



KNX RW

Rain/Wind Sensor



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1. Description

The **Rain/Wind Sensor KNX RW** measures precipitation and wind speed and transfers the values to the KNX system. Four switching outputs with three adjustable threshold values as well as additional AND and OR logic gates are available. The sensor system, the evaluation electronics and the electronics of the bus connection are mounted in a compact housing.

Functions:

- **Precipitation perception:** The surface of the sensor is heated so that only drops and flakes are recognised as precipitation but not fog or dew. If it stops raining or snowing, the sensor dries quickly and the precipitation message ends
- **Wind measurement:** The wind strength measurement takes place electronically and thus noiselessly and reliably, even during hail, snow and sub-zero temperatures. Even turbulent air and anabatic winds in the vicinity of the weather station are recorded
- **4 switching outputs**, 3 with adjustable threshold values (Threshold values can be set by parameter or via communication objects)
- **8 AND and 8 OR logic gates** with each 4 inputs. Every switching incident as well as 8 logic inputs (in the form of communication objects) may be used as inputs for the logic gates. The output of each gate may optionally be configured as 1 bit or 2 x 8 bits

Configuration is made using the KNX software ETS. The **programme file** (format VD), the data sheet and the manual can be downloaded from the Elsner Elektronik homepage on **www.elsner-elektronik.de** in the "Service" menu.

1.1. Technical specifications

Housing	Plastic material
Colour	White/ translucent
Mounting	On-wall
Protection category	IP 44
Dimensions	approx. 96 x 77 x 118 (W x H x D, mm)
Weight	230 V AC version: approx. 240 g, 24 V DC version: approx. 170 g
Ambient temperature	Operation -30...+50°C, storage -30...+70°C
Operating voltage	Available for 230 V AC or 24 V DC (20 V AC). An appropriate 20 V AC power supply unit can be obtained from Elsner Elektronik.
Cable cross-section	Massive conductors of up to 1.5 mm ² or conductors with fine wires
Current	230 V AC version: max. 20 mA, 24 V DC version max. 100 mA, residual ripple 10%
Data output	KNX +/- bus terminal plug

BCU type	Own micro controller
PEI type	0
Group addresses	max. 254
Allocations	max. 255
Communication objects	81
Heating rain sensor	approx. 1,2 W (230 V and 24 V)
Measurement range wind	0...70 m/s
Resolution (wind)	<10% of the measured value
Accuracy (wind)	±25% at 0...15m/s, at an angle of attack of 45°, pole mounting

The following standards have been considered for the evaluation of the product in terms of electro magnetic compatibility:

Transient emissions:

- EN 60730-1:2000 Section EMV (23, 26, H23, H26) (threshold category: B)
- EN 50090-2-2:1996-11 + A1:2002-01 (threshold category: B)
- EN 61000-6-3:2001 (threshold category: B)

Interference resistance:

- EN 60730-1:2000 Section EMV (23, 26, H23, H26)
- EN 50090-2-2:1996-11 + A1:2002-01
- EN 61000-6-1:2004

The product has been tested for the above mentioned standards by an accredited EMV laboratory.

2. Installation and commissioning

2.1. Notes on installation



Warning, mains voltage!

National legal regulations are to be observed.

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

Disconnect all lines to be assembled, and take safety precautions against accidental switch-on.

The device is exclusively intended for appropriate use. With each inappropriate change or non-observance of the instructions for use, any warranty or guarantee claim will be void.

After unpacking the device, check immediately for any mechanical damages. In case of transport damage, this must immediately notified to the supplier.



If damaged, the device must not be put into operation.

If an operation without risk may supposedly not be guaranteed, the device must be put out of operation and be secured against accidental operation.

The device must only be operated as stationary system, i.e. only in a fitted state and after completion of all installation and start-up works, and only in the environment intended for this purpose.

Elsner Elektronik does not assume any liability for changes in standards after publication of this instruction manual.

2.2. Location

Select an assembly location at the building where precipitation and wind may be collected by the sensors unobstructedly. Do not assemble any construction components above the sensor from where water may drop on to the rain and wind sensor after it has stopped raining or snowing. At least 60 cm of free space must be left beneath the device to enable correct wind measurement and prevent snowing in when there is snow.

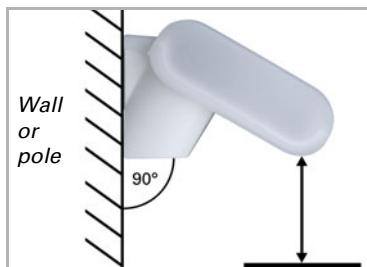


Fig. 1

The rain/wind sensor must be mounted onto a vertical wall (or pole).



Fig. 2

The rain/wind sensor must be mounted horizontally in the lateral direction.

2.3. Mounting the sensor

2.3.1. Attaching the mount

The sensor comes with a combination wall/pole mount. The mount comes adhered by adhesive strips to the rear side of the housing.

Fasten the mount vertically onto the wall or pole.

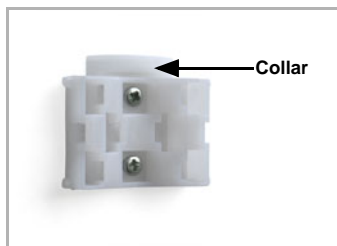


Fig. 3

When wall mounting: flat side on wall, crescent-shaped collar upward.

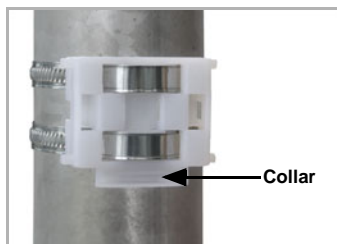


Fig. 4

When pole mounting: curved side on pole, collar downward.



Fig. 5

An additional, optional accessory available from Elsner Elektronik is an articulated arm for flexible wall, pole or beam mounting of the sensor.



Fig. 6

Example uses of the hinge arm mounting: With the hinge arm mounting, the sensor peeps out from beneath the roof overhang.



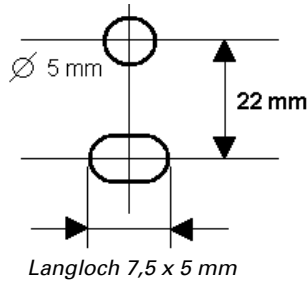
Fig. 7

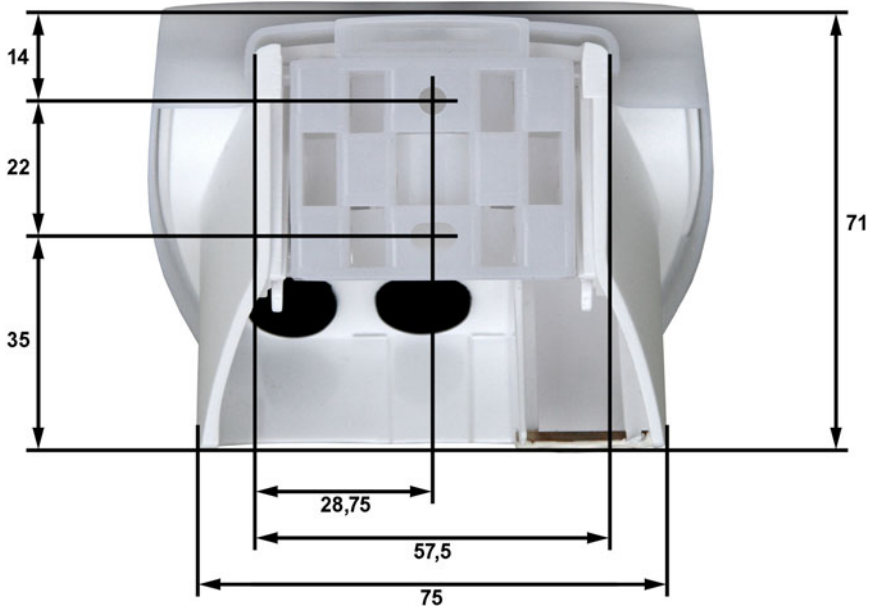
Example uses of the hinge arm mounting: Fitting to a pole with worm drive hose clips

2.3.2. View of rear side and drill hole plan

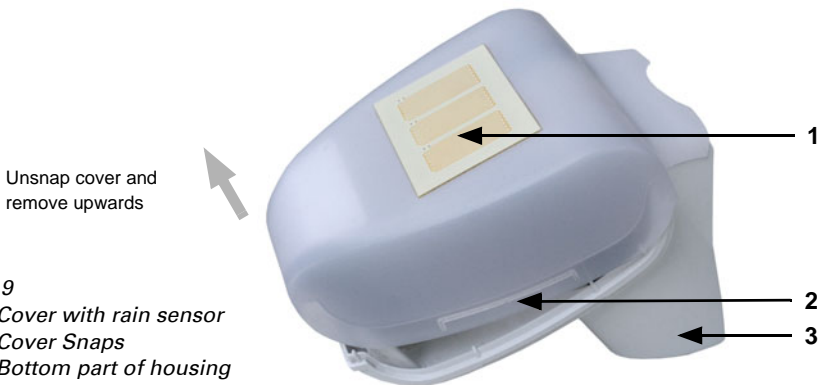
Fig. 8 a+b
Drill hole plan

Dimensions of rear side of housing with bracket. Subject to change for technical enhancement.





2.3.3. Preparing the sensor



The sensor cover snaps in on the left and right along the bottom edge (see Fig.). Remove the cover. Proceed carefully, so as not to pull off the wire connecting the PCB in the bottom part with the rain sensor in the cover (soldered cable connection in case of 230 V AC version, cable with plug in case of 24 V DC version).

Lead the cable for the voltage supply and bus connection through the rubber seals on the bottom of the device and connect Voltage L/N and Bus +/- to the terminals provided.

For 24V devices the connection cable must be plugged in between the cover and circuit board.

2.3.4. PCB Layout

230 V AC version

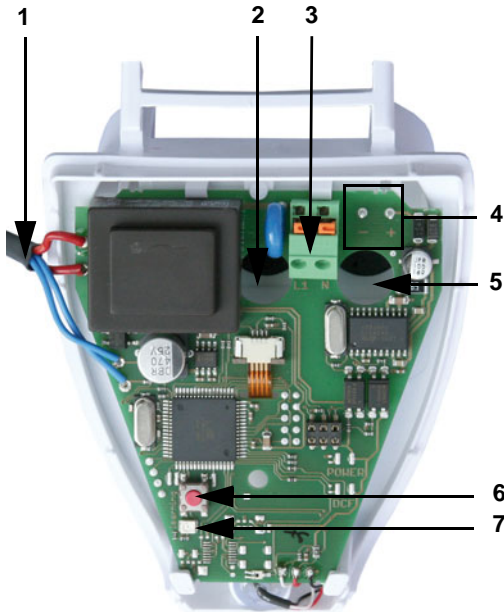
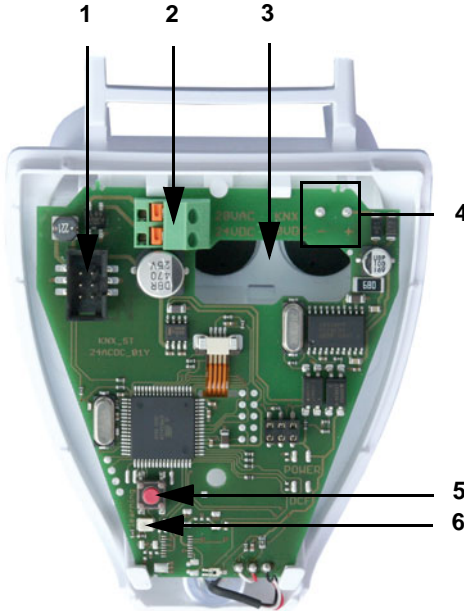


Fig. 10

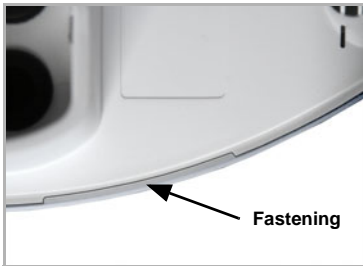
- 1) Cable connection to the rain sensor in the housing cover
- 2) Opening for the cable for the voltage supply
- 3) Tension clamp for voltage supply (230 V AC), suitable for massive conductors of up to 1.5 mm² or conductors with fine wires
- 4) Slot for KNX clamp +/-
- 5) Opening for the bus cable
- 6) Programming pushbutton for the teach-in of the device
- 7) Programming LED

24 V DC version**Fig. 11**

- 1 Slot for cable connection to the rain sensor in the housing cover
- 2 Tension clamp for voltage supply (24 V DC/20 V AC), suitable for massive conductors of up to 1.5 mm² or conductors with fine wires
- 3 Opening for the cable for the voltage supply and for the bus cable
- 4 Slot for KNX clamp +/-
- 5 Programming pushbutton for the teach-in of the device
- 6 Programming LED

2.3.5. Mounting the sensor

Close the housing by putting the cover back over the bottom part. The cover must snap in on the left and right with a definite "click".

**Fig. 12**

Make sure the cover and bottom part are properly snapped together! This picture is looking at the closed sensor from underneath.



Fig. 13

Push the housing from above into the fastened mount. The bumps on the mount must snap into the rails in the housing.

To remove it, the sensor can be simply pulled upwards out of the mount, against the resistance of the fastening.

2.4. Notes on mounting and commissioning

Do not open the device if water (rain) might ingress: even some drops might damage the electronic system.

Observe the correct connections. Incorrect connections may destroy the sensor or connected electronic devices.

The measured wind value and thus all other wind switching outputs may only be supplied 60 seconds after the supply voltage has been connected.

After the auxiliary voltage has been applied, the device will enter an initialisation phase lasting 5 seconds. During this phase no information can be received via the bus.

3. Maintenance

The sensor 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.



As a precaution, the device should always be separated from power supply for maintenance works (e.g. deactivate or remove fuse).

4. Transmission protocol

Units of measurement:

Wind in metre per second

4.1. List of all communication objects

Abbreviations EIS types:

- 1 Switching1/0
- 5 Floating point value
- 6 8 bit value

Abbreviations flags:

- C Communication
- R Read
- W Write
- T Transmit

No	Name	Function	EIS type	flags
0	Wind force measured value	Output	5	C R T
1	Request max. wind force	Input	1	C R W
2	Max. wind force measured value	Output	5	C R T
3	Reset max. wind force	Input	1	C R W
4	Wind threshold value 1	16 bit value	5	C R W T
5	Wind threshold value 1	1 = Increment 0 = Decrement	1	C R W
6	Wind threshold value 1	Increment	1	C R W
7	Wind threshold value 1	Decrement	1	C R W
8	Wind threshold value 1	Switching output	1	C R T
9	Wind threshold value 1	Switching output block	1	C R W
10	Wind threshold value 2	16 bit value	5	C R W T
11	Wind threshold value 2	1 = Increment 0 = Decrement	1	C R W
12	Wind threshold value2	Increment	1	C R W
13	Wind threshold value 2	Decrement	1	C R W
14	Wind threshold value 2	Switching output	1	C R T
15	Wind threshold value 2	Switching output block	1	C R W
16	Wind threshold value 3	16 bit value	5	C R W T
17	Wind threshold value 3	1 = Increment 0 = Decrement	1	C R W
18	Wind threshold value3	Increment	1	C R W

No	Name	Function	EIS type	flags
19	Wind threshold value 3	Decrement	1	C R W
20	Wind threshold value 3	Switching output	1	C R T
21	Wind threshold value 3	Switching output block	1	C R W
22	Wind sensor Disruption	Output	1	C R T
23	AND Logic 1	Switching output	1	C R T
24	AND Logic 1	8 bit output A	6	C R T
25	AND Logic 1	8 bit output B	6	C R T
26	AND Logic 2	Switching output	1	C R T
27	AND Logic 2	8 bit output A	6	C R T
28	AND Logic 2	8 bit output B	6	C R T
29	AND Logic 3	Switching output	1	C R T
30	AND Logic 3	8 bit output A	6	C R T
31	AND Logic 3	8 bit output B	6	C R T
32	AND Logic 4	Switching output	1	C R T
33	AND Logic 4	8 bit output A	6	C R T
34	AND Logic 4	8 bit output B	6	C R T
35	AND Logic 5	Switching output	1	C R T
36	AND Logic 5	8 bit output A	6	C R T
37	AND Logic 5	8 bit output B	6	C R T
38	AND Logic 6	Switching output	1	C R T
39	AND Logic 6	8 bit output A	6	C R T
40	AND Logic 6	8 bit output B	6	C R T
41	AND Logic 7	Switching output	1	C R T
42	AND Logic 7	8 bit output A	6	C R T
43	AND Logic 7	8 bit output B	6	C R T
44	AND Logic 8	Switching output	1	C R T
45	AND Logic 8	8 bit output A	6	C R T
46	AND Logic 8	8 bit output B	6	C R T
47	OR Logic 1	Switching output	1	C R T
48	OR Logic 1	8 bit output A	6	C R T
49	OR Logic 1	8 bit output B	6	C R T
50	OR Logic 2	Switching output	1	C R T
51	OR Logic 2	8 bit output A	6	C R T
52	OR Logic 2	8 bit output B	6	C R T
53	OR Logic 3	Switching output	1	C R T
54	OR Logic 3	8 bit output A	6	C R T
55	OR Logic 3	8 bit output B	6	C R T
56	OR Logic 4	Switching output	1	C R T

No	Name	Function	EIS type	flags
57	OR Logic 4	8 bit output A	6	C R T
58	OR Logic 4	8 bit output B	6	C R T
59	OR Logic 5	Switching output	1	C R T
60	OR Logic 5	8 bit output A	6	C R T
61	OR Logic 5	8 bit output B	6	C R T
62	OR Logic 6	Switching output	1	C R T
63	OR Logic 6	8 bit output A	6	C R T
64	OR Logic 6	8 bit output B	6	C R T
65	OR Logic 7	Switching output	1	C R T
66	OR Logic 7	8 bit output A	6	C R T
67	OR Logic 7	8 bit output B	6	C R T
68	OR Logic 8	Switching output	1	C R T
69	OR Logic 8	8 bit output A	6	C R T
70	OR Logic 8	8 bit output B	6	C R T
71	Logic input 1	Input	1	C R W
72	Logic input 2	Input	1	C R W
73	Logic input 3	Input	1	C R W
74	Logic input 4	Input	1	C R W
75	Logic input 5	Input	1	C R W
76	Logic input 6	Input	1	C R W
77	Logic input 7	Input	1	C R W
78	Logic input 8	Input	1	C R W
79	Switching output rain	Output	1	C R T
80	Software Version	readable	6	CR

5. Setting of parameters

5.1. General settings

Wind force

Measured value	<ul style="list-style-type: none"> • do not send • <u>send cyclically</u> • send on change • send on change and cyclically
send cyclically every (only if sending "cyclically")	<u>5 sec</u> ... 2 h
From change in % (only if sending "on change")	1 ... 50; <u>20</u>
Send and reset of the maximum wind load value on request	<u>do not release</u> • release
Use malfunction object	<u>No</u> • Yes

Rain

Switching output is with rain	0 • <u>1</u>
Switching output sends	<ul style="list-style-type: none"> • not • on change • on change to 1 • on change to 0 • on change and cyclically • on change to 1 and cyclically • <u>on change to 0 and cyclically</u>
send cyclically every (only if sending "cyclically")	<u>5 sec</u> ... 2 h
Maximum telegram quota	1 • 2 • 3 • <u>5</u> • 10 • 20 <u>telegrams per second</u>

5.2. Threshold values**Wind force**

Use threshold value 1 / 2 / 3	<u>No</u> • Yes
Transmission delay of the switching outputs after power up and programming	<u>5 sec</u> ... 2 h
Transmission delay of the switching outputs after power up and programming	<u>5 sec</u> ... 2 h

5.2.1. Wind threshold value 1 / 2 / 3**Threshold value**

Threshold value setpoint per	<u>Parameter</u> • Communication object
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If the threshold value is set per Parameter:

Threshold value in 0,1 m/s	0 ... 350; <u>40</u>
Hysteresis of the threshold value in %	0 ... 250; <u>20</u>

If the threshold value is set per Communication object:

The value communicated last shall be maintained	<ul style="list-style-type: none"> • <u>not</u> • after restoration of voltage (the changes threshold value may be saved at least 100,000 times) • after restoration of voltage and programming (Attention: Do not use for first commissioning)
Start threshold value in 0,1 m/s valid until 1. communication (only if the value communicated last is „not“ maintained or „after restoration of voltage“)	0 ... 350; <u>40</u>

Type of threshold change	<ul style="list-style-type: none"> • <u>Absolute value with a 16 bit communication object</u> • Increment / decrement with one communication object • Increment / decrement with two communication objects
Step size (only if sending „Increment/decrement“)	0,1 m/s ... 5 m/s; <u>1 m/s</u>
Hysteresis of the threshold value in %	0 ... 250; <u>20</u>

Switching output

Output is at (TV = Threshold Value)	<ul style="list-style-type: none"> • <u>TV above = 1 TV - Hyst. below = 0</u> • <u>TV above = 0 TV - Hyst. below = 1</u> • <u>TV below = 1 TV + Hyst. above = 0</u> • <u>TV below = 0 TV + Hyst. above = 1</u>
Switching delay from 0 to 1	<u>none</u> • 1 sec ... 2 h
Switching delay from 1 to 0	<u>none</u> • 1 sec ... 2 h
Switching output sends	<ul style="list-style-type: none"> • <u>not</u> • on change • on change to 1 • on change to 0 • on change and periodically • on change to 1 and periodically • on change to 0 and periodically
send periodically all (only if sending “periodically“)	<u>5 sec</u> ... 2 h

Blocking

„Blocking“ only appears if using „Switching output sends on change“

Use block of the switching output	Yes • <u>No</u>
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If block of the switching output is used:

Use block of the switching output	Yes
Evaluation of the blocking object	<ul style="list-style-type: none"> • <u>if value 1: block if value 0: release</u> • <u>if value 0: block if value 1: release</u>
Value of the blocking object before 1. communication	<u>0</u> • 1
Behaviour of the switching output with blocking	<ul style="list-style-type: none"> • <u>do not send telegram</u> • send 0 • send 1
Behaviour of the switching output with release (Auswahl je nach vorheriger Einstellung möglich)	<ul style="list-style-type: none"> • do not send telegram • <u>send status of the switching output</u> • if switching output = 1 => send 1 • if switching output = 0 => send 0

5.3. Logic

Communication objects logic inputs	<u>do not release</u> • release
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AND Logic

Logic 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8	<u>not active</u> • active
Transmission delay of the switching outputs after power up and programming	<u>5 sec</u> ... 2 h

OR Logic

Logic 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8	<u>not active</u> • active
Transmission delay of the switching outputs after power up and programming	<u>5 sec</u> ... 2 h

5.3.1. AND Logic 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8

1. / 2. / 3. / 4. Input	<ul style="list-style-type: none"> • do not use • all switching events which the sensor provides (see "Linkage inputs of the AND logic")
Logic output sends	<ul style="list-style-type: none"> • <u>not</u> • one 1 bit object • two 8 bit objects

Logic output sends "one 1 bit Object":

Logic output sends	one 1 bit object
if logic = 1 → object value	<u>1</u> • 0
if logic = 0 → object value	1 • <u>0</u>
Communication object AND Logic 1 sends	<ul style="list-style-type: none"> • <u>in case of the change of logic</u> • in case of the change of logic to 1 • in case of the change of logic to 0 • in case of the change of logic and cyclically • in case of the change of logic to 1 and cyclically • in case of the change of logic to 0 and cyclically
send cyclically every (only if sending "cyclically")	<u>5 sec</u> ... 2 h

Logic output sends "two 8 bit objects":

Logic output sends	two 8 bit objects
if logic = 1 → object A value	0 ... 255; <u>127</u>
if logic = 0 → object A value	<u>0</u> ... 255
if logic = 1 → object B value	0 ... 255; <u>127</u>

if logic = 0 → object B value	<u>0</u> ... 255
Communication objects AND Logic 1 A and B sends	<ul style="list-style-type: none"> • <u>in case of the change of logic</u> • in case of the change of logic to 1 • in case of the change of logic to 0 • in case of the change of logic and cyclically • in case of the change of logic to 1 and cyclically • in case of the change of logic to 0 and cyclically
send cyclically every (only if sending "cyclically")	<u>5 sec</u> ... 2 h

5.3.2. Linkage inputs of AND logic

do not use

Communication object logic input 1

Communication object logic input 1 inverted

Communication object logic input 2

Communication object logic input 2 inverted

Communication object logic input 3

Communication object logic input 3 inverted

Communication object logic input 4

Communication object logic input 4 inverted

Communication object logic input 5

Communication object logic input 5 inverted

Communication object logic input 6

Communication object logic input 6 inverted

Communication object logic input 7

Communication object logic input 7 inverted

Communication object logic input 8

Communication object logic input 8 inverted

Rain

no rain

Malfunction wind

Malfunction wind inverted

Wind threshold value 1

Wind threshold value 1inverted

Wind threshold value 2

Wind threshold value 2 inverted

Wind threshold value 3

Wind threshold value 3 inverted

5.3.3. OR Logic 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8

1. / 2. / 3. / 4. Input	<ul style="list-style-type: none"> • <u>do not use</u> • all switching events which the sensor provides (see "Linkage inputs of the OR logic")
Logic output sends	<ul style="list-style-type: none"> • <u>one 1 bit object</u> • two 8 bit objects

All settings of the OR logic correspond to those of the AND logic.

5.3.4. Linkage inputs of OR logic

The linkage inputs of the OR logic correspond with the parameters of the AND logic. The OR logic is additionally provided with the following inputs:

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
 AND Logic output 5
 AND Logic output 5 inverted
 AND Logic output 6
 AND Logic output 6 inverted
 AND Logic output 7
 AND Logic output 7 inverted
 AND Logic output 8
 AND Logic output 8 inverted

