P04-KNX-GPS
Weather Station

Item number 71230

elsner
e l e k t r o n i k

Installation and Adjustment

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. Safety and operating instructions

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

CAUTION!
Live voltage!
There are unprotected live components inside the device.
• Inspect the device for damage before installation. Only put undamaged devices into operation.
• Comply with the locally applicable directives, regulations and provisions for electrical installation.
• Immediately take the device or system out of service and secure it against unintentional switch-on if risk-free operation is no longer guaranteed.

Use the device exclusively for building automation and observe the operating instructions. Improper use, modifications to the device or failure to observe the operating instructions will invalidate any warranty or guarantee claims.

Operate the device only as a fixed-site installation, i.e. only in assembled condition 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.

For information on maintenance, disposal, scope of delivery and technical data, please refer to the installation instructions.

2. Description

The **Weather Station P04-KNX-GPS** for the KNX building bus system measures temperature, wind speed and brightness. It recognises precipitation and receives the GPS signal for time and location.

The compact housing of the **P04-KNX-GPS** accommodates the sensors, evaluation circuits and bus-coupling electronics.

Functions:
• **Brightness measurement**
• **GPS receiver**, outputting the current time and location coordinates
• **Wind measurement**: The wind strength is measured electronically and thus noiselessly and reliably, even during hail, snow and sub-zero temperatures. Even turbulent air and rising winds in the vicinity of the device are recorded
• **Wind sensor monitoring**: If the wind measurement value changes by less than ± 0.5 m/s within 48 hours, the maximum measurement value of 35 m/s is

output as a fault message. All wind alarms with a limit value below 35 m/s become active as a result

- **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
- **Temperature measurement**

3. Installation and start-up

3.1. Installation location

Select an installation position on the building where the sensors can measure wind, rain and sunshine 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 weather station should not be shaded by structures or, for example, trees.

At least 60 cm of clearance must be left around the device. This facilitates correct wind speed measurement without eddies. At the same time, this prevents spray (raindrops hitting the device) or snow (snow penetration) from impairing the measurement. The wind sensor must not come into contact with water. The distance also prevents birds from biting the sensor.

The mounting position must be selected so that the sensors for rain and wind cannot be touched by persons.

Please ensure that the extended awning does not cast shade on the device, and does not protect the device against wind.

Temperature measurements can also be distorted by external influences such as warming or cooling of the building structure on which the sensor is mounted. Temperature variations from such sources of interference must be corrected in the ETS in order to ensure the specified accuracy of the sensor (temperature offset).

Magnetic fields, transmitters and interference fields from electrical consumers (e.g. fluorescent lamps, neon signs, switch mode power supplies etc.) can block or interfere with the reception of the GPS signal.
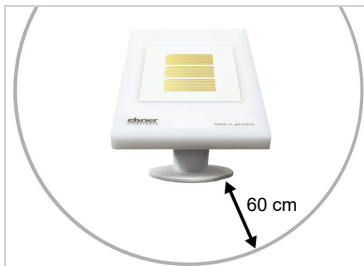
Fig. 1
There must be at least 60 cm clearance to other elements (structures, construction parts, etc.) below, to the sides and in front of the device.
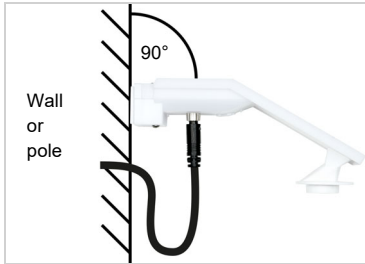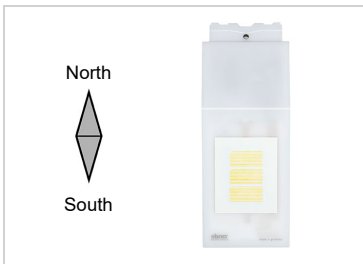

Fig. 2
The device must be attached to a vertical wall (or a pole).

Place the supply line in a loop before leading it into the wall or junction box. This will allow rain to drip off and not drain into the wall or box.

Fig. 3
The device must be mounted in the horizontal (transverse) direction.
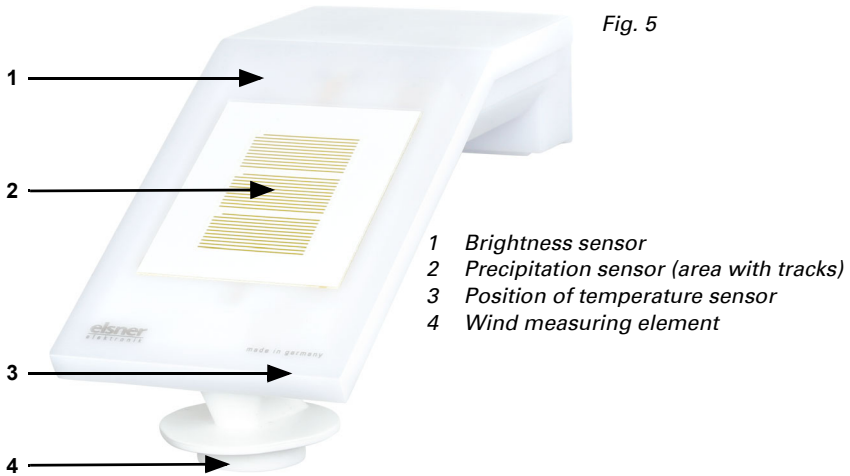

Fig. 4
For installation in the northern hemisphere, the device must be aligned to face south.

For installation in the southern hemisphere, the device must be aligned to face north.

3.2.   Position of the sensors

Fig. 5

1

2

3

4

1 *Brightness sensor*
2 *Precipitation sensor (area with tracks)*
3 *Position of temperature sensor*
4 *Wind measuring element*

STOP **ATTENTION!**
Sensitive wind sensor.
• Remove the protective transport sticker after installation.
• Do not touch the sensor on the wind measuring element
  (on bottom, recessed).

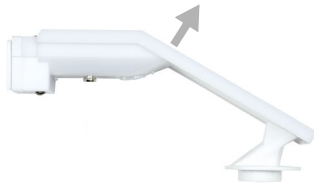### 3.2.1. Measurement direction of the brightness sensor

Fig. 6
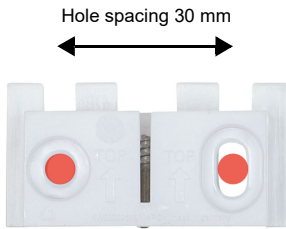*Measurement directed vertically to the device surface*

3.3. Installing the weather station

3.3.1. Attach mount

First, assemble the mount for wall/pole mounting. Release the screw joint of the mount with a cross-headed screwdriver.

Wall installation
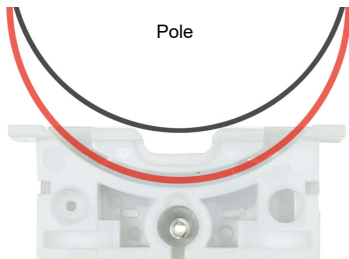
Hole spacing 30 mm

Fig. 7 Front view

Use two screws to attach the mount to the wall. Use the fastening material (dowels, screws) that is suitable for the base.

Make sure that the arrows are pointing upward.

Pole installation

The device is installed on the pole with the enclosed clamp.

Pole

Fig. 8 Bottom view

Insert the clamp in the mount through the recess. Tighten the clamp on the pole.

Make sure that the arrows are pointing upward.

3.3.2. Assembly with Mounting Arm Fix

With the Mounting Arm Fix, the weather station can be flexibly mounted on the wall.

Only use suitable fixing material (screws, dowels) to fix the wall installation plate and make sure that the subsurface is stable.

Dimensions Fix:

Fig. 9

Mounting plate
Sensor

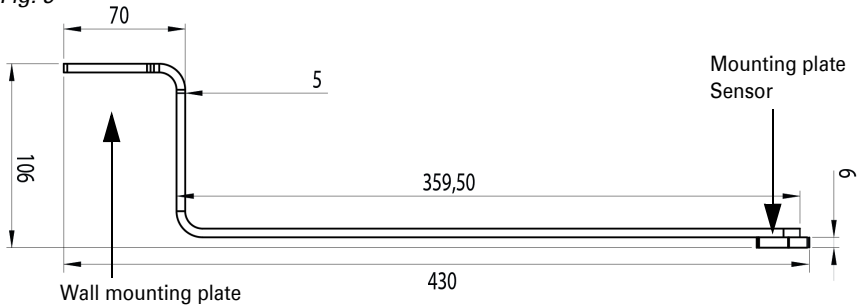Wall mounting plate

Wall mounting plate Fix:
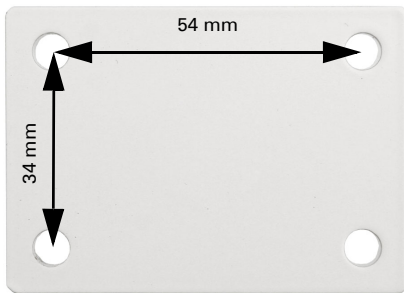
Fig. 10
Hole diameter 6.2 mm

Affix sensor mounting plate:
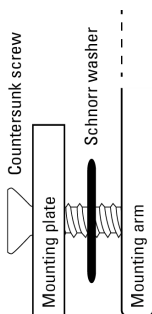
Fig. 11
(Schema sequence screw fastening)

Screw the sensor mounting plate onto the boom with the countersunk screw DIN 7991 M8x10. Place the Schnorr tooth lock washers between the mounting plate and the boom

Fig. 12
For mounting use the cylinder head screws DIN 912 M4x25 and place the DIN 125 washers under the screw heads.

Fig. 13

Mounting plate sensor   Mount Suntracer KNX sl

Screw holes
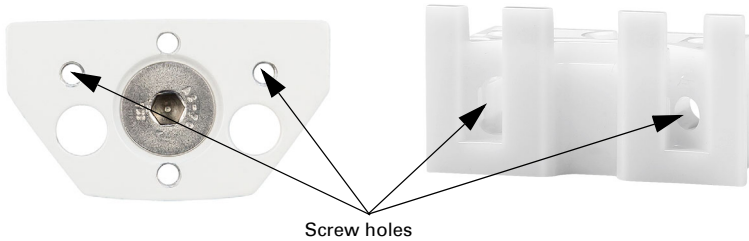
Installation examples:

Fig. 14

Sensor offset upwards.

Fig. 15

Sensor offset downwards.

Fig. 16

Sensor offset to the right (or the left).

3.3.3. Attaching and connecting the device

Fig. 17
1. Slide the device onto the mounting from above.
2. Tighten the screw of the mount to secure the device.
3. Screw the M8 connectors of the connection cable onto the connection socket on the bottom side of the device.

Connect the loose end of the connection cable to KNX bus and auxiliary voltage. Use the connection sockets and clips included for this purpose.

KNX bus:	Auxiliary votage:
+ red	+ yellow
- black	- white

bottom side   top side

Fig. 18
After installation, remo-
ve the protective sticker
on the wind sensor and
the "distance" sticker on
the top of the cover.

3.4. Instructions for assembly and initial start-up

The wind measurement value and thus also all wind switching outputs cannot be output until 35 seconds after the power is turned on.

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

After the bus voltage has been applied, the device will enter an initialisation phase lasting approx. 4 seconds. During this phase no information can be received or sent via the bus.

4.   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 mm² wire.
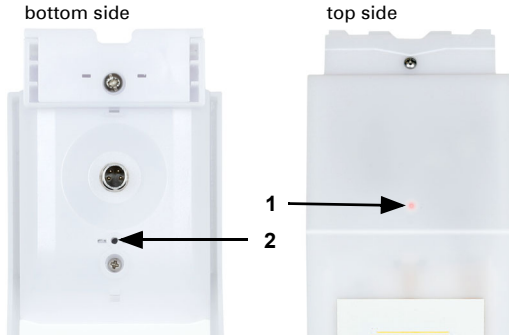
bottom side   top side

Fig. 19
1   Programming LED (under
    the semi-transparent lid)
2   Programming button for
    teaching the device

5.   Transfer protocol

Units:

Temperatures in degrees Celsius
Brightness in Lux
Wind in metres per second

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
1	Software version	Output	R-CT	[217.1] DPT_Version	2 Bytes
24	GPS malfunction (0 : OK | 1: NOK)	Output	R-CT	[1.2] DPT_Bool	1 Bit
25	Date / time	Input / Output	RWCT	[19.1] DPT_Date-Time	8 Bytes
26	Date	Input / Output	RWCT	[11.1] DPT_Date	3 Bytes
27	Time	Input / Output	RWCT	[10.1] DPT_TimeOfDay	3 Bytes
28	Date and time query	Input	-WC-	[1.017] DPT_Trigger	1 Bit
30	Location: Northern latitude [°]	Output	R-CT	[14.7] DPT_Value_AngleDeg	4 Bytes
31	Location: Eastern longitude [°]	Output	R-CT	[14.7] DPT_Value_AngleDeg	4 Bytes
34	Rain: Switching output	Output	R-CT	[1.1] DPT_Switch	1 Bit
35	Rain: Switching output with fixed delays	Output	R-CT	[1.1] DPT_Switch	1 Bit
36	Rain: Switching delay to rain	Input	-WC-	[7,005] DPT_TimePeriodSec	2 Bytes
37	Rain: Switching delay to no rain	Input	-WC-	[7,005] DPT_TimePeriodSec	2 Bytes
41	Temperature sensor: Malfunction	Output	R-CT	[1.1] DPT_Switch	1 Bit
42	Temperature sensor: External measurement	Input	-WCT	[9.1] DPT_Value_Temp	2 Bytes
43	Temperature sensor: Measurement value	Output	R-CT	[9.1] DPT_Value_Temp	2 Bytes

No	Text	Function	Flags	DPT type	Size
44	Temperature sensor: Total measurement	Output	R-CT	[9.1] DPT_-Value_Temp	2 Bytes
45	Temperature sensor: Min./Max. measurement query	Input	-WC-	[1.017] DPT_Trigger	1 Bit
46	Temperature sensor: Minimum measurement	Output	R-CT	[9.1] DPT_-Value_Temp	2 Bytes
47	Temperature sensor: Maximum measurement	Output	R-CT	[9.1] DPT_-Value_Temp	2 Bytes
48	Temperature sensor: Min./Max. measurement reset	Input	-WC-	[1.017] DPT_Trigger	1 Bit
95	Brightness sensor measurement	Output	R-CT	[9.4] DPT_-Value_Lux	2 Bytes
271	Wind sensor: Malfunction	Output	R-CT	[1.1] DPT_Switch	1 Bit
272	Wind sensor: Measurement [m/s]	Output	R-CT	[9.5] DPT_-Value_Wsp	2 Bytes
273	Wind sensor: Measurement [Beaufort]	Output	R-CT	[20.014] DPT_Beaufort_Wind_-Force_Scale	1 Byte
274	Wind sensor: Max. query measurement	Input	-WC-	[1.017] DPT_Trigger	1 Bit
275	Wind sensor: Maximum measurement [m/s]	Output	R-CT	[9.5] DPT_-Value_Wsp	2 Bytes
276	Wind sensor: Maximum measurement [Beaufort]	Output	R-CT	[20.014] DPT_Beaufort_Wind_-Force_Scale	1 Byte
277	Wind sensor: Max. reset measurement	Input	-WC-	[1.017] DPT_Trigger	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. The "Software version" communications object is sent once after 5 seconds.

6.0.2. Malfunction objects

Malfunction objects are sent after every reset and, additionally, after changes (i.e. at the beginning and end of a malfunction).

6.1. General settings

Set basic characteristics of data transfer.

Transmission delay after reset/restoration of bus for:	
Measured values	<u>5</u> … 300 seconds
Maximum telegram quota	1 • 2 • 5 • <u>10</u> • 20 • 50 <u>Telegrams per sec.</u>

6.2. GPS

Set whether the time and date are to be sent as separate objects or as one common object. Specify whether the time and date are to be set by the GPS signal or objects.

If time and date are **set by the GPS-Signal**, the data is available as soon as a valid GPS signal is received.

If time and date are **set by two objects**, then only a maximum of 10 seconds may elapse between receiving the date and receiving the time Furthermore, a change of date may not occur between receiving both objects. The objects must be received by the device on the same day.

The device has an integrated real-time clock. Therefore, time keeps on running internally and can be sent to the bus, even when no GPS coverage is available or no time object has been received for some time. The internal clock can show a time drift of up to ±6 seconds per day.

Object type date and time	• <u>two separate objects</u> • a common object
Date and time will be set by	• <u>GPS signal and not sent</u> • GPS signal and sent periodically • GPS signal and sent on request • GPS signal and sent on request + periodically • object(s) and not sent
Send cycle *(if sent periodically)*	5 s … 2 h; <u>1 min</u>

Set what happens in the event of a GPS malfunction. Please note, that after return of auxiliary voltage, it can take up to 10 minutes before the GPS signal is received.

If there is no reception, GPS fault is … recognised after the last reception	20 min • <u>30 min</u> • 1 h • 1.5 h • 2 h

GPS fault object sends (1: malfunction| 0: no malfunction)	• <u>never</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 cycle *(if sent periodically)*	5 s … 2 h; <u>10 s</u>

6.3.   Location

The **location** is received via GPS or entered manually (selection of the nearest town or by entering coordinates). Also when using the GPS signal coordinates can be entered manually for the initial commissioning. This data is used as long as no GPS reception exists. For this you select the option "Input (only valid until the first GPS reception)".

Location is determined by	• input • input (only valid until the first GPS reception) • <u>GPS reception</u>	
Location input using *(if input selected)*	• <u>Town</u> • Coordinates	
Country *(if input by town is selected)*	• Belgium • Denmark • <u>Germany</u> • France • Great Britain • Italy	• Liechtenstein • Luxembourg • Netherlands • Austria • Switzerland • USA
Town *(if input by town is selected)*	6 towns in Belgium 1 town in Denmark 48 towns in Germany; <u>Stuttgart</u> 23 towns in France 4 towns in Great Britain 10 towns in Italy 1 town in Liechtenstein 1 town in Luxembourg 2 towns in the Netherlands 4 towns in Austria 4 towns in Switzerland 2 towns in the USA	
E. longitude [degrees, -180…+180] *(if input by coordinates is selected)*	<u>9</u> [negative values mean "western longitude"]	
E. longitude [minutes, -59…+59] *(if input by coordinates is selected)*	<u>10</u> [negative values mean "western longitude"]	

Northern latitude [Degrees, -90...+90] *(if input by coordinates is selected)*	48 [negative values mean "southern latitude"]
Northern latitude [minutes, -59...+59] *(if input by coordinates is selected)*	46 [negative values mean "southern latitude"]

In order to be able to output the **local time**, the time zone (difference to world time (Coordinated Universal Time)) and the summer time rules must be defined. Specify the hours and minutes after winter time (standard time).

Time zone (relative to GMT):	
Prefix	• <u>positive (+)</u> • negative (-)
Hours	0 ... 13; <u>1</u>
Minutes	0 ... 59; <u>0</u>
Summertime rule	• <u>Europe</u> • USA • user-defined • none
All the following times are to be entered as winter time = standard time	
Start of Summer Time:	
on	• Monday ... <u>Sunday</u> • Date
From (day) *(for Europe or USA summer time rules)* (Day) *(For user defined summer time rules)*	1 ... 31; <u>25</u>
(Month)	1 ... 12; <u>3</u>
(Hour)	0 ... 23; <u>2</u>
(minutes)	<u>0</u> ... 59
End of Summer Time:	
on	• Monday ... <u>Sunday</u> • Date
From (day) *(for Europe or USA summer time rules)* (Day) *(For user defined summer time rules)*	1 ... 31; <u>25</u>
(Month)	1 ... 12; <u>10</u>
(hour)	0 ... 23; <u>2</u>
(minutes)	<u>0</u> ... 59
Time shift:	
hours	-12 ... 12; <u>1</u>
minutes	<u>0</u> ... 59

The standard coordinates can be transmitted from the device to the bus and thus be used in other applications, no matter whether they have been received via GPS or specified manually.

Send coordinates	• never • periodically • on change • on change and periodically
on change of	0.5° • 1° • 2° • 5° • 10°
Send cycle	5 s … 2 h; 5 min

6.4. Rain

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

Use rain sensor	No • **Yes**

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	• never • after power restoration • after power restoration and programming

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	No • Yes

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)	No • Yes
Delay on rain	none • 1 s … • 2 h
Delay on no rain (after drying of the sensor)	5 min • 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	• <u>on change</u> • on change to rain • on change to no rain • on change and periodically • on change to rain and periodically • on change to no rain and periodically
Send cycle *(if sent periodically)*	5 s ... 2 h; <u>10 s</u>
Object value(s) with rain	0 • <u>1</u>

6.5.   Temperature measurement value

First of all set whether the temperature sensor malfunction object is to be used and correct, if necessary, the output of the measurement value by specifying an offset (e.g. in order to compensate malfunction sources).

Use malfunction object	<u>No</u> • Yes
Offset in 0.1°C	-50… 50; <u>0</u>

Then set the mixed value calculation if desired.

Use external reading	<u>No</u> • Yes
Ext. Reading proportion of the total reading *(if external reading is to be used)*	5% • 10% • 15% • ... • <u>50%</u> • ... • 95% • 100%
All following settings refer to the total measured value	

Specify the send pattern for the total measured value.

Send pattern	• <u>never</u> • periodically • on change • on change and periodically
on change of *(if sent on change)*	0.1°C • 0.2°C • 0.5°C • <u>1.0°C</u> • 2.0°C • 5.0°C
Send cycle *(if sent periodically)*	5 s ... 2 h; <u>10 s</u>

Select whether the minimum and maximum value should be used.

Use minimum and maximum value	<u>No</u> • Yes

6.6.   Brightness measurement value

Set the send pattern for the measured brightness.

Send pattern	• <u>never</u> • periodically • on change • on change and periodically
at and above change in % *(if sent on change)*	1 ... 100; <u>20</u>
Send cycle *(if sent periodically)*	<u>5 s</u> ... 2 h

6.7.   Wind measurement

If necessary, activate the wind malfunction object. Specify whether the measurement should also be output in Beaufort.

Use malfunction object	<u>No</u> • Yes
Measured value additionally output in the Beaufort scale	<u>No</u> • Yes

Define the send pattern and, if necessary, activate the maximum value (this value is not retained after a reset).

Send pattern	• <u>never</u> • periodically • on change • on change and periodically
on change of *(if sent on change)*	2% • <u>5%</u> • 10% • 25% • 50%
Send cycle *(if sent periodically)*	5 s ... 2 h; <u>10 s</u>
Use maximum value	<u>No</u> • Yes

Beaufort scale

Beaufort	Meaning
0	Calm
1	Light air
2	Light breeze
3	Gentle breeze
4	Moderate breeze

Beaufort	Meaning
5	Fresh breeze
6	Strong breeze
7	High wind
8	Gale
9	Severe gale
10	Storm
11	Violent storm
12	Hurricane