Manual
Climate Meter PCE-313A

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Contents

1   Introduction

Thank you for purchasing a PCE-313A from PCE Instruments.
The PCE-313A humidity and temperature data logger has been designed for professional use, for instance in the air conditioning sector. It can measure the relative humidity as well as the ambient temperature. This device can be connected to K-type thermocouples. The sampling rate for real-time measurements can be adjusted and you can save your readings either to the internal memory of this instrument to an SD memory card with a capacity of 1 … 16 GB. The values saved on the SD card as an xls file can be transferred to a PC for further analysis. The PCE-313A can work independently, without the user being present during the measurement as it can be programmed via the keypad in advance. For long-term measurements we recommend you to use the PCE-313A with the optional mains adaptor.

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 within the approved temperature range.
- 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 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 abrasives or solvents.

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

Measurement ranges	
- temperature	5 ... 95 % RH
- relative humidity	0 ... + 50 °C
- K-type	-50 ... +1300 °C
- calculated dew point	-25.3 ... +48.9 °C
- calculated wet bulb temperature	-21.6 ... +50 °C
Resolution	
- temperature	0.1 % RH
- relative humidity	0.1 °C
- K-type	0.1 °C
- calculated dew point	0.1 °C
- calculated wet bulb temperature	0.1 °C
Accuracy	
- temperature	±0.8 °C
- relative humidity	≥70 % RH ±3 % of reading ±1 % RH
	<70 % RH ±3 % RH
- K-type	±(0.4 % +0.5 °C)
Memory	SD card (1 ... 16 GB) 2 GB included
Sampling rate	adjustable, 1 ... 3600 seconds
Thermocouples	K-type and J-type compatible
Display	LC display 52 x 38 mm, with backlight
Interface	RS-232 and USB
Power supply	6 x 1.5 V AA batteries / 9 V mains adaptor (optional)
Operating conditions	0 ... + 50 °C
	<85 % RH
Dimensions	177 x 68 x 45 mm
Weight	490 g

4   System description
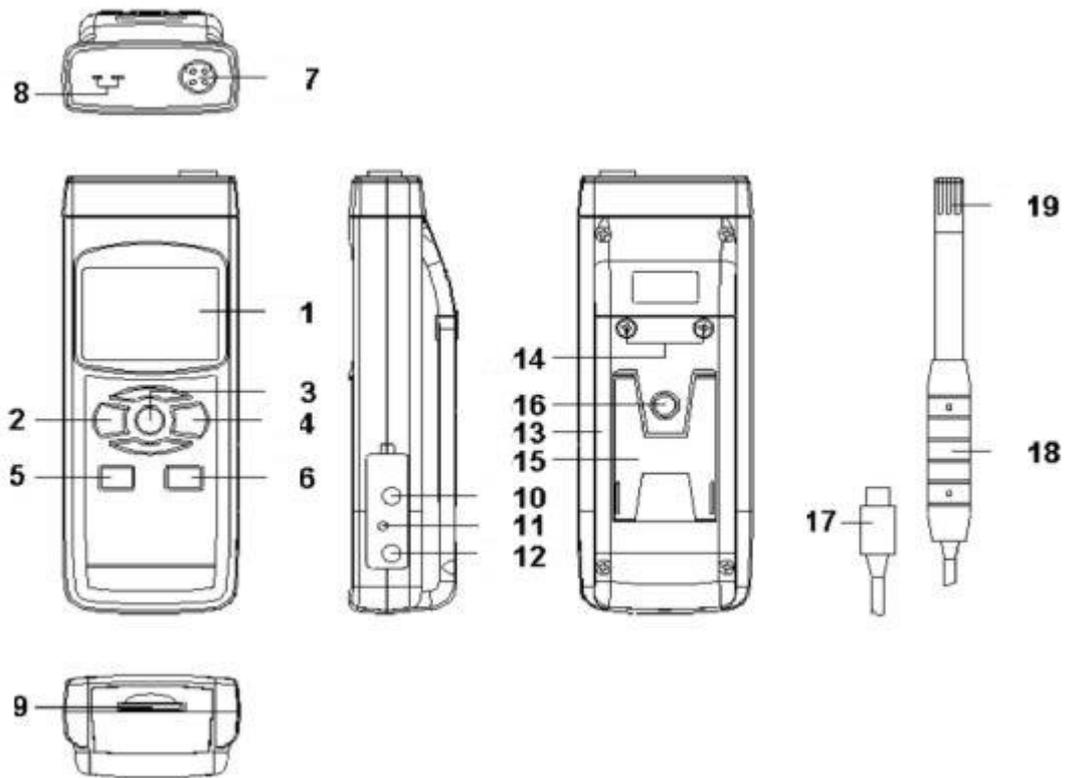
1   Display
2   Power key (ESC, backlight)
3   Hold key (function key, next key)
4   REC key (enter key)

5   SET key (▼ key, check time)

6   Logger key (▲ key, check sampling rate)
7   Sensor input socket (humidity and temperature sensor)
8   K- / J-type input
9   SD card slot
10   RS-232 output
11   Reset key
12   9 V input (for mains adaptor)
13   Battery compartment cover
14   Screws of the battery compartment cover
15   Table-top stand
16   Tripod connection
17   Plug of the humidity and temperature sensor
18   Handle of the humidity and temperature sensor
19   Probe tip of the humidity and temperature sensor

5   Instructions

5.1   How to select the function

1. Switch on the device by pressing the power key (2). If you hold the power key for more than 2 seconds, this will switch off the instrument.

2. The device has 4 functions:
   a) humidity and temperature
   b) dew point
   c) wet bulb
   d) temperature via thermocouple input (K- or J-type)

If you hold the Hold key (3), you will see the following abbreviations in the display:

rH	humidity and temperature measurement
dP	dew point measurement
_Et	wet bulb temperature measurement
tP	K / J-type temperature measurement

If you release the Hold key (3) at the time the relevant abbreviation appears in the display, the desired function will be set as the standard measurement.

3. Humidity and temperature measurement
   a) Switch on the device by means of the power key (2).
   b) Insert the plug (17) of the humidity sensor into the sensor input socket (7).
   c) Select humidity and temperature measurement by means of the Hold key (3) if you have not done so yet.
   d) The display will now show you the humidity value in % RH (upper line) and the temperature in °C (lower line).

Note: You can switch between °C and °F as the temperature unit. For more information about this, see below (settings).

4. Dew point measurement
   a) Switch on the device by means of the power key (2).
   b) Insert the plug (17) of the humidity sensor into the sensor input socket (7).
   c) Select dew point measurement by means of the Hold key (3).
   d) You can now read the dew point from the upper line of the display. The lower line of the display shows "dP" for "dew point".

5. Wet bulb temperature measurement
   a) Switch on the device by means of the power key (2).
   b) Insert the plug (17) of the humidity sensor into the sensor input socket (7).
   c) Select wet bulb temperature measurement by means of the Hold key (3).
   d) Now you can see the wet bulb temperature in the upper line of the display. The lower line of the display will show "_Et".

6. Temperature measurement by means of the thermocouple input
   a) Disconnect the humidity / temperature sensor by removing the plug (17) from the socket (7).
   b) Insert a K-type or J-type thermocouple into the K- / J-type input (8).
   c) Switch on the device by means of the power key (2).
   d) Select K- / J-type temperature measurement by means of the Hold key (3).
   e) You can now see the temperature on the display. Moreover, either "K" or "J" will appear in the display.

Note: K-type sensors are used as standard. If you wish to change from a K-type to a J-type thermocouple, see below (settings).

5.2   Data Hold function

By pressing the Hold key (3), you can hold the measurement values in the display during the measurement. The display will indicate "HOLD". If you press the Hold key (3) again, you leave the Hold function.

5.3   Max / Min function

1. This function saves the maximum and minimum values of a series of measurements. You can activate this function by pressing the REC key (4). "REC" is displayed.
2. When the "REC" icon appears in the display, you can retrieve the maximum value by means of the REC key (4). The display will additionally show "REC: MAX". If you wish, you can now delete this value by means of the Hold key (3). The "REC" icon will be displayed again.
3. If you press the REC key (4) again, you will see the minimum value. The display will additionally indicate "REC: MIN". If you wish, you can now delete this value by means of the Hold key (3). The "REC" icon will be displayed again.
4. To leave this function, press and hold the REC key (4) for more than 2 seconds.

5.4   Backlight

If you have switched on the device by means of the power key (2), the backlight will light up automatically. You can switch the backlight on and off by means of the power key (2) during the measurement.

5.5   Memory

5.5.1   Preparation

a) How to insert the SD memory card
   Insert the SD card into the slot (9). Please make sure that you insert the SD card in the right direction and carefully. The memory card should snap into place without using much force.
b) How to format the SD card
   If you use the SD card for the first time, it is necessary to format it. To do so, please refer to the settings chapter below.
c) How to set the clock
   If you use the device for the first time, you must set the time. To do so, please refer to the settings chapter below.
d) How to set the decimal point
   In the factory setting, the decimal point is a point, e. g. "20.6." or "1000.53". However, in some countries it is more common to use a comma as the decimal point, e. g. "20,6" or "1000,53". Therefore, it might make sense to change the format of the decimal point. For information about this, check the settings chapter below.

5.5.2   Automatic data logger function

a) How to start the data logger
   Press the REC key (4) once. The REC icon will be displayed. Press the logger key (6). The REC icon will start flashing and the device saves the data to the SD card.
   Note: To find out how to set the sampling rate and switch the beeper on and off, check the settings chapter below.
b) How to halt the data logger
   While the data logger is recording data, you can halt it by means of the logger key (6). In this case, the REC icon will stop flashing.
   Note: If you press the logger key (6) again, recording will start again.
c) How to stop the data logger permanently
   While the data logger is recording data, you can end data logging by means of the REC key (4). To do so, press and hold the REC key (4) for 2 seconds. The REC icon in the display will disappear.

5.5.3 Manual data logger function

a) Set the sampling rate to 0 seconds (see settings chapter). Press the REC key (4) once so that the REC symbol appears in the display. After that, press the logger key (6). The REC symbol will start flashing and you hear the beeper. At the same time, the data will be saved to the SD card memory. In the lower line of the display, the memory location number of your set of data will be indicated.

Note: In manual data logger mode, you can select the individual memory locations (1 … 99) by means of the ▼ (5) and the ▲ keys (6). The memory locations are shown in the lower line of the display as Px (x = 1 … 99). After selecting the memory location, you can confirm it with the REC key (4) and save the measurement values at the same time.

b) How to stop the data logger permanently
To stop this function, press and hold the REC key (4) for 2 seconds. The REC icon will disappear from the display.

5.5.4 Time information

In normal measurement mode (without data logger function), you can check the time information via the SET key (5) which is also labelled "time check". You will then see the date and time in the display.

5.5.5 Data information

In normal measurement mode (without data logger function), you can check the sampling rate via the logger key (5) which is also labelled "sampling check". The lower line of the display will indicate the sampling rate you have set.

5.5.6 SD memory card

1. When you insert the SD card into the device for the first time, the device will generate a folder on the SD card called HTA01.
2. When you start the data logger function for the first time, the device will generate a file in the folder HTA01\ called HTA01001.xls. The data will then be saved in this file. As soon as there are 30000 sets of data in this file, a new file is created. This will be called HTA01002.xls.
3. When the folder HTA01 contains 99 files, the device will create a new folder called HTA02\...
4. The following structure results:
   HTA01
   HTA01001.xls
   HTA01002.xls
   …
   …
   HTA01099.xls
   HTA02
   HTA02001.xls
    HTA02002.xls
   …
   …
   HTA02099.xls
   HTAXX
…
Note: XX cannot be higher than 10.

5.6   How to transfer data to a PC

1. After saving data to the SD card by means of the meter, remove the SD card from its slot (9).
2. Insert the SD memory card into the card reader of your computer.
3. Switch on the computer and start the Windows programme Excel. You can now open the files saved on the SD card. Then you can process the data via Excel, e. g. create graphs.

Examples:

	A	B	C	D	E	F	G	H	I	J
1	Place	Date	Time	Value	Unit	Value	Unit	Value	Unit	
2	1	2009/4/23	18:48:59	53.8	%RH	29.5	Degree C			
3	2	2009/4/23	18:49:01	53.8	%RH	29.5	Degree C			
4	3	2009/4/23	18:49:03	53.8	%RH	29.5	Degree C			
5	4	2009/4/23	18:49:05	53.8	%RH	29.5	Degree C			
6	5	2009/4/23	18:49:07	53.7	%RH	29.5	Degree C			
7	6	2009/4/23	18:49:09	53.7	%RH	29.5	Degree C			
8	7	2009/4/23	18:49:11	66.1	%RH	29.5	Degree C			
9	8	2009/4/23	18:49:13	76.7	%RH	29.6	Degree C			
10	9	2009/4/23	18:49:15	75.9	%RH	29.6	Degree C			
11	10	2009/4/23	18:49:17	66.8	%RH	29.7	Degree C			
12	11	2009/4/23	18:49:19	63.2	%RH	29.6	Degree C			
13	12	2009/4/23	18:49:21	58.5	%RH	29.6	Degree C			
14	13	2009/4/23	18:49:23	56	%RH	29.6	Degree C			
15	14	2009/4/23	18:49:25	55	%RH	29.6	Degree C			
16	15	2009/4/23	18:49:27	54.8	%RH	29.5	Degree C			
17	16	2009/4/23	18:49:29	54.4	%RH	29.5	Degree C			
18	17	2009/4/23	18:49:31	54.3	%RH	29.5	Degree C			
19										
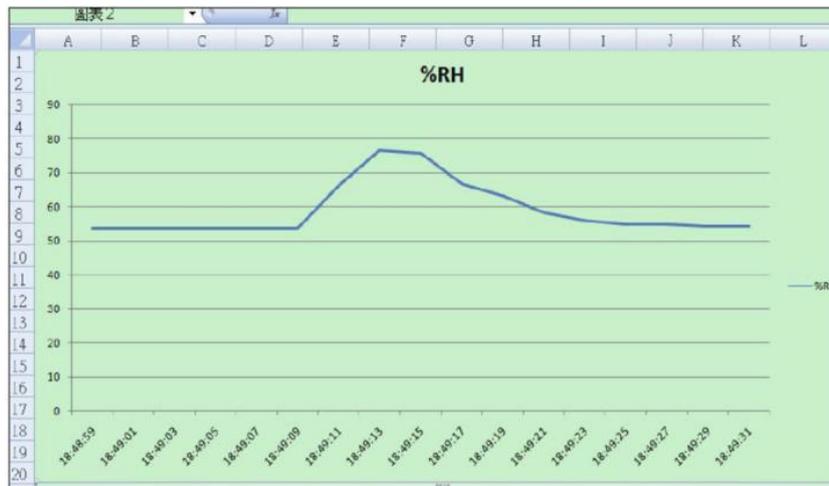
5.7   Settings

When the data logger function is deactivated, press and hold the SET key (5) for more than 2 seconds. This will take you to the setup menu. You can navigate through the menu by pressing the hold key (3):

dAtE…	set date and time (year / month / day, hour / minute / second)
dEC…	set decimal point format (point or comma)
PoFF..	Auto Power Off function on / off
bEEP..	set beeper (on or off)
tYPE..	set thermocouple (K- or J-type)
t-CF…	set temperature unit (°C or °F)
SP-t….	set sampling rate (hours / minutes / seconds)
Sd F….	format SD card

You can leave the setup menu by means of the power key (2).

5.7.1 How to set the date and time

1. When "dAtE" is displayed, confirm your selection by means of the enter key (4). You can now set the value by means of the ▼ (5) and the ▲ keys (6). The year comes first. After setting the value, press the enter key (4) to get to the next value. The order will then be as follows: month, day, hour, minute and second.
2. When you have set all values and confirmed with the enter key (4), all settings will be saved. Now you automatically get to the menu "dEC" where you can set the decimal point.
Note: The date and time always always runs with the device. Hence, you only need to make the setting once, unless you change the batteries.

5.7.2 How to set the decimal point

The decimal point can be set as a point or comma. As in many countries in the world the decimal point is a point (e. g. 523.25) and in Europe, the decimal point normally is a comma (e. g. 523,25), you can choose "bASIC" if you wish to set a point and "Euro" if you want a comma.

1. When the display shows "dEC", you can use the ▼ (5) and the ▲ keys (6) to select "bASIC" (for the point) or "Euro" (for the comma).
2. Confirm and save by means of the enter key (4).

5.7.3 Auto Power Off function

1. When the display indicates "PoFF", you can select "yES" or "no" by means of the ▼ (5) and the ▲ keys (6). By selecting "yES", you activate the Automatic Power Off function and by selecting "no", you deactivate this function.
2. Confirm and save by means of the enter key (4).

5.7.4 How to set the beeper

1. When the display indicates "bEEP", you can select "yES" or "no" by means of the ▼ (5) and the ▲ keys (6). By selecting "yES", you activate the beeper which means that an acoustic signal sounds everytime a value is saved. "no" means that the beeper is off.
2. Confirm and save by means of the enter key (4).

5.7.5 How to select the thermocouple (K- or J-type)

1. When the display shows "tYPE", you can select "K" or "J" by means of the ▼ (5) and the ▲ keys (6). "K" stands for a K-type thermocouple and "J" means that you select a J-type thermocouple.
2. Confirm and save by means of the enter key (4).

5.7.6 How to select the unit (°C or °F)

1. When the display indicates "t-CF", you can use the ▼ (5) and the ▲ keys (6) to select "C" or "F". "C" means degrees Centigrade and "F" means degrees Fahrenheit.
2. Confirm and save by means of the enter key (4).

5.7.7 How to set the sampling rate

1. When the display shows "SP-t", use the ▼ (5) and the ▲ keys (6) to set the sampling rate in steps of 0, 1, 2, 5, 10, 30, 60, 120, 300, 600, 1800 and 3600 seconds. The "0" is set for manual data logging, see chapter 5.5.3.
2. Confirm and save by means of the enter key (4).

5.7.8 How to format the SD card

1. When the display indicates "Sd F", you can select "yES" or "no" by means of the ▼ (5) and the ▲ keys (6). "yES" means that you would like to format the SD card.
2. Confirm and save by means of the enter key (4). If you confirm "yES" by means of the enter key (4), there will be another question where you can select "yES Enter". Confirm this entry with the enter key (4) again. The SD memory card will be formatted.
Note: When you format the SD card, all data saved on it will be deleted irrevocably.

5.8 Mains adaptor

In addition to battery power supply, the device can also be powered by a 9 V dc mains adaptor. To do so, please use the 9 V input socket (12). If you use the device with the mains adaptor, it is always on. Thus, the power key (2) will not work.

5.9 System reset

If you have an issue using the device, for example because it does not show any reaction when you press a key, you can reset the device to its original condition. You can do this as follows:
When the device is on, use a pointed object to push the RESET key (11) in slightly. The device is now in its original condition.

6 RS-232 interface

The device is equipped with an RS-232 interface with a 3.5 mm jack socket (10). The data output is a 16 bit data string which can be read out and processed in line with the users' requirements. See the following circuit diagram of the interface:
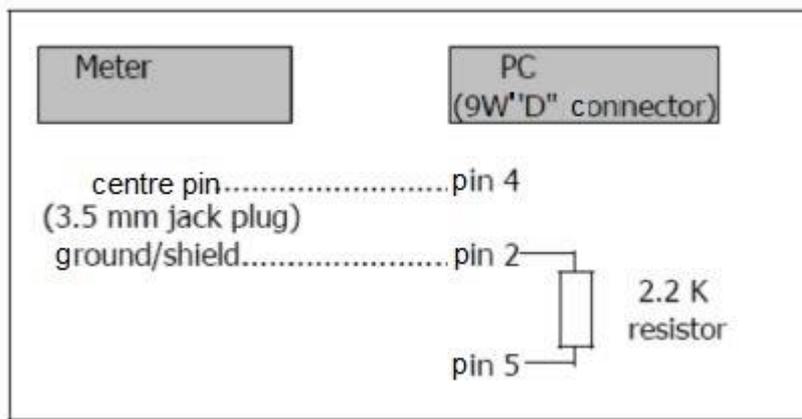
The data result in a data stream of 16 components.
D15 D14 D13 D12 D11 D10 D9 D8 D7 D6 D5 D4 D3 D2 D0

D0	end word
D1 & D8	display, D1 = LSD, D8 = MSD example: when 1234 is displayed, D8 to D1 is: 00001234
D9	decimal point (DP), position from right to left 0 = no DP, 1 = 1 DP, 2 = 2 DP, 3 = 3 DP
D10	polarity 0 = positive, 1 = negative
D11 & D12	displayed unit °C = 01, °F = 02, % RH = 04
D13	Selection of display line 1 = upper line 2 = lower line
D14	4
D15	start word

RS-232 format, 9600, N8, 1

Baud rate	9600
Parity	No
Start bit	8
Stop bit	1

7 Patents

The following patents for the device have been granted or applied for:

Germany	No. 20 2008 016 337.4
Japan	3151214
Taiwan	M 358970 M 359043
China	ZL 2008 2 0189918.5 ZL 2008 2 0189917.0
USA	applied for

8   Batteries

When the battery level indicator appears in the left corner of the display, the batteries must be replaced.
1. Loose the screws (14) of the battery compartment cover (13) on the rear side of the device.
2. Remove the batteries and replace them by 6 new AA batteries. Make sure that the polarity is correct when you insert the batteries.
3. Fix the battery compartment cover by means of the screws (14).

For the disposal of batteries, the 2006/66/EC directive of the European Parliament applies. Due to the contained pollutants, batteries must not be disposed of as household waste. They must be given to collection points designed for that purpose.

In order to comply with the EU directive 2012/19/EU we take our devices back. We either re-use them or give them to a recycling company which disposes of the devices in line with law.

If you have any questions, please contact PCE Instruments.

9   Contact

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

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