

## P03/3-RS485-GPS, P03/3-RS485-CET Weather Station

### Technical specifications and installation instructions

#### Item numbers

30145 (P03/3-RS485-GPS)

30151 (P03/3-RS485-CET)



### 1. Description

The **P03/3-RS485-GPS/CET Weather Station** measures temperature, wind speed and brightness (eastern, southern and western sun). It recognizes precipitation and receives the time signal with a GPS receiver. With the weather station P03/3-RS485-GPS the international time signal UTC and position coordinates are output. Direction (azimuth) and height (elevation) of the sun are also calculated and output. For the P03/3-RS485-CET Weather Station, the Central European Time (CET) is output. The daylight savings time is adjusted automatically according to the specifications for Central Europe.

The weather station sends the currently recorded weather data, date and time 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 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
- 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

#### Functions P03/3-RS485-GPS:

- Integrated **GPS receiver**. Output of UTC (Universal Time Coordinated), position (degree of longitude and latitude) and position of the sun (azimuth, elevation)

#### Functions P03/3-RS485-CET:

- Integrated **GPS receiver**. Output of CET (Central European Time), automatic adjustment of daylight savings time.

### 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 x 77 x 118 (W x H x 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.
Cable cross-section	Massive conductors of up to 0.8 mm <sup>2</sup>
Current	max. 120 mA, residual ripple 10%
Data output	RS485
Heating rain sensor	approx. 1.2 W
Measurement range temperature	-40...+80°C
Resolution (temperature)	0.1°C
Accuracy (temperature)	±1.5°C at -25...+80°C
Measurement range wind	0...35 m/s
Resolution (wind)	0.1 m/s
Accuracy (wind)	at ambient temperature -20...+50°C: ±22% of the measurement value when incident flow is from 45...315° ±15% of the measurement value when incident flow is from 90...270° (Frontal incident flow corresponds to 180°)

Measurement range brightness	0 ... 99,000 lux
Resolution (brightness)	1 lux up to 300 lux 2 lux up to 1,000 lux 20 lux up to 99,000 lux
Accuracy (brightness)	±15% at 30 lux ... 30,000 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 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.

#### 2.0.1. 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).

Magnetic fields, transmitters and interfering fields from electricity consumers (e.g. fluorescent lamps, neon signs, switched-mode power supplies etc.) can interfere with or even cut out reception of the GPS signal.

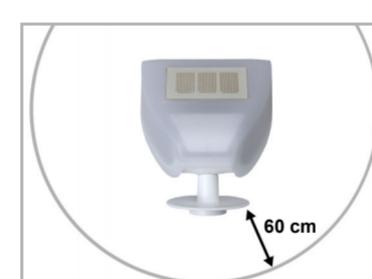


Fig. 1  
There must be at least 60 cm of space below, to the sides and in front of the weather station left from other elements (structures, construction parts, etc.).

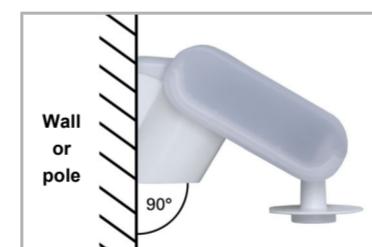


Fig. 2  
The weather station must be mounted on a vertical wall (or a pole).



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

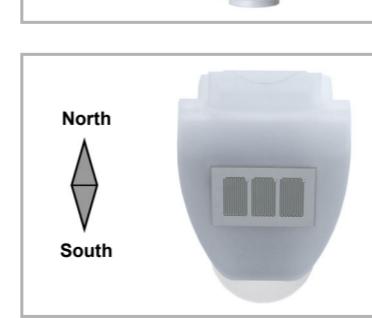


Fig. 4  
For installation in the northern hemisphere, the weather station must be aligned to face south.

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

### 2.1. Mounting the sensor

#### 2.1.1. 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.

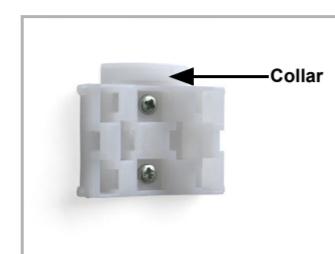


Fig. 5  
When wall mounting: flat side on wall, crescent-shaped collar upward.

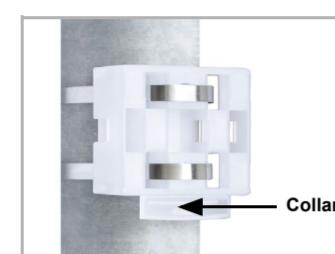


Fig. 6  
When pole mounting: curved side on pole, collar downward.



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.

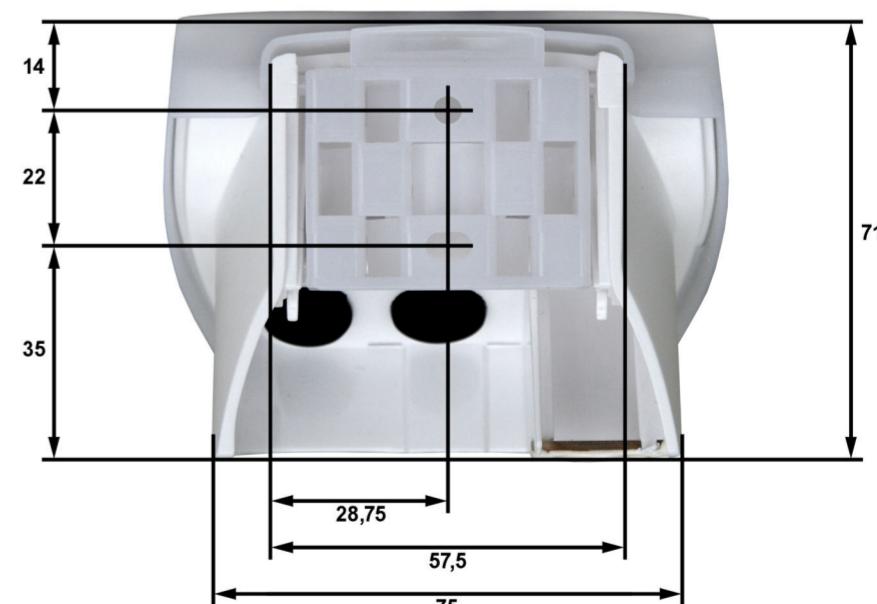
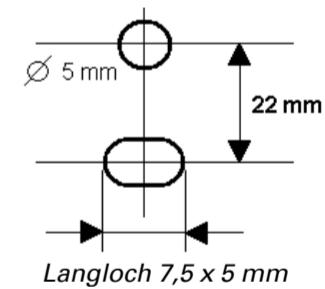


Fig. 9  
Example use of the hinge arm mounting: Fitting to a pole with worm drive hose clips

#### 2.1.2. 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.



**2.1.3. Connection**

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

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 x 2 x 0.8).

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

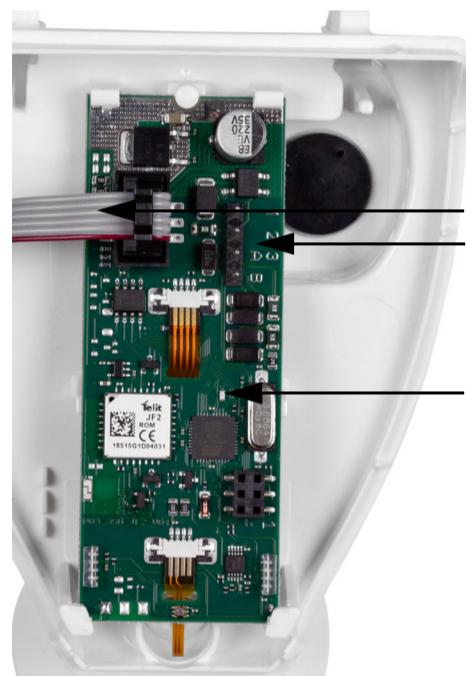
**2.1.4. PCB Layout**

Fig. 12: Overview PCB  
1 Connecting cables to rain sensor in housing cover  
2 Socket for connecting plug, suitable for massive conductors of up to 0.8 mm<sup>2</sup>  
1: +24 V DC / 2: GND  
A: data / B: data  
3 GPS reception control LED

**2.1.5. Mounting the weather station**

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".

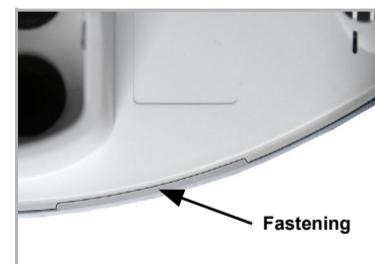


Fig. 13  
Make sure the cover and bottom part are properly snapped together! This picture is looking at the closed sensor from underneath.



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 weather station can be simply pulled upwards out of the mount, against the resistance of the fastening.

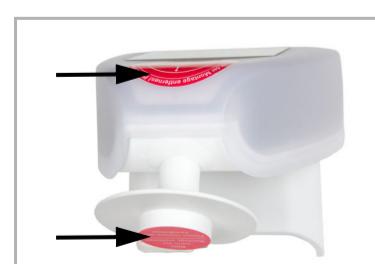


Fig. 15  
After installation, remove the protective sticker on the wind sensor and the "distance" sticker on the top of the cover.

**2.2. 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.

The correct wind value may only be supplied about 10 seconds after the supply voltage has been connected.

**2.3. Maintenance of the weather station****Risk of injury caused by components moved automatically!**

The automatic control can start system components and place people in danger.

- 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.

**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	Data bits	Stop bit	Parity
19200 Baud	8	1	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	Sun intensity	Daylight	Wind
in degrees Celsius	in kilolux	in Lux	in metres per second

**P03/3-RS485-GPS:**

Byte No	Char	Description
1	G	Start of string
2	+ / -	Outdoor temperature in °C, sign
3	0 ... 9	Outdoor temperature in °C, tens digit
4	0 ... 9	Outdoor temperature in °C, units digit
5	.	Outdoor temperature in °C, decimal point
6	0 ... 9	Outdoor temperature in °C, tenths digit
7	0 ... 9	Sun south in kLux, tens digit
8	0 ... 9	Sun south in kLux, units digit
9	0 ... 9	Sun west in kLux, tens digit
10	0 ... 9	Sun west in kLux, units digit
11	0 ... 9	Sun east in kLux, tens digit
12	0 ... 9	Sun east in kLux, units digit
13	J / N	Lux twilight indication
14	0 ... 9	Daylight in Lux, hundreds digit
15	0 ... 9	Daylight in Lux, tens digit
16	0 ... 9	Daylight in Lux, units digit
17	0 ... 9	Wind in m/s, tens digit
18	0 ... 9	Wind in m/s, units digit
19	.	Wind in m/s, decimal point
20	0 ... 9	Wind in m/s, tenths digit
21	J / N	Rain indication
22	? / 1 ... 7	UTC weekday (1 = monday ... 7 = sunday   ? = UTC not OK)
23	0 ... 9	UTC date day, tens digit
24	0 ... 9	UTC date day, units digit
25	0 ... 9	UTC date month, tens digit
26	0 ... 9	UTC date month, units digit
27	0 ... 9	UTC date year, tens digit
28	0 ... 9	UTC date year, units digit
29	0 ... 9	UTC time hour, tens digit
30	0 ... 9	UTC time hour, units digit
31	0 ... 9	UTC time minute, tens digit
32	0 ... 9	UTC time minute, units digit
33	0 ... 9	UTC time second, tens digit
34	0 ... 9	UTC time second, units digit
35	0 / 1	GPS report azimuth/elevation/longitude/latitude (1 = OK, 0 = not OK)
36	0 ... 3	Azimuth in °, hundreds digit
37	0 ... 9	Azimuth in °, tens digit
38	0 ... 9	Azimuth in °, units digit

Byte No	Char	Description
39	.	Azimuth in °, decimal point
40	0 ... 9	Azimuth in °, tenths digit
41	+ / -	Elevation in °, sign
42	0 ... 9	Elevation in °, tens digit
43	0 ... 9	Elevation in °, units digit
44	.	Elevation in °, decimal point
45	0 ... 9	Elevation in °, tenths digit
46	O / W	Longitude in ° (O = east, W = west)
47	0 / 1	Longitude in °, hundreds digit
48	0 ... 9	Longitude in °, tens digit
49	0 ... 9	Longitude in °, units digit
50	.	Longitude in °, decimal point
51	0 ... 9	Longitude in °, tenths digit
52	N / S	Latitude in ° (N = north, S = south)
53	0 ... 9	Latitude in °, tens digit
54	0 ... 9	Latitude in °, units digit
55	.	Latitude in °, decimal point
56	0 ... 9	Latitude in °, tenths digit
57	0 ... 9	Checksum thousands digit
58	0 ... 9	Checksum hundreds digit
59	0 ... 9	Checksum tens digit
60	0 ... 9	Checksum units digit
61	0x03	end identifier

**P03/3-RS485-CET:**

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)
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)
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 east 1st digit (tens)
12	SoO: 2nd digit	Sun east 2nd digit (units)
13	Twilight	Twilight: J = Yes; N = No
14	Daylight 0-999Lx	Daylight 1st digit (hundreds)
15	Daylight 0-999Lx	Daylight 2nd digit (tens)
16	Daylight 0-999Lx	Daylight 3rd digit (units)
17	Wind: 1st digit	Wind 1st digit (tens)
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: 1-7	Week day: 1 = Mon, 7 = Sun
23	Date: Day 1st digit	Date: Day 1st digit (tens)
24	Date: Day 2nd digit	Date: Day 2nd digit (units)
25	Date: Month 1st digit	Date: Month 1st digit (tens)
26	Date: Month 2nd digit	Date: Month 2nd digit (units)
27	Date: Year 1st digit	Date: Year 1st digit (tens)
28	Date: Year 2nd digit	Date: Year 2nd digit (units)
29	Time: Hour 1st digit	Time: Hour 1st digit (tens)
30	Time: Hour 2nd digit	Time: Hour 2nd digit (units)
31	Time: Min. 1st digit	Time: Min. 1st digit (tens)
32	Time: Min. 2nd digit	Time: Min. 2nd digit (units)
33	Time: Sec. 1st digit	Time: Sec. 1st digit (tens)
34	Time: Sec. 2nd digit	Time: Sec. 2nd digit (units)
35	Summer time	J = Summer time N = Winter time ? = not defined
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

**4. Disposal**

After use, the device must be disposed of or recycled in accordance with the legal regulations. Do not dispose of it with the household waste!