P03/3-RS485 basic Weather Station

Technical specifications and installation instructions

Item number 30140

1.   Description

The **P03/3-RS485 basic Weather Station** measures temperature, wind speed, brightness (eastern, southern and western sun) and it recognizes precipitation.

The weather station sends the currently recorded weather data once every second. This data flow can be received and analyzed by an end device such as SPS, PC or MC.

Functions:

- **Brightness measurement** with three separate sensors for east, south and west. Recognition of twilight/dawn
- **Wind speed measurement:** by means of a nonwearing electronic sensor. No damage from storm or hail as with mechanical anemometers
- **Temperature measurement**
- Heated **precipitation sensor** (1.2 watts): No false reports as a result of fog or dew. Dries quickly after precipitation has stopped
- Sending cycle for data 1 second

1.0.1. Scope of delivery

- Weather station

1.1.   Technical specifications

Housing	Plastic material
Colour	White / translucent
Mounting	On-wall
Degree of protection	IP 44
Dimensions	approx. 96 × 77 × 118 (W × H × D, mm)
Weight	approx. 160 g
Ambient temperature	Operation -30…+50°C, Storage -30…+70°C
Operating voltage	24 V DC ±10%. A suitable power pack can be purchased from Elsner Elektronik.
Connection	Screw terminal
Conductor cross-section	Solid/fine-stranded conductors of 0.5...1.0 mm²
Stripping length	6 mm
Current	max. 130 mA, residual ripple 10%
Data output	RS485
Heating rain sensor	approx. 1.2 W
Measurement range temperature	-40…+80°C
Measurement range wind	0…35 m/s
Measurement range brightness	0 … 99,000 lux

The product conforms with the provisions of EU directives.

2.   Installation and commissioning

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

⚠ **CAUTION!**
Live voltage!

- 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.

2.1.   Installation position

Choose an installation position in the building where wind, rain and sun can be measured unhindered by the sensors. The weather station must not be installed underneath any structural parts from which water can still drip onto the rain sensor after it has stopped raining or snowing. The weather station must not be shaded by anything, such as building structures or trees.

At least 60 cm of clearance must be left all round the weather station. This facilitates correct wind speed measurement without eddies. The distance concurrently prevents spray (raindrops hitting the device) or snow (snow penetration) from impairing the measurement. It also does not allow birds to bite it.
Please take note that an extended awning does not shade the device from sun and wind.

Temperature measurements can also be affected by external influences such as by warming or cooling of the building structure on which the sensor is mounted, (sunlight, heating or cold water pipes).
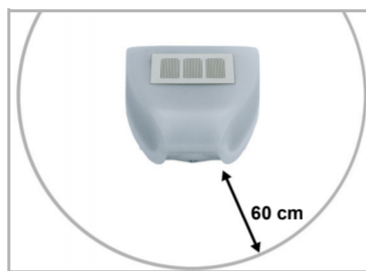

Fig. 1
There must be at least 60 cm of space below, to the sides and in front of the weather station left from other elements (structures, construction parts, etc.).
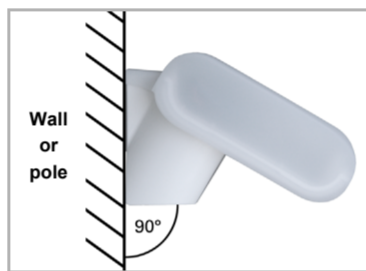
60 cm

Fig. 2
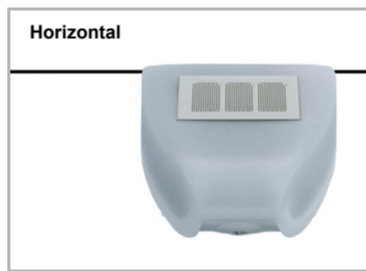*The weather station must be mounted on a vertical wall (or a pole).*

Wall or pole   90°

Fig. 3
The weather station must be mounted in the horizontal transverse direction (horizontally).
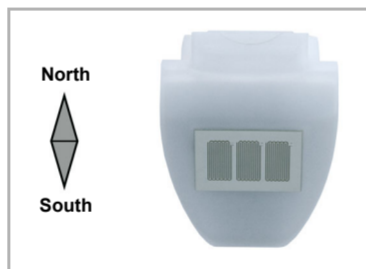
Horizontal

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

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

North   South

2.2.   Mounting the sensor

2.2.1. 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.
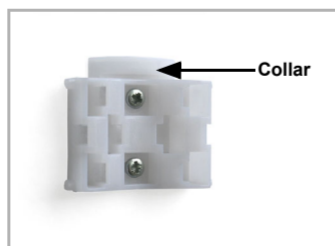

Fig. 5
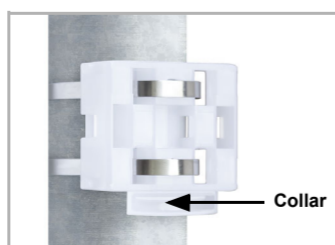*When wall mounting: flat side on wall, crescent-shaped collar upward.*

Collar

Fig. 6
When pole mounting: curved side on pole, collar downward.

Collar

Fig. 7
Different mounting arms are available from Elsner Elektronik as additional, optional accessories for flexible installation of the weather station on a wall, pole or beam (pictures of sensors exemplary). Example of the use of a mounting arm: Due to flexible ball joints, the sensor can be brought into ideal position.

Fig. 8
Example use of the hinge arm mounting: With the hinge arm mounting, the weather station projects from beneath the roof overhang. Sun, wind and precipitation can act upon the sensors without hindrance.
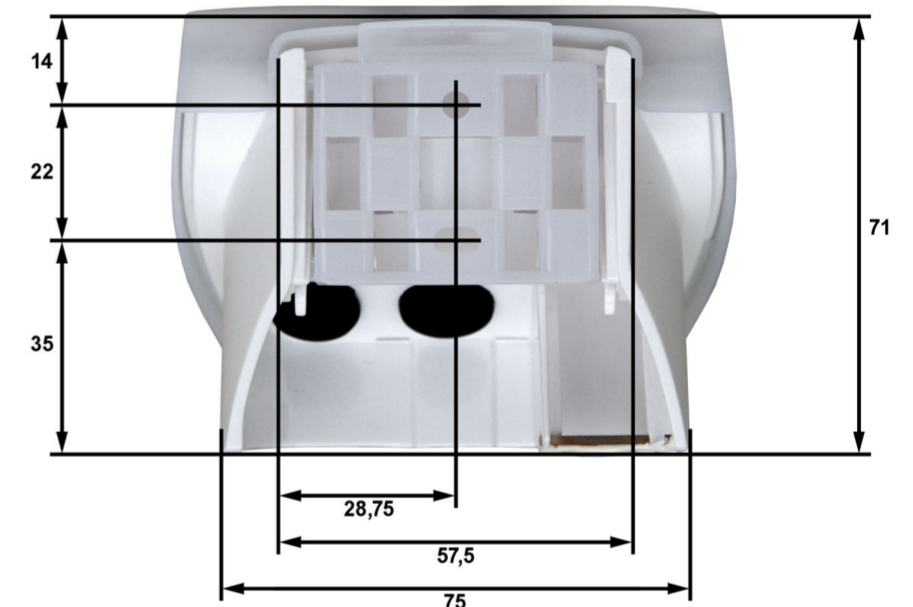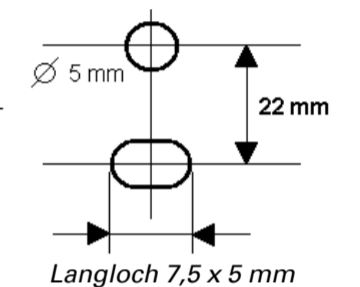

Fig. 9
Example use of the hinge arm mounting: Fitting to a pole with worm drive hose clips

2.2.2. View of rear side and drill hole plan

Fig. 10 a+b
Drill hole plan

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

Ø 5 mm
22 mm
Langloch 7,5 x 5 mm

14   22   35   28,75   57,5   75   71

2.2.3. Connection

Unsnap cover and remove upwards

Fig. 11
1) Cover Snaps
2 Bottom part of housing

1
2

The weather station cover with the rain sensor snaps in on the left and right along the bottom edge (see figure). Remove the weather station 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 (wire with push-connector).

Connect the Modbus data line to terminals A and B. Connect the power supply (24 V DC) to terminals 1 and 2. Ensure correct connection!

Push the connecting cable through the rubber seal on the bottom of the weather station and connect the power and bus cables to the terminals provided for this purpose.

The connection is by typical telephone cable (J-Y(ST)Y 2 × 2 × 0.8).

The connection cable must be plugged in between the cover and circuit board.
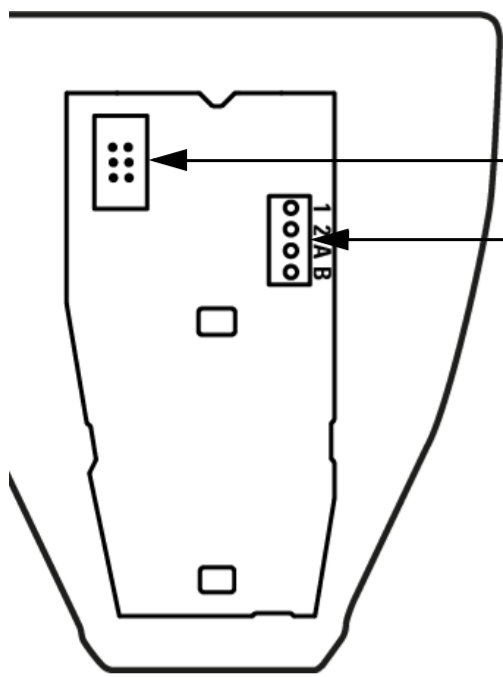
2.2.4. PCB Layout

Fig. 12: Overview PCB
1   Connecting cables to rain sensor
    in housing cover
2   Terminal for connection
    1: +24 V DC | 2: „-"
    A: data | B: data

2.2.5. 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".
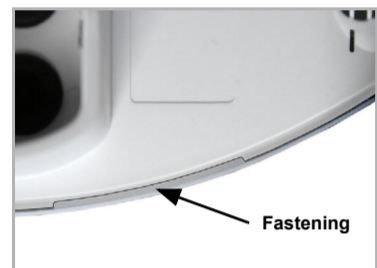

Fig. 13
Make sure the cover and bottom part are properly snapped together! This picture is looking at the closed sensor from underneath.

Fastening

Fig. 14
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.
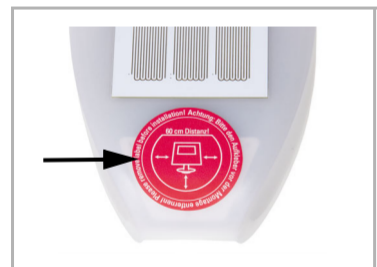

Fig. 15
After installation, remove the "distance" sticker on the top of the cover.

2.3. Notes on mounting and commissioning

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

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

Please take care not to damage the temperature sensor (small blank at the bottom part of the housing.) when mounting the weather station. Please also take care not to break away or bend the cable connection between the blank and the rain sensor when connecting the weather station.

Remove all existing protection labels after installation.

The correct wind value may only be supplied about 30 seconds after the supply voltage has been connected.

2.4. Maintenance of the weather station

⚠ **WARNING!**
Risk of injury caused by components moved automatically!
The automatic control can start system components and place people in danger.
• Always isolate the system 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.

🛑 **ATTENTION**
The device can be damaged if water penetrates the housing.
• Do not clean with high pressure cleaners or steam jets.

3.   Transfer protocol

All characters and/or digits are based on the ASCII standard, i.e. every reading processed internally as an integer or float value will always be broken down into and transferred in its individual ASCII format characters. They must then be reassembled in the reverse process by the receiver.

Transfer rate: 19200 Baud
Data bits: 8
Stop bit: 1
Parity: none

The checksum is calculated along by the receiver by adding all received bytes up until byte 35 and then compared with the checksum transferred from the P03.

Units:
Temperatures in degrees Celsius
Sun intensity in kilolux
Daylight in Lux
Wind in metres per second

Byte No	char	Description	
1	W	Start of Weather Data	
2	AT: sign	Outdoor temperature sign - / +	
3	AT: 1st digit	Outdoor temperature 1st digit (tens)	in °C
4	AT: 2nd digit	Outdoor temperature 2nd digit (units)	
5	AT: decimal point	Outdoor temperature decimal point	
6	AT: 3rd digit	Outdoor temperature 3rd digit (tenths)	
7	SoS: 1st digit	Sun South 1st digit (tens)	1-99 klx
8	SoS: 2nd digit	Sun South 2nd digit (units)	
9	SoW: 1st digit	Sun West 1st digit (tens)	
10	SoW: 2nd digit	Sun West 2nd digit (units)	
11	SoO: 1st digit	Sun East1st digit (tens)	
12	SoO: 2nd digit	Sun East 2nd digit (units)	
13	Twilight	Twilight: J = Yes; N = No	< 10 lx
14	Daylight 0-999Lx	Daylight 1st digit (hundreds)	0-999 lx
15	Daylight 0-999Lx	Daylight 2nd digit (tens)	
16	Daylight 0-999Lx	Daylight 3rd digit (units)	
17	Wind: 1st digit	Wind 1st digit (tens)	in m/s
18	Wind: 2nd digit	Wind 2nd digit (units)	
19	Wind: decimal point	Wind decimal point	
20	Wind: 3rd digit	Wind 3rd digit (tenths)	
21	Rain	Rain: J = Yes; N = No	
22	Week day: ?	This function is not implemented	
23	Date: ?	This function is not implemented	
24	Date: ?	This function is not implemented	
25	Date: ?	This function is not implemented	
26	Date: ?	This function is not implemented	
27	Date: ?	This function is not implemented	
28	Date: ?	This function is not implemented	
29	Time: ?	This function is not implemented	
30	Time: ?	This function is not implemented	
31	Time: ?	This function is not implemented	
32	Time: ?	This function is not implemented	
33	Time: ?	This function is not implemented	
34	Time: ?	This function is not implemented	
35	Summer time: ?	This function is not implemented	
36	Checksum: 1st digit	Checksum 1st digit (thousands)	
37	Checksum: 2nd digit	Checksum 2nd digit (hundreds)	
38	Checksum: 3rd digit	Checksum 3rd digit (tens)	
39	Checksum: 4th digit	Checksum 4th digit (units)	
40	End identifier	end identifier 0x03	

3.1. Disposal

Observe legal regulations and do not dispose of with household waste!