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Manual Wind Logger PCE-WL2



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1 Introduction

1.1 General

Thank you for purchasing a wind logger PCE-WL2 from PCE Instruments.

The wind logger PCE-WL 2 is used to determine and analyse the current wind situation before putting wind energy plants into service. The wind sensor saves measured data on wind direction as well as wind velocity to an SD memory card. This means that after the measurement, the data can be further analysed by means of a PC. Its case is weather-resistant and protected according to the IP65 protection class. The cable of the wind sensor is connected to the data logger via screwed connections. The wind sensor can measure velocities of up to 40 m/s and wind directions of between 2.5 ° and 357.5 °. The cup anemometer of the wind logger is equipped with low-wear reed relays that ensure a long operating time. Optionally, this device can be equipped with a display which indicates wind direction and velocity results in real time.

1.2 Delivery content

- 1 x wind logger PCE-WL2
- 1 x combined wind sensor
- 1 x SD memory card
- 2 x battery
- 1 x instruction manual

2 Safety notes

Please read this manual carefully and completely before you use the device for the first time. The device may only be used by qualified personnel and repaired by PCE Instruments personnel. There is no warranty of damages or injuries caused by non-observance of the manual.

- The device may only be used in the approved temperature range. Do not expose it to extreme temperatures such as direct sunlight, extreme air humidity or moisture. The limit values for operating temperature and humidity must be within the specifications.
- Never use the instrument with wet hands.
- The case should only be opened by qualified personnel of PCE Instruments.
- The instrument should never be placed with the user interface facing an object (e.g. keyboard or display side on a table)
- You must not make any technical changes to the device.
- The appliance should only be cleaned with a damp cloth / use only pH-neutral cleaner, no cleaning agents containing abrasives or solvents.
- The device may only be used with PCE accessories or equivalent.
- Before each use, check the case and the test leads for visible damage. If any damage is visible, do not use the device.
- The instrument must not be used in explosive atmospheres.
- When the battery is low (e. g. according to the battery level indicator), do not use the device anymore as false measurement values can cause life-threatening situations. You can use the device again after replacing the batteries.
- Before each use, test the device by measuring a known factor.
- The limit values for the measuring variables stated in the specifications must under no circumstances be exceeded.
- When the instrument will not be used for a long period of time, remove the batteries to avoid damage due to battery leakage.

This manual is published by PCE Instruments without any guarantee.

We expressly point to our general guarantee terms which can be found in our general terms of business.

If you have any questions please contact PCE Instruments.

3 Specifications

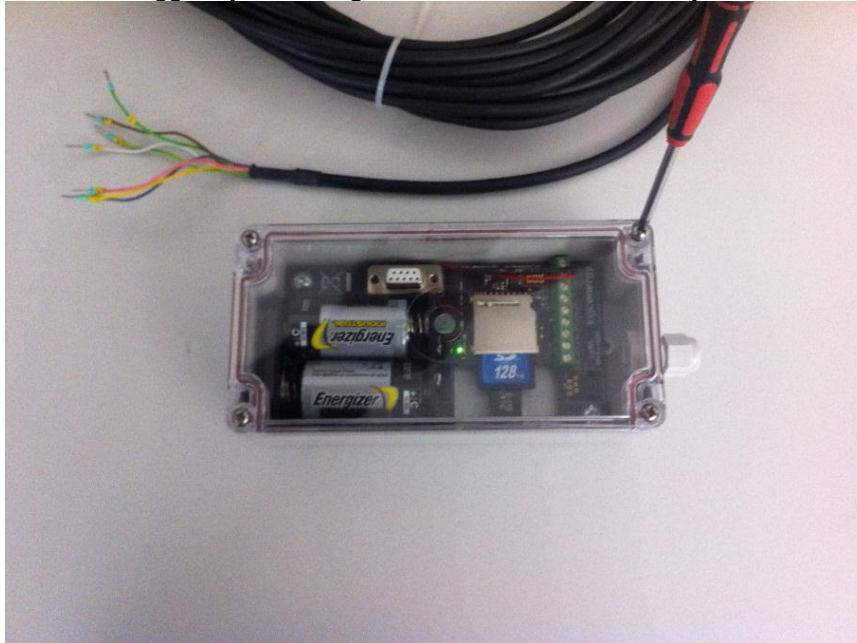
Wind logger	
Memory	SD/MMC card (FAT16/32)
Power supply	2 x 1.5 V C type batteries
Operating conditions	-15 ... + 50 °C
Inputs	1x analogue input 2x digital input
Interface	RS232
Recording interval	10 seconds, 1 minute or 10 minutes
Storage medium	SD memory card (max. 2 GB)
File format	CSV file, ASCII format
Case	resilient plastic case
Protection class	IP65
Dimensions	160 x 80 x 55 mm
Weight	450 g
Wind sensor	
Wind velocity	
Output	0 ... 100 Hz at 40 m/s
Measurement range	0.8 ... 40 m/s
Capacity	10 VA max. 0.5 A max. 42 V
Wind direction	
Measurement range	10...350 °
Accuracy	± 5 °
Output signal	1 kΩ
Potentiometer capacity	0.3 W
Temperature	
Measurement range	-30 ... +60 °C
Sensor	NTC 10 kΩ
General	
Operating conditions	-25 ... +60 °C (if ice-free)
Weight	approx. 1 kg
Cable	15 m; fixed
Protection class	IP54

4 System description

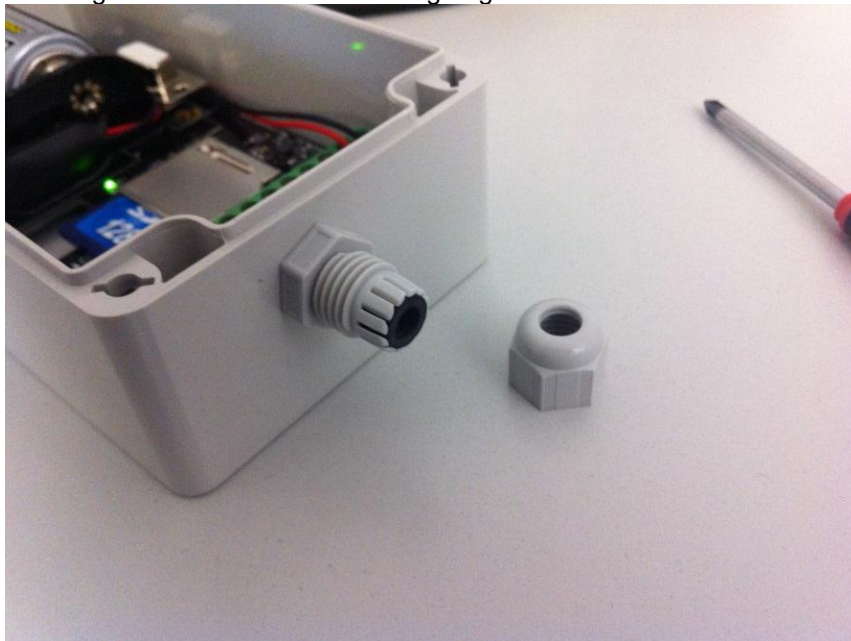
4.1 Installation of hardware

4.1.1 How to open the case and install the cable

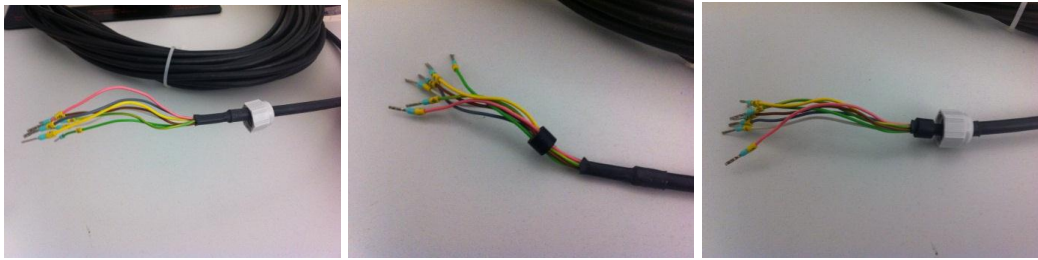
Open the case of the wind logger by loosening four screws at its corners by means of a screwdriver.



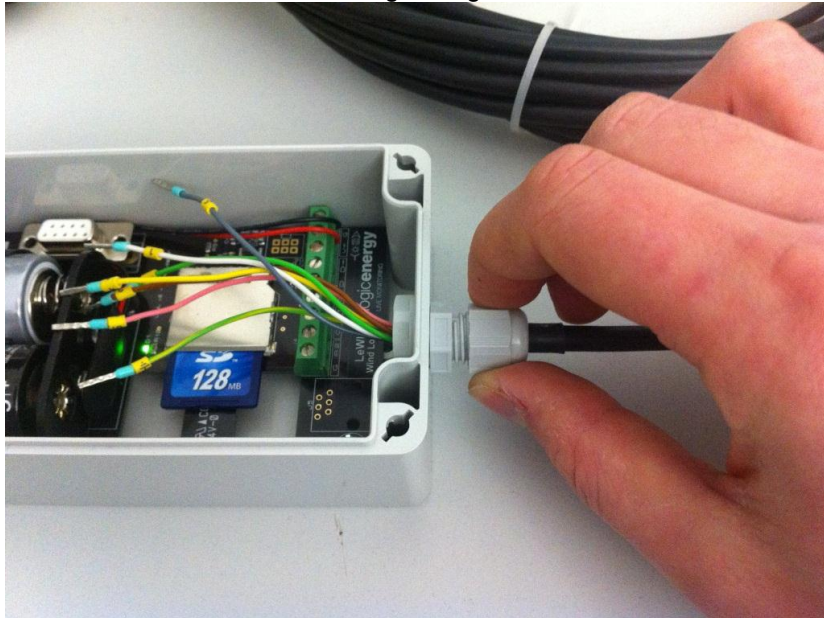
You can now see the circuit board of the data logger. The next step is to install the cable. To do so, open the PG gland and remove the sealing ring.



First slide the nut over the wind sensor cable, followed by the sealing ring.



Now you can insert the cable into the case through the gland and fix the nut.



4.1.2 How to connect the sensor

The connector block of the sensors is fixed to the main circuit board. The connectors on the main circuit board have the following functions:

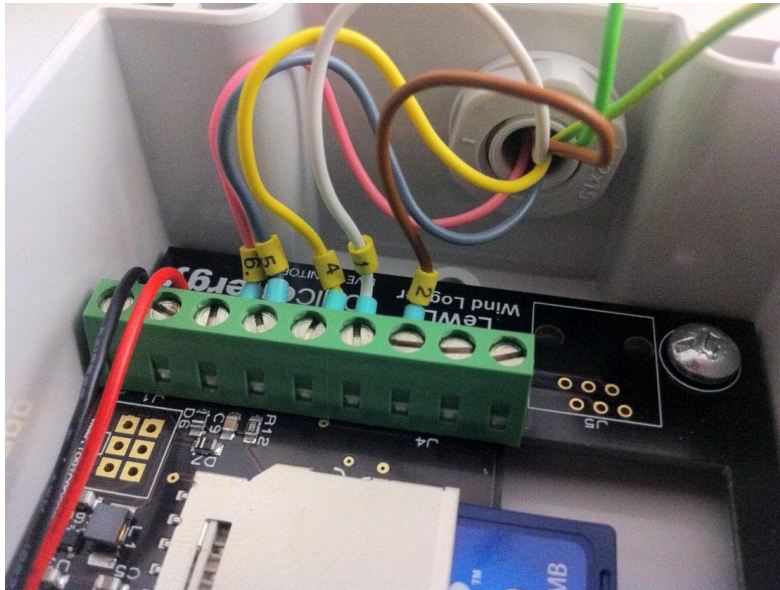
From left to right:

- G: ground
- A2: input of sensor 2
- G: ground
- A1: input of sensor 1
- G: ground
- D: input of wind direction sensor
- D+: power supply of wind direction sensor
- V+: positive pole (red)
- G: ground (black)

The sensor is connected as follows:

Connection to circuit board	Cable marker	Cable colour	Function
A1	1	white	input of sensor 1
G	2	brown	ground of sensor 1
D+	6	pink	power supply of wind direction sensor
D	5	grey	input wind direction
G	4	yellow	ground wind direction

When everything is connected, the circuit board and the connector block should look like this:



We recommend to use tweezers or long nose pliers for installation.

Note: The green and the green-yellow cable are not connected. We recommend to insulate the ends of both cables.

4.1.3 How to mount the waterproof box to the wall

As there are 4 prepared holes, the PCE-WL2 can easily be mounted to a wall.

4.2 Power supply

The PCE-WL2 is powered by two 1.5 V D cells.

Note: Check on a regular basis whether the data logger still works properly und whether the batteries are charged. Otherwise there might be some problems with the memory. We recommend to replace the batteries every 3 months.

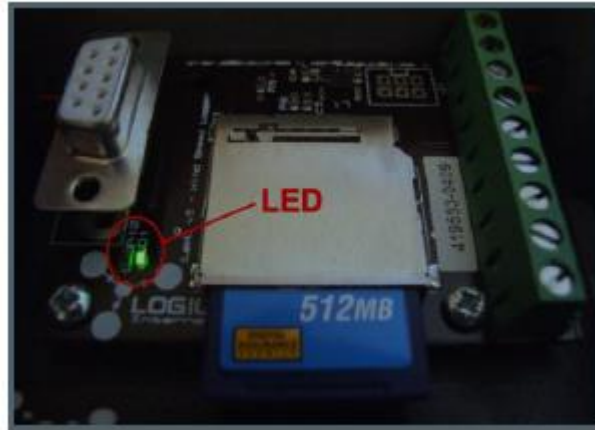
Attention: When replacing the batteries, date and time are reset. You have to make the date and time setting again.

We recommend to make a backup of the SD card on another SD card. Before replacing the batteries, make all SD card settings by means of the configuration software. Replace the batteries and insert the newly configured SD card. The new settings will then be saved directly to the data logger.

5 Instructions

5.1 Device status

The current device status is indicated by a green LED inside the device.



LED off: The logger is in normal data storage mode. The LED flashes in the recording interval you set up. If the set interval is 10 seconds, the LED flashes every 10 seconds. If the set interval is 1 minute, the LED will flash every minute.

LED flashes quickly: There is a memory card error. One possible reason is that the memory card has not been inserted correctly but it is also possible that the power consumption of the memory card is too high to ensure proper recording. Quick flashing can also indicate that the wind logger is ready for communication via the RS-232 interface.

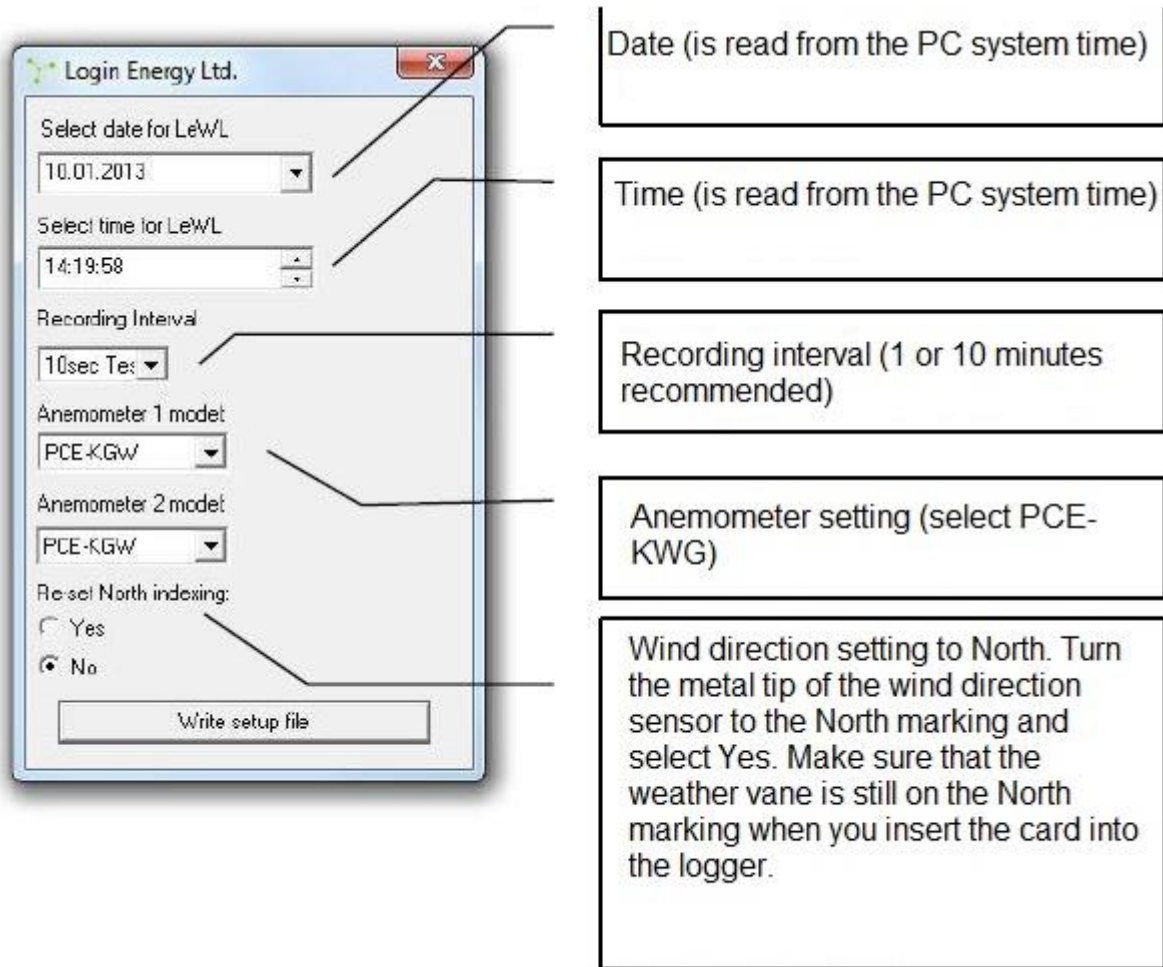
LED on: The logger is in setup mode and settings must be made by means of a computer connected to the device via the RS-232 interface.

5.2 Setup of the wind logger PCE-WL2

5.2.1 Setup of the data on the SD card by means of the software (for beginners)

Remove the SD card from the data logger and connect it to a PC by means of a card reader.

Start the file `lew1_setup.exe`. The following window will open:



After making all settings, click on the “Write setup file” button to save the settings. You can now remove the SD card from the PC and insert it into the logger again. Data storage will start automatically. The flashing LED in the set recording interval indicates that the wind logger works properly.

5.2.2 Setup by means of the terminal programme (for experts)

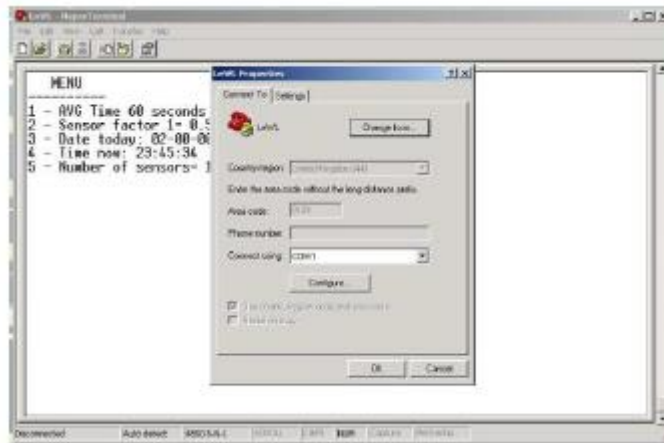
The PCE-WL2 data logger has an integrated menu which can easily be configured by means of a terminal programme via a PC. All parameters (except date and time) are saved to the device permanently and so not have to be set every time.

Note: PCs which are equipped with Windows 7 do not have an integrated terminal programme. As a replacement, we recommend the programme HTerm by Tobias Hammer which is freely available.

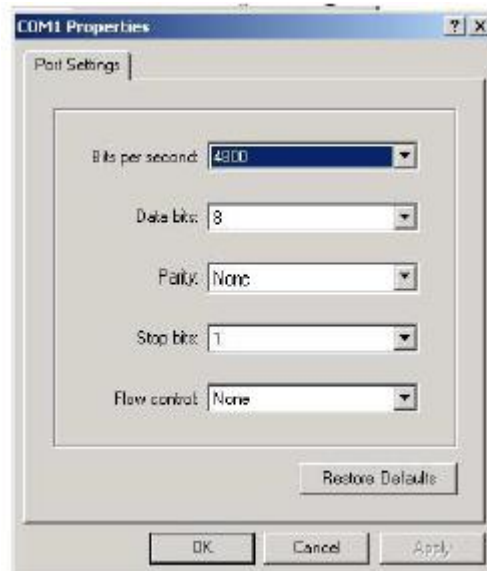
5.2.2.1 Connection to a PC

In order to carry out the configuration of the device, open the terminal programme and connect the device with the following parameters:

1. the COM port you use
2. baud rate: 4800
3. 8 data bits
4. no parity
5. 1 stop bit
6. no flow control



Click on “Configure”:



Confirm by clicking on “OK”.

5.2.2.2 How to start the menu

Make sure that the SD card is not inserted in the SD card slot and that the wind logger is supplied with voltage. Otherwise the SD card must be removed and the device must be supplied with voltage. Press “M” on your keyboard to call up the data logger’s menu in the terminal programme and confirm you entry by pressing “ENTER”. You will now enter the main menu.

5.2.2.3 Main menu of the wind logger

MENU – 5.4 1sd

.....

- 1 - AVG Time 60 seconds
 - 2 - Anemometer setup
 - 3 - Date today: 12:09:08
 - 4 - Time now: 13:49:25
 - 6 - Wind direction calibration
- Select option and press Enter

5.2.2.4 How to set up the recording interval

Press “1” and “ENTER”. The menu for changing the recording interval will now appear:

Select number to set recording intervals

- 1 - 10 seconds
- 2 - 1 minute
- 3 - 10 minutes

4 – Back

You now have the opportunity to change the interval in line with your requirements. Select the suitable interval by means of the related number and confirm with “ENTER”. When the settings are finished, you will return to the main menu.

Note: The value in brackets is the recording interval which is currently set.

Note: You get the best measurement result when the recording interval is 1 or 10 minutes.

5.2.2.5 Anemometer setup

When you are in the main menu, press “2” and “ENTER” to enter the menu for setting the wind sensors.

5.2.2.5.1 Setup of standard wind sensor

After selecting the menu, the following will appear on your PC screen:

ANEMOMETER A1 = LE-Basic

Select type:

Anemometer LE-Vortex > 1

Anemometer LE-Pro > 2

Anemometer PCE-KWG > 3

Anemometer Raw Hz > 4

Anemometer custom > 5

Exit >6

Now select the wind sensor PCE-KWG. To do so, press “3” and confirm your entry with “ENTER”.

Note: “ANEMOMETER A1” indicates which anemometer has been selected.

5.2.2.5.2 Setup of own wind sensor

In case you use another wind sensor or other sensors (such as a revolution sensor, ...), select “5” and press “ENTER” in order to set the conversion factor of the frequency into the desired unit:

The conversion factor is calculated as follows:

Wind sensors:

$$\frac{\text{velocity (desired unit)}}{\text{frequency in Hz}} = \text{conversion factor}$$

Other sensors:

$$\frac{\text{value to be displayed}}{\text{frequency in Hz}} = \text{conversion factor}$$

Confirm the value with “ENTER”. The same menu will appear for the second sensor.

5.2.2.6 Date setup

Press “3” and “ENTER” to set the date:

MENU - 5.4.1sd

1 - AVG Time 60 seconds

2 - Anemometer setup

3 - Date today: 09-01-13

4 - Time now: 13:49:25

6 - Wind direction calibration
Select option and press Enter
Enter date dd/mm/yy

Enter the date in the indicated format (dd = day, mm = month, yy = year) and press „ENTER“.

Example: 09/01/13

Note: The date must be entered with a “/”. Otherwise, you must repeat the setting.

Attention: As soon as the batteries are removed, date and time are reset. The setting must be repeated.

5.2.2.7 Time setup

When you are in the main menu, press “4” and “ENTER” to set the time:

MENU - 5.4.1sd

```
-----
1 - AVG Time 60 seconds
2 - Anemometer setup
3 - Date today: 09-01-13
4 - Time now: 13:49:25
6 - Wind direction calibration
Select option and press Enter
Enter time in 24h, hh:mm:ss
```

Enter the time in the format indicated (hh = hour, mm = minute, ss = second) and press “ENTER”.

Example: 13:49:25

Note: The time must be entered with a “:”. Otherwise, you must repeat the setting.

Attention: As soon as the batteries are removed, date and time are reset. The setting must be repeated.

5.2.2.8 How to import data by means of the terminal via PC

As soon as all settings have been made, you will be in the main menu. Insert the SD card into the SD card slot and confirm with “ENTER”.

The memory of the wind logger will now update and all settings are transferred.

If the device is still connected to a PC, you should see the following:

Example:

Card size: 120818 KB
SD Header updated

After this, the saved data will be displayed in your terminal programme everytime data are saved.

16-06-08, 19:38:36, 90, 21.7, 0.7, 1.3, 0.1, 0.8, 1.6, 0.2

Explanation:

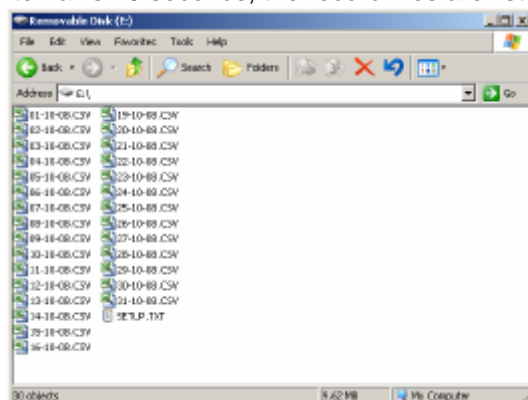
16-06-08	date
19:38:36	time of the saved set of data
90	wind direction in degrees
21.7	temperature in °C
0.7	average wind velocity in m/s, anemometer 1
1.3	maximum wind velocity, anemometer 1
0.1	standard deviation anemometer 1
0.8	average wind velocity in m/s, anemometer 2
1.6	maximum wind velocity, anemometer 2
0.2	standard deviation anemometer 2

You can now disconnect the wind logger from the PC and install it.

5.3 How to read out data from the memory card

When you want to remove the card from the device, make sure that no data are saved to the SD card at that moment, which is indicated by the LED flashing in the recording interval. In order to start data recording again, you only have to insert the memory card into the device again.

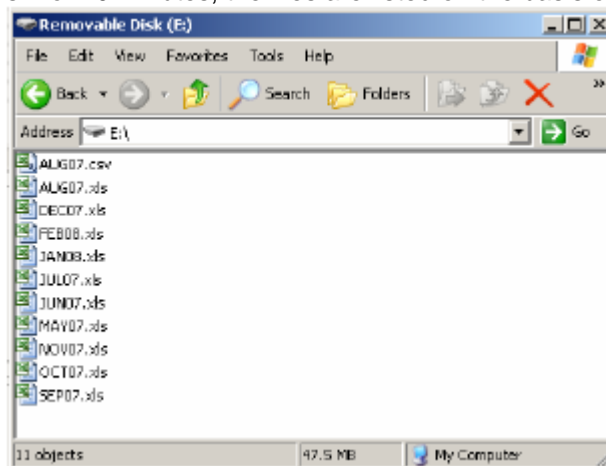
The data saved on the memory card can easily be read out on the PC by means of a memory card reader. If the recording interval is 10 seconds, the record files are listed on the basis of the date.



Example: The file 01-10-08.CSV contains all data recorded this day:

	A	B	C	D	E	F	G
1	Logic Energy Ltd. LeVVL v4.3a						
2	Time	Direction	Temp. °C	Anem1	Anem1 m	Anem2	Anem2 max
3	00:00:07	NEE	19.5	0	0	0	0
4	00:00:17	NEE	19.2	0	0	0	0
5	00:00:27	NEE	19.5	0	0	0	0
6	00:00:37	NEE	19.5	0	0	0	0
7	00:00:47	NEE	19.5	0	0	0	0
8	00:00:57	NEE	19.2	0	0	0	0

If the recording interval is 1 or 10 minutes, the files are listed on the basis of the month:



The file LOG.TXT contains all configuration parameters: date, time of configuration, recording interval and number of sensors:

16-10-08, 17:16:51, Avg_time=10, Sensor1=1.05999994, Sensor2=1.05999994

5.4 Evaluation by means of the WindSpeedAnalyser

Start the JAVA programme "WindSpeedAnalyser" by double-clicking on it. You can find the programme on the SD card, in the folder "analysis tool".

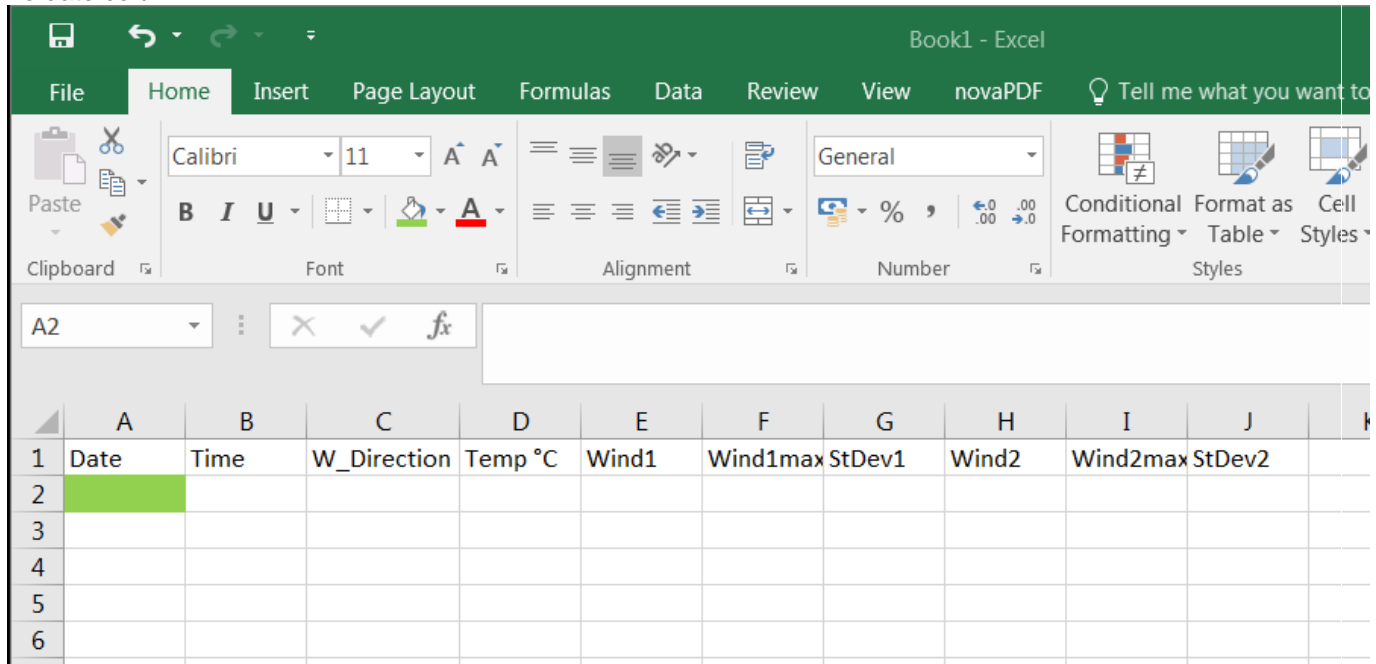
Note: JAVA must be installed on your PC. Otherwise you cannot run the programme.

You have the possibility to import the measured data into the programme.
You can see the measurement results in the different tabs.

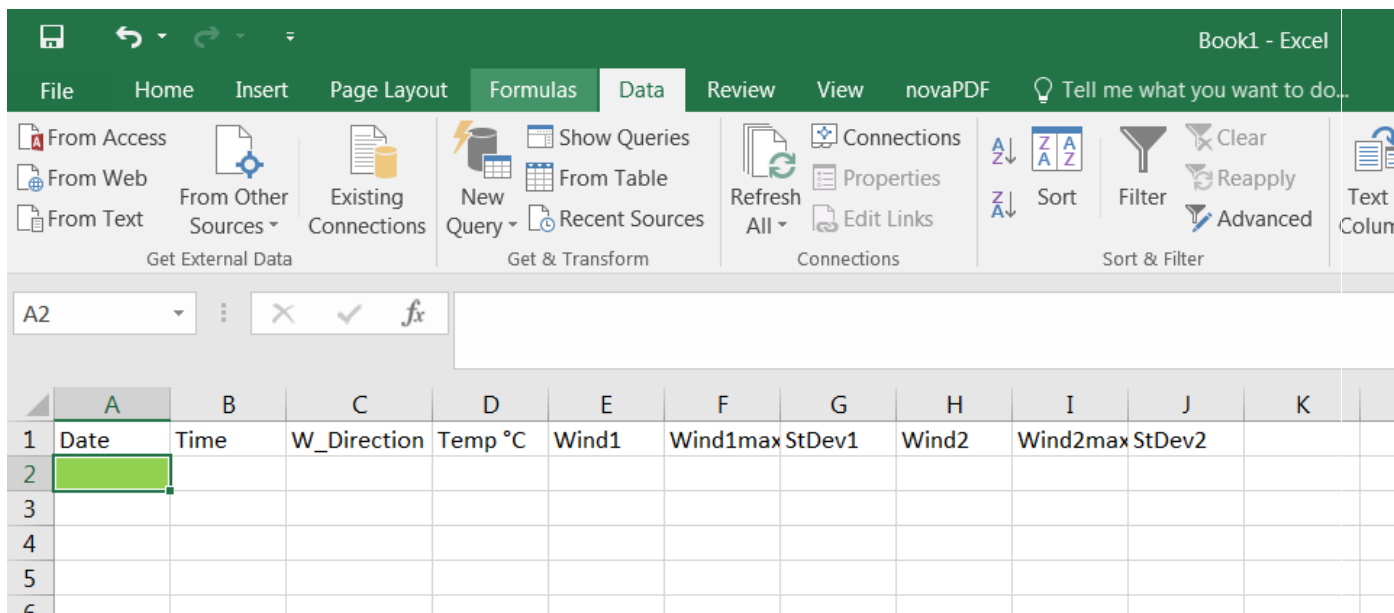
5.5 How to import records into Excel

You can find the Excel programme on the SD card, in the folder “analysis tool”. Open the Excel file by double-clicking on it and follow the instructions.

Important: only suitable if the sampling rate exceeds 1 minute. If the sampling rate is lower, there will be no date column.

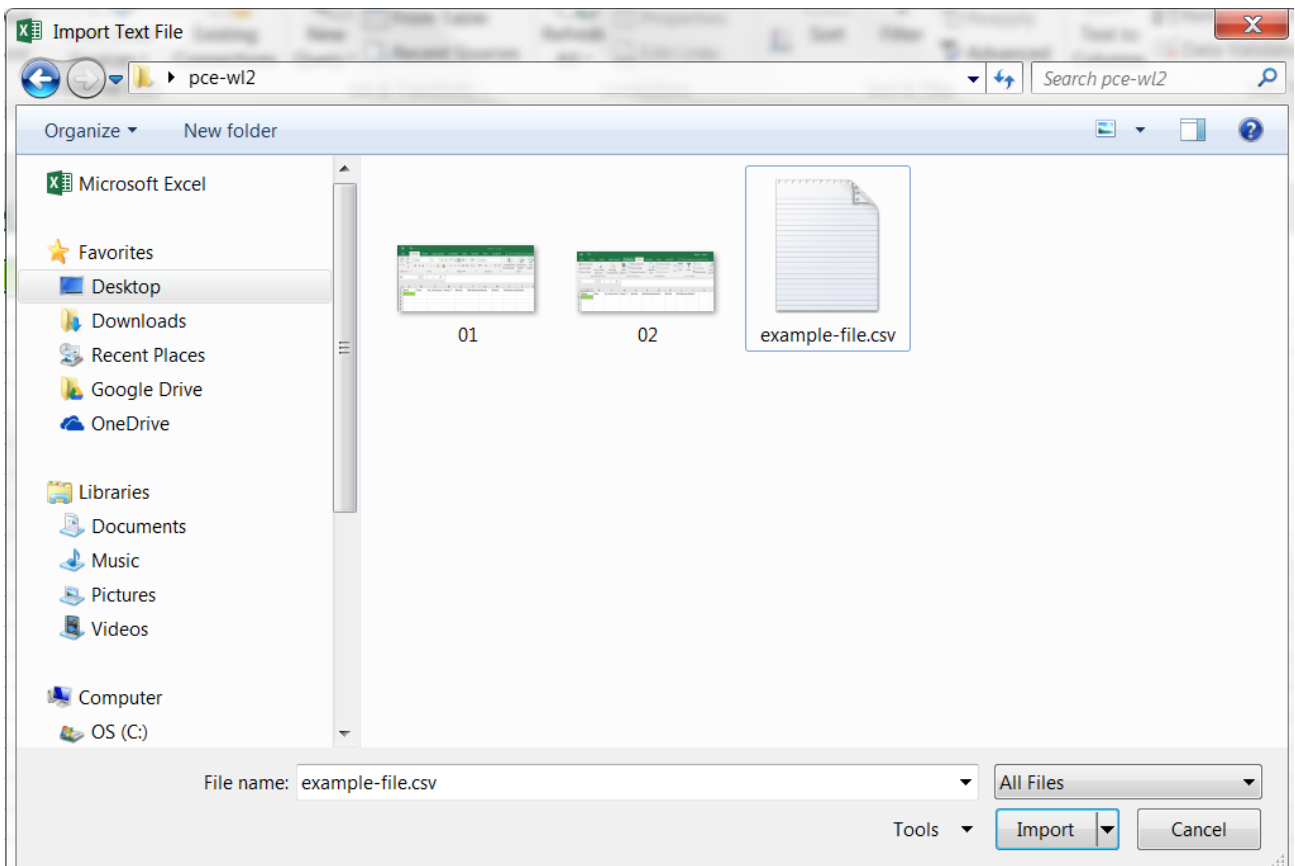


Select / highlight cell A2

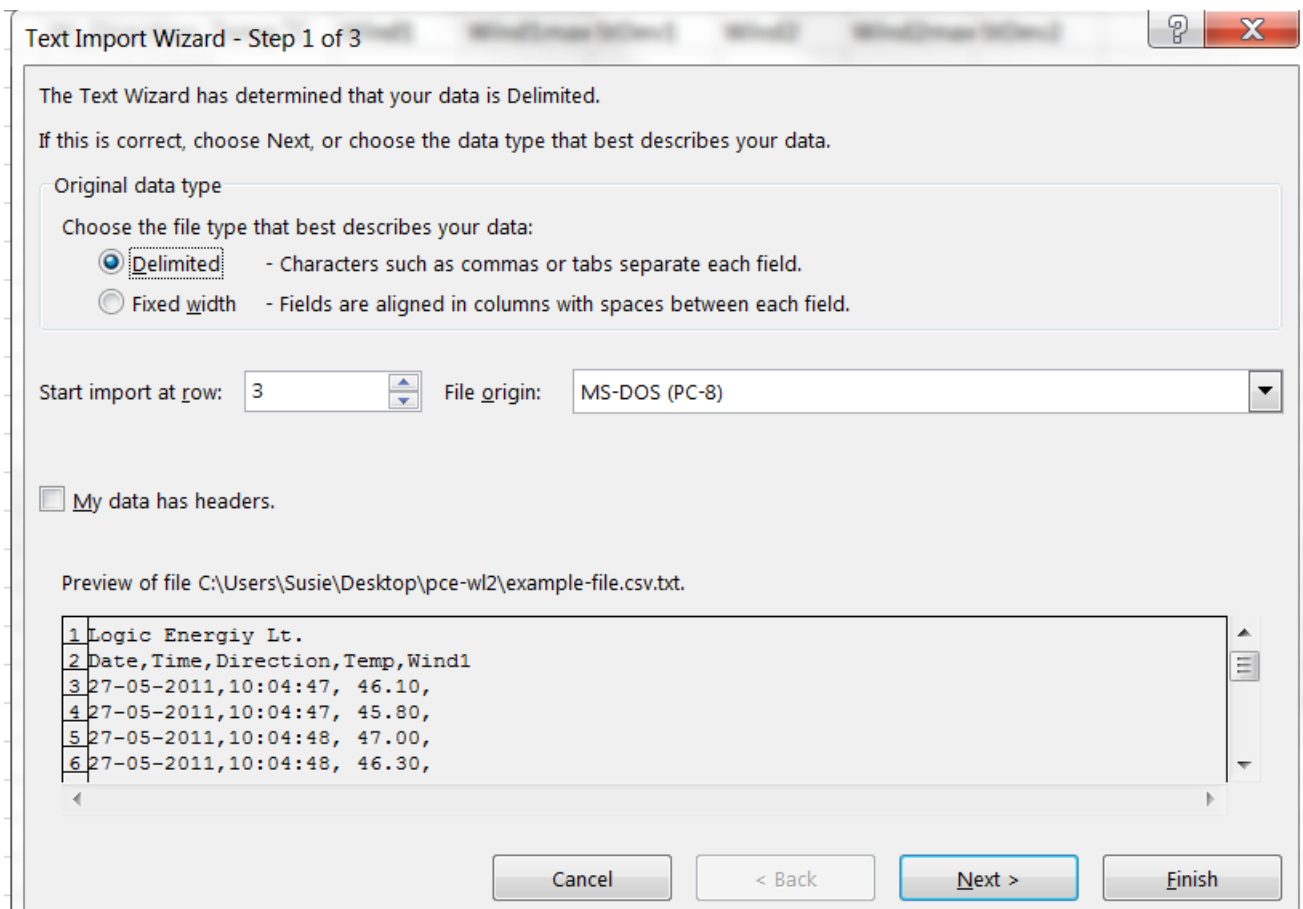


Open tab “Date”

Select external data “from text”



Import file with measurement data



The import must start at row 3 (in order not to import the headings)

Click on "Next"

Text Import Wizard - Step 2 of 3

This screen lets you set the delimiters your data contains. You can see how your text is affected in the preview below.

Delimiters

☐ Tab

☐ Semicolon

☒ Comma

☐ Space

☐ Other:

☐ Treat consecutive delimiters as one

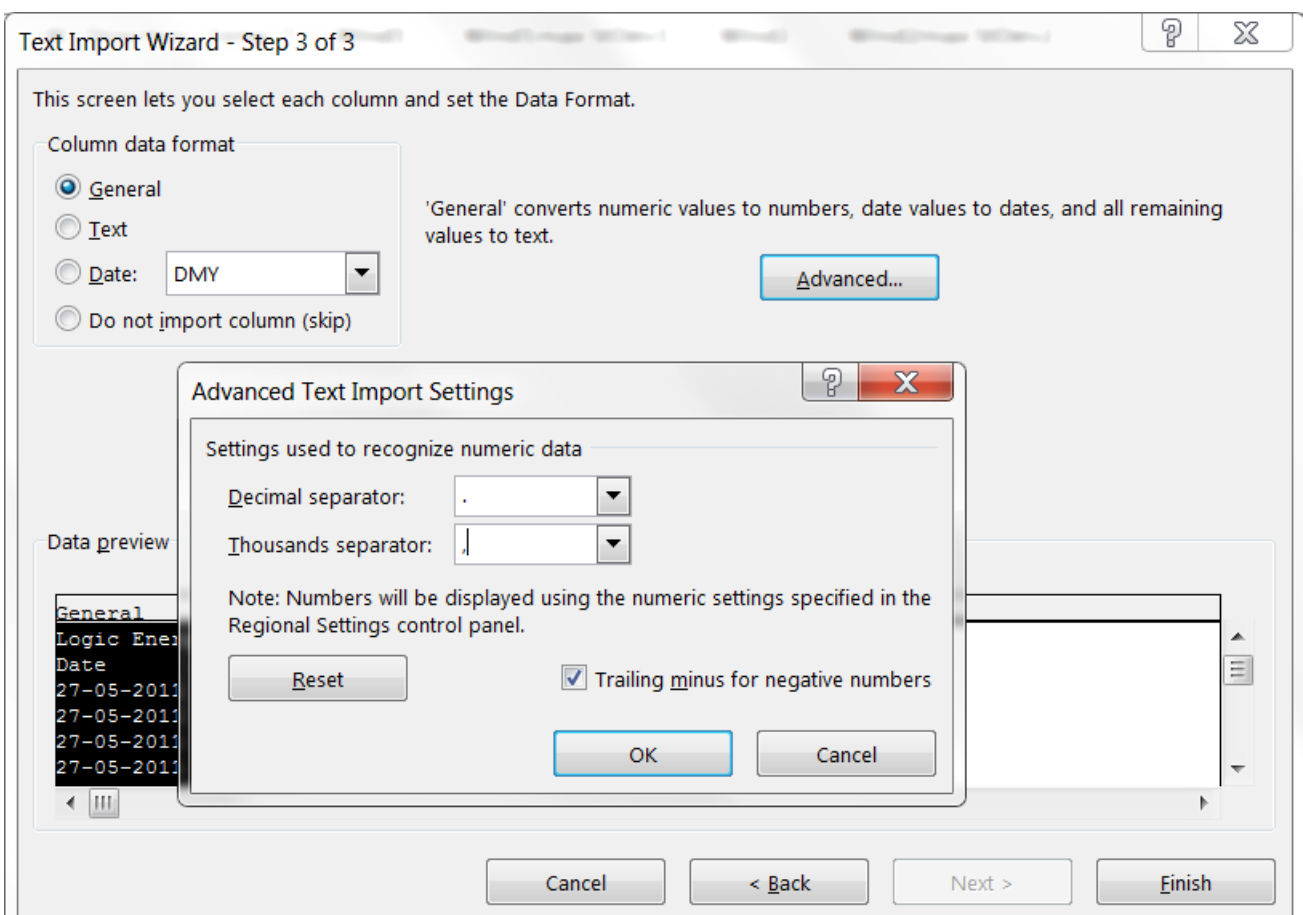
Text qualifier: " ▼

Data preview

Logic Energiy Lt.	Date	Time	Direction	Temp	Wind1
	27-05-2011	10:04:47	46.10		
	27-05-2011	10:04:47	45.80		
	27-05-2011	10:04:48	47.00		
	27-05-2011	10:04:48	46.30		

Cancel < Back Next > Finish

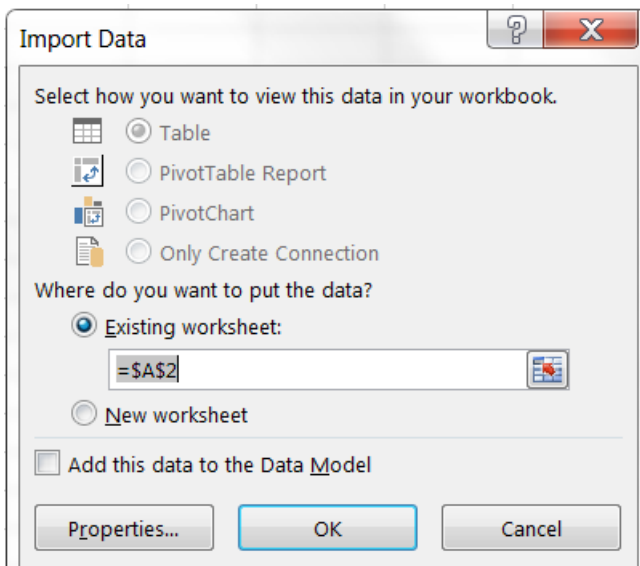
If required (e. g. in some European countries), select "comma" as your delimiter.
Click on "Next".



In step 3, select “Advanced”.

As decimal separator, select the point or comma, as required.

As thousands separator, select the comma or point, as required.



If you wish to insert the data into the existing worksheet, starting from A2, use the formula \$A\$2. Confirm by clicking on “OK”.

6 Contact

If you have any questions about our range of products or measuring instruments please contact PCE Instruments.

6.1 PCE Instruments UK

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