

## Descriptions

Air Quality Node is designed for environment monitoring and controlling in industrial, commercial and other buildings. These transmitters can be used to monitor air quality and temperature in various industrial and commercial settings. Modbus RS485/Bacnet MS/TP for direct digital reading on all models.

### Highlights:

- The RS485 are hardened up for overvoltage and power supply crossed over.
- Display in degrees Fahrenheit or Celsius(connection to Bacnet).
- The LCD is a bitmap so we can show network connectivity.
- The user can configure what they want to show on the display: network activiy, baud rate, protocol, etc.
- You can show a user setpoint so you can use it as a room / setpoint display.
- RS485/Bacnet MS/TP for direct digital reading on all models



AQ-N-LCD



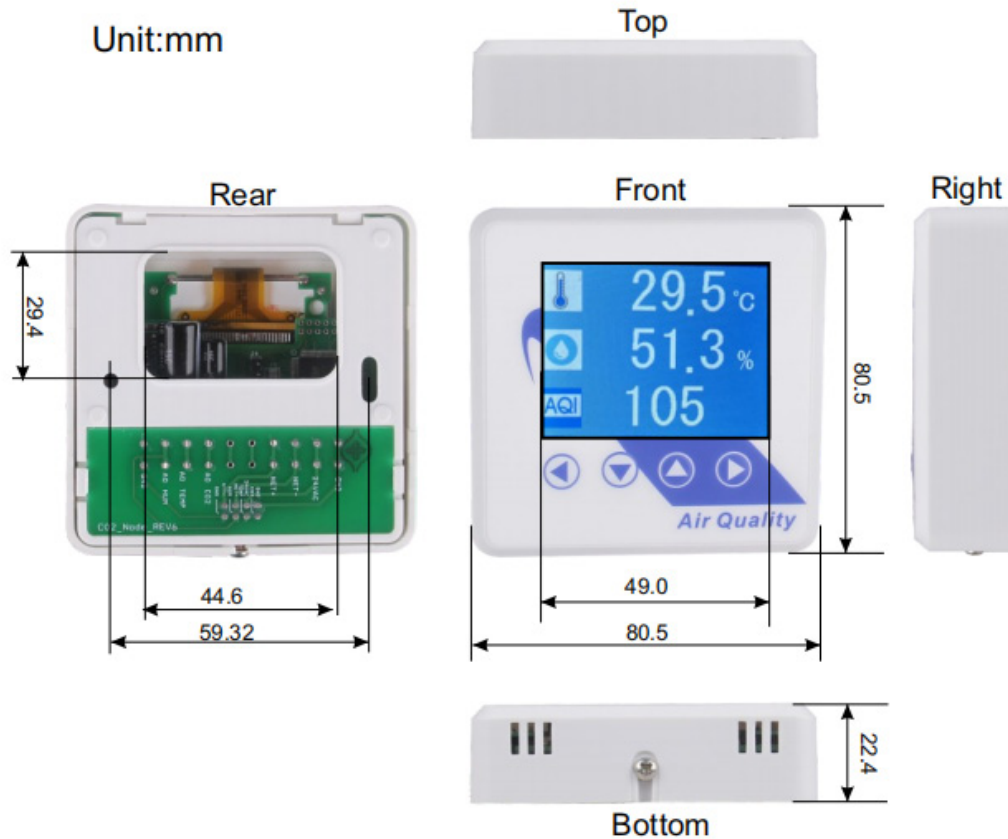
AQ-N

## Specifications

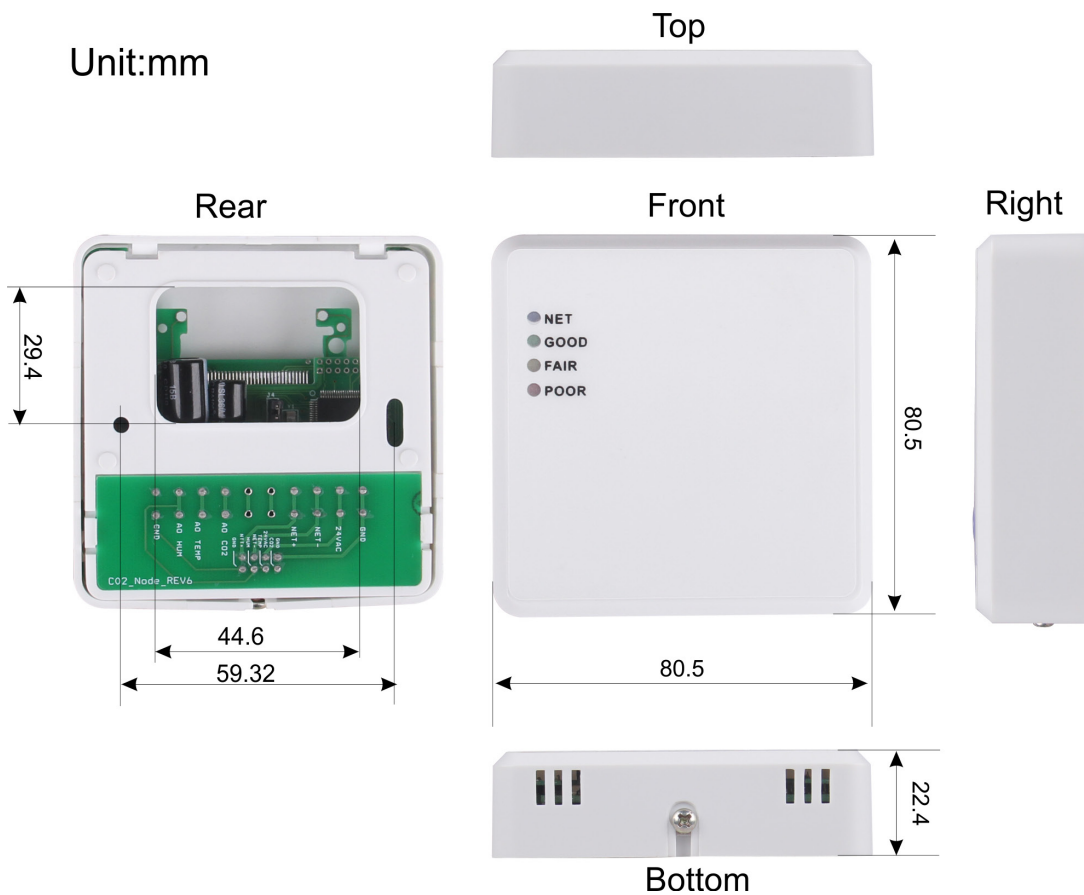
<b>Typical Application</b>	Wall mount indoors	
<b>RS485 ports</b>	1	
<b>Power</b>	15-24V +/- 10%, AC or DC, 1 watt typical	
<b>Operating Temp</b>	-30~+60°C, 0-95% non condensing	
<b>Plastic Housing</b>	Flammability rating UL 94V0 file E194560	
<b>Display</b>	LCD screen, Resolution 0.1°C, 0.1% RH	
<b>Control Features</b>	N/A	
<b>Analog</b>	Output 10v 4-20mA	
<b>Protocols</b>	Bacnet&Modbus	
<b>TEMP</b>	Sensor Type	10K thermistor
	Range	-40~150°C(-60~340°F)
	Accuracy	< ±0.5°C @ 25°C
	Output	4-20mA, 0-5V or 0-10V, RS 485
<b>Relative Humidity</b>	Sensor Type	Capacitance polymer
	Range	0~100% non condensing
	Accuracy	3% RH (25°C, 20~80% RH)
	Output	4-20mA, 0-5V or 0-10V, RS 485
<b>AQ</b>	Sensor Type	TGS2600
<b>Size</b>	80.5 (L)x 80.5(W)x22.4(H)mm	

Dimension

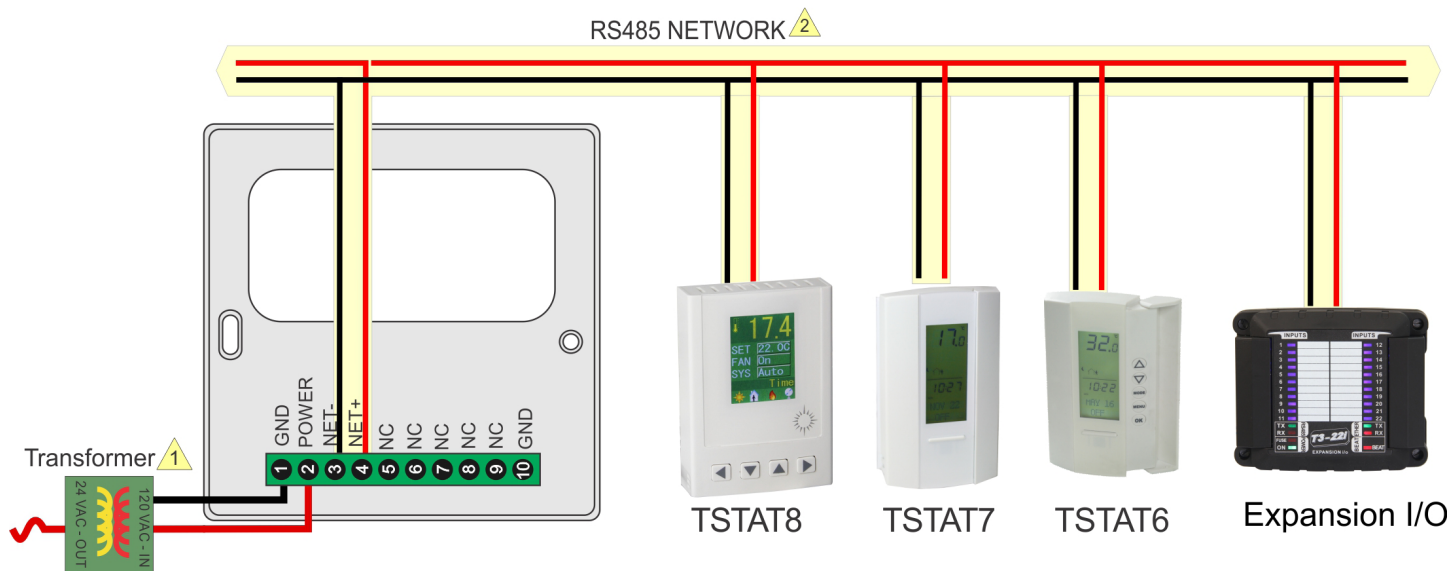
AQ-N-LCD



AQ-N



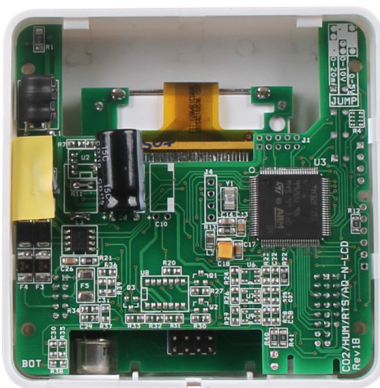
## Backplate Features



- 1 Power Supply, 15 to 24V, AC or DC
- 2 RS485 Net, 18ga twisted pair typical, optional ground & shield



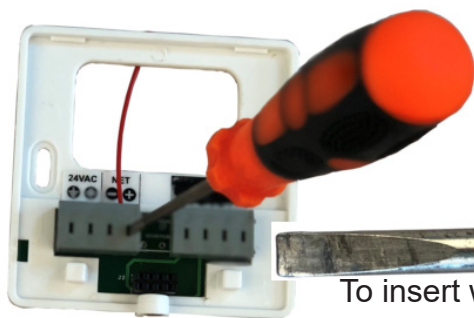
Rear



Rear of device



Front



Front

### Installation instructions

Flat screwdriver tip

To insert wires into the nuscrew terminals there is a small trick which may not be apparent to folks who have not used these terminals before. Strip the wire about half a centimeter and twist the stands together if its stranded conductor, Gently press the end of a sall flat screwdriver into the wire entry port, insert the wire into the hole while maintaining pressure with the screwdriver. Release the screwdriver and the connection is made. Tug on the wire to make sure there's good contact the wire should not pull out.

## Modbus Register List

Address	Bytes	Register Description
0 to 3	4	Serial Number - 4 byte value. Read-only
4 to 5	2	Software Version – 2 byte value. Read-only
6	1	ADDRESS. Default Modbus device address=254
7	1	Product Model. This is a read-only register that is used by the microcontroller to determine the product
8	1	Hardware Revision. This is a read-only register that is used by the microcontroller to determine the hardware rev
9	1	PIC firmware version
10	1	PLUG_N_PLAY_ADDRESS, 'plug n play' address, used by the network master to resolve address conflicts. See VC code for algorithms
15	1	Baudrate Setting: 0 = 9600bps, 1 = 19200bps,2=38400bps,3=57600bps,4=115200bps
16	1	Firmware Update Register, used to show the status of firmware updates
17 to 99		Blank, for future use
100	2	adc value of co2 voltage output, not used, read only
101	2	adc value of temperature voltage output, not used, read only
102	2	adc value of humidity voltage output, not used, read only
103	2	adc value of co2 current output, not used, read only
104	2	adc value of temperature current output, not used, read only
105	1	adc value of humidity current output, not used, read only
106	2	adc value of on board thermistor sensor, read only
107	2	adc value of on board light sensor, read only
108	2	co2 value (ppm). It will be calibrated if write to it.
109	2	co2 calibration offset. User can change it to calibrate the co2 ppm. It will be changed also if user write the data to register co2 ppm
110	1	Delta value for eliminating the pulse ppm value. The default value is 200.
111	2	Filter times, make the ppm value go smooth. The default value is 5.
112	2	The fair alarm ppm setpoint of co2 sensor.
113	2	The poor alarm ppm setpoint of co2 sensor.
114	1	co2 alarm status:
		0b'xxxx 1xxx': co2 poor
		0b'xxxx 01xx': co2 fair
		0b'xxxx 001x': co2 good
115	1	the version number of humidity sensor
116	2	the relative humidity
117	2	the frequency value read from humidity sensor, read only
118	1	the number of calibration points of the humidity sensor
119	2	degree celsius temperature value of the humidity sensor
120	2	degree fahrenheit temperature value of the humidity sensor
121	2	celsius degree temperature value of the on board thermistor sensor

## Modbus Register List

Address	Bytes	Register Description
123	2	the offset for calibrating the on board thermistor sensor
124	1	select the temperature direct to analog output: 0: on board thermistor sensor, default setting 1: humidity sensor
125	1	select the temperature unit direct to analog output: 0: degree celsius 1: degree fahrenheit, default setting
126	2	Lighting value, for feature
127	1	analog output mode, change it by setting the jumper (J20) on the board, read only
128	2	the minimum value of temperature directs to the analog output
129	2	the maximum value of temperature directs to the analog output
130	2	the minimum value of humidity directs to the analog output
131	2	the maximum value of humidity directs to the analog output
132	2	the minimum value of co2 directs to the analog output
133	2	the maximum value of co2 directs to the analog output
		e.g. co2 output: if the co2 ppm is 1000, the (minimum value, maximum value) = (0, 3000), then
		1. setting J20 to select 0V-10V output mode, so the co2 output is about $((1000\text{ppm} / (3000\text{ppm} - 0\text{ppm})) * (10\text{V} - 0\text{V})) + 0\text{V} = 3.3\text{V}$
		2. setting J20 to select 0V-5V output mode, so the co2 output is about $((1000\text{ppm} / (3000\text{ppm} - 0\text{ppm})) * (5\text{V} - 0\text{V})) + 0\text{V} = 1.65\text{V}$
		3. setting J20 to select 4mA-20mA output mode, so the co2 output is about $((1000\text{ppm} / (3000\text{ppm} - 0\text{ppm})) * (20\text{mA} - 4\text{mA})) + 4\text{mA} = 9.3\text{mA}$
184	2	AQ value
500	1	co2 automatic compensation background enable or disable. 0 = Disable, 1 = Enable.
501	2	"Background CO2", default is 400ppm, minimum is 390, max is 500.
502	1	Maximum adjustment per day" default is 1ppm, max is 10 ppm, minimum is 1.
503	1	"Number of days to watch for minimum", default is 7 days. Max is 30 days. Minimum is 2 days.
505	2	co2 background calibration offset.

## Bacnet Register List


Value	Value and Description
AV1	SerialNumber LowByte
AV2	SerialNumber HighByte
AV3	SoftWare Version
AV4	Modbus id
AV5	Product Model
AV6	Instance
AV7	Station Number
AV8	BaudRate
AV9	Update
AV10	Protocol switch. 0 = MODBUS,1=MSTP.
AV11	Auto/Manual,Analog output auto/manual control. Bit 1 directs to temperature output, 0=Auto, 1=Manual.
AV12	Dew Point
AV13	Passwords
AV14	Mixing Ratio, the mass of water over the mass of dry gas, [g/kg]
AV15	Enthalpy of the air, [kJ/kg]
AV16	Spare
AV17	Temperature Offset
AV18~AV19	Spare
AV20	Temperature Filter
AV21	Spare
AV22	Temperature Unit
AV23	Output Mode
AV24~ AV25	Spare
AV26	Minimal Range for temperature
AV27	Maxium Range for temperature
AV28~AV30	Spare
AV31	Temperature Setpoint
AV32	Spare

Analog Input	Analog Input and Description
AI1	Spare
AI2	Temperature
AI3	Spare
AI4	AQ

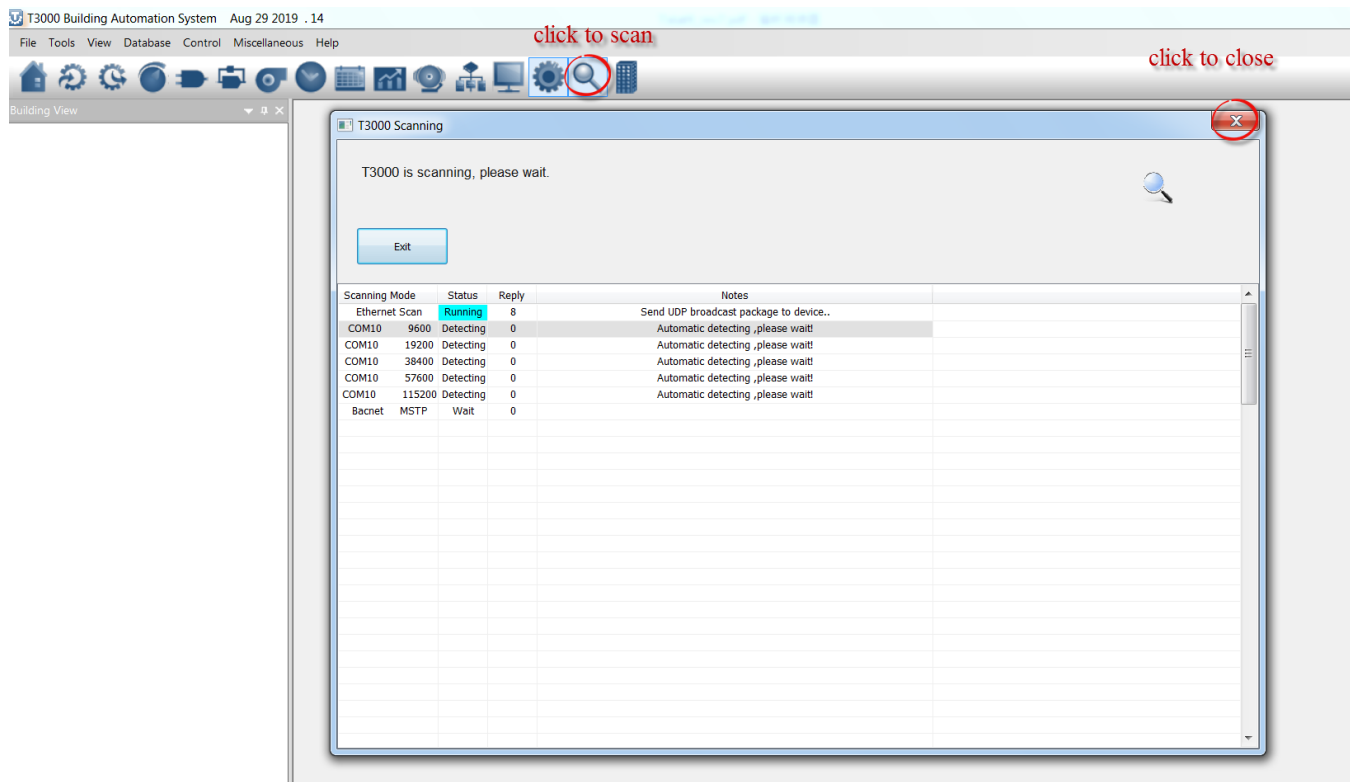
Analog Output	Analog Output and Description
AO1	Spare
AO2	Temperature
AO3	Spare

## T3000 Operation

1. Visit <https://temcocontrols.com/ftp/software/09T3000Software.zip>, download T3000 software and install it;

2. Start T3000 software, click  to scan

3. Connect AQ-N-LCD to PC by RS485, start T3000 software



The screenshot shows the T3000 Building Automation System software interface. The main window is titled "T3000 Scanning" and displays the message "T3000 is scanning, please wait." Below this message is an "Exit" button. A table shows the scanning progress for various modes:

Scanning Mode	Status	Reply	Notes
Ethernet Scan	Running	0	Send UDP broadcast package to device..
COM10 9600	Detecting	0	Automatic detecting ,please wait!
COM10 19200	Detecting	0	Automatic detecting ,please wait!
COM10 38400	Detecting	0	Automatic detecting ,please wait!
COM10 57600	Detecting	0	Automatic detecting ,please wait!
COM10 115200	Detecting	0	Automatic detecting ,please wait!
Bacnet MSTP	Wait	0	

Red annotations on the screenshot include "click to scan" pointing to the magnifying glass icon and "click to close" pointing to the close button in the window's title bar.

## 4. By connecting the T3000, the correction is performed using registers

T3000 Building Automation System Jan 13 2025 15

File Tools View Database Control Miscellaneous Help

Connect

- Change Modbus ID
- Bacnet Tool
- Modbus Poll
- Register Viewer**
- Modbus Register v2 (beta)
- RegisterList Database Folder
- Load firmware for a single device [Ctrl+F2]
- Load firmware for many devices [Ctrl+M]
- Flash SN
- Psychrometry
- PH Chart
- Option
- Disconnect the serial port
- Login my account

ID Address: 53    Enable Change    Serial Number: 209711  
 Firmware Version: 12.0    CO2 CO2 Value: 1171 ppm  
 Hardware Version: 34    Previous Alarm Setpoint: 800  
 Baudrate: 115200    Alarm Setpoint: 1000  
 Relative Humidity: 39.7%    Calibrating Offset: 0  
 Refresh  
 Alarm Setting:  Manual  Auto  
 Alarm State: ON  
 Password:  Enable Password    1234  
 CO2 Sensor Type: SCD40  
 CO2 Calibration: Enter the known CO2 concentration here from your reference meter, or 400ppm for outside air.  
 Calibration    PPM    Help  
 TCP/IP Info  
 Port: 502    IP Address: 192 . 168 . 0 . 3  
 IP Model: STATIC    Subnet Mask: 255 . 255 . 255 . 0  
 MAC Address: 00-0E-C6-F2-8C-86    Gateway: 192 . 168 . 0 . 1  
 Apply

Date: 2025/ 1/21  
Time: 9:20:06  
Synchronization Local PC  
Alarm On (s): 2  
Alarm Off (s): 2  
Menu Block Time (s): 0  
Backlight  
 LCD Always On  
 LCD Always Off  
 LCD Delay Off 255 (s)  
LCD Scroll Bar  
 Enable  Disable

ID	Address	Operation	Length	Register Name	Value	Data Format	Description	Unit
40	70	03_06 Read Holding and W. 1	1	MODBUS_GHOST_GATEWAY 192		8 Bit Unsigned Integer	GHOST_GATEWAY	
41	71	03_06 Read Holding and W. 1	1	MODBUS_GHOST_GATEWAY 168		8 Bit Unsigned Integer	GHOST_GATEWAY	
42	72	03_06 Read Holding and W. 1	1	MODBUS_GHOST_GATEWAY 0		8 Bit Unsigned Integer	GHOST_GATEWAY	
43	73	03_06 Read Holding and W. 1	1	MODBUS_GHOST_GATEWAY 1		8 Bit Unsigned Integer	GHOST_GATEWAY	
44	75	03_06 Read Holding and W. 1	1	MODBUS_GHOST_LISTEN_PK 502		16 Bit Unsigned Integer	GHOST_LISTEN_PORT	
45	76	03_06 Read Holding and W. 1	1	MODBUS_WRITE_GHOST_SY 0		8 Bit Unsigned Integer	1-WRITE_GHOST_SYSTEM	
46	201	03_06 Read Holding and W. 1	1	MODBUS_TEMPERATURE_DE 0		8 Bit Unsigned Integer	Temperature display unit ,0= CELSIUS DEGREE , 1= FAHRENHEIT DEGRU	
47	204	03 Read Holding Registers 1	1	MODBUS_TEMPERATURE_CE 21.8		16 Bit Signed Integer/10	Temperature at celsius	
48	205	03 Read Holding Registers 1	1	MODBUS_TEMPERATURE_FA 71.2		16 Bit Signed Integer/10	Temperature at fahrenheit	
49	207	03 Read Holding Registers 1	1	MODBUS_HUMIDITY 38.7		16 Bit Unsigned Integer/10	RH humidity	
50	210	03 Read Holding Registers 1	1	MODBUS_CO2_INTERNAL_E 7		8 Bit Unsigned Integer	internal_co2_module_type, NONE ->0 , MAYBE_OGM200 ->1 , MAYBE	
51	211	03 Read Holding Registers 1	1	MODBUS_CO2 790		16 Bit Unsigned Integer	CO2	
52	212	03_06 Read Holding and W. 1	1	MODBUS_CO2_OFFSET 49.8		16 Bit Signed Integer/10	CO2 offset	CO2
53	213	03_06 Read Holding and W. 1	1	MODBUS_CO2_PREALARM_S 800		16 Bit Unsigned Integer	CO2 previous alarm setpoint	
54	214	03_06 Read Holding and W. 1	1	MODBUS_CO2_ALARM_SETP 1000		16 Bit Unsigned Integer	CO2 alarm setpoint	
55	1232	03_06 Read Holding and W. 1	1	MODBUS_CO2_FILTER 5		8 Bit Unsigned Integer	CO2 filter	
56	1239	03_06 Read Holding and W. 1	1	MODBUS_RTC_YEAR 2016		16 Bit Unsigned Integer	YEAR	
57	1240	03_06 Read Holding and W. 1	1	MODBUS_RTC_MONTH 6		8 Bit Unsigned Integer	MONTH	
58	1241	03_06 Read Holding and W. 1	1	MODBUS_RTC_DAY 21		8 Bit Unsigned Integer	DAY	
59	1242	03_06 Read Holding and W. 1	1	MODBUS_RTC_WEEK 2		8 Bit Unsigned Integer	WEEK	
60	1243	03_06 Read Holding and W. 1	1	MODBUS_RTC_HOUR 0		8 Bit Unsigned Integer	HOUR	
61	1244	03_06 Read Holding and W. 1	1	MODBUS_RTC_MINUTE 25		8 Bit Unsigned Integer	MINUTE	
62	1245	03_06 Read Holding and W. 1	1	MODBUS_RTC_SECOND 7		8 Bit Unsigned Integer	SECOND	
63	1255	03_06 Read Holding and W. 1	1	MODBUS_OUTPUT_RANGE_J -40.0		16 Bit Signed Integer/10	Temperature output range MIX default value:0°C	
64	1256	03_06 Read Holding and W. 1	1	MODBUS_OUTPUT_RANGE_J 600		16 Bit Unsigned Integer	Temperature output range MAX default value:100°C	
65	1257	03_06 Read Holding and W. 1	1	MODBUS_OUTPUT_RANGE_J 0.0		16 Bit Unsigned Integer/10	Humidity output range MIX default value: 0% RH	
66	1258	03_06 Read Holding and W. 1	1	MODBUS_OUTPUT_RANGE_J 100.0		16 Bit Unsigned Integer/10	Humidity output range MAX default value: 100% RH	
67	1259	03_06 Read Holding and W. 1	1	MODBUS_OUTPUT_RANGE_J 0		16 Bit Unsigned Integer	CO2 output range MIX default value: 0 PPM	
68	1260	03_06 Read Holding and W. 1	1	MODBUS_OUTPUT_RANGE_J 2000		16 Bit Unsigned Integer	CO2 output range MAX default value: 2000 PPM	
69	1262	03_06 Read Holding and W. 1	1	MODBUS_BACKLIGHT_KEEP 255		8 Bit Unsigned Integer	0:OFF , 255:ON , 1-254 :Backlight ON Timer left	
70	3001	03_06 Read Holding and W. 1	1	MODBUS_TEMPRATURE_FIL 5		8 Bit Unsigned Integer	TEMPRATURE FILTER	
71	3002	03_06 Read Holding and W. 1	1	MODBUS_HUIDITY_FILTER 5		8 Bit Unsigned Integer	HUMIDITY FILTER	
72	3049	03 Read Holding Registers 1	1	MODBUS_DEW_PT 0.0		16 Bit Signed Integer/10	unit.°C	
73	3050	03 Read Holding Registers 1	1	MODBUS_DEW_PT_F 0.0		16 Bit Signed Integer/10	unit.°F	
74	3053	03 Read Holding Registers 1	1	MODBUS_PWS 0		16 Bit Unsigned Integer	unit.hPa	
75	3054	03 Read Holding Registers 1	1	MODBUS_MIX_RATIO 0		16 Bit Unsigned Integer	unit.g/kg	
76	3055	03 Read Holding Registers 1	1	MODBUS_ENTHALPY 0		16 Bit Unsigned Integer	unit.kJ/kg	
77	3056	03_06 Read Holding and W. 1	1	MODBUS_TEMP_OFFSET 0		16 Bit Unsigned Integer	TEMPERATURE OFFSET	
78	3057	03_06 Read Holding and W. 1	1	MODBUS_HUM_OFFSET 0		16 Bit Unsigned Integer	HUMIDITY OFFSET	
79	3066	03 Read Holding Registers 1	1	MODBUS_OUTPUT_HUM 3.87		16 Bit Unsigned Integer/100	HUMIDITY OUTPUT 0-10 volts	
80	3067	03 Read Holding Registers 1	1	MODBUS_OUTPUT_TEMP 6.17		16 Bit Unsigned Integer/100	TEMPERATURE OUTPUT 0-10 volts	
81	3068	03 Read Holding Registers 1	1	MODBUS_OUTPUT_CO2 0.01		16 Bit Unsigned Integer/100	CO2 OUTPUT 0-10 volts	
82	3070	03_06 Read Holding and W. 1	1	MODBUS_OUTPUT_HUM_VOI -0.8		16 Bit Signed Integer/10	HUMIDITY VOLTAGE OFFSET	
83	3071	03_06 Read Holding and W. 1	1	MODBUS_OUTPUT_TEMP_VC -0.8		16 Bit Signed Integer/10	TEMPERATURE VOLTAGE OFFSET	
84	3072	03_06 Read Holding and W. 1	1	MODBUS_OUTPUT_CO2_VOI 0.0		16 Bit Signed Integer/10	CO2 VOLTAGE OFFSET	
85	3073	03_06 Read Holding and W. 1	1	MODBUS_OUTPUT_HUM_CUI 1.0		16 Bit Signed Integer/10	HUMIDITY CURRENT OFFSET	
86	3074	03_06 Read Holding and W. 1	1	MODBUS_OUTPUT_TEMP_CL 1.0		16 Bit Signed Integer/10	TEMPERATURE CURRENT OFFSET	
87	3075	03_06 Read Holding and W. 1	1	MODBUS_OUTPUT_CO2_CUI 0.0		16 Bit Signed Integer/10	CO2 CURRENT OFFSET	
88	3141	03_06 Read Holding and W. 1	1	MODBUS_CO2_FORCED_RE: 800		16 Bit Unsigned Integer	Sensiron CO2 sensor RE-CALIBRATION :	