

Weather Station Sensor & Data Logger

Specifications

Power	24Vdc, ~5W
Max Cable Distance	1000ft
Aspirator	6cfm Fan with Foam Filter
Temperature Range	-20 - 60°C
Temperature Accuracy	±0.2°C typical ±0.4°C maximum
Humidity Range	0-100% RH (non condensing)
Humidity Accuracy	±2% 0-80% typical ±4% maximum
Light Irradiance Range	0 - 1000W/m2
Light Accuracy	±10%
CO2 Range (optional)	0-2,000ppm
CO2 Accuracy	±50ppm +3%
Wind Speed Range	0 - 125 mph
Wind Speed Accuracy	±1mph
Wind Direction Range	0 - 359°
Wind Angle Precision	±1°
4-20mA DAC Resolution	12 bit, 0.005mA
Interface	GrowNET, MODBUS



Shown with optional sensors and mounting kit.



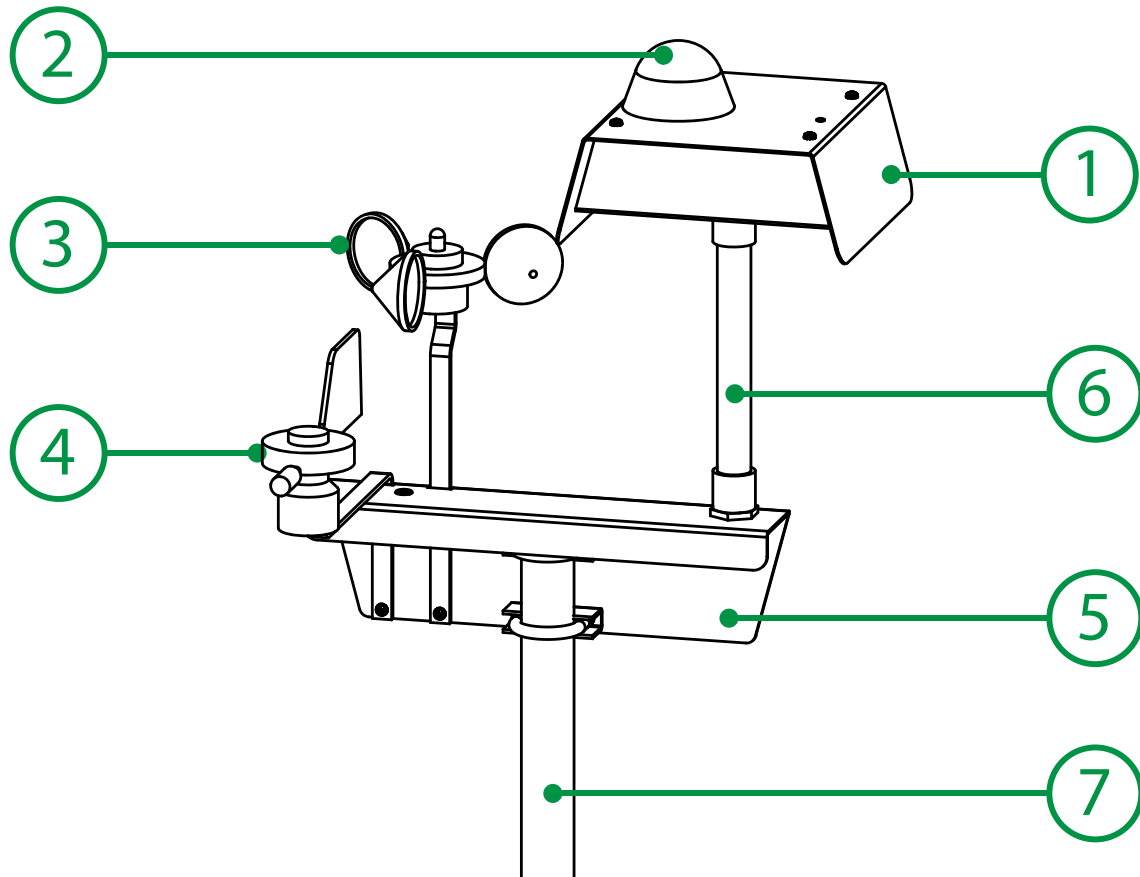
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Overview

SXW Weather sensors are designed for monitoring outdoor weather conditions in greenhouse control and other monitoring or control applications. SXW sensors feature temperature, relative humidity and light sensors standard, with options for CO₂, rain, wind speed and wind direction.

An optional mounting bracket kit allows the mounting of all sensors to a single 1" PVC or EMT conduit pole.



SXW System Components

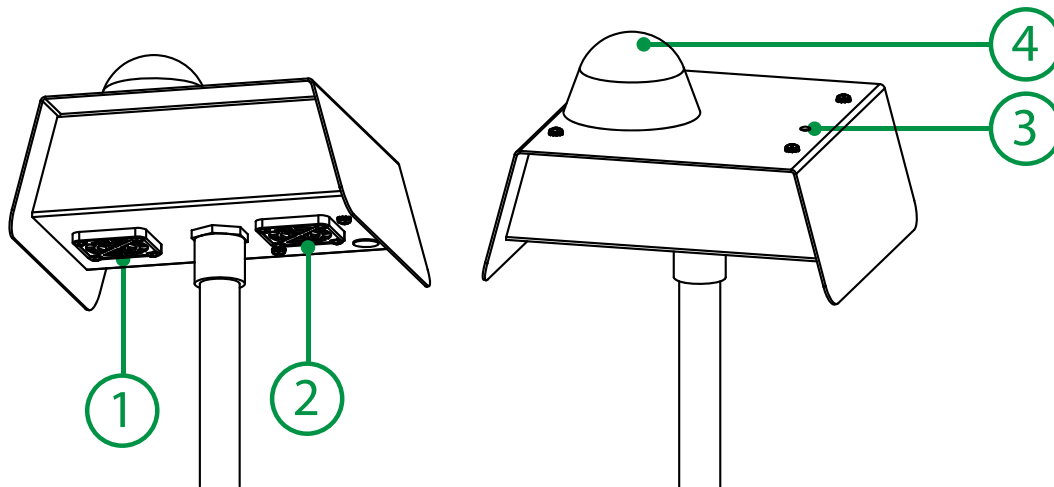
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| 1. SXW Weather Sensor | Base weather station for temperature, humidity and light. |
| 2. SXR Rain Sensor | Optical rain sensor (optional.) |
| 3. Wind Anemometer | Wind speed sensor (optional.) |
| 4. Wind Vane | Wind direction sensor (optional.) |
| 5. Mounting Bracket Kit | Stainless steel pole mounting bracket with clamps. |
| 6. PVC Conduit | 8" PVC conduit riser (included with mounting bracket kit.) |
| 7. 1" Pole | PVC or Conduit pole for mounting (provided by customer.) |

Installation Instructions

The SXW weather station is made of corrosion-resistant powder-coated aluminum enclosure and is intended for mounting outdoors on a conduit pole. A 7/8" hole is provided in the bottom of the sensor for installing a 1/2" EMT conduit fitting.

Install the sensor box in a vertical orientation with the openings facing down. The top of the box is rain proof when oriented properly.

IMPORTANT: The cover screws are stainless steel and provided with a sealing washer under the head. Do not substitute screws; contact Agrowtek for replacements.



SXW Features

1. Intake Fan
2. Exhaust Fan
3. Light Sensor
4. SXR Rain Sensor

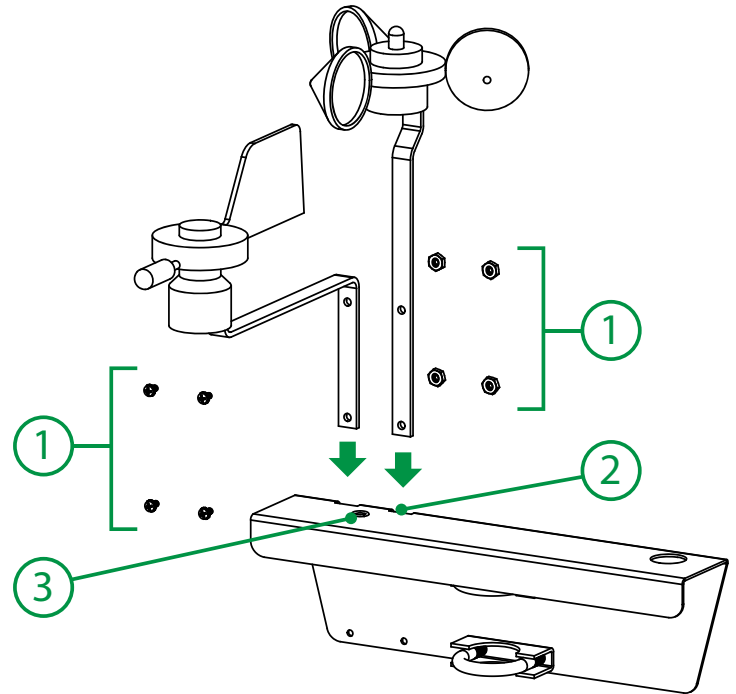
Fan and filter assembly for pushing air into the sensor enclosure.
Fan and filter assembly for pulling air out of the sensor enclosure.
Ambient light sensor.
Optical rain sensor (optional.)

Assemble Mounting Bracket

Optional stainless steel pole mounting bracket allows all weather station components to be mounted on a single pole for simple installation. It is recommended to mount the base of the pole on a hinge point so that the sensor array can be tipped down to ground elevation for service without a ladder.

Install Wind Sensors

1. Insert direction vane and anemometer brackets into slots located in the top of the bracket (2).
2. Using the provided screw and nut kit, fasten the wind sensors to the bracket through the holes in the brackets.
3. Route wires through the grommet in the top of the mounting bracket.



Install SXW Sensor

1. Remove the top cover from the SXW sensor and locate the 7/8" diameter hole in the bottom of the enclosure.

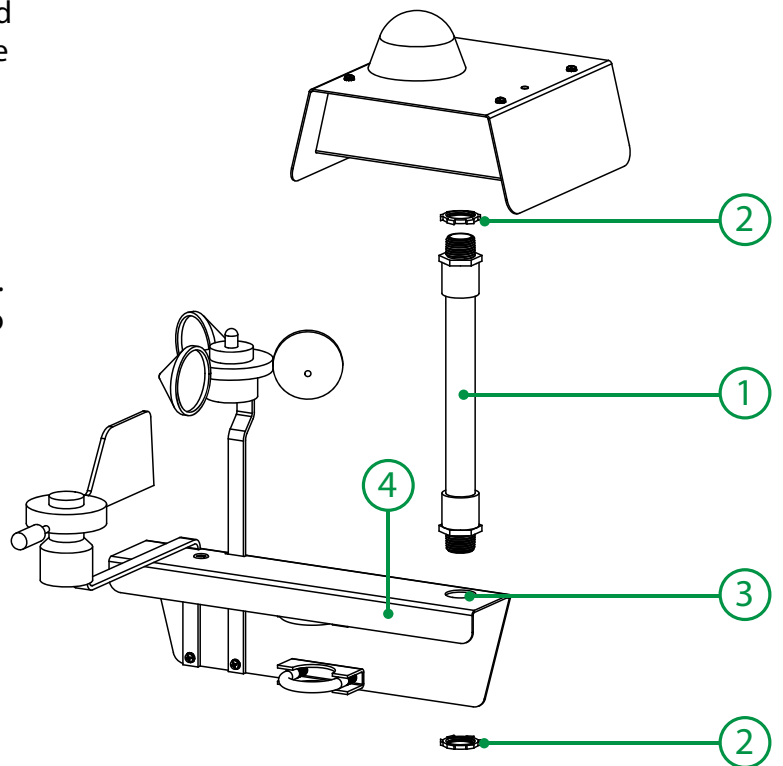
2. Assemble the stand-off pipe (1) through the hole and secure with included EMT nut (2).

Note: hand tighten nut, then turn pipe to tighten.
Note: circuit board may be removed temporarily to increase access to the nut if required.

3. Install pipe and sensor assembly into bracket mounting hole (3) and secure with EMT nut.

4. Route RJ-45 cable from sensor circuit board through stand-off pipe (1).

5. Route wind sensor cables into sensor through stand-off pipe (1). Keep cables under protective cover (4) area to shield from sun and rain.



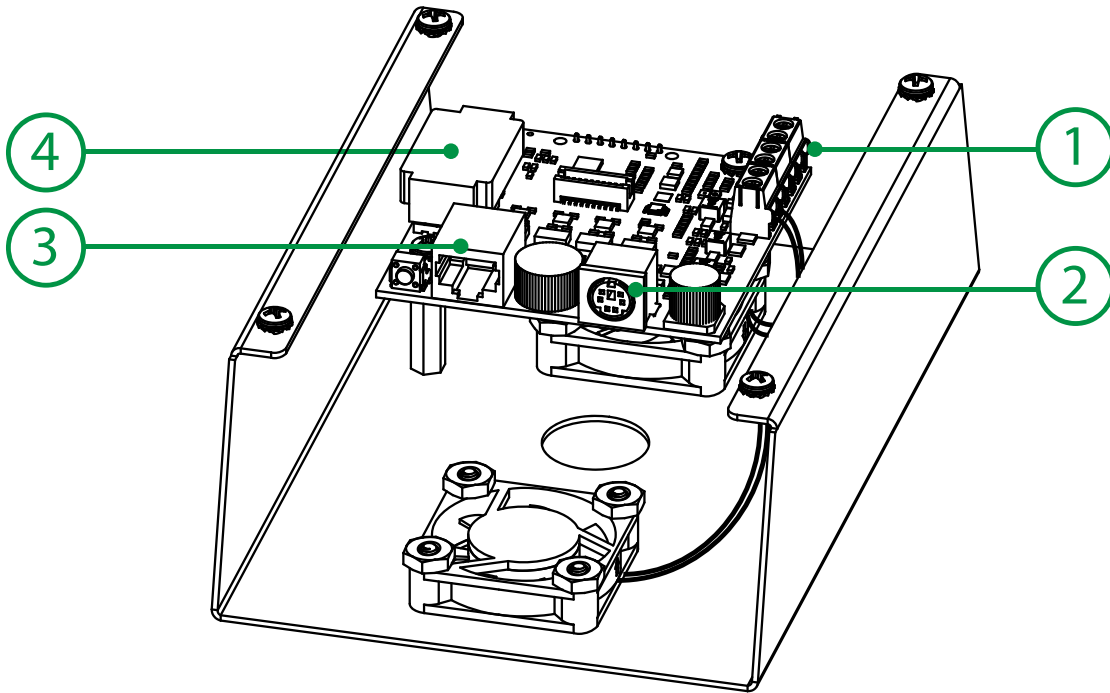
Mount on Pole

1-3/8" diameter clamps for 1" conduit or PVC pipe clamps secure with nuts on the back side of the bracket.

Route the RJ-45 GrowNET™ cable through the pole to shield it from weather.

Connecting Wind Sensors

Wind speed (anemometer) and direction vane sensors are available for connection to the weather station for collection of wind data. Wind sensors connect to the terminal blocks inside of the sensor box and are mounted externally. RJ-45 connector is provided for power & data to GrowControl™ controllers and interfaces.



Internal Components

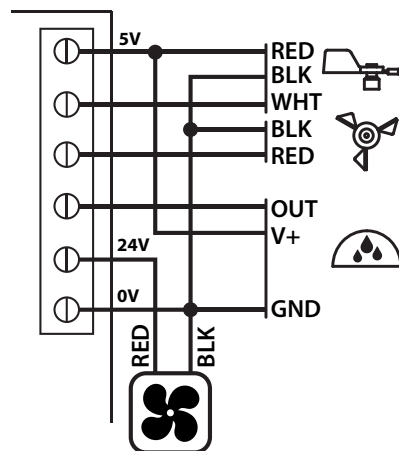
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| <ul style="list-style-type: none"> 1. Connection Terminals 2. Analog Connection 3. GrowNET™ Port 4. CO2 Sensor | <p>Terminals for connecting rain and wind sensors.
4-20mA output connection (optional, shown) or DC input jack.
RJ-45 jack for GrowNET™ power/communication.
Optional NDIR CO2 ppm sensor.</p> |
|--|--|

⚠ Do NOT connect the GrowNET™ port to Ethernet networks.

⚠ Disconnect power while making connections to prevent damage to any components.

Wire wind sensors according to the diagram below:

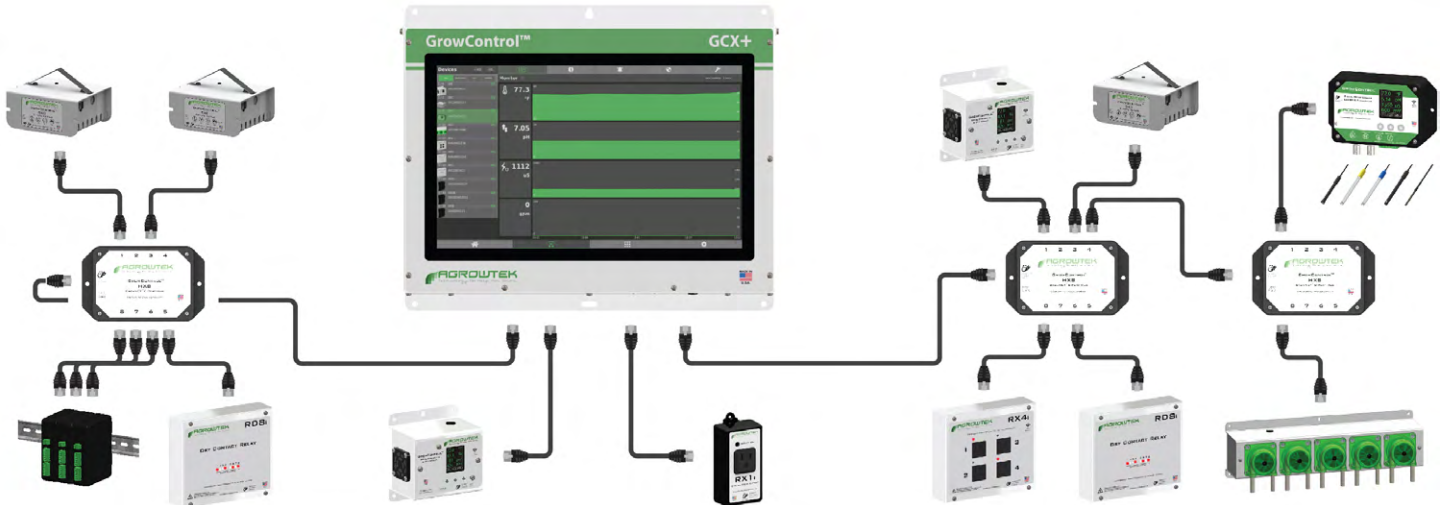
WIRING DIAGRAM



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.



Installation Notes

⚠ NOTICE

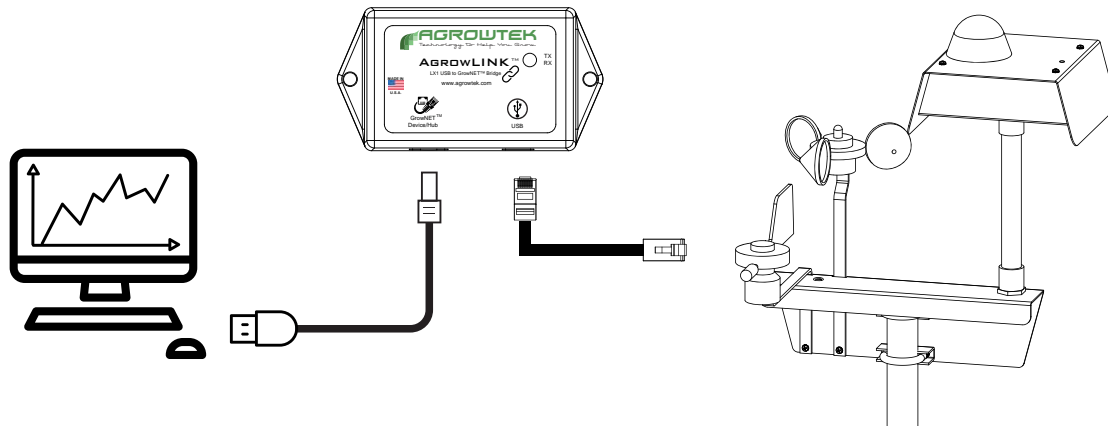
GrowNET™ ports use standard RJ-45 connections but are NOT compatible the Ethernet network equipment. *Do not connect GrowNET™ ports to Ethernet ports or network switch gear.*

⚠ DIELECTRIC GREASE

Dielectric grease is recommended on RJ-45 GrowNET™ connections when used in humid environments. Place a small amount of grease onto the RJ-45 plug contacts before inserting into the GrowNET™ port. *Non-conductive grease is designed to prevent corrosion from moisture in electrical connectors.*

- Loctite LB 8423
- Dupont Molykote 4/5
- CRC 05105 Di-Electric Grease
- Super Lube 91016 Silicone Dielectric Grease
- Other Silicone or Lithium based insulating grease

Connection to USB AgrowLINK



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

- Firmware Updates
- Calibration
- Configuration
- Data Logging Download
- More

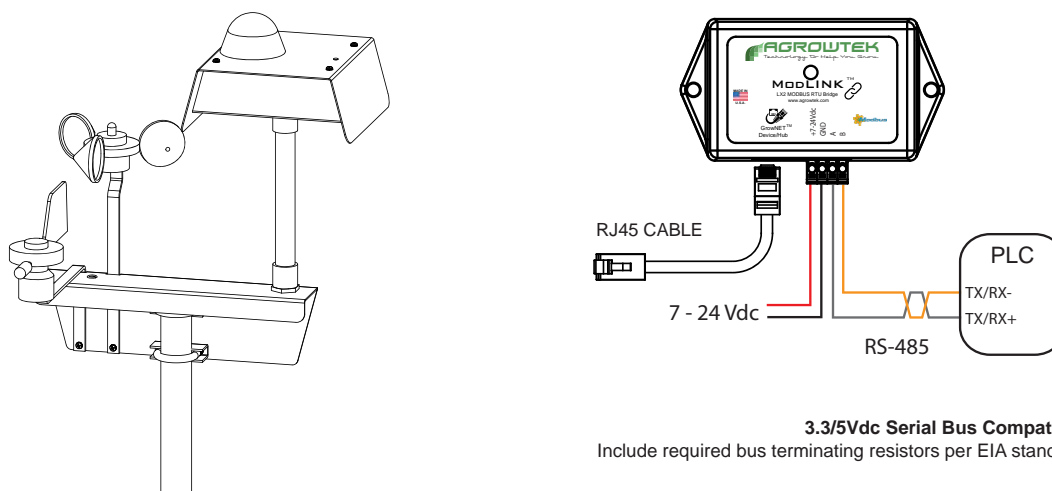
Visit www.agrowtek.com for free software applications.

Standard FTDI drivers automatically install in Windows. GrowNET protocol available for custom software applications; sample C# code available. See software manual for more information.

Connection to MODBUS RTU

RS-485

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



See *MODBUS manual* for more information.



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	Light	x1	0 - 1000 W/m ²
4	CO ₂	x1	0 - 10,000 ppm
5	Speed	x1	0 - 125mph
6	Direction	x1	0 - 359°
7	Barometric Pressure		NOT CURRENTLY AVAILABLE
8	Rain		0 - 1

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

The value "9999" is representative of a failed sensor (with the exception of CO₂ which will read 0.)

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.”

Analog Calibration (± 1 calibration bit = ± 0.005 mA adjustment)

Analog output calibration sends a positive or negative offset to the respective output channel’s digital to analog converter (DAC.) The DAC has a resolution of 0.005mA/bit.

For example: to shift the analog output up by 0.1 mA, set the analog offset value to +20. ($0.1 / 0.005 = 20$)

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
Sensor Reading, Integer	Temperature	-2000 - 6000 (-20 - 60°C)	16 bit, signed	R	40101
	Humidity	0 - 1000 (0 - 100%)			40102
	Light	0 - 1000 W/m2			40103
	CO2	0 - 10,000ppm			40104
	Speed	0 - 125mph			40105
	Direction	0 - 359°			40106
	Barometric Pressure	N/A			40107
	Rain	0 - 1			40108
Sensor Reading, Float	Temperature	-20.00- 60.00 °C	32 bit, floating pt	R	40201
	Humidity	0 - 100.0 %			40203
	Light	0 - 1000 W/m2			40205
	CO2	0 - 10,000ppm			40207
	Speed	0 - 125mph			40208
	Direction	0 - 359°			40211
	Barometric Pressure	N/A			40213
Calibration Input, Offset (Zero)	Temperature	See integer ranges above.	16 bit, signed	W	41101
	Humidity				41102
	Light				41103
	CO2				41104
	Speed				41105
	Direction				41106
	Barometric Pressure				41107
Calibration Input, Analog Output	Temperature	-255 - 255 (bits)	16 bit, signed	W	41301
	Humidity				41302
	Light				41303
	CO2				41304

A request to read or write a register that is not available will return an illegal address exception.

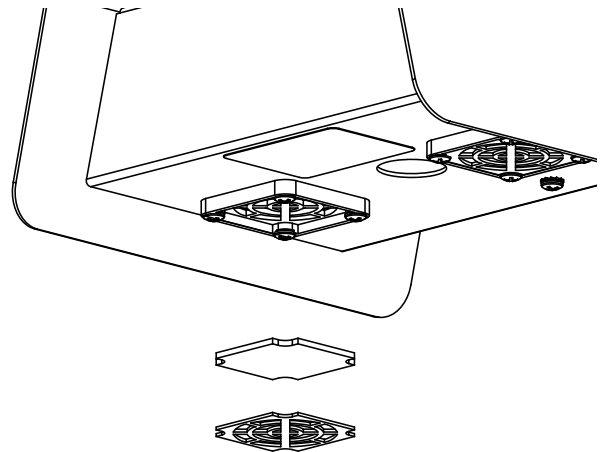
Maintenance & Service

Sensors require periodic maintenance to ensure proper performance.

Fan Filter

The fan air filter should be periodically removed for cleaning. **It is NOT necessary to remove the fan.**

1. Pry the retaining grate out using a small flat blade eye-glass screwdriver or tip of a pocket knife.
2. Remove the foam filter and replace, or clean with mild dish detergent and water, then pat dry.
3. Re-install the foam filter and grate by gently snapping the grate back into place.



CO2 ppm Sensor Upgrade

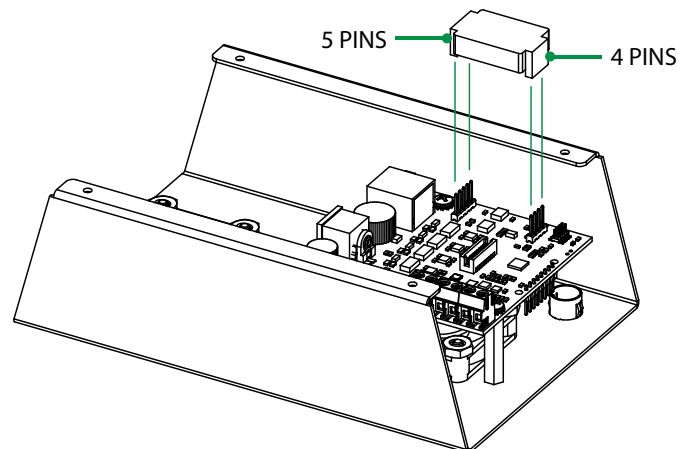
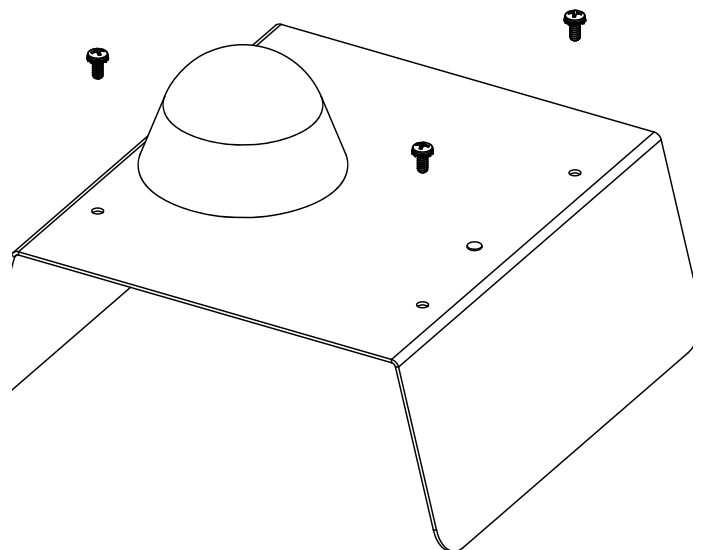
The SXW sensor may be upgraded to sense and control CO2 ppm with a precision NDIR type CO2 sensor.

1. Disconnect RJ-45 GrowNET™ and any power cables from the sensor.
2. Remove the four cover screws and lift off the cover. *Note the orientation of the light sensor on the cover.*
3. Locate the CO2 headers on the circuit board.
4. Position and install the CO2 sensor module ensuring the sensor is oriented with the correct pin headers.

One header is 4-pins and the other is 5-pins.

⚠ WARNING: *Installing the sensor backwards will damage the CO2 module.*

7. Re-install the top cover and re-connect cables.
8. Check to ensure the CO2 reading is now working.



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 1 year from the date of purchase. This warranty is extended to the original purchaser from the date of receipt. This warranty does not cover damages from abuse, accidental breakage, or units that have been modified, altered, or installed in a manner other than that which is specified in the installation instructions. Agrowtek Inc. must be contacted prior to return shipment for a return authorization. No returns will be accepted without a return authorization. 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, high humidity or high temperature conditions. 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.