sind während des Normalbetriebs deaktiviert.

#### **Test mode:**

In this mode, the two sensors are set up and the transmitter is tested. These mode puts heavy load on the battery and should only be used **for a short period of time!**

The display elements of the transmitter are activated during test mode.

After switching to test mode, the transmitter sends a watchdog signal only when the switch is attenuated. The Tx LED then lights up regularly



### 6.2.3 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.
TX	A radiogram is sent just now.

## 7 Maintenance and care

The system is maintenance-free.

Only the life span of the transmitter is limited by the battery installed ► 3 [12]. To change the battery, contact SCHUNK Service.

## 8 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-T2-US/CA is used at grippers.

Incorrectly gripping the workpiece may cause the gripped workpiece to loosen itself out of the gripper fingers during movement and to move uncontrollably. As a result there may be significant material damage and/or serious personal injury.

To detect if the gripper fingers are positioned correctly, up to 2 reed switches can be attached to the gripper and in this way 2 positions can be monitored. If the correct position is reached, the signal at the sensor is changed which results 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.

## 9 Difference to the previous product

designation	previous product	current product
transmitter	RSS-T2	RSS T2-US/CA
ID-number	0377710	0377717

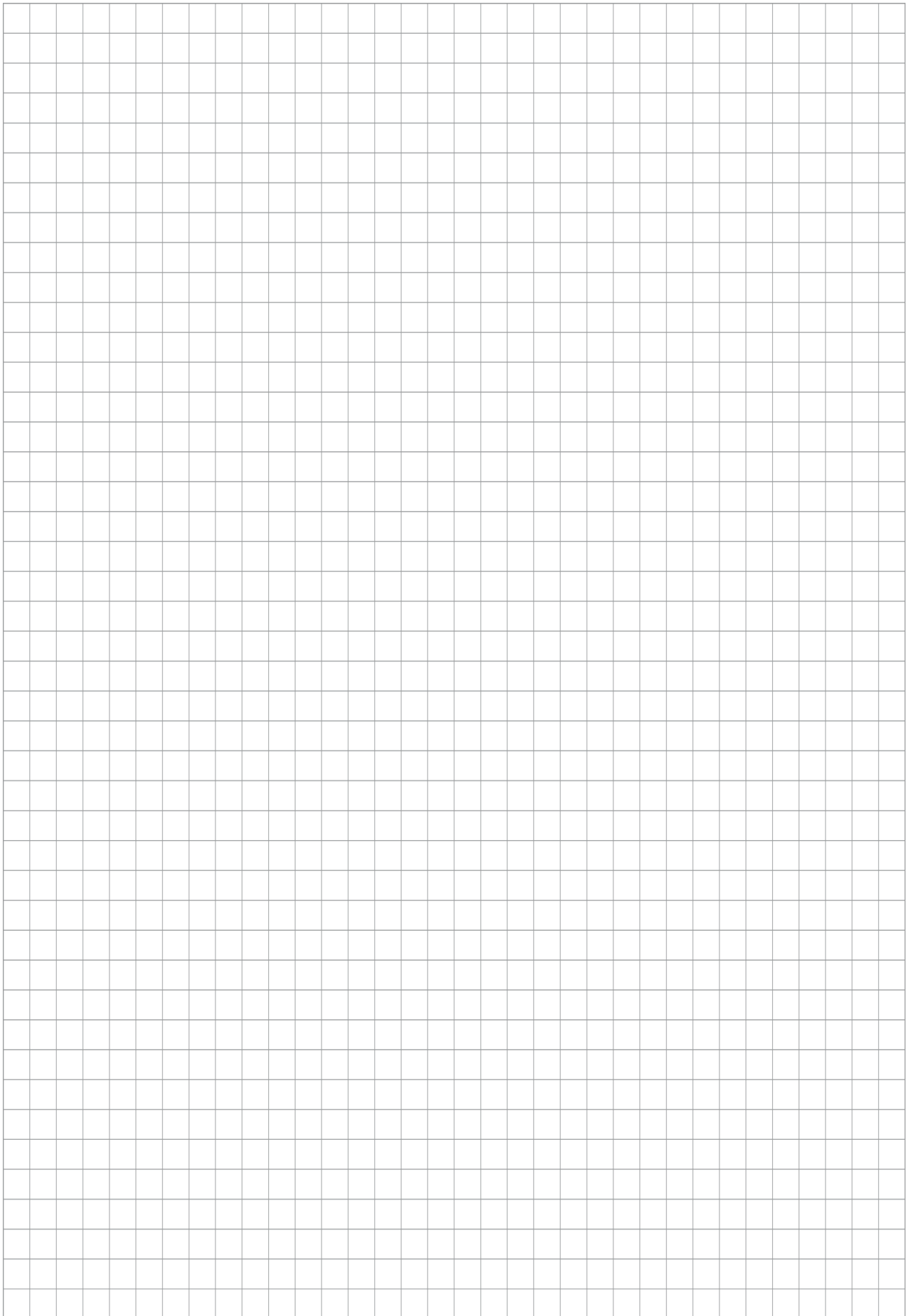
Both products differ in their watchdog time:

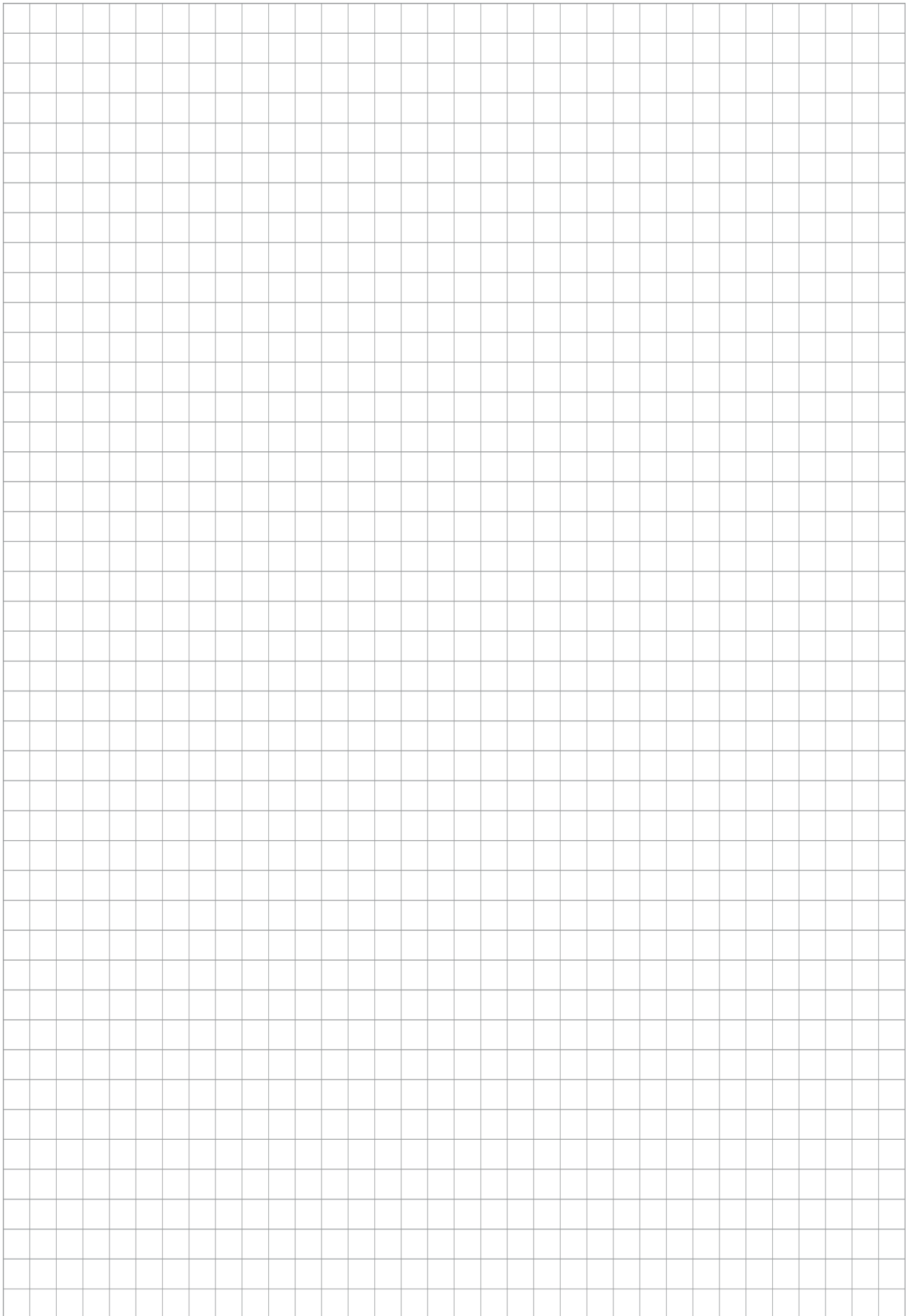
- **RSS-T2:** watchdog time = 1 sec
- **RSS T2-US/CA:** watchdog time = 10 sec

If the transmitter is changed/replaced in a consisting system, the watchdog time of the receiver has to be adjusted, ► [5.4 \[19\]](#).

SCHUNK recommends setting the watchdog time to 15 seconds.

If the watchdog time of the receiver is not adapted, this could lead to error messages in the system.







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