

Air Quality VOC Sensor

Specifications

Power, GrowNET/MODBUS	24Vdc
Max Cable Distance	100 ft
Temperature Range	-20 - 60°C (0 - 140°F)
Temperature Accuracy	±1°C typ ±2°C max
Humidity Range	0 - 100% RH (non condensing) 80% RH Max Operating
Humidity Accuracy	±3% 20-80%
Air Quality Index	0 - 500, 100 background air
Protocols Supported	GrowNET™ or MODBUS RTU



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KEEP THESE INSTRUCTIONS

This product is intended for commercial use only.

REV 07/26

Features

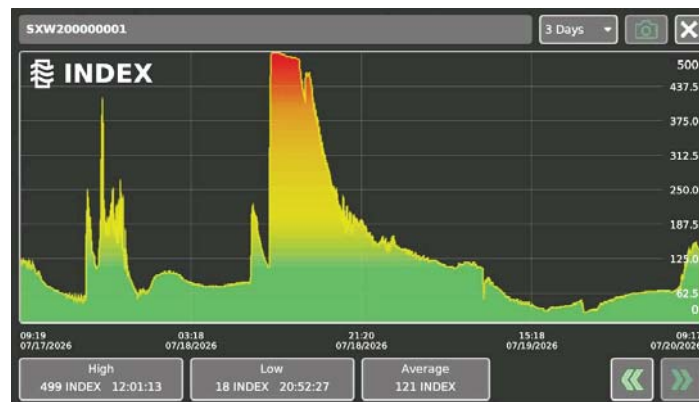
The AQ1 Air Quality Sensor monitors air quality, temperature and relative humidity in a compact, naturally ventilated package. AQ1 sensors continuously detect volatile organic compounds and report the air quality index providing a simple way to identify changing air conditions.

Air quality is reported in a range of 0 - 500 using a sliding 24-hour average where 100 represents your baseline air quality. Lower values signal improving conditions; higher values signal deteriorating conditions.



Control System Integration

When connected to a GrowControl™ GCX Cultivation Control System, the air quality readings can activate alarms, send notifications or activate exhaust systems. Data is also logged and graphed for analysis.



LED Color Indication

LED's inside the unit illuminate the enclosure to indicate the current air quality with changing colors; green for good air quality, yellow for moderate and red for poor air quality. LED's can be disabled for use in growing environments with internal button.



Warnings & Notices

Sensors are precision electronic instruments which require attention and care to maintain their accuracy and reliability. Failure to install and operate the equipment properly can cause damage, equipment failure and injury or death.

READ & UNDERSTAND ENTIRE MANUAL PRIOR TO INSTALLATION OR OPERATION.

Failure to read, understand and comply with warnings and installation requirements may result in property damage, personal injury or death.

NOTICE

Do not spray the sensor with water or chemicals. Protect sensor from direct water exposure. Always cover sensor openings when spraying chemicals or fogging.

NOTICE

Do not locate the sensor near HVAC vents, humidifiers, or dehumidifiers, lighting equipment, etc. This may result in inaccurate readings.

NOTICE

GrowNET™ ports use standard RJ-45 connections but are NOT compatible the Ethernet network equipment. *Do not connect GrowNET™ ports to Ethernet ports or network switch gear or equipment damage may result.*

WARNING

Do not drill or cut into the enclosure. Damage to the product from metallic debris or impact from the tool may result.

WARNING

This product may contain chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

Installation Instructions

The AQ1 sensor is designed for indoor use only. Follow the installation instructions to ensure the product operates correctly and is not damaged and warranty coverage is in effect.

The AQ1 sensor includes a double-sided adhesive mounting pad for easy peel & stick installation, or the back of the enclosure features two slots for screwing the sensor to a surface. Two screws and wall anchors are included with the sensor in addition to the adhesive pad.

Installation Location

Ensure that the location where the sensor is to be installed meets the following requirements:

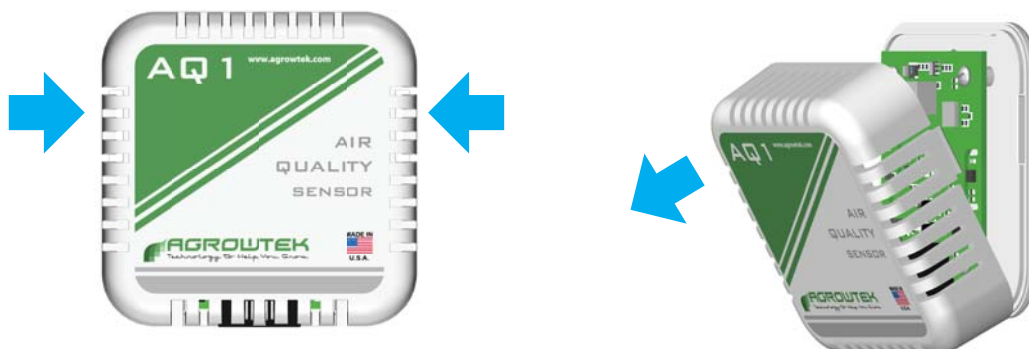
- Air must adequately circulate to the sensor and be representative of the environment; avoid corners.
- Do not install near ventilation ducts, doorways, windows, directly under lights or hot equipment.
- Do not install near misters, humidifiers, sprayers, rain or where liquids may otherwise enter the sensor.
- Install at operator height on a vertical wall surface or other location where monitoring is required.

Avoid installing the sensor with the jack facing up to prevent moisture running along the cabling into the enclosure. Do not install in areas where the sensor may come into contact with liquids or condensation.



Removing the Cover

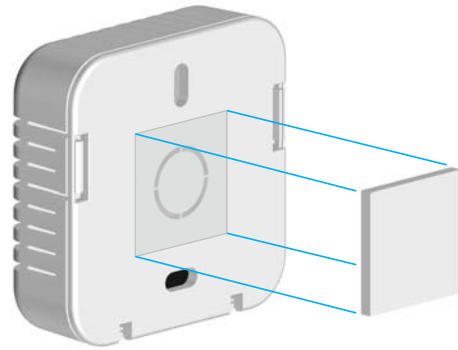
The cover is held in place with two hooks at the bottom of the base, and two latches on the sides of the cover. To remove the cover, grasp the latches on each side of the enclosure with your thumb and index finger and compress slightly to release the latches. Rotate the cover outwards along the bottom hooks until the cover releases from the base.



Adhesive Pad Mounting

For a quick and easy installation, use the double sided adhesive pad to stick the sensor to a surface.

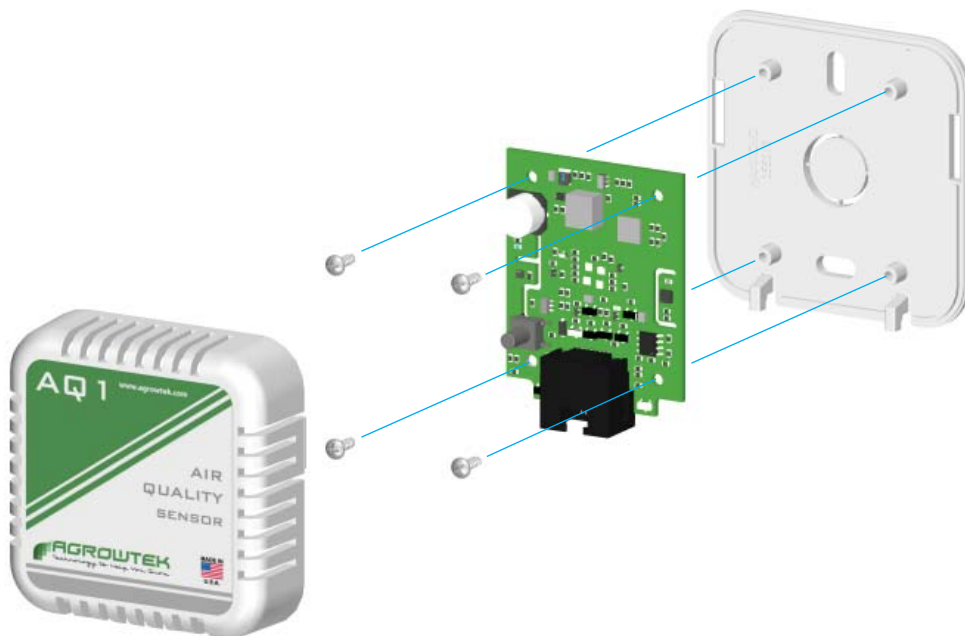
1. Remove the liner from one side of the adhesive pad.
2. Apply the pad to the center of the back of the sensor.
3. Remove the remaining liner from the pad.
4. Confirm the sensor orientation is correct.
5. Press the sensor evenly onto the surface.



Screw Mounting

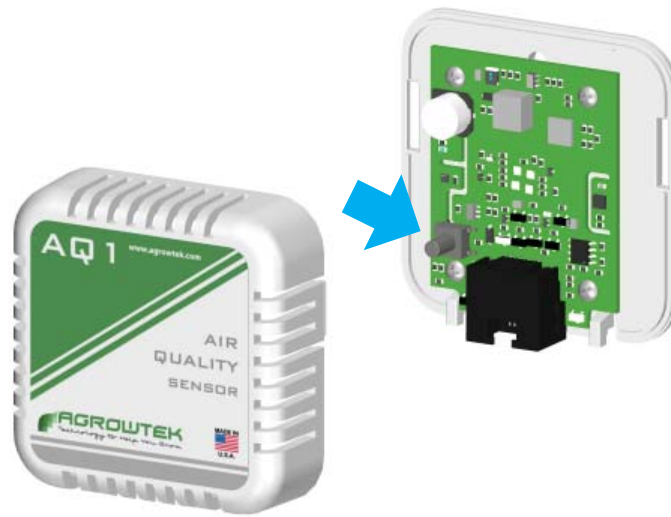
Mounting the sensor using the provided screws and wall anchors requires disassembly of the unit to access the screw holes in the base.

1. Remove the front cover.
2. Remove the four screws holding the PCB in place. Store the screws and PCB in a safe place.
3. Mark the locations of the screws using the base plate as a template.
4. If using the wall anchors, drill appropriate holes (3/16" diameter) and press anchors into the holes.
5. Screw the base into the anchors or mounting surface using the provided screws.
6. Re-install the PCB and cover.



Mode / Reset Button

The AQ1 sensor includes a mode button which is located on the circuit board; the cover must be removed to access the button.



The mode button has two functions:

LED Mode

Multi-color LED's on the circuit board illuminate and shine through the sides of the enclosure to indicate the current air quality level. The LED's can be disabled for use in growing environments and other areas where light emissions are not acceptable.

To enable or disable the LED's simply press the mode button momentarily (do not hold down.) The lights will toggle on or off each time the mode button is depressed.

Reset Device Address

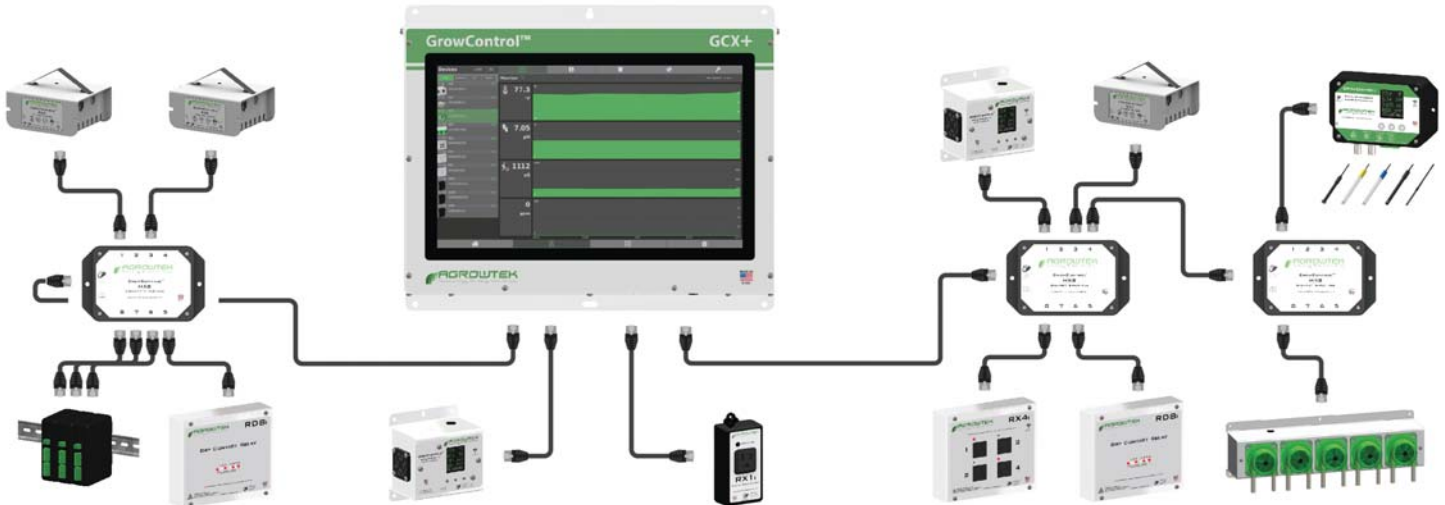
Devices retain their "device address" in memory. Any time a device is stored away and then re-used, the device address should be reset. If a device will not recognize on the system, it may have a conflicting address with another device that is in use and should be reset.

Reset the device by holding the mode button in for three seconds while the device is plugged in. The LED's will flash three times to indicate it has reset. The device should now be detected by the control system. If the device is not recognized, see the troubleshooting section.

Connection to GrowControl™ GCX

All GrowNET™ devices are connected using standard CAT5 Ethernet cable with RJ-45 connections.

Devices can be connected directly to the GrowNET™ ports on the bottom of the controller, or through HX8 GrowNET™ hubs. It is typical to simplify cabling by locating hubs centrally in hall ways and rooms allowing single runs from an 8-port device hub back to a central hub or back to the controller.



Refer to the GCX controller manual for details on adding the device to the system.

GrowNET™ Hubs

HX8 GrowNET™ hubs expand a single port into eight more ports. Hubs can be daisy-chained to form a network of up to 100 devices per GrowNET™ bus. Individually buffered port transceivers provide excellent signal integrity and extended communication strength and range.

Hubs provide up to 1A of power for operating sensors and most relays directly over the CAT5 cable. A DC jack on the hub provides 24Vdc power to the ports from the included wall power supply. A terminal block power option is also available.



Connection to USB AgrowLINK



LX1 USB AgrowLINK connects Agrowtek's devices to a computer's USB port for:

- Testing
- Firmware Updates
- Calibration
- Configuration

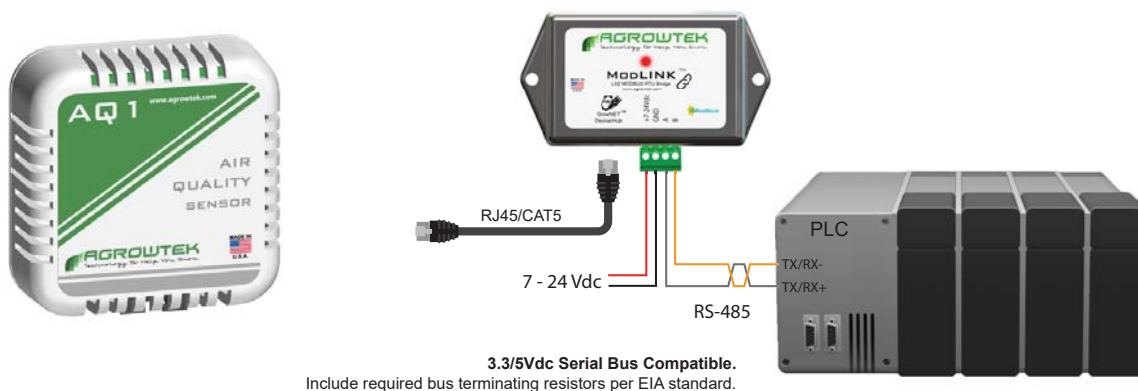
Visit www.agrowtek.com for free software applications.

Standard FTDI drivers automatically install in Windows. See software manual for more information.

Connection to MODBUS RTU

RS-485

Use the LX2 ModLINK to connect MODBUS devices to the GrowNET™ port.



HX8 GrowNET™ hubs are compatible with LX2 ModLINK™ and MODBUS. Connect multiple devices to a single LX2 and benefit from the superior buffered communication of the HX8 hub.



Supported Commands

0x03 Read Multiple Registers

0x06 Write Single Register

A request to use a function that is not available will return an illegal function exception.

Register Types

Data registers are 16 bits wide with addresses using the standard MODICON protocol. Floating point values use the standard IEEE 32-bit format occupying two contiguous 16 bit registers. ASCII values are stored with two characters (bytes) per register in hexadecimal format.

Sensor Value Registers

Sensor values are available in integer or floating point formats depending on the register requested (see map.)

Sensor #	Type	Integer Scale	Range
1	Temperature	x100	-2000 - 6000 (-20 - 60°C) / -400 - 14000 (-4 - 140°F)
2	Humidity	x10	0 - 1000 (0 - 100%)
3	Air Quality	x1	0 - 500

For example: an integer temperature value of 2417 is equal to a temperature reading of 24.17°C.

Toggle Units Register

Sensors with alternate units may toggle the units using the “toggle units” register. To toggle the units, send the sensor channel number to the toggle register. *This register is write-only.*

For example: to toggle between °F and °C, send a “1” to register 1002.

Calibration Registers

Calibration registers are 16-bit signed integers for the purpose of calibrating the sensor values or analog output channels. Calibration may be achieved by writing the desired calibrated value to the associated register. Writing to the calibration registers automatically invokes the calibration routine for that register.

Offset Calibration

Offset, or zero calibration, is an arithmetic positive or negative correction to the sensor reading and is the only type of sensor calibration available on climate/environmental sensors.

To perform a sensor offset calibration, simply write the corrected sensor value to the offset calibration register (taking into account the integer scale as shown above.)

For example: to set the temperature to a calibrated value of 25°C, write the value “2500.”

MODBUS Holding Registers

Parameter	Description	Range	Type	Access	Address
Address	Device Slave Address	1 - 247	8 bit	R/W	40001
Serial#	Device Serial Number	ASCII	8 char	R	40004
DOM	Date of Manufacture	ASCII	8 char	R	40008
HW Version	Hardware Version	ASCII	8 char	R	40012
FW Version	Firmware Version	ASCII	8 char	R	40016
Toggle Units	Toggle sensor units	1 - 4	16 bit, unsigned	W	41002
Heater Power	RH Sensor Heater	0 - 16 ⁽¹⁾	16 bit, unsigned	W	41003
Sensor Reading, Integer	Temperature	-2000 - 6000 (-20 - 60°C)	16 bit, signed	R	40101
	Humidity	0 - 1000 (0 - 100%)			40102
	Air Quality Index	0 - 500			40103
Sensor Reading, Float	Temperature	-20.00- 60.00 °C	32 bit, floating pt	R	40201
	Humidity	0 - 100.0 %			40203
	Air Quality Index	0 - 500			40205
Calibration Input, Offset (Zero)	Temperature	See INTEGER ranges above.	16 bit, signed	W	41101
	Humidity				41102
Reset to Factory Calib.	Clear Calibration	Write "1" to clear calibration.	16 bit, unsigned	W	41401

A request to read or write a register that is not available will return an illegal address error (0x02).

Note:

Sensor heater power will reset to default (0) on a power cycle. Use sensor heater to test the temperature/RH sensor, drive off condensation or recondition the RH sensor element from saturation. Use full power (16) for 24 hours to bake the sensor.

Internal algorithm operates heater as needed to maintain RH sensor stability.

Troubleshooting

Problem	Solution
Sensor is "Offline" or not reading on the control system.	Check if the fan is operating by listening or removing the filter and observing for rotation. If the fan is not operating, the PCB may not be receiving power. Check the power supply of the controller or hub that the sensor is plugged into. Check the RJ-45 connection for damage. Test the RJ-45 cable with a tester tool. If connected to an HX8 hub, ensure the hub's LED is illuminated to indicate it has power. Try an alternate hub port to ensure there is not a problem with the hub port. Try an alternate RJ-45 cable to ensure there is not a problem with the cable. Check the RJ-45 jack on the sensor; ensure there is no corrosion or missing pins.
Sensor is reporting incorrect or inaccurate values.	Ensure the sensor fan is operating and the filter is clean. See Fan Filter section for removal instructions. Reset the sensor to factory calibration and check the readings again. Ensure the sensor is not located in an area of undue influence such as below a light or near an air duct. See the sensor calibration app note for more details on checking a sensor's calibration.

Storage and Disposal

Storage

Store equipment in a clean, dry environment with ambient temperature between 10-50°C.

Disposal

This industrial control equipment may contain traces of lead or other metals and environmental contaminants and must not be discarded as unsorted municipal waste, but must be collected separately for the purpose of treatment, recovery and environmentally sound disposal. Wash hands after handling internal components or PCB's.

Warranty

Agrowtek Inc. warrants that all manufactured products are, to the best of its knowledge, free of defective material and workmanship and warrants this product for one (1) year from the date of purchase. This warranty is extended to the original purchaser from the date of purchase. Returns not purchased directly from Agrowtek Inc. must include proof of purchase date otherwise purchase date is considered as date of manufacture. This warranty does not cover damages from abuse, accidental breakage, or items that have been modified, altered, or installed in a manner other than that which is specified in the installation instructions. This warranty is applicable only to products that have been properly stored, installed, and maintained per the installation and operation manual and used for their intended purpose. This limited warranty does not cover products installed in or operated under unusual conditions or environments including, but not limited to, excessive humidity or extreme temperature conditions outside of the specified limits. Agrowtek Inc. must be contacted prior to return shipment of any returns for a return authorization. No returns will be accepted without a return authorization. Customer is responsible for return shipment to Agrowtek Inc. for warranty service. Return authorization number(s) must be printed on the outside of the box or the return may be rejected and returned to the sender. Agrowtek Inc. is not responsible for supplying replacement products or parts in advance of return(s) for warranty claim. The products which have been claimed and comply with the aforementioned restrictions shall be replaced or repaired at the sole discretion of the Agrowtek Inc. at no charge. This warranty is provided in lieu of all other warranty provisions, express or implied. It is including but not limited to any implied warranty of fitness or merchantability for a particular purpose and is limited to the Warranty Period. In no event or circumstance shall Agrowtek Inc. be liable to any third party or the claimant for damages in excess of the price paid for the product, or for any loss of use, inconvenience, commercial loss, loss of time, lost profits or savings or any other incidental, consequential or special damages arising out of the use of, or inability to use, the product. This disclaimer is made to the fullest extent allowed by law or regulation and is specifically made to specify that the liability of Agrowtek Inc. under this limited warranty, or any claimed extension thereof, shall be to replace or repair the Product or refund the price paid for the Product.