

Air Quality Wireless Datalogger Panel

E2230

User Manual



Table of contents

Specifications	3
Product description	4
Safety requirements	4
Operating conditions	5
Installation guidelines	5
Mounting dimensions	7
Operation	8
Modbus RTU Communication	15
RS485 communication interface	15
Communication parameters	15
Modbus holding registers	15
Warranty	18
Manufacturer contacts	18

Specifications

Measured parameters	Temperature, Humidity, CO ₂ level
Additional features	Clock, Calendar
Data Logging	10 s ... 1 h measurement interval, 16000 datasets memory, wireless data transmission and time synchronization
Sensors	Digital RH and T sensor, Optical NDIR CO ₂ sensor
Measurement ranges	0...85 %RH, 0...+50 °C, 400...9 999 ppm CO ₂
Resolution	0,1 %RH / 0,1 °C / 1 ppm CO ₂
Accuracy	±2,5 %RH / ±0,3 °C / ±50 ppm CO ₂ +3% of reading
Response time	~120 seconds
Power supply	9 VDC, 90...265 VAC adapter
Power consumption	< 6 W
Digital interfaces	USB, RS485
Wireless interface	IEEE 802.11 b/g/n
Enclosure	Black ABS, wall mount, protection class IP40
Dimensions	H232 × W322 × D34 mm
Display	7-segment LED number-indicators
Symbol height	Time - 58 mm Date - 14 mm CO ₂ - 25 mm T, RH - 20 mm
Operating environment	Dry indoor spaces
Operating conditions	0...+50 °C, 0...85 %RH non-condensing

Product description

Air Quality Wireless Datalogger Panel E2230 is intended for use in schools, hospitals, offices and other areas. The device provides autonomous long-time monitoring of indoors climate with high accuracy and stability.

The data logger uses the latest achievements in digital humidity and temperature sensing and low-power NDIR CO₂ sensing technologies, providing excellent accuracy and reliability and long lifetime.

The device measures temperature, relative humidity and CO₂ level, saves the data (up to 16000 datasets) and transmits it to stationary or mobile devices.

Bright LED displays provide easy direct monitoring.

Additional features include real-time clock and calendar.

Safety requirements

Misuse will impair the protection of the product. Always adhere to the safety provisions applicable in the country of use.

Do not perform any maintenance operation with the power on. Do not let water or foreign objects inside the device.

Removal of the PCB from the enclosure voids the warranty. Do not touch the electronic components directly, as they are sensitive to static electricity.

The device might not perform correctly or be damaged if the wrong power supply is connected.

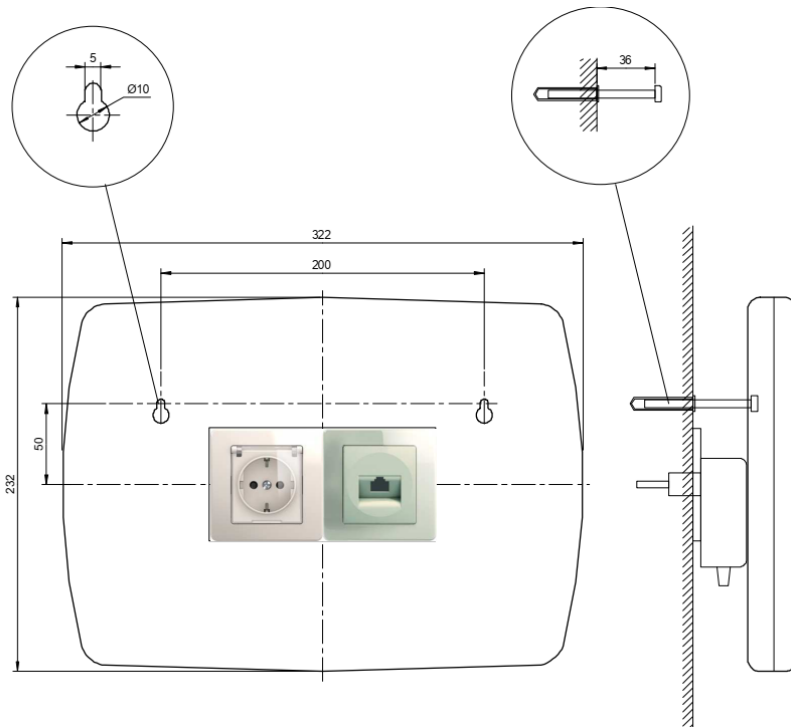
External circuits connected to the equipment should have sufficient insulation rating according to the environmental conditions and equipment power.

Operating conditions

The device should be used both in a non-hazardous area and in a basic electromagnetic environment, where the latter is defined in EN 61326-1. Avoid strong mechanical shock and vibrations. Avoid corrosive atmosphere and areas highly contaminated with dust, oil mist, etc. Keep the instrument away from direct sunlight. A sudden temperature or humidity change might affect the sensitivity of the sensor.

Installation guidelines

Wall mounting



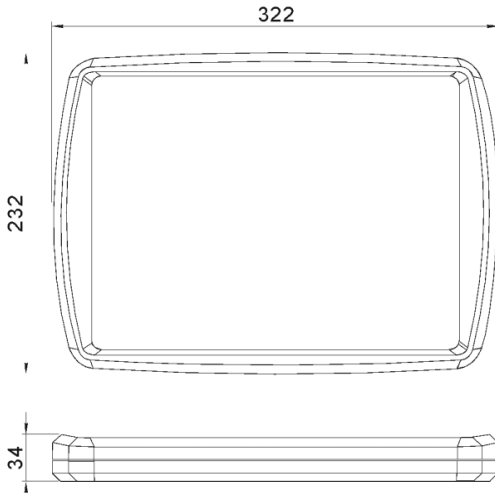
Recommended panel mounting is on the wall by two screws, directly in front of specially installed CEE 7/3 type mains and RJ45 type networking sockets.



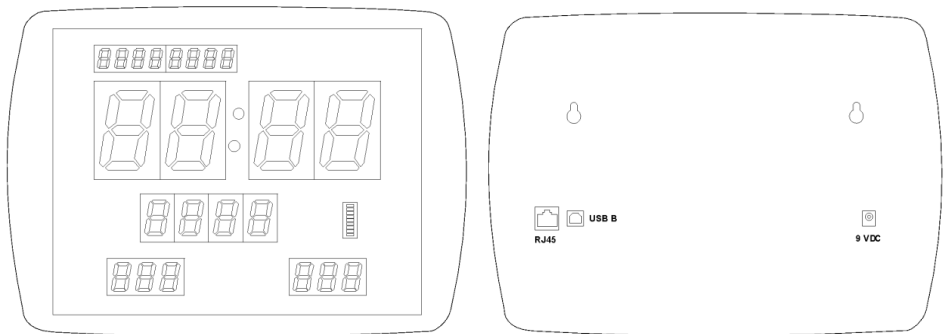
Mains power adapter (included)

Dimensions 67 x 44 x 44 mm, cable 1,2 m, 9 W, 9 VDC, 1 A, connector 5,5/2,1 mm

Mounting dimensions



Dimensions



Front view

Back view

Operation

Powering on the device

After powering on the device following 3 procedures shall take place on the device:

1. For 3 seconds the device will switch on all LED indicators to make sure of their functionality.
2. E2230 will measure one time temperature, humidity and CO2 concentration and they will be indicated on the panel to make sure sensors work. These values shall be shown until the device shall be put into indication/logging mode. Logger 2 seconds LEDs shall blink independently to indicate that logger is in configuration/checking mode.
3. E2230 will read out logger internal memory and shall confirm memory validation. This process can take up to 10 seconds depending on how much data has been saved.

After these procedures logger shall start indicating and logging if datalogging is permitted. (Depending if circular memory overwriting is enabled or not) E2230 series 2 seconds LEDs shall blink together after all procedures are finished to indicate indication/logging mode.

Configuration and Communication

1. via WiFi

After powering on the device, it will switch on its own WiFi Hotspot, called E2830-XXXX.

XXXX - Last 4 digits of the Serial No.

Example of WiFi Hotspot name: E2830-1086

Default password of Hotspot WiFi network: E2830E2830

Device will keep up the hotspot for 5 minutes after which it will switch off the hotspot.

Browser support

The numbers in the table specify the first browser version that fully supports the device web server.

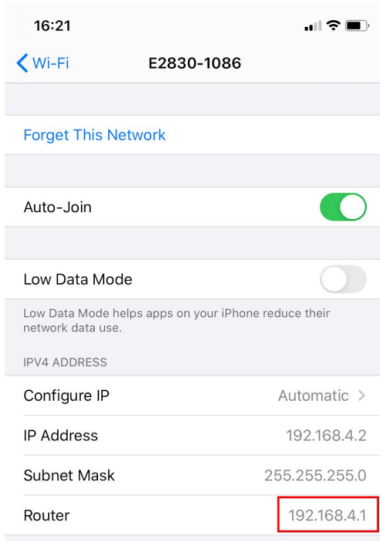
				
14.0	13.0	20.0	10.1	15.0

IP Address

For connecting to the device user should connect to the device by using its IP address. If user is connected to the Hotspot then device IP is 192.168.4.1

This can also be seen if you look at the connection settings of your device which is used for connecting.

This picture shows the connection settings of the connected WiFi hotspot if the connected device is an iPhone.



Marked red is the router of the connected WiFi network which is the device itself. The IP address is also 192.168.4.1. By navigating to this IP user will be navigated to the device WebServer.

Main page

After navigating to the device, the device measurement status page will open.

< **E2830 Status**

Logger State:	Logging
Circular logging:	Enabled
Logging stopped:	False
Saved records:	304
Used memory:	0.928 %
Logger Time :	16:29:34
Logger Date :	2020-0 5-20
Latest temperature :	29.11 C
Latest humidity :	21.42 % RH
Latest CO2 :	724 PPM
Latest logged time :	16 : 5 : 20
Latest logged date :	2020 - 0 5 - 20
Latest logged C :	29.11 C
Latest logged % RH :	21.42 % RH
Latest logged CO2 :	726 PPM
NTP Time:	02:01:53
NTP Date:	1970-01-01
<div style="background-color: #007bff; color: white; padding: 5px; display: inline-block; border-radius: 5px;">REFRESH</div>	

By clicking the left arrow icon, the user will be navigated to the Main menu.

Device status - First page which indicates measured values of the device.

Device status with Chart - Similar to the first page but with added support for stationary logging into the chart

AP WiFi configuration - Hotspot configuration and data sending configuration

STA WiFi configuration - Available WiFi network connectivity configuration

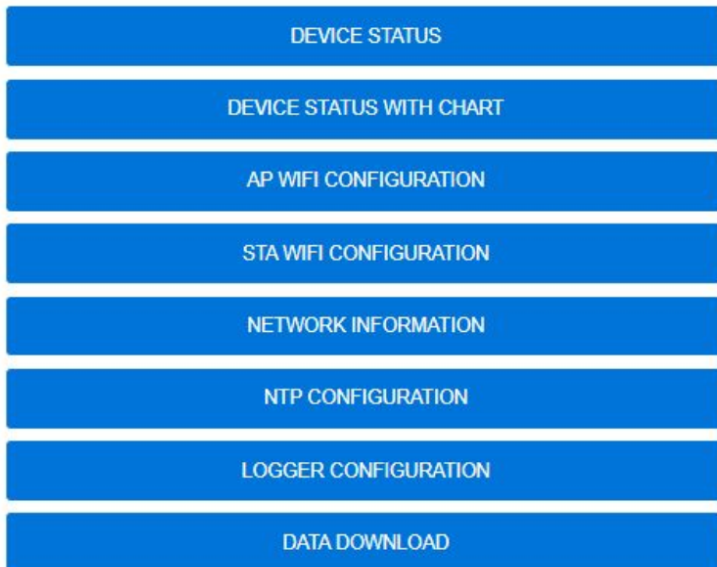
Network information - Connected WiFi network connectivity status

NTP Configuration - Timeserver configuration

Logger configuration - Details about memory, option for configuring logging interval, time and clearing memory

Data download - Downloading data from device

E2830 Websensor



STA WiFi configuration

To connect the device to an existing WiFi network, choose the WiFi network you are using from the list and enter it to the SSID (Service Set Identifier) field, enter the password and click save. You can then access the device within your local WiFi network by navigating to the device IP. If DHCP was selected while configuring, the user can get information about its IP address in the Network Information page. If DHCP was not selected, the user can navigate to the device within the local WiFi network by its assigned IP address.

Note! Manually assigning IP addresses to the device should be done accordingly to LAN network settings. e.g. IP address, subnet mask and router IP should be configured by taking into regard network settings of the connected WiFi network..

Note 1: Time will be saved until reboot. After reboot the configuration will revert back to unconfigured state.

Note 2: E2230 can be configured using Plurasens configurator. If the device is connected to the computer via USB, configuration via Wi-Fi can not be done.

2. via Modbus

2.1. Indication / logging mode

E2230 series shall respond only to following Modbus functions in indication / logging mode to make sure device is working correctly without any interruptions:

1. FC 03 Read Holding Registers Start 255, QTY 11
 - a. Register 255 Device status, logging stop, memory overwritten
 - b. Register 256 Last Temperature measurement
 - c. Register 257 Last Humidity measurement
 - d. Register 258 Last CO2 measurement
 - e. Register 259 Measurement errors
 - f. Register 260 CURRENT YEAR
 - g. Register 261 CURRENT MONTH
 - h. Register 262 CURRENT DAY
 - i. Register 263 CURRENT HOUR
 - j. Register 264 CURRENT MINUTE
 - k. Register 265 CURRENT SECONDS
2. FC 03 Read Holding Registers Start 412 QTY 11
 - a. Register 412 Recorded units LSB 2 out of 4 bytes
 - b. Register 413 Recorded units MSB 2 out of 4 bytes
 - c. Register 414 Last Temperature record
 - d. Register 415 Last Humidity record
 - e. Register 416 Last CO2 record
 - f. Register 417 Last logged data YEAR
 - g. Register 418 Last logged data MONTH
 - h. Register 419 Last logged data DAY
 - i. Register 420 Last logged data HOUR
 - j. Register 421 Last logged data MINUTE
 - k. Register 422 Last logged data SECONDS

2.3 Configuration / checking mode

E2230 series can be put into configuration / checking mode by writing 1 into register 255 while the device is in indication / logging mode. After that device 2 seconds LEDs shall blink independently to indicate that the device is in configuration mode. After that user shall gain access to following Modbus registers:

Register 16 Logging interval (s), allowed values: [10, 15, 20, 30, 60, 120, 180, 240, 300, 360, 600, 900, 1200, 1800, 3600, 7200, 10800, 14400, 21600, 43200]

Register 17 Restart, writing 42330 will trigger restart. No modbus response will follow.

Register 168, CO2 averaging (s) allowed values: 0...32000

Registers 260-265 (Current Time)

Register 280, Writing 42330 will clean internal memory of the device and will reboot the device

Register 430, CO2 ABC period (days), default 14

Register 432, CO2 ABC baseline value (ppm), default 430 ppm

Register 434, CO2 current ABC shift

Modbus RTU Communication

RS485 communication interface

Databits: 8 Parity: none / odd / even Stop bits: 1 or 2 Protocol: Modbus RTU	Supported Modbus functions: 03 – Read multiple registers 06 – Write a single register
---	---

Communication parameters

Parameter	Permitted values	Default
Supported baud rates	1200, 2400, 4800, 9600, 19200, 38400, 57600	9600
Data bits	8	8
Parity	none / odd / even	none
Stop bits	1, 2	1
Protocol	Modbus RTU	
Modbus functions	03 - Read multiple registers 06 - Write a single register	
Error codes	01 – Illegal function 02 – Illegal data address 03 – Illegal data value 04 – Slave device failure (details of last error 04 can be read from register 0x0008)	

Modbus holding registers

Register addresses are shown 0-based, Address in hexadecimal, Reg in decimal format. Modbus holding register numbers MHR are shown in the decimal 1-based format and may be addressed either from 00001 or 40001 base.

Address	Reg / MHR	RW	Description	Supported values (dec)	Default
0x0001	1 / 40002	R	Hardware version		-
0x0002	2 / 40003	R	Software version		-
0x0003	3 / 40004	R	Product serial number	1...65535	-
0x0004	4 / 40005	RW	Slave ID (net address) *	1...247 **	1

0x0005	5 / 40006	RW	Baud rate *	1200, 2400, 4800, 9600, 19200, 38400,	57600
	16 / 40017	RW	Logging interval, s	10, 15, 20, 30, 60, 120, 180, 240, 300, 360, 600, 900, 1200, 1800, 3600, 7200, 10800, 14400, 21600, 43200	15
0x0011	17 / 40018	RW	Restart	writing 42330 restarts the instrument, no ModBus response will follow	-
0x00A8	168 / 40169	RW	CO ₂ averaging, s	1...32000 (seconds), 0 - no filter	180
0x00FF	255 / 40256	RW	Device status, logging stop, memory overwritten	bit[0]= 0 bit[1]= 1 bit[2]= 0/1 - Circular memory off/on bit[3]= 0 bit[4]= 0 bit[5]= 0/1 - Logging stopped due to memory full bit[6]= 0 bit[7]= 0 bit[8]= 1/0 - Indication or logging mode / Configuration or checking mode	user defined
	256 / 40257	R	Last temperature measurement		
	257 / 40258	R	Last humidity measurement		
	258 / 40259	R	Last CO ₂ measurement		
0x0103	259 / 40260	R	Measurement errors	bit[0]= 1 => Temp NO DEV ERROR bit[1]= 1 => Temp FAIL ERROR bit[2]= 1 => Temp CRC ERROR bit[4]= 1 => Humi NO DEV ERROR bit[5]= 1 => Humi FAIL ERROR bit[6]= 1 => Humi CRC ERROR bit[8]= 1 => CO ₂ NO DEV ERROR bit[9]= 1 => CO ₂ FAIL ERROR	
	260 / 40261	R	Current year	13...63	

0x0105	261 / 40262	R	Current month	1...12	
0x0106	262 / 40263	R	Current day	1...31	
0x0107	263 / 40264	R	Current hour	0...23	
0x0108	264 / 40265	R	Current minute	0...59	
	265 / 40266	R	Current seconds	0...59	
	266 / 40267	R	Day of the week		
	267 / 40268	R	RTC TRIM		
	280 / 40281	RW	Memory	writing 42330 cleans internal memory and reboots device	RW
	412 / 40413	R	Recorded units LSB 2 out of 4 bytes		
	413 / 40414	R	Recorded units MSB 2 out of 4 bytes		
	414 / 40415	R	Last temperature record		
	415 / 40416	R	Last humidity record		
	416 / 40417	R	Last CO2 record		
	417 / 40418	R	Last logged data YEAR		
	418 / 40419	R	Last logged data MONTH		
	419 / 40420	R	Last logged data DAY		
	420 / 40421	R	Last logged data HOUR		
	421 / 40422	R	Last logged data MINUTE		
	422 / 40423	R	Last logged data SECONDS		
	430 / 40431	RW	CO2 ABC period, days		14
	431 / 40432	RW	Days since last ABC shift		0
	432 / 40433	RW	CO2 ABC baseline value, ppm		430
	434 / 40435	R	CO2 current ABC shift		0

Note: E2230 series shall only respond to Modbus functions in indication / logging mode once per second. Frequent requests shall not be followed.

Warranty

This product is warranted to be free from defects in material and workmanship for a period of one year from the date of the original sale. During this warranty period, the Manufacturer will, at its option, either repair or replace a product that proves to be defective. This warranty is void if the product has been operated in conditions outside ranges specified by the Manufacturer or damaged by customer error or negligence or if there has been an unauthorized modification.

Manufacturer contacts

Evikon MCI OÜ

Teaduspargi 7/9, Tartu

50411 Estonia

info@evikon.eu

www.evikon.eu

