



# KNX R sl

## Precipitation Sensor

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Item number 70165





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Installation, inspection, commissioning and troubleshooting of the device must only be carried out by a competent electrician.

This manual is amended periodically and will be brought into line with new software releases. The change status (software version and date) can be found in the contents footer. If you have a device with a later software version, please check **www.elsner-elektronik.de** in the menu area "Service" to find out whether a more up-to-date version of the manual is available.

## Clarification of signs used in this manual



Safety advice.



Safety advice for working on electrical connections, components, etc.

### **DANGER!**

... indicates an immediately hazardous situation which will lead to death or severe injuries if it is not avoided.

### **WARNING!**

... indicates a potentially hazardous situation which may lead to death or severe injuries if it is not avoided.

### **CAUTION!**

... indicates a potentially hazardous situation which may lead to trivial or minor injuries if it is not avoided.



**ATTENTION!** ... indicates a situation which may lead to damage to property if it is not avoided.

### ETS

In the ETS tables, the parameter default settings are marked by underlining.

# 1. Description

The **Precipitation Sensor KNX R sl** for the KNX building bus system detects precipitation. Two switching outputs, AND logic gates and OR logic gates are available.

The compact housing of the **KNX R sl** accommodates the sensors, evaluation circuits and bus-coupling electronics.

## Functions:

- **Precipitation detection:** The sensor surface is heated, so that only drops and flakes are recognised as precipitation, but not mist or dew. When the rain or snow stops, the sensor is soon dry again and the precipitation warning ends
- **2 switching outputs** (communication objects)
- **4 AND and 4 OR logic gates**, each with 4 inputs. All switching events as well as 16 logic inputs (in the form of communications objects) can be used as inputs for the logic gates. The output of each gate can be configured optionally as 1-bit or 2 x 8-bit

Configuration is made using the KNX software ETS. The **product file** can be downloaded from the Elsner Elektronik website on [www.elsner-elektronik.de](http://www.elsner-elektronik.de) in the "Service" menu.

## 1.0.1. Deliverables

- Sensor
- Connection cable approx. 3 m, with plug
- Surface-mounted junction box (IP 55)
- Worm drive hose clips Ø 40-60 mm
- 4x50 mm stainless steel roundhead screws and 6x30 mm dowels for wall mounting. Use fixing materials that are suitable for the base!

## 1.1. Technical specification

Housing	Plastic
Colour	White / Translucent
Assembly	Surface mount
Protection category	IP 44
Dimensions	approx. 62 x 71 x 145 (W x H x D, mm)
Weight	approx. 80 g
Ambient temperature	Operation -25...+85°C, storage -30...+85°C
Auxiliary supply	12...40 V DC, 12...28 V AC. An appropriate power supply unit can be purchased from Elsner Elektronik.
Auxiliary current	at 12V DC: max. 185 mA at 24V DC: max. 90 mA at 24V AC: max. 82 mA
Bus current	max. 10 mA

Data output	KNX +/-
BCU type	Integrated microcontroller
PEI type	0
Group addresses	max. 254
Assignments	max. 254
Communication objects	54

The product conforms with the provisions of EU directives.

## 2. Installation and start-up

### 2.1. Installation notes



Installation, testing, operational start-up and troubleshooting should only be performed by an electrician.



#### **CAUTION!** **Live voltage!**

There are unprotected live components inside the device.

- National legal regulations are to be followed.
- Ensure that all lines to be assembled are free of voltage and take precautions against accidental switching on.
- Do not use the device if it is damaged.
- Take the device or system out of service and secure it against unintentional use, if it can be assumed, that risk-free operation is no longer guaranteed.

The device is only to be used for its intended purpose. Any improper modification or failure to follow the operating instructions voids any and all warranty and guarantee claims.

After unpacking the device, check it immediately for possible mechanical damage. If it has been damaged in transport, inform the supplier immediately.

The device may only be used as a fixed-site installation; that means only when assembled and after conclusion of all installation and operational start-up tasks and only in the surroundings designated for it.

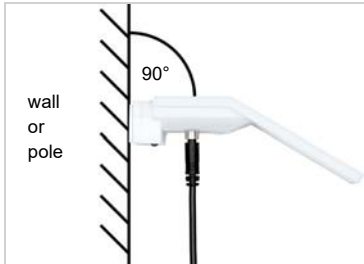
Elsner Elektronik is not liable for any changes in norms and standards which may occur after publication of these operating instructions.

### 2.2. Installation location

Select an installation position on the building where the sensor can measure rain without hindrance. No structural elements should be mounted above the weather station,

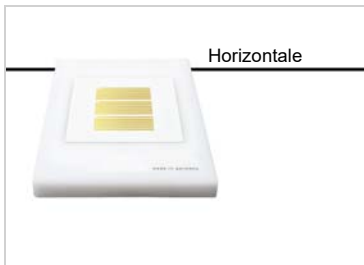
from which water could continue to drop on the precipitation sensor even after it has stopped raining or snowing.

The mounting position must be selected so that the precipitation sensor cannot be touched by persons.



*Fig. 1*

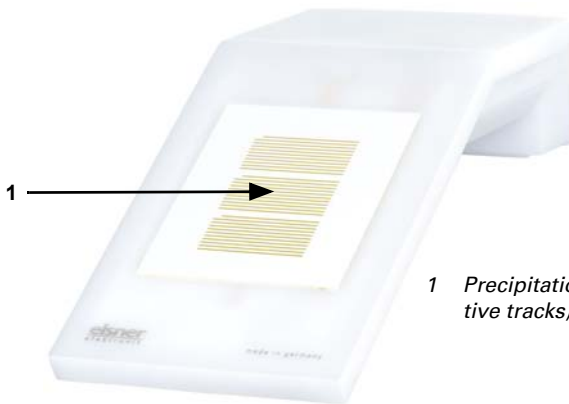
*The device must be attached to a vertical wall (or a pole).*



*Fig. 2*

*The device must be mounted in the horizontal (transverse) direction.*

## 2.3. Position of the rain sensor



*Fig. 3*

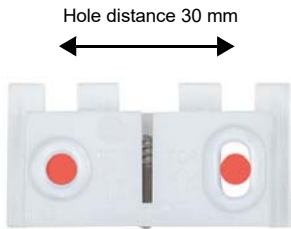
*1 Precipitation sensor (Area with conductive tracks)*

## 2.4. Sensor assembly

### 2.4.1. Attaching the mount

First mount the bracket for wall or pole mounting. To do this, loosen the screw connection of the holder with a cross-headed screwdriver.

#### Wall mounting

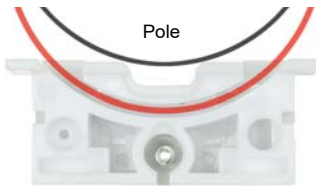


*Fig. 4 Front view*

Screw the holder to the wall with two screws. Use fixing materials (dowels, screws) that are suitable for the base. Make sure that the arrows point upwards.

#### Pole mounting

The device is mounted to the pole with the enclosed clamp.



*Fig. 5 Bottom view*

Insert the clamp through the recess in the bracket. Tighten the clamp on the pole. Make sure that the arrows point upwards.

### 2.4.2. Fitting and connecting the device



*Fig. 6*

1. Slide the device onto the mounting from above.



2. Tighten the screw of the mounting to secure the device.
3. Screw the M8 connector of the connection cable to the connection socket on the bottom of the device.

Connect the loose end of the connection cable to the KNX bus and auxiliary voltage. Use the supplied connection box and the terminals.

<i>KNX bus:</i>	<i>Auxiliary voltage:</i>
+ <i>red</i>	+ <i>yellow</i>
- <i>black</i>	- <i>white</i>

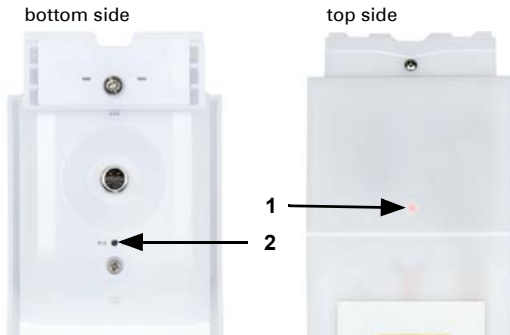
## 2.5. Instructions for assembly and initial start-up

After the auxiliary voltage has been applied, the device will enter an initialisation phase lasting a few seconds. During this phase no information can be received or sent via the bus.

## 3. Addressing the equipment

The equipment is delivered ex works with the bus address 15.15.255. You program a different address in the ETS by overwriting the address 15.15.255 or teach the device using the programming button.

The programming button can be reached through the opening on the underside of the housing; it is recessed by approx. 15 mm. Use a thin object to reach the key, e. g. a 1.5 mm<sup>2</sup> wire.



*Fig. 7*

- 1 *Programming LED (under the semi-transparent lid)*
- 2 *Programming button for teaching the device*

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## 4. Maintenance

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**WARNING!****Risk of injury caused by components moved automatically!**

The automatic control can start system components and place people in danger (e.g. moving windows/awnings if a rain/wind alarm has been triggered while cleaning).

- Always isolate the device from the mains for servicing and cleaning.
- 

The device must regularly be checked for dirt twice a year and cleaned if necessary. In case of severe dirt, the sensor may not work properly anymore.

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**ATTENTION**

The device can be damaged if water penetrates the housing.

- Do not clean with high pressure cleaners or steam jets.
-

## 5. Transfer protocol

### 5.1. List of all communications objects

#### Abbreviation flags:

*C* Communication

*R* Read

*W* Write

*T* Transmit

*U* Update

No.	Text	Function	Flags	DPT type	Size
0	Software version	Output	R-CT	[217.1] DPT_Version	2 bytes
1	Rain: Switching output	Output	R-CT	[1.1] DPT_Switch	1 bit
2	Rain: Switching output with fixed delays	Output	R-CT	[1.1] DPT_Switch	1 bit
3	Rain: Switching delay to rain	Input	-WC-	[7,005] DPT_TimePeriodSec	2 bytes
4	Rain: Switching delay to no rain	Input	-WC-	[7,005] DPT_TimePeriodSec	2 bytes
6	Logic input 1	Input	-WC-	[1.2] DPT_Bool	1 bit
7	Logic input 2	Input	-WC-	[1.2] DPT_Bool	1 bit
8	Logic input 3	Input	-WC-	[1.2] DPT_Bool	1 bit
9	Logic input 4	Input	-WC-	[1.2] DPT_Bool	1 bit
10	Logic input 5	Input	-WC-	[1.2] DPT_Bool	1 bit
11	Logic input 6	Input	-WC-	[1.2] DPT_Bool	1 bit
12	Logic input 7	Input	-WC-	[1.2] DPT_Bool	1 bit
13	Logic input 8	Input	-WC-	[1.2] DPT_Bool	1 bit
14	Logic input 9	Input	-WC-	[1.2] DPT_Bool	1 bit
15	Logic input 10	Input	-WC-	[1.2] DPT_Bool	1 bit
16	Logic input 11	Input	-WC-	[1.2] DPT_Bool	1 bit
17	Logic input 12	Input	-WC-	[1.2] DPT_Bool	1 bit
18	Logic input 13	Input	-WC-	[1.2] DPT_Bool	1 bit
19	Logic input 14	Input	-WC-	[1.2] DPT_Bool	1 bit
20	Logic input 15	Input	-WC-	[1.2] DPT_Bool	1 bit
21	Logic input 16	Input	-WC-	[1.2] DPT_Bool	1 bit
22	AND logic 1: 1-bit switching output	Output	R-CT	[1.2] DPT_Bool	1 bit
23	AND logic 1: 8-bit output A	Output	R-CT	[5.010] DPT_Value_1_Ucount	1 byte
24	AND logic 1: 8-bit output B	Output	R-CT	[5.010] DPT_Value_1_Ucount	1 byte
25	AND logic 1: Block	Input	-WC-	[1.1] DPT_Switch	1 bit
26	AND logic 2: 1-bit switching output	Output	R-CT	[1.2] DPT_Bool	1 bit
27	AND logic 2: 8-bit output A	Output	R-CT	[5.010] DPT_Value_1_Ucount	1 byte

No.	Text	Function	Flags	DPT type	Size
28	AND logic 2: 8-bit output B	Output	R-CT	[5.010] DPT_Value_1_Ucount	1 byte
29	AND logic 2: Block	Input	-WC-	[1.1] DPT_Switch	1 bit
30	AND logic 3: 1-bit switching output	Output	R-CT	[1.2] DPT_Bool	1 bit
31	AND logic 3: 8-bit output A	Output	R-CT	[5.010] DPT_Value_1_Ucount	1 byte
32	AND logic 3: 8-bit output B	Output	R-CT	[5.010] DPT_Value_1_Ucount	1 byte
33	AND logic 3: Block	Input	-WC-	[1.1] DPT_Switch	1 bit
34	AND logic 4: 1-bit switching output	Output	R-CT	[1.2] DPT_Bool	1 bit
35	AND logic 4: 8-bit output A	Output	R-CT	[5.010] DPT_Value_1_Ucount	1 byte
36	AND logic 4: 8-bit output B	Output	R-CT	[5.010] DPT_Value_1_Ucount	1 byte
37	AND logic 4: Block	Input	-WC-	[1.1] DPT_Switch	1 bit
38	OR logic 1: 1-bit switching output	Output	R-CT	[1.2] DPT_Bool	1 bit
39	OR logic 1: 8-bit output A	Output	R-CT	[5.010] DPT_Value_1_Ucount	1 byte
40	OR logic 1: 8-bit output B	Output	R-CT	[5.010] DPT_Value_1_Ucount	1 byte
41	OR logic 1: Block	Input	-WC-	[1.1] DPT_Switch	1 bit
42	OR logic 2: 1-bit switching output	Output	R-CT	[1.2] DPT_Bool	1 bit
43	OR logic 2: 8-bit output A	Output	R-CT	[5.010] DPT_Value_1_Ucount	1 byte
44	OR logic 2: 8-bit output B	Output	R-CT	[5.010] DPT_Value_1_Ucount	1 byte
45	OR logic 2: Block	Input	-WC-	[1.1] DPT_Switch	1 bit
46	OR logic 3: 1-bit switching output	Output	R-CT	[1.2] DPT_Bool	1 bit
47	OR logic 3: 8-bit output A	Output	R-CT	[5.010] DPT_Value_1_Ucount	1 byte
48	OR logic 3: 8-bit output B	Output	R-CT	[5.010] DPT_Value_1_Ucount	1 byte
49	OR logic 3: Block	Input	-WC-	[1.1] DPT_Switch	1 bit
50	OR logic 4: 1-bit switching output	Output	R-CT	[1.2] DPT_Bool	1 bit
51	OR logic 4: 8-bit output A	Output	R-CT	[5.010] DPT_Value_1_Ucount	1 byte
52	OR logic 4: 8-bit output B	Output	R-CT	[5.010] DPT_Value_1_Ucount	1 byte
53	OR logic 4: Block	Input	-WC-	[1.1] DPT_Switch	1 bit

## 6. Parameter setting

### 6.0.1. Behaviour on power failure/power restoration

#### **Behaviour on bus or auxiliary power failure**

The device sends nothing.

#### **Behaviour on bus or auxiliary voltage restoration and following programming or reset**

The device sends all measurement values as well as switching and status outputs according to their send pattern set in the parameters with the delays established in the "General settings" parameter block.

### 6.1. General settings

Set basic characteristics of data transfer. A different transmission delay prevents an overload of the bus shortly after the reset.

When labelling objects, you can enter an additional label (abbreviation) for the objects of the device, e.g. 'LR' for 'living room', to make the room installation more transparent.

Sending delay in seconds after reset and bus voltage return	<u>5</u> ... 7200
Maximum telegram quota	1 • 2 • 5 • <u>10</u> • 20 • 50 Telegrams per sec.
Object labelling	[Free text max. 20 characters]

### 6.2. Rain

Activate the rain sensor in order to use objects and switch outputs.

Use rain sensor	<u>No</u> • Yes
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Set, in which cases delay times received are to be kept per object. The parameter is only taken into consideration if the setting by object is activated further down. Please note that the setting "After power restoration and programming" should not be used for the initial start-up, as the factory settings are always used until the first call (setting via objects is ignored).

Maintain the delays received via communication objects	<ul style="list-style-type: none"> <li>• never</li> <li>• after power restoration</li> <li>• after power restoration and programming</li> </ul>
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Select whether the special rain output is to be used with fixed switching delay. This switching output has no delay on rain recognition and 5 minutes delay after it is dry again.

Use rain output with fixed switching delay	<u>No</u> • Yes
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Set the delay times. If the delays are defined using objects, then the times set here are only valid up to the first call.

Delays can be set via objects (in seconds)	<u>No</u> • Yes
Delay on rain	<u>none</u> • 1 s ... • 2 h
Delay on no rain (after drying of the sensor)	<u>5 min</u> • 1 h... • 2 h

Define the send pattern for the rain switch output and specify the object value for the event of rain.

Switching output sends	<ul style="list-style-type: none"> <li>• <u>on change</u></li> <li>• on change to rain</li> <li>• on change to no rain</li> <li>• on change and periodically</li> <li>• on change to rain and periodically</li> <li>• on change to no rain and periodically</li> </ul>
Send cycle (if sent periodically)	5 s ... 2 h; <u>10 s</u>
Object value(s) with rain	<u>0</u> • <u>1</u>

### 6.3. Logic

The device has 16 logic inputs, 4 AND and 4 OR logic gates.

Activate the logic inputs and assign object values up to first call.

Use logic inputs	Yes • <u>No</u>
Object value prior to first call for:	
- Logic input 1	<u>0</u> • 1
- Logic input ...	<u>0</u> • 1
- Logic input 16	<u>0</u> • 1

Activate the required logic outputs.

#### AND logic

AND logic 1	<u>not active</u> • active
AND logic ...	<u>not active</u> • active
AND logic 4	<u>not active</u> • active

## OR logic

OR logic 1	<u>not active</u> • active
OR logic ...	<u>not active</u> • active
OR logic 4	<u>not active</u> • active

### 6.3.1. AND logic 1-4 and OR logic outputs 1-4

The same setting options are available for AND and OR logic.

Each logic output may transmit one 1 bit or two 8 bit objects. Determine what the output should send if logic = 1 and = 0.

1. / 2. / 3. / 4. Input	<ul style="list-style-type: none"> <li>• <u>do not use</u></li> <li>- Logic inputs 1...16</li> <li>- Logic inputs 1...16 inverted</li> <li>• all switching events that the device provides (see <i>Connection inputs of the AND/OR logic</i>)</li> </ul>
Output type	<ul style="list-style-type: none"> <li>• a 1-Bit-object</li> <li>• two 8-bit objects</li> </ul>

If the **output type is a 1-bit object**, set the output values for the various conditions.

Output value if logic = 1	<u>1</u> • <u>0</u>
Output value if logic = 0	1 • <u>0</u>
Output value If block is active	1 • <u>0</u>
Output value if monitoring period is exceeded	1 • <u>0</u>

If the **output type is two 8-bit objects**, set the type of object and the output values for the various conditions.

Object type	<ul style="list-style-type: none"> <li>• Value (0...255)</li> <li>• Percent (0...100%)</li> <li>• Angle (0...360°)</li> <li>• Scene call-up (0...127)</li> </ul>
Output value object A if logic = 1	0 ... 255 / 100% / 360° / 127; <u>1</u>
Output value object B if logic = 1	0 ... 255 / 100% / 360° / 127; <u>1</u>
Output value object A if logic = 0	0 ... 255 / 100% / 360° / 127; <u>0</u>
Output value object B if logic = 0	0 ... 255 / 100% / 360° / 127; <u>0</u>

Output value object A if block is active	0 ... 255 / 100% / 360° / 127; <u>0</u>
Output value object B if block is active	0 ... 255 / 100% / 360° / 127; <u>0</u>
Output value object A if monitoring period is exceeded	0 ... 255 / 100% / 360° / 127; <u>0</u>
Output value object B if monitoring period is exceeded	0 ... 255 / 100% / 360° / 127; <u>0</u>

Set the output send pattern.

Send pattern	<ul style="list-style-type: none"> <li>• <u>on change of logic</u></li> <li>• on change of logic to 1</li> <li>• on change of logic to 0</li> <li>• on change of logic and periodically</li> <li>• on change of logic to 1 and periodically</li> <li>• on change of logic to 0 and periodically</li> <li>• on change of logic+object receipt</li> <li>• on change of logic+object receipt and periodically</li> </ul>
Send cycle (if sent periodically)	5 s • <u>10 s</u> • ... • 2 h

## Block

If necessary, activate the block for the logic output and set what a 1 or 0 at the block input means and what happens in the event of a block.

Use block	<u>No</u> • Yes
Analysis of the blocking object	<ul style="list-style-type: none"> <li>• <u>At value 1: block   At value 0: release</u></li> <li>• At value 0: block   At value 1: release</li> </ul>
Blocking object value before first call	<u>0</u> • 1
Output pattern On block	<ul style="list-style-type: none"> <li>• <u>Do not send message</u></li> <li>• Transmit block value [see above, Output value if blocking active]</li> </ul>
On release (with 2 seconds release delay)	[send value for current logic status]

## Monitoring

If necessary, activate the input monitoring. Set which inputs are to be monitored, at which intervals the inputs are to be monitored and what value the "monitoring status" should have, if the monitoring period is exceeded without a feedback being given.

Use input monitoring	<u>No</u> • Yes
Input monitoring	<ul style="list-style-type: none"> <li>• 1 • 2 • 3 • 4</li> <li>• 1 + 2 • 1 + 3 • 1 + 4 • 2 + 3 • 2 + 4 • 3 + 4</li> <li>• 1 + 2 + 3 • 1 + 2 + 4 • 1 + 3 + 4 • 2 + 3 + 4</li> <li>• <u>1 + 2 + 3 + 4</u></li> </ul>



Monitoring period	5 s • ... • 2 h; <u>1 min</u>
Output behaviour on exceeding the monitoring time	<ul style="list-style-type: none"> <li>• <u>Do not send message</u></li> <li>• Send value exceeding [= value of the parameter "monitoring period"]</li> </ul>

### 6.3.2. Connection inputs of the AND logic

Do not use

Logic input 1

Logic input 1 inverted

Logic input 2

Logic input 2 inverted

Logic input 3

Logic input 3 inverted

Logic input 4

Logic input 4 inverted

Logic input 5

Logic input 5 inverted

Logic input 6

Logic input 6 inverted

Logic input 7

Logic input 7 inverted

Logic input 8

Logic input 8 inverted

Logic input 9

Logic input 9 inverted

Logic input 10

Logic input 10 inverted

Logic input 11

Logic input 11 inverted

Logic input 12

Logic input 12 inverted

Logic input 13

Logic input 13 inverted

Logic input 14

Logic input 14 inverted

Logic input 15

Logic input 15 inverted

Logic input 16

Logic input 16 inverted

Switching output rain

Switching output rain inverted

Switching output rain 2

Switching output rain 2 inverted

### 6.3.3. Connection inputs of the OR logic

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The OR logic connection inputs correspond to those of the AND logic. In addition, the following inputs are available for the OR logic:

- AND logic output 1
- AND logic output 1 inverted
- AND logic output 2
- AND logic output 2 inverted
- AND logic output 3
- AND logic output 3 inverted
- AND logic output 4
- AND logic output 4 inverted





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