akribis

USER GUIDE

IAQRM

Produal

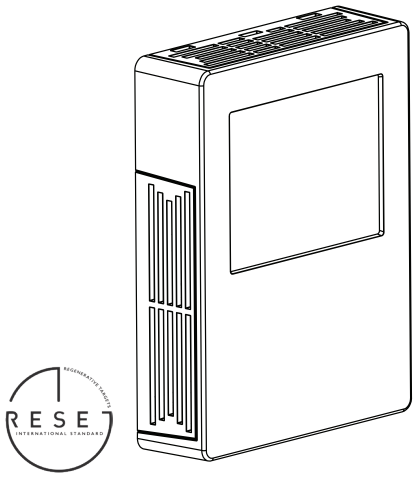
Distributed by AKRIBIS



GREYSTONE
ENERGY SYSTEMS INC

INDOOR AIR QUALITY DETECTOR

IAQ Series - Installation Instructions



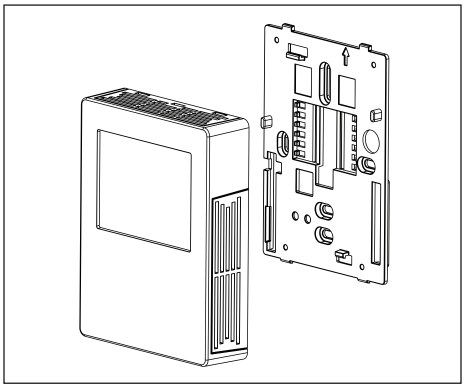
INTRODUCTION

The Total Indoor Air Quality Monitor will monitor up to 6 parameters that include Particulate Matter (PM1, PM2.5, PM4 & PM10), Volatile Organic Compounds, Carbon Dioxide, Formaldehyde, Humidity & Temperature and provide either a BACnet® or Modbus signal for connection to a building automation system. The IAQ features a full-colour capacitive touch screen LCD that's user configurable, a configurable alarm relay output and field replaceable sensor modules. All this housed in a new modern, quick mount enclosure.

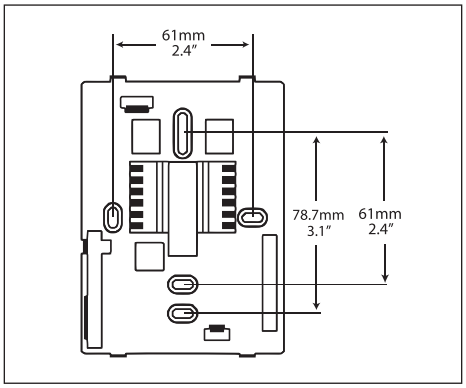
⚠ WARNING

Read these installation instructions carefully before commissioning the IAQ. Failure to follow these instructions may result in product damage. Do not use in an explosive or hazardous environment, with combustible or flammable gases, as safety or emergency stop devices or in any other application where failure of the product could result in personal injury. Use electrostatic discharge precautions during installation and do not exceed the device ratings.

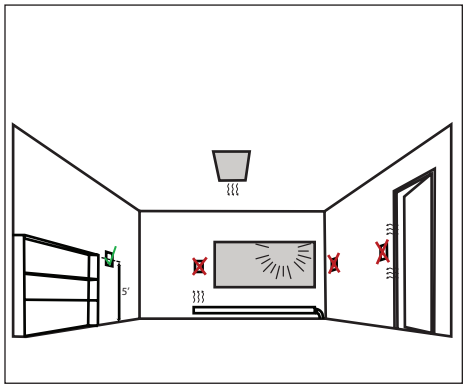
MOUNTING



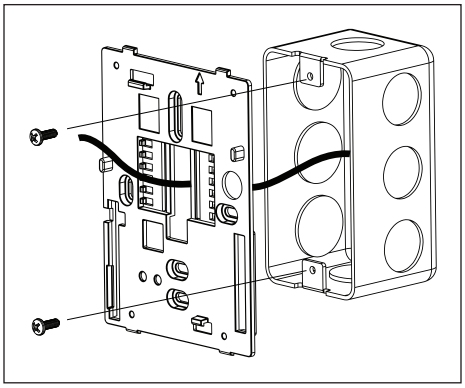
1 Included is the backplate and sensor module/cover. **Do not separate sensor module and cover.**



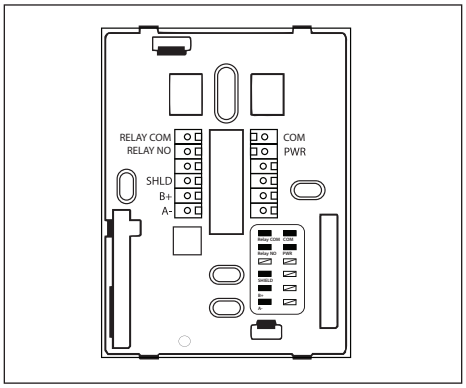
2 The backplate includes mounting holes for several mounting box types.



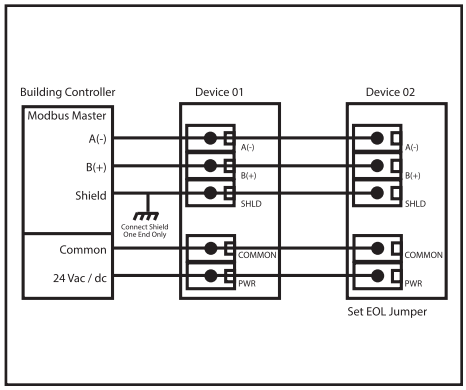
3 The sensor should be mounted 1.5 m (5') from the floor of the area to be controlled. Do not mount the sensor near doors, opening windows, supply air diffusers or other known disturbances. Avoid areas where the detector is exposed to vibrations or rapid temperature changes.



3 Feed control wire through the center hole and mount backplate to an electrical box with 2 screws (not supplied).



4 The backplate contains the wiring terminals and terminal designations.

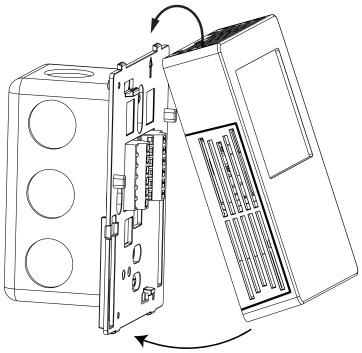


Typical Network Wiring

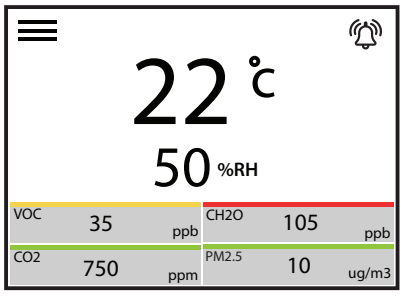
PRINTED IN CANADA

AKRIBIS . www.akribis.info . contacto@akribis.info

 Copyright © Greystone Energy Systems, Inc. All Rights Reserved Phone: +1 506 853 3057 Web: www.greystoneenergy.com



5 **NOTE: The sensor module can be installed with power applied, but it is not recommended.** To Install sensor module/cover by placing the tabs on the top of backplate into slots in the sensor module/cover and snap onto tabs on bottom of backplate



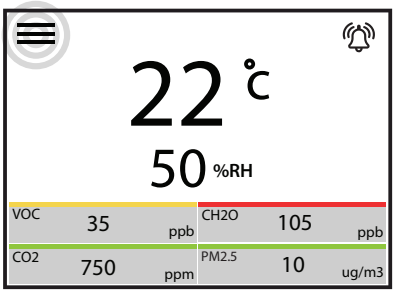
6 If power is present the LCD will illuminate and after about 10 seconds, the sensor readings will be displayed. Allow 24 hours for sensors to stabilize for accurate readings.

LCD BACKLIGHT

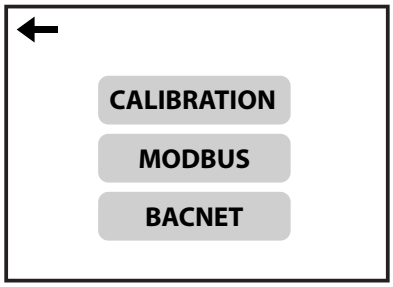
The LCD Backlight default is ON. To turn OFF refer to the Network Setup Guide. In the OFF setting, the LCD backlight remains OFF and when the LCD is touched turns on for 2 minutes.

For devices with the Concealed LCD, the LCD Backlight default is OFF.

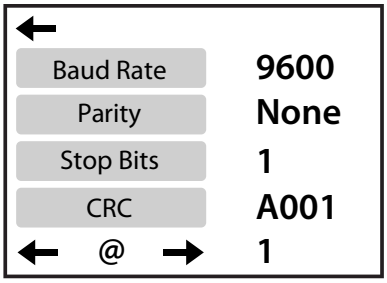
NETWORK CONFIGURATION



1 To configure, select the menu icon in the top left of display.

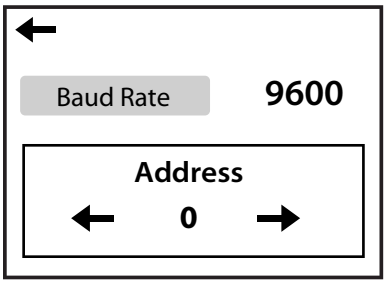


2 Select network system type. BACnet® or Modbus



3 **MODBUS**
For a Modbus network, required parameters are Baud Rate, Parity Value, Stop Bits, CRC Value & Address

MODBUS
Baud Rate range: 9600, 19200, 38400, 57600, 76800 or 115200. The default network baud rate is 9600.
Parity Value: None, Odd or Even. The default Modbus parity bit is None
Stop Bits: 1 or 2. The default Modbus stop bits is 1.
CRC Value: A001 (CRC-16 reverse), 1021 (CITT), 8005 (CRC-16) or 8408 (CITT reverse). The default CRC is A001.
Address: 1-255. The default addess is 1.

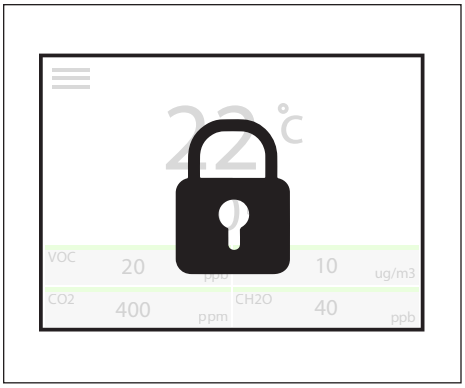


4 **BACNET®**
For a BACnet® network, required parameters are Baud Rate & Address

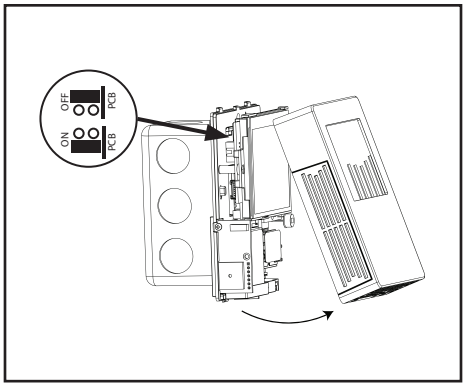
BACnet®
Baud Rate range: 9600, 19200, 38400, 57600, 76800 or 115200. The default network baud rate is 9600.
Address: 0-127. The default addess is 0.

PRINTED IN CANADA

AKRIBIS · www.akribis.info · contacto@akribis.info
Copyright © Greystone Energy Systems, Inc. All Rights Reserved



5 After initial setup, the touchscreen can be locked during network set up via the network to avoid any unauthorized access. See Network Setup Guide.



6 This device includes a EOL network termination jumper and will connect the (121 Ω) resistor correctly on the PCB. The default is OFF. Simply move the jumper to the ON position. Remove cover to set the EOL Jumper.

⚠ WARNING

The CO2 sensor incorporates a self-calibration feature (ASC) to correct CO2 sensor drift. Use the self-calibration feature for applications where the CO2 sensor is exposed to fresh air (400 ppm) at least 1 hour each day. If the monitored space has 24 hour occupancy or consistently maintains higher or lower levels of CO2, turn off the self-calibration feature and perform a yearly calibration. If you disable the self-calibration feature at installation time without an allowance for the 7 day auto-calibration cycle, then perform a manual calibration to ensure the accuracy of the device. To disable the ASC, refer to the Network Setup Guide.

⚠ WARNING

This sensor has multiple settings that can be set or adjusted after installation such as parameter ranges, relay settings, display settings, etc. and can only be completed over the Network.

To set or adjust parameters, refer to the Network Setup Guide.

NETWORK SETUP GUIDE

The network setup guides describe the implementation of the BACnet® or Modbus protocol. They are intended to assist control system programmers who may need to add support to their systems to communicate with the device.

BACnet® and Modbus setup guide download is available online.

BACnet® PROTOCOL
https://downloads.greystoneenergy.com/SG/SG-IAQXXXBAC-001.pdf

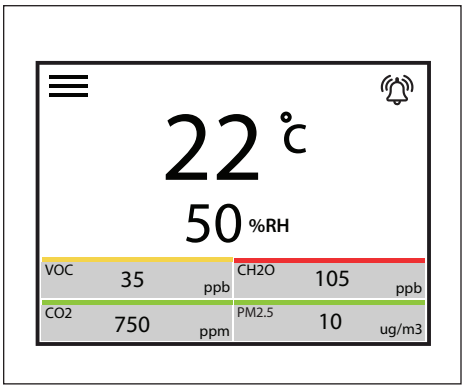
Modbus PROTOCOL
https://downloads.greystoneenergy.com/SG/SG-IAQXXXMOD-001.pdf

PRINTED IN CANADA

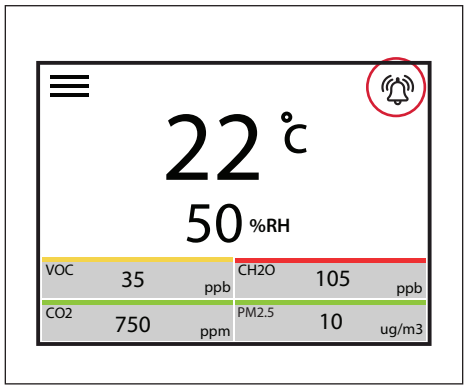
AKRIBIS . www.akribis.info . contacto@akribis.info

 Copyright © Greystone Energy Systems, Inc. All Rights Reserved Phone: +1 506 853 3057 Web: www.greystoneenergy.com

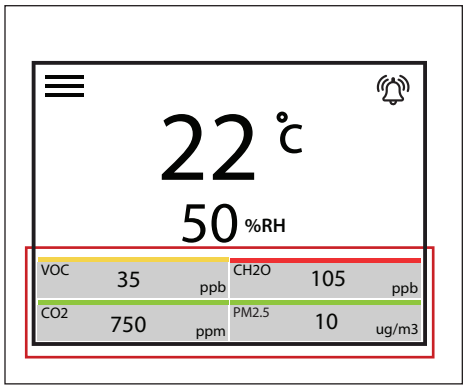
DISPLAY



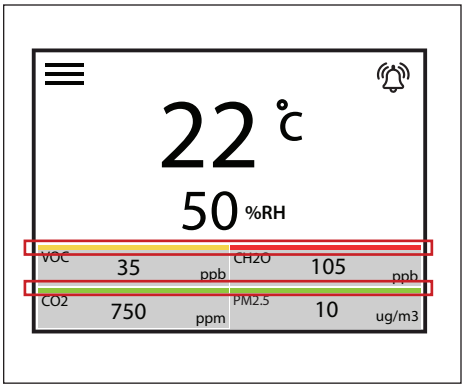
1 The touchscreen display has several features that are configurable during set up. The factory default is all features on. To change features see Network Setup Guide.



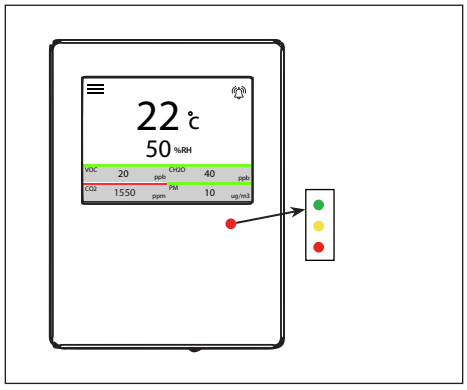
2 Alarm Icon - The alarm icon is tied to the alarm relay. If the alarm relay is not in alarm mode the icon is not shown. If alarm relay is activated the icon is shown. See alarm relay settings to set alarm functions.



3 Sensor Display - Display of the VOC, PM, CO2 and CH2O are optional. The factory default is all on. Each parameter can be turned off individually during network set up. To change parameter display see Network Setup Guide.



4 Status Bars - The colored status bars for each parameter are displayed as Green, Yellow or Red and change based on preset contamination levels. See below chart. The factory default is all on. To turn all off see Network Setup Guide. Note: if the parameter displays are turned off in step 3, status bars are also off.



5 LED - A tri-color, Green, Yellow or Red status LED illuminates based on the same preset contamination levels as STEP 4. If any one of the measured parameters changes status, the LED color will change. The factory default is on. To turn off see Network Setup Guide.

STATUS BAR LEGEND

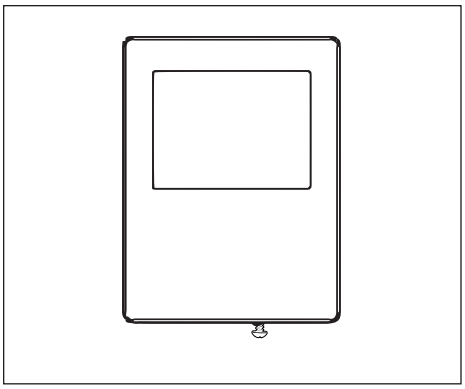
	GREEN	YELLOW	RED	UOM
VOC/TVOC	<250	250-400	>400	VOCI
	<159	159-362	>362	ppb
	<713	713-1620	>1620	ug/m3
CO2	<1000	1000 to 1500	>1500	ppm
PM	<12	12 to 55	>55	ug/m3
CH2O	<40	40 to 100	>100	ppb

PRINTED IN CANADA

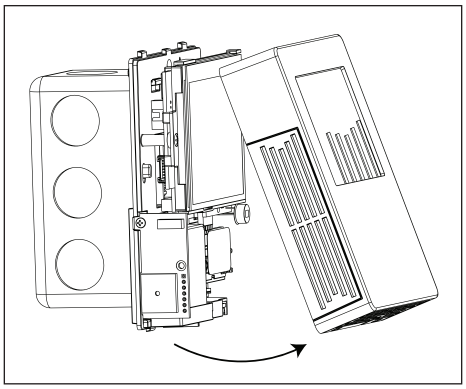
AKRIBIS · www.akribis.info · contacto@akribis.info

Copyright © Greystone Energy Systems, Inc. All Rights Reserved

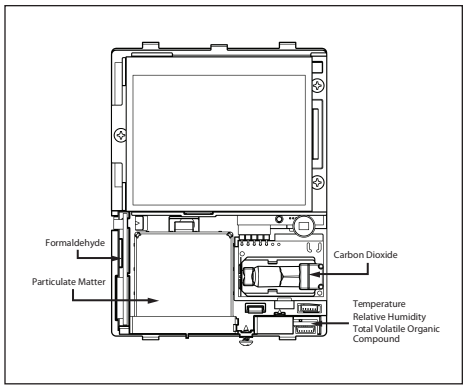
SERVICING



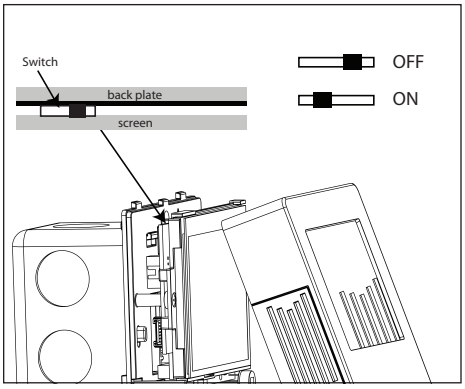
1 For sensor servicing or to remove from wall, loosen the security screw. Complete removal is not required.



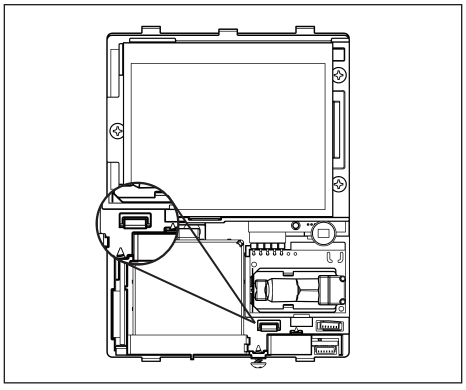
2 Remove cover by pulling outward on bottom and lift off backplate tabs



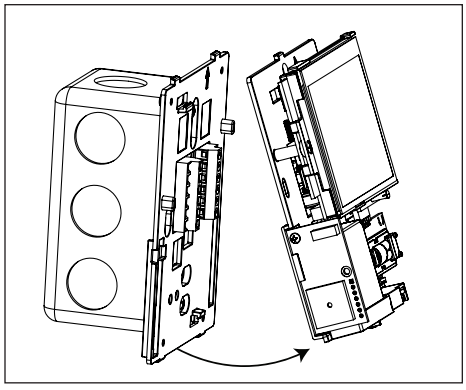
3 There 3 or 4 replaceable sensor modules depending on device purchased. The VOC, RH & Temperature sensor are combined on one module. For sensor module replacement, please refer to the sensor replacement instructions.



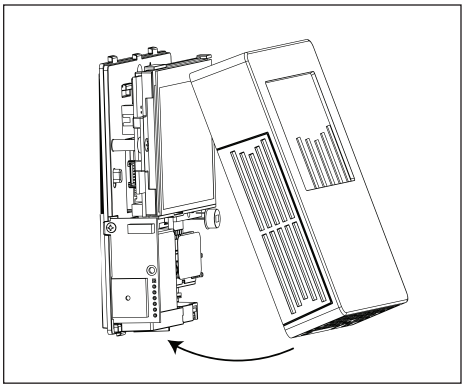
4 The device must be powered off to perform a sensor replacement or removal from the wall. An on/ off switch located on the top left of the device is provided.



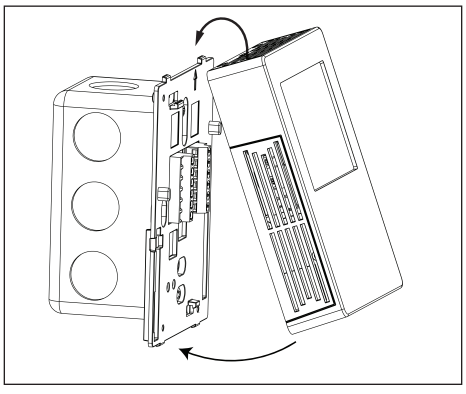
5 To remove device from wall, use a standard screwdriver to gently pry up the locking tab.



6 While prying gently on locking tab, pull out the bottom of the sensor carriage. The backplate will remain mounted to the wall.



7 To re-install, turn Power Switch to On and attach cover to sensor carriage and tighten security screw before re-installing on the backplate.



8 Install sensor module/cover by placing the tabs on the top of backplate into slots in the sensor module/cover and snap onto tabs on bottom of backplate

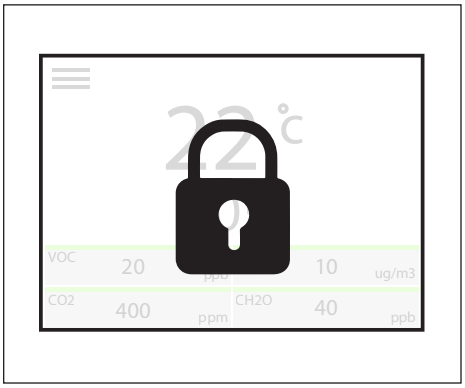
PRINTED IN CANADA

AKRIBIS . www.akribis.info . contacto@akribis.info

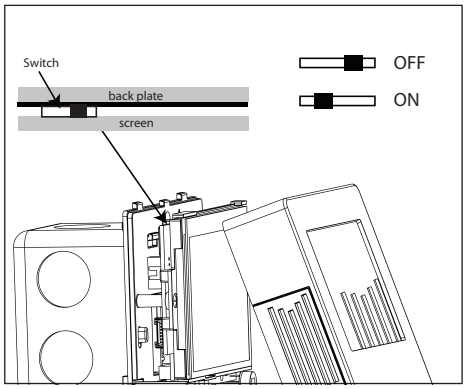
Copyright © Greystone Energy Systems, Inc. All Rights Reserved

CALIBRATION (CO2 ONLY)

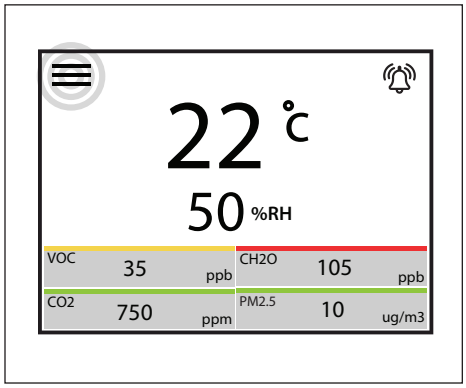
Field calibration can be completed on the CO2 sensor by 2 methods. 1) Using a field calibration kit, CO2 gas and sensor hood (Part# IAQA-CO2HOOD) or 2) By a using a handheld CO2 meter or secondary device as a reference. To perform using a field calibration kit, please refer field calibration instructions. To perform using a handheld CO2 meter or secondary device as a reference follow the steps below. To start, perform STEP 1 & 2 from the SERVICING Section.



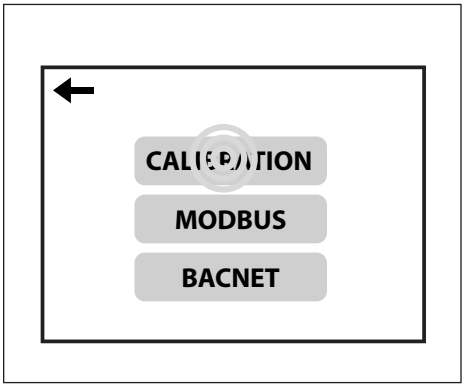
1 If touchscreen is enabled, skip to STEP 3. If touchscreen was disabled during initial set up it will need to be re-enabled via the Network settings, or turning power off and back on will enable the touchscreen for 2 minutes. Entering calibration screen will extend this time indefinitely.



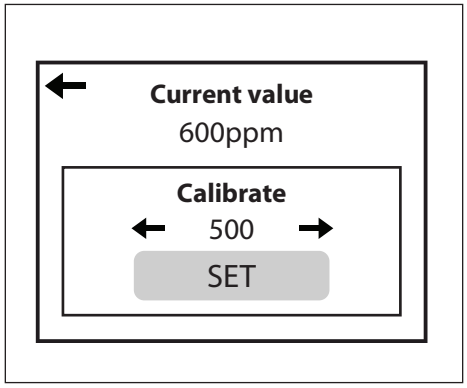
2 An on/ off switch located on the top left of the device is provided. Turn off and back on.



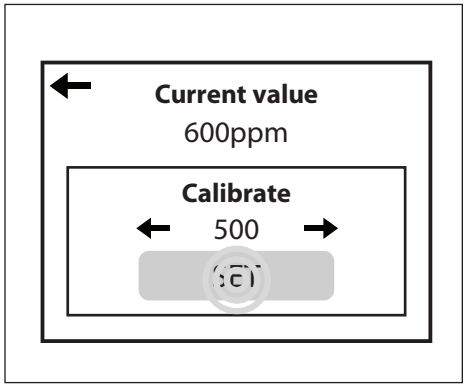
3 Select the menu icon in the top left of display



4 Select calibration from the menu items



5 Set calibration CO2 level based on reading from handheld CO2 meter or secondary reference device.

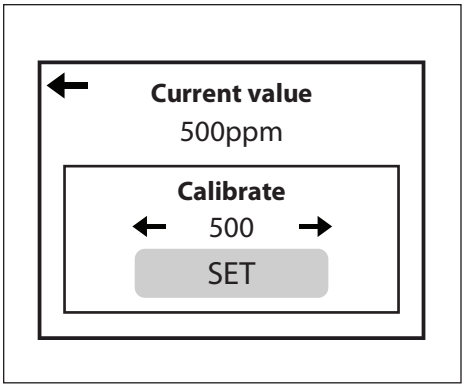


6 Select SET to calibrate the sensor.

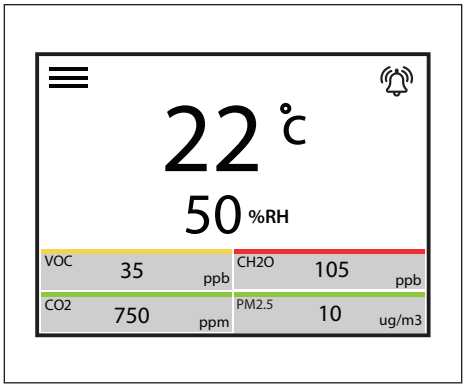
PRINTED IN CANADA

AKRIBIS · www.akribis.info · contacto@akribis.info

 Copyright © Greystone Energy Systems, Inc. All Rights Reserved

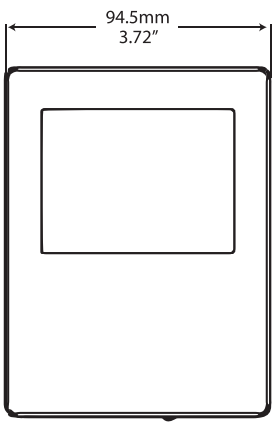


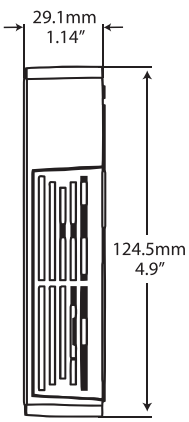
7 When calibration is complete the CURRENT VALUE and SET VALUE will match. Select back arrow in top left of screen to exit to main screen

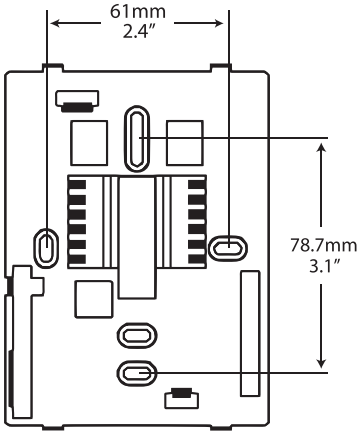


8 If touchscreen lock was set initially and disabled by turning the device off/on, after 2 minutes it will re-enable automatically. If disabled via the Network settings, it will need to be re-enabled via the Network settings.

DIMENSIONS







PRINTED IN CANADA

AKRIBIS · www.akribis.info · contacto@akribis.info

Copyright © Greystone Energy Systems, Inc. All Rights Reserved

SPECIFICATIONS

PARTICULATE MATTER SENSOR

Type
Laser Scatter Method (Field Replaceable)
Particulate Size
PM1.0, PM2.5, PM4.0 and PM10
Mass Concentration Range
0 - 1000 ug/m³ or 0 - 3000 #/cm³ (Selectable)
Mass Concentration Resolution
1 (ug/m³, 1#/cm³)
Accuracy PM1.0 and PM2.5
±10 ug/m³ (0 – 100 ug/m³), ±10%M.V. (100 – 1000 ug/m³)
Accuracy PM4 and PM10
±25 ug/m³ (0 – 100 ug/m³), ±25%M.V. (100 – 1000 ug/m³)
Sensor Life Expectancy >10 years

CARBON DIOXIDE SENSOR

Type
Dual channel non-dispersive infrared (Field Replaceable)
Accuracy
± (30ppm + 3% of measured value)
Measurement Range
0 - 10000 ppm
Auto-Cal
Selectable On (ASC) or Off (FRC)
Altitude Adjustment
0 - 3000 meters
Calibration
Field calibration capable with calibration kit
Sensor Life Expectancy >15 years

VOLATILE ORGANIC COMPOUNDS SENSOR

Type
MOX metal oxide semiconductor (Field Replaceable)
Range
VOC Index (0 - 500) or TVOC (5-1382 ppb or 23-6220 ug/m3)
Resolution
1 (VOCI, PPB, ug/m³)

RELATIVE HUMIDITY SENSOR

Type Thermoset Polymer-based Capacitance Sensor Chip (Field Replaceable)
Range 0-100% RH
Accuracy ±1.5% RH
Calibration +/-10% Offset
Resolution 0.1% RH

TEMPERATURE SENSOR

Type Bipolar Transistor Sensor Chip
Range 0 - 60°C, 32 - 140°F
Resolution 0.1°C/°F
Accuracy ± 0.2°C, ± 0.4°F (Typical)
Calibration
-5 to 5°C Offset, Resolution = 0.1°C ;
-10 to 10°F Offset, Resolution = 0.1°F

FORMALDEHYDE SENSOR

Type
Electrochemical (Field Replaceable)
Range 0 - 1000 ppb or 0 - 1230 ug/m³
Accuracy ±10% FS@25°C
Resolution 1 (ppb, ug/m³)
Sensor Life Expectancy > 6 years

NETWORK INTERFACE

Hardware
MS/TP, 2-Wire, RS-485
Software
BACnet® or Modbus
Baud Rate
9600, 19200, 38400, 57600, 76800, or 115200
Address Range
BACnet®: 0 - 127, Modbus: 1 - 255

GENERAL

Power Supply
12 - 28 Vac/Vdc, 50/60 Hz
Consumption
Maximum 150mA @ 12Vdc, 1.8W
Protection Class
III
Wiring Termination
Backplate mounted terminal block (14 to 22 AWG)
Operating Conditions
0 to 60°C (32 to 140°F), 0 to 95 %RH non-condensing
Sensor Coverage
100 m2 (1000 ft2) typical
Certifications
CE, UKCA, RESET® AIR Accredited CE

RELAY

Contact Rating
Form A, 2A max 24Vac/dc
Setpoint/Hysterisis/Delay
Selectable based on selected sensor
Relay Setpoints (Selectable)
PM Mass Concentration: 50 - 900 ug/ m³;
VOC: 100 - 500 VOC Index;
CH_2O: 50 - 900 ppb;
CO_2: 500 - 9000 ppm
Humidity: 20 - 90%;
Temperature: 5 - 40°C / 40 - 100°F
Relay Configuration
Via BACnet®/Modbus
Switching Power
60W, 62.5VA

ENCLOSURE

Material
White PC/ABS, UL94-V0, UV Protected, IP30
Connection
Wall plate with screw terminal blocks
Dimensions
124.5 mm H x 94.5 mm W x 29 mm D (4.9" x 3.72" x 1.14")

VISUAL INDICATION

Display
3.5" full colour graphic LCD
User Interface
Capacitive Touchscreen
Display Options
Viewable or Concealed
Display Parameters
Temperature and Humidity - Standard
CO_2, VOC, PM & CH_2O - Selectable On/Off
Status Bars
Green/Yellow/Red - Selectable On/Off
Status LED
Green/Yellow/Red - Selectable On/Off

PRINTED IN CANADA

AKRIBIS . www.akribis.info . contacto@akribis.info

GREYSTONE
ENERGY SYSTEMS INC

IAQRM Series
Multi Sensor
SETUP GUIDE MODBUS COMMUNICATION



Copyright © Greystone Energy Systems, Inc. All Rights Reserved www.greystoneenergy.com

AKRIBIS · www.akribis.info · contacto@akribis.info

Modbus Address	Typical Offset	Units	Data Type	Access	Description	Notes (All 16 bit Integers)	Register Value	Default Value
40001	+0	VOC Sensor Value	Word	Read	VOC Sensor Value	0-500 VOC Index, resolution 1 5-1382 PPB, resolution 1, or 23-6220 ug/m3, resolution 1, Sensor Error = -1000	0x0000 to 0x01F4 (0 to 500 VOC Index) 0x0033 to 0x3600 (51-13824 PPB), or 0x17 to 0x184C corresponding to 230 to 62200 (multiplier = 1/10)	N/A
40002	1	RH Sensor Value	Word	Read	RH Sensor Value	0-100%RH, Resolution = 0.1%RH Sensor Error = -1000	0x0000 to 0x3E8 (0.0 to 100.0%RH multiplier = 10)	N/A
40003	2	Temperature Sensor Value	Word	Read	Temperature Sensor Value	0 to 50 °C, Resolution = 0.1 °C 32 to122 °F, Resolution = 0.1 °F Sensor Error = -1000	0x0000 to 0x01F4, corresponding to 0.0 to 50.0 °C (multiplier = 10) 0x0140 to 0x04C4, corresponding to 32.0 to 122.0 °F (multiplier = 10)	N/A
40004	3	PM 1.0 Particulate Mass	Word	Read	PM1.0 Particulate Mass	0 to 1000ug/m^3, resolution 1ug/m^3 Sensor Error = -1000	0x0000 to 0x03E8, corresponding to 0 to 1000 ug/m3	N/A
40005	4	PM 2.5 Particulate Mass	Word	Read	PM2.5 Particulate Mass	0 to 1000ug/m^3, resolution 1ug/m^3 Sensor Error = -1000	0x0000 to 0x03E8, corresponding to 0 to 1000 ug/m3	N/A
40006	5	PM 4.0 Particulate Mass	Word	Read	PM4.0 Particulate Mass	0 to 1000ug/m^3, resolution 1ug/m^3 Sensor Error = -1000	0x0000 to 0x03E8, corresponding to 0 to 1000 ug/m3	N/A
40007	6	PM 10 Particulate Mass	Word	Read	PM10.0 Particulate Mass	0 to 1000ug/m^3, resolution 1ug/m^3 Sensor Error = -1000	0x0000 to 0x03E8, corresponding to 0 to 1000 ug/m3	N/A
40008	7	PM 0.5 Number concentration range	Word	Read	PM0.5 Particulate Count	0 to 3000 #/cm^3, resolution 1 Sensor Error = -1000	0x0000 to 0x0BB8, corresponding to 0 to 3000 #/cm3	N/A
40009	8	PM 1.0 Number concentration range	Word	Read	PM1.0 Particulate Count	0 to 3000 #/cm^3, resolution 1 Sensor Error = -1000	0x0000 to 0x0BB8, corresponding to 0 to 3000 #/cm3	N/A
40010	9	PM 2.5 Number concentration range	Word	Read	PM2.5 Particulate Count	0 to 3000 #/cm^3, resolution 1 Sensor Error = -1000	0x0000 to 0x0BB8, corresponding to 0 to 3000 #/cm3	N/A
40011	10	PM 4.0 Number concentration range	Word	Read	PM4.0 Particulate Count	0 to 3000 #/cm^3, resolution 1 Sensor Error = -1000	0x0000 to 0x0BB8, corresponding to 0 to 3000 #/cm3	N/A
40012	11	PM10 Number concentration range	Word	Read	PM10 Particulate Count	0 to 3000 #/cm^3, resolution 1 Sensor Error = -1000	0x0000 to 0x0BB8, corresponding to 0 to 3000 #/cm3	N/A
40013	12	CO2 Sensor Value	Word	Read	CO2 Level	0 to 10,000PPM, resolution 1PPM Sensor Error = -1000	0x0000 to 0x2710, corresponding to 0 to 10,000 PPM	N/A
40014	13	Formaldehyde Sensor Value	Word	Read	Formaldehyde Level	0-1230 ug/m3, or 0 to 1000PPB, resolution 1 Sensor Error = -1000	0x0000 to 0x04CE, corresponding to 0 to 1230 ug/m3, or 0x0000 to 0x03E8, corresponding to 0 to 1000 PPB	N/A
40015	14	Relay Status	Word	Read		0 = Inactive, 1 = Active	0x0000 (Inactive) or 0x0001 (Active)	N/A

Copyright © Greystone Energy Systems, Inc. All Rights Reserved

AKRIBIS · www.akribis.info · contacto@akribis.info

Modbus Address	Typical Offset	Units	Data Type	Access	Description	Notes (All 16 bit Integers)	Register Value	Default Value
40016	15	Temperature Units	Word	Read/ Write	Celsius (0) or Fahrenheit (1)	0 = °C, 1 = °F	0x0000 (C) or 0x0001 (F)	0
40017	16	Temperature Offset	Word	Read/ Write	Temperature Offset	-5 to 5 Δ°C, Resolution = 0.1 Δ°C -10 to 10 Δ°F, Resolution = 0.1 Δ°F	0xFFCE to 0x0032, corresponding to -5.0 to 5.0 °C (multiplier = 10) 0xFF9C to 0x0064, corresponding to -10.0 to 10.0 °F (multiplier = 10)	0
40018	17	Humidity Offset	Word	Read/ Write	RH Offset	+/-10 %RH, Resolution = 1 %RH	0xFFF6 to 0X000A (-10 to 10 %RH)	0
40019	18	CO2 Availability	Word	Read/ Write	Enable (0) or Disable (1)	0 = CO2 Enabled, 1 = CO2 Disabled	0x0000 (Enable) or 0x0001 (Disable)	0
40020	19	VOC Availability	Word	Read/ Write	Enable (0) or Disable (1)	0 = VOC Enabled, 1 =VOC Disabled	0x0000 (Enable) or 0x0001 (Disable)	0
40021	20	PM Availability	Word	Read/ Write	Enable (0) or Disable (1)	0 = PM Enabled, 1 =PM Disabled	0x0000 (Enable) or 0x0001 (Disable)	0
40022	21	CH2O Availability	Word	Read/ Write	Enable (0) or Disable (1)	0 = CH2O Enabled, 1 = CH2O Disabled	0x0000 (Enable) or 0x0001 (Disable)	0
40023	22	LED Availability	Word	Read/ Write	Enable (0) or Disable (1)	0 = LED Enabled, 1 = LED Disabled	0x0000 (Enable) or 0x0001 (Disable)	0
40024	23	Status Bars Availability	Word	Read/ Write	Enable (0) or Disable (1)	0 = Status Bars Enabled, 1 = Status Bars LED Disabled	0x0000 (Enable) or 0x0001 (Disable)	0
40025	24	Touch Screen Availability	Word	Read/ Write	Enable (0) or Disable (1)	0 = Touch Screen Enabled, 1 = Touch Screen LED Disabled	0x0000 (Enable) or 0x0001 (Disable)	0
40026	25	VOC Units	Word	Read/ Write	0 = VOCI, 1 = PPB, 2=ug/m3	0 = VOCI, 1 = PPB, 2=ug/m3	0x0000 (VOCI) ,0x0001 (PPB) or 0x0002(ug/m3)	0
40027	26	CH2O Units	Word	Read/ Write	0 = ug/m3, 1 = PPB	0 = ug/m3, 1 = PPB	0x0000 (ug/m3) or 0x0001 (PPB)	0
40028	27	CO2 Offset	Word	Read/ Write	CO2 Offset	+/-200PPM, Resolution = 10PPM	0xFF38 to 0X00C8(-200 to 200)	0
40029	28	CO2 Altitude Adjustment	Word	Read/ Write	CO2 Altitude	0 to 3000meters, Resolution 100m	0x0000 to 0x0BB8, corresponding to 0 to 3000 Meters in 100m steps	0
40030	29	CO2 ASC	Word	Read/ Write	Enable (0) or Disable (1)	0 = Enable ASC (Auto Cal), 0 = Disable ASC	0x0000 (Enable) or 0x0001 (Disable)	0
40031	30	Relay Assignment	Word	Read/ Write	Relay Assignment	1 = VOC,2 = RH, 3 = Temperature,4= CO2, 5= PM_MASS, 6 =PM_NUMBER, 7= CH2O, 0 = No Relay	0x0000 to 0x0007	3
40032	31	Relay Setpoint	Word	Read/ Write	VOC: 100-500 VOC Index, RH: 20 to 90%RH TEMP: 5-40 °C, 40-100 °F CO2: 500 to 1500PPM PM: 50 to 900ug/m3 CH2O: 50 to 900 ug/m3, or PPB	Setpoint to activate Relay, VOC Index, range 100-500, resolution 10 or 500-10000 PPB, resolution 50, or 250-6000, resolution 25 RH range 20 to 90%RH 1%RH Temperature 5 to 40 °C, Resolution = 1 °C 40 to100 °F, Resolution =1 °F, CO2 range 500 to 9000ppm, Resolution=100ppm PM_MASS 50 to 900ug/m3, resolution 10ug/m3 PM_NUMBER 50 to 2900#/cm3, resolution 25#/cm3	0x0064 to 0x01F4 (100 to 500 VOC Index), or 0x1F4 to 0x2710 (500 to 10000 PPB), or 250-6000 for 250-60000ug/m3 (multiplier = 1/10) 0x0014 to 0X005A (20 to 90 %RH) 0x0005 to 0x0028 (5 to 40 °C) ,or 0x0028 to 0x0064 (40 to100 °F). 0x01F4 to 0x2328 (500 to 9000PPM) 0x0032 to 0x0384 (50 to 900ug/m3), 0x0032 to	26

Copyright © Greystone Energy Systems, Inc. All Rights Reserved www.greystoneenergy.com

AKRIBIS · www.akribis.info · contacto@akribis.info

						CH2O 50 to 900 ug/m3 or PPB, resolution 10 No Relay = 0	0x0B54 (50 to 2900#/cm3) 0x0032 to 0x0384 (50 to 900 ug/m3 or PPB)	
Modbus Address	**Typical Offset**	**Units**	**Data Type**	**Access**	**Description**	**Notes (All 16 bit Integers)**	**Register Value**	**Default Value**
40033	32	Relay Hysteresis	Word	Read/ Write	VOC: 10-50 VOC Index RH: 5 to 20%RH TEMP: 1 to 5 °C or 2-10/°F CO2: 25 to 200PPM PM: 10 to 40ug/m3 CH2O: 10 to 40 ug/m3 or PPB	Hysteresis for relay activation, VOC Index, range 10-50 resolution 1, or 10-100 PPB resolution 10, or 500-2000ug/m3, resolution =50 1%RH, range 5 to 20%RH, 1 °C/F, range 1 to 5 °C, or 2-10°F CO2 25 to 500PPM, Resolution=25ppm PM_MASS 10 to 40ug/m3, resolution 5ug/m3 PM_NUMBER 10 to 120 #/cm3, resolution 10#/cm3 CH20 10 to 40 ug/m3 or PPB, resolution 5 No Relay = 0	0x000A to 0x0032 (10 to 50 VOC Index), or 0x000A to 0x0064(10-100PPB), or 500-2000ug/m3 0x0005 to 0X0014 (5 to 20 %RH) 0x0001 to 0x0005 (1 to 5°C) ,or 0x0002 to 0x000A (2 to10 °F). 0x0019 to 0x01F4 (25 to 500PPM) 0x000A to 0x0028 (10 to 40ug/m3), 0x000A to 0x0078 (10 to 120#/cm3) 0x000A to 0x0028 (10 to 40 ug/m3 or PPB)	2
40034	33	Relay On Time	Word	Read/ Write	0 to 255 Seconds	Delay time before relay activated, resolution 1second, range 255 seconds	0x0000 to 0X00FF (0 to 255 Seconds)	15
40035	34	Relay Test	Word	Read/ Write	Normal (0) or Test (1)	0 = Inactive, 1 = Test. Customers must reset to 0 for relay normal operation after test	0x0000 (Inactive) or 0x0001 (Test)	0
40036	35	LCD Backlight	Word	Read/ Write	LCD Backlight	1 = On, 2 = Off		1

RTU Message Format

Modbus Framing	8 bit binary
Data Bits	start bits --- 1 data bits --- 8 parity bits --- none, odd or even stop bits --- 1or 2
Baud Rate	9600, 19200, 38400, 57600, 76800 or 115200
Duplex	Half duplex
Error Checking	Cyclical Redundancy Check (CRC) CRC-16 --- polynomial x16+x15+x2+x0 0x8005 or reversed version 0xA001 or CRC-CITT --- polynomial x16+x12+x5+x0 0x1021 or reversed version 0x8408
Latency	More than 3.5 characters --- minimum, 50, 100, 150, 200, 250, 300 or 350 mS

RTU Framing Support and Bit Sequences

Start	1	2	3	4	5	6	7	8	Stop	
Start	1	2	3	4	5	6	7	8	Stop	Stop
Start	1	2	3	4	5	6	7	8	Odd	Stop
Start	1	2	3	4	5	6	7	8	Even	Stop

RTU Function Codes

0x03 --- Read holding registers

Query

 Copyright © Greystone Energy Systems, Inc. All Rights Reserved

AKRIBIS · www.akribis.info · contacto@akribis.info

Slave address (0x01 to 0xFF)	Function code (0x03)	Starting address MSB	Starting address LSB	Quantity of registers MSB	Quantity of registers LSB	CRC LSB	CRC MSB	CRC MSB

* Starting address = 0x0000 to 0x0023, Quantity of registers = 0x0001 to 0x0024

Response

Slave address (0x01 to 0xFF)	Function code (0x03)	Byte count 2N	Register value MSB	Register value LSB	…	CRC LSB	CRC MSB	CRC MSB

* N= Quantity of registers

0x06 --- Write single register

Query

Slave address (0x01 to 0xFF)	Function code 0x06	Register address MSB	Register address LSB	Register value MSB	Register value LSB	CRC LSB	CRC MSB	CRC MSB

Response

Slave address (0x01 to 0xFF)	Function code 0x06	Register address MSB	Register address LSB	Register value MSB	Register value LSB	CRC LSB	CRC MSB	CRC MSB

* Register address = 0x000F to 0x0023, Registers value = 0x0000 to 0xFFFF

Exception response

Slave address (0x01 to 0xFF)	Function code + 0x80	Exception code 0x01, 0x02 or 0x03	CRC LSB	CRC MSB

* An exception response is only returned if the CRC is correct
  Exception code 01 --- illegal function, 02 --- illegal address, 03 --- illegal data value

Note that the registers may be read individually, or multiple registers may be read at the same time by changing the query as shown below.

To read several registers with one query…

0x03 --- Read ALL REGISTERS

Query

Slave address (0x01 to 0xFF)	0x03	0x00	0x00 (Note 1)	0x00	0x05 (Note2)	CRC LSB	CRC MSB	CRC MSB

Response

Slave address (0x01 to 0xFF)	0x03	0x0A (Note 3)	Register value MSB	Register value LSB	. . .	CRC LSB	CRC MSB	CRC MSB

Note 1: The starting address (A) may be 0x0000 to 0x0022. The read multiple feature will read all registers from the starting address forward. If the starting address is 0x0000 then registers 40001 to 40036 can be read. If the starting address is 0x0008 then registers 40009 to 40036 can be read.

Note 2: The quantity of registers (N) may be 0x0001 to 0x0024, but must be limited to 36 – A. If the starting address (A) is set to 0x0000 then N may be 0x0001 to 0x0024. If the starting address is set to 0x0008 then N may be 0x0001 to 0x0001C.

Note 3: The byte count (B) will always be 2N. If the quantity of registers (N) is 0x0001 then B will be 0x02. If N is 0x0005 then B will be 0x0A.

Copyright © Greystone Energy Systems, Inc. All Rights Reserved

AKRIBIS · www.akribis.info · contacto@akribis.info

GREYSTONE
ENERGY SYSTEMS INC

IAQRM Series
Multi Sensor
SETUP GUIDE BACnet® COMMUNICATION



 Copyright © Greystone Energy Systems, Inc. All Rights Reserved
AKRIBIS · www.akribis.info · contacto@akribis.info

Object Type (BACnet Object Type)	Object Identifier (BACnet Object Identifier)	Object Name (Character String (32))	Notes	Present Value (Default)	Description (Character String(32))	Device Type (Character String(32))	Status Flags (BACnetStatus Flags)	Event State (BACnet EventState)	Reliability (BACnet Reliability)	Out of Service (Boolean)	Units (BACnet EngineeringUnits)	COV increment (Real)	Number of States	Property List (BACnet Array)
Device	381003	MSN-003		381003										
Analog Input	AI 1	VOC Sensor Value	0-500 VOC Index, or 5-1382 PPB, or 23-6220 ug/m3, resolution 1 Sensor Error = -1000	Current Reading	VOC Sensor Value	VOC Sensor	{false, false, false, false} (0000) or (1100) if no sensor	NORMAL (0) or FAULT (1) if no sensor	NO_FAULT_ DETECTED (0) or NO_SENSOR (1)	FALSE (0)	no units (95), or parts-per-billion (97), or micro-grams-per-cubic-meter (219)	50		
	AI 2	RH Sensor Value	0-100%RH, Resolution = 0.1%RH Sensor Error = -1000	Current Reading	RH Sensor Value	RH Sensor	{false, false, false, false} (0000) or (1100) if no sensor	NORMAL (0) or FAULT (1) if no sensor	NO_FAULT_ DETECTED (0) or NO_SENSOR (1)	FALSE (0)	percent-relative-humidity (29)	10		
	AI 3	Temperature Sensor Value	0 to 50 °C, Resolution = 0.1 °C -32 to122 °F, Resolution = 0.1 °F Sensor Error = -1000	Current Reading	Temperature Sensor Value	Temperatur e Sensor	{false, false, false, false} (0000) or (1100) if no sensor	NORMAL (0) or FAULT (1) if no sensor	NO_FAULT_ DETECTED (0) or NO_SENSOR (1)	FALSE (0)	degrees-Celsius (62) or degrees-Fahrenheit (64)	2/4		
	AI 4	PM 1.0 Particulate Mass	0 to 1000ug/m3, resolution 1ug/m3 Sensor Error = -1000	Current Reading	PM1.0 Particulate Mass	PM Sensor	{false, false, false, false} (0000) or (1100) if no sensor	NORMAL (0) or FAULT (1) if no sensor	NO_FAULT_ DETECTED (0) or NO_SENSOR (1)	FALSE (0)	micro-grams-per-cubic-meter (219)	50		
	AI 5	PM 2.5 Particulate Mass	0 to 1000ug/m3, resolution 1ug/m3 Sensor Error = -1000	Current Reading	PM2.5 Particulate Mass	PM Sensor	{false, false, false, false} (0000) or (1100) if no sensor	NORMAL (0) or FAULT (1) if no sensor	NO_FAULT_ DETECTED (0) or NO_SENSOR (1)	FALSE (0)	micro-grams-per-cubic-meter (219)	50		
	AI 6	PM 4.0 Particulate Mass	0 to 1000ug/m3, resolution 1ug/m3 Sensor Error = -1000	Current Reading	PM4.0 Particulate Mass	PM Sensor	{false, false, false, false} (0000) or (1100) if no sensor	NORMAL (0) or FAULT (1) if no sensor	NO_FAULT_ DETECTED (0) or NO_SENSOR (1)	FALSE (0)	micro-grams-per-cubic-meter (219)	50		
	AI 7	PM 10 Particulate Mass	0 to 1000ug/m3, resolution 1ug/m3 Sensor Error = -1000	Current Reading	PM10.0 Particulate Mass	PM Sensor	{false, false, false, false} (0000) or (1100) if no sensor	NORMAL (0) or FAULT (1) if no sensor	NO_FAULT_ DETECTED (0) or NO_SENSOR (1)	FALSE (0)	micro-grams-per-cubic-meter (219)	50		
	AI 8	PM 0.5 Number concentration range	0 to 3000 #/cm3, resolution 1 Sensor Error = -1000	Current Reading	PM0.5 Particulate Count	PM Sensor	{false, false, false, false} (0000) or (1100) if no sensor	NORMAL (0) or FAULT (1) if no sensor	NO_FAULT_ DETECTED (0) or NO_SENSOR (1)	FALSE (0)	micro-grams-per-cubic-meter (219)	100		
	AI 9	PM 1.0 Number concentration range	0 to 3000 #/cm3, resolution 1 Sensor Error = -1000	Current Reading	PM1.0 Particulate Count	PM Sensor	{false, false, false, false} (0000) or (1100) if no sensor	NORMAL (0) or FAULT (1) if no sensor	NO_FAULT_ DETECTED (0) or NO_SENSOR (1)	FALSE (0)	micro-grams-per-cubic-meter (219)	100		

 Copyright © Greystone Energy Systems, Inc. All Rights Reserved
AKRIBIS · www.akribis.info · contacto@akribis.info

Object Type (BACnet Object Type)	Object Identifier (BACnet Object Identifier)	Object Name (Character String (32))	Notes	Present Value (Default)	Description (Character String(32))	Device Type (Character String(32))	Status Flags (BACnetStatus Flags)	Event State (BACnet EventState)	Reliability (BACnet Reliability)	Out of Service (Boolean)	Units (BACnet EngineeringUnits)	COV increment (Real)	Number of States	Property List (BACnet Array)
	AI 10	PM 2.5 Number concentration range	0 to 3000 #/cm3, resolution 1 Sensor Error = -1000	Current Reading	PM2.5 Particulate Count	PM Sensor	{false, false, false, false} (0000) or (1100) if no sensor	NORMAL (0) or FAULT (1) if no sensor	NO_FAULT_DETECTED (0) or NO_SENSOR (1)	FALSE (0)	micro-grams-per-cubic-meter (219)	100		
	AI 11	PM 4.0 Number concentration range	0 to 3000 #/cm3, resolution 1 Sensor Error = -1000	Current Reading	PM4.0 Particulate Count	PM Sensor	{false, false, false, false} (0000) or (1100) if no sensor	NORMAL (0) or FAULT (1) if no sensor	NO_FAULT_DETECTED (0) or NO_SENSOR (1)	FALSE (0)	micro-grams-per-cubic-meter (219)	100		
	AI 12	PM10 Number concentration range	0 to 3000 #/cm3, resolution 1 Sensor Error = -1000	Current Reading	PM10 Particulate Count	PM Sensor	{false, false, false, false} (0000) or (1100) if no sensor	NORMAL (0) or FAULT (1) if no sensor	NO_FAULT_DETECTED (0) or NO_SENSOR (1)	FALSE (0)	micro-grams-per-cubic-meter (219)	100		
	AI 13	CO2 Sensor Value	0 to 10,000PPM, resolution 1PPM Sensor Error = -1000	Current Reading	CO2 Level	CO2 Sensor	{false, false, false, false} (0000) or (1100) if no sensor	NORMAL (0) or FAULT (1) if no sensor	NO_FAULT_DETECTED (0) or NO_SENSOR (1)	FALSE (0)	parts-per-million (96)	100		
	AI 14	Formaldehyde Sensor Value	0 to 1230 ug/m3, or 0 to 1000PPB, resolution 1 Sensor Error = -1000	Current Reading	Formaldehyde Level	Formaldehyde Sensor	{false, false, false, false} (0000) or (1100) if no sensor	NORMAL (0) or FAULT (1) if no sensor	NO_FAULT_DETECTED (0) or NO_SENSOR (1)	FALSE (0)	ug/m3 ((219) or ppb (97)	50		
Analog Value	AV 1	Temperature Offset	-5 to 5 Δ°C, Resolution = 0.1 Δ°C -10 to 10 Δ°F, Resolution = 0.1 Δ°F	0	Temperature Offset	NA	{false, false, false, false} (0000) or (1100) if no sensor	NORMAL (0) or FAULT (1) if no sensor	NA	FALSE (0)	Δ °F (120) or Δ °C (121)			
	AV 2	Humidity Offset	+/-10 %RH, Resolution = 1 %RH	0	RH Offset	NA	{false, false, false, false} (0000) or (1100) if no sensor	NORMAL (0) or FAULT (1) if no sensor	NA	FALSE (0)	percent-relative-humidity (29)			
	AV 3	CO2 Offset	+/-200PPM, Resolution = 10PPM	0	CO2 Offset	NA	{false, false, false, false} (0000) or (1100) if no sensor	NORMAL (0) or FAULT (1) if no sensor	NA	FALSE (0)	parts-per-million (96)			
	AV 4	CO2 Altitude Adjustment	0 to 3000meters, Resolution 100m	0	CO2 Altitude	NA	{false, false, false, false} (0000) or (1100) if no sensor	NORMAL (0) or FAULT (1) if no sensor	NA	FALSE (0)	meters (31)			

 Copyright © Greystone Energy Systems, Inc. All Rights Reserved

AKRIBIS · www.akribis.info · contacto@akribis.info

Object Type (BACnet Object Type)	Object Identifier (BACnet Object Identifier)	Object Name (Character String (32))	Notes	Present Value (Default)	Description (Character String(32))	Device Type (Character String(32))	Status Flags (BACnetStatus Flags)	Event State (BACnet EventState)	Reliability (BACnet Reliability)	Out of Service (Boolean)	Units (BACnet EngineeringUnits)	COV increment (Real)	Number of States	Property List (BACnet Array)
	AV5	Relay Setpoint	Setpoint to activate Relay, VOC Index, range 100-500, resolution 10 TVOC, 500-1000 PPB, resolution 50, or 2500-6000ug/m3, resolution 250 RH range 20 to 90%RH 1%RH. Temperature 5 to 40 °C, Resolution = 1 °C 40 to100 °F, Resolution =1 °F CO2 range 500 to 9000ppm, Resolution=100ppm PM_MASS 50 to 900ug/m3, resolution 10ug/m3 PM_NUMBER 50 to2 900#/Cm3, resolution 25#/cm3 CH2O 50 to 900 ug/m3 or PPB, resolution 10 No Relay = 0	26°C	VOC: 100-500 VOC Index, TVOC: 500-10000 PPB,or 2500-60000ug/m3 RH: 20 to 90%RH TEMP: 5-40 °C, 40-100 °F PM_MASS: 50 to 900ug/m3 PM_NUMER: 50 to 2900#/cm3 CO2: 500 to 9000ppm CH2O: 50 to 900 ug/m3 or PPB	NA	{false, false, false, false} (0000) or (1100) if no relay	NORMAL (0) or FAULT (1) if no relay	NA	FALSE (0)	VOC Index - no units (95) TVOC - ppb (97), or ug/m3 (219) RH - %RH (29) Temperature - C (62) or F (64) parts-per-million (96) ug/m3 or #/cm3 (219) ug/m3 ((219) or ppb (97)			
	AV6	Relay Hysteresis	Hysteresis for relay activation, VOC Index, range 10-50 resolution 1 TVOC, 10-100 PPB resolution 10, or 500-2000ug/m3, resolution =50 1%RH, range 5 to 20%RH, 1 °C/F, range 1 to 5 °C,or 2-10°F, CO2: 25 to 500PPM, Resolution=25ppm PM_MASS 10 to 40ug/m3, resolution 5ug/m3, PM_NUMBER 10 to 120#/cm3, resolution 25#/cm3 CH20 10 to 40 ug/m3 or PPB, resolution 5 No Relay = 0	2°C	VOC: 10-50 VOC Index TVOC: 10-100 PPB, or 500-2000ug/m3 RH: 5 to 20%RH TEMP: 1 to 5 C or 2-10/F PM_MASS: 10 to 40ug/m3, PM_NUMER: 10 to 120#/cm3 CO2: 25 to 500PPM CH2O: 10 to 40 ug/m3 or PPB	NA	{false, false, false, false} (0000) or (1100) if no relay	NORMAL (0) or FAULT (1) if no relay	NA	FALSE (0)	VOC Index - no units (95) TVOC - ppb (97), or ug/m3 (219) RH - %RH (29) Temperature - C (62) or F (64) parts-per-million (96) ug/m3 or #/cm3 (219) ug/m3 ((219) or ppb (97)			
	AV7	Relay On Time	Delay time before relay activated/deactivated, resolution 1second, range 255 seconds	15	0 to 255 Seconds	NA	{false, false, false, false} (0000) or (1100) if no relay	NORMAL (0) or FAULT (1) if no relay	NA	FALSE (0)	seconds (73)			

 Copyright © Greystone Energy Systems, Inc. All Rights Reserved

AKRIBIS · www.akribis.info · contacto@akribis.info

Object Type (BACnet Object Type)	Object Identifier (BACnet Object Identifier)	Object Name (Character String (32))	Notes	Present Value (Default)	Description (Character String(32))	Device Type (Character String(32))	Status Flags (BACnetStatus Flags)	Event State (BACnet EventState)	Reliability (BACnet Reliability)	Out of Service (Boolean)	Units (BACnet EngineeringUnits)	COV increment (Real)	Number of States	Property List (BACnet Array)
Binary Value	BV 1	Temperature Units	0 = °C, 1 = °F	0	Celsius (0) or Fahrenheit (1)	NA	{false, false, false, false} (0000)	NORMAL (0)	NA	FALSE (0)	NA			
	BV 2	CH2O Units	0 = ug/m3, 1 = ppb	0	Set CH2O Units	NA	{false, false, false, false} (0000) or (1100) if no relay	NORMAL (0)	NA	FALSE (0)	NA			
	BV 3	Relay Test	0 = Inactive, 1 = Test	0	Normal (0) or Test (1)	NA	{false, false, false, false} (0000) or (1100) if no sensor	NORMAL (0) or FAULT (1) if no relay	NA	FALSE (0)	NA			
	BV 4	LCD Backlight	0= Enabled 1 = Disabled	0	Enable (0) or Disable (1)	NA	{false, false, false, false} (0000)	NORMAL (0)	NA	FALSE (0)	NA			
	BV 5	CO2 ASC	0= Enabled 1 = Disabled	0	Enable (0) or Disable (1)	NA	{false, false, false, false} (0000) or (1100) if no sensor	NORMAL (0) or FAULT (1) if no sensor	NA	FALSE (0)	NA			
	BV6	CO2 Availability	0= Enabled 1 = Disabled	0	Enable (0) or Disable (1)	NA	{false, false, false, false} (0000)	NORMAL (0)	NA	FALSE (0)	NA			
	BV 7	VOC Availability	0= Enabled 1 = Disabled	0	Enable (0) or Disable (1)	NA	{false, false, false, false} (0000)	NORMAL (0)	NA	FALSE (0)	NA			
	BV8	PM Availability	0= Enabled 1 = Disabled	0	Enable (0) or Disable (1)	NA	{false, false, false, false} (0000)	NORMAL (0)	NA	FALSE (0)	NA			
	BV 9	CH2O Availability	0= Enabled 1 = Disabled	0	Enable (0) or Disable (1)	NA	{false, false, false, false} (0000) or (1100) if no relay	NORMAL (0)	NA	FALSE (0)	NA			
	BV 10	LED Availability	0= Enabled 1 = Disabled	0	Enable (0) or Disable (1)	NA	{false, false, false, false} (0000)	NORMAL (0)	NA	FALSE (0)	NA			
	BV 11	Status Bars Availability	0= Enabled 1 = Disabled	0	Enable (0) or Disable (1)	NA	{false, false, false, false} (0000)	NORMAL (0)	NA	FALSE (0)	NA			
	BV 12	Touch Screen Availability	0= Enabled 1 = Disabled	0	Enable (0) or Disable (1)	NA	{false, false, false, false} (0000)	NORMAL (0)	NA	FALSE (0)	NA			
Binary Input	BI 1	Relay Status	0 = Normal, 1 = Alarm	Current Reading	Normal (0) or Alarm (1)	NA	{false, false, false, false} (0000) or (1100) if no relay	NORMAL (0) or FAULT (1) if no relay	NA	FALSE (0)	NA			

 Copyright © Greystone Energy Systems, Inc. All Rights Reserved

AKRIBIS · www.akribis.info · contacto@akribis.info

Object Type (BACnet Object Type)	Object Identifier (BACnet Object Identifier)	Object Name (Character String (32))	Notes	Present Value (Default)	Description (Character String(32))	Device Type (Character String(32))	Status Flags (BACnetStatus Flags)	Event State (BACnet EventState)	Reliability (BACnet Reliability)	Out of Service (Boolean)	Units (BACnet EngineeringUnits)	COV increment (Real)	Number of States	Property List (BACnet Array)
Multi-State Value	MSV 1	Relay Assignment	1 = VOC 2 = RH 3 = Temperature 4= CO2 5= PM_MASS, 6= PM_NUMBER 7= CH2O 0 = No Relay	3	Relay Assignment	NA	{false, false, false, false} (0000)	NORMAL (0)	NA	FALSE (0)	NA		8	
	MSV2	Set VOC Units	1 = VOCI 2 = PPB 3 = ug/m3	1	Set VOC Units	NA	{false, false, false, false} (0000) or (1100) if no sensor	NORMAL (0) or FAULT (1) if no sensor	NA	FALSE (0)	NA		3	

 Copyright © Greystone Energy Systems, Inc. All Rights Reserved

AKRIBIS · www.akribis.info · contacto@akribis.info

The BACnet Device object

Property	Default Value	Property Data Type	Access	Notes
Object Identifier	381003	BACnetObjectIdentifier(numeric)	Read / Write	Initial default number is 381003, where 381 is the vendor ID and 003 is the default network MAC address. When the MAC address is initially changed the value is updated and saved. For example, if the MAC address is set to 50 via the menu for startup, then the device instance will be set to 381050. This property is also writable via BACnet. If the Device:Object_Identifier is written to via BACnet then the MAC address is no longer appended to the vendor ID to create this value.
Object Name	MSN-001	CharacterString (32)	Read / Write	Initial string is "MSN-003" where 003 is the default network address. Can be written with a new string of maximum length of 32 characters and the value is saved. The "003" is the MAC address and is automatically changed if the MAC address is changed. Once written to via BACnet, the MAC address no longer gets appended to the value.
Object Type	DEVICE (8)	BACnetObjectType	Read	
System Status	OPERATIONAL (0)	BACnetDeviceStatus	Read	
Vendor Name	Greystone Energy Systems	CharacterString	Read	
Vendor Identifier	381	Unsigned16	Read	
Model Name	MSN	CharacterString	Read	
Firmware Revision	1	CharacterString	Read	
Application Software Version	V1.0	CharacterString	Read	
Location	150 English Drive, Moncton, NB	CharacterString (32)	Read / Write	
Description	Multi Sensor	CharacterString (32)	Read / Write	
Protocol Version	1	Unsigned	Read	
Protocol Revision	14	Unsigned	Read	
Protocol Services Supported	See Notes	BACnetServicesSupported	Read	readProperty, readPropertyMultiple, writeProperty, deviceCommunicationControl, who-Has, who-Is, subscribeCOV, subscribeCOVProperty, Binary bit string = {00000100 00001011 01000000 00000000 01100010 0}
Protocol Object Types Supported	See Notes	BACnetObjectTypesSupported	Read	Analog_Input, Analog_Value, Binary_Value, Binary_Input, Multistate_Value, Device Binary bit string = {10110100 10000000 00010000 00000000 00000000 00000000 0000000}
Object List	See Notes	BACnetArray	Read	((Device, Instance 3), (AI1..AI4), (AV1..AV7), (BV1..BV12), (BI1), (MSV1…2)
Maximum APDU Length Accepted	50, B'0000'	Unsigned	Read	
Segmentation Supported	NO_SEGMENTATION (3)	BACnetSegmentation	Read	
APDU Timeout	6,000	Unsigned	Read / Write	Value is 6,000. Can be modified from 1 to 10,000.
Number of APDU Retries	3	Unsigned	Read / Write	Value is 3. Can be modified from 1 to 10.
Max Master	127	Unsigned	Read / Write	Value is 127. Can be modified from 1 to 127.
Max Info Frames	1	Unsigned	Read	
Device Address Binding	Empty	BACnetAddressBinding	Read	
Database Revision	0	Unsigned	Read	Value is 0 to 255.
perty List		BACnetArray	Read	

 Copyright © Greystone Energy Systems, Inc. All Rights Reserved
AKRIBIS · www.akribis.info · contacto@akribis.info

BACnet Protocol Implementation Conformance Statement (PICS)

Date : March 15, 2023
Vendor Name : Greystone Energy Systems
Product Name : Multi Sensor
Product Model Number : MSN
Application Software Version : 1.0
Firmware Revision : 1.0
BACnet Protocol Revision : 14

Product Description : The Greystone Multi Sensor is a sensor with native BACnet MS/TP protocol for network communication. It measures Air Quality levels and reports values back to a building automation system (BAS).

BACnet Standardized Device Profile (Annex L) : BACnet Application Specific Controller (B-ASC)

BACnet Interoperability Building Blocks Supported (Annex K) : DS-RP-B, DS-RPM-B, DS-WP-B, DS-COV-B, DS-COVP-B, DM-DDB-B, DM-DOB-B, DM-DCC-B

Segmentation Capability: Not supported

Standard Object Types Supported

Object Type	Dynamically Creatable	Dynamically Deletable	Optional Properties Supported	Writable Properties
Device	No	No	Location, Description,	Object_Identifier, Object_Name, Location,
			Max_Master,	Description, APDU_Timeout, Max_Master,
			Max_Info_Frames	Number_Of_APDU_Retries
Analog Input	No	No	Description, Reliability, Device_Type,	Units
			COV_Increment	
Analog Value	No	No	Description	Present_Value
Binary Value	No	No	Description	Present_Value
Binary Input	No	No	Description, Reliability	
Multi-State Value	No	No	Description	Present_Value

Data Link Layer Options: MS/TP master (Clause 9), Baud rates: 9600, 19200, 38400, 57600, 76800, 115200

Device Address Binding : Not supported

Networking Options : None

Character Set Supported : ISO 10646 (UTF-8)

 Copyright © Greystone Energy Systems, Inc. All Rights Reserved