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	±2°C
Humidity Range (optional)	0-100%RH (non condensing)
Humidity Accuracy	±3%
Light Irradiance Range	0 - 1000W/m2
Light Accuracy	±10%
CO2 Range (optional)	0-2000ppm
CO2 Accuracy	±100ppm
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 or WiFi

Shown with optional WiFi and wind sensors.

Contents

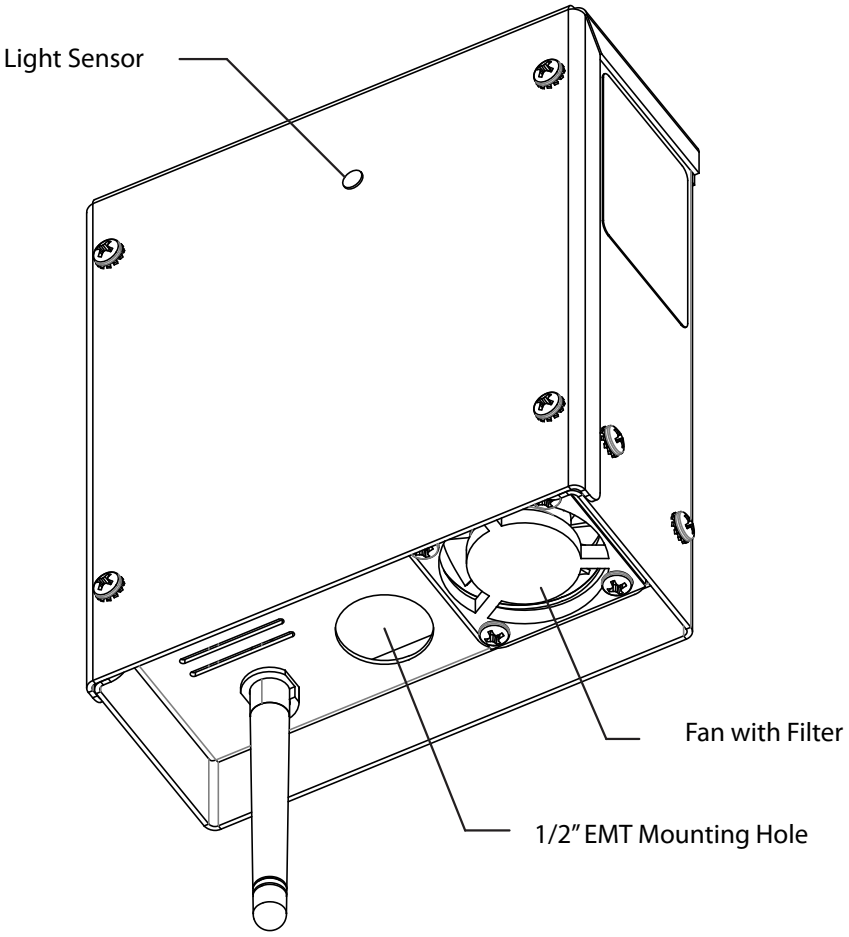
Installation Instructions

The SXW weather station is made of corrosion-proof stainless steel and is intended for mounting outdoors on a conduit pole.

A 7/8″ hole is provided in the heavy mounting plate on the bottom of the sensor for installing a 1/2″ EMT conduit fitting.

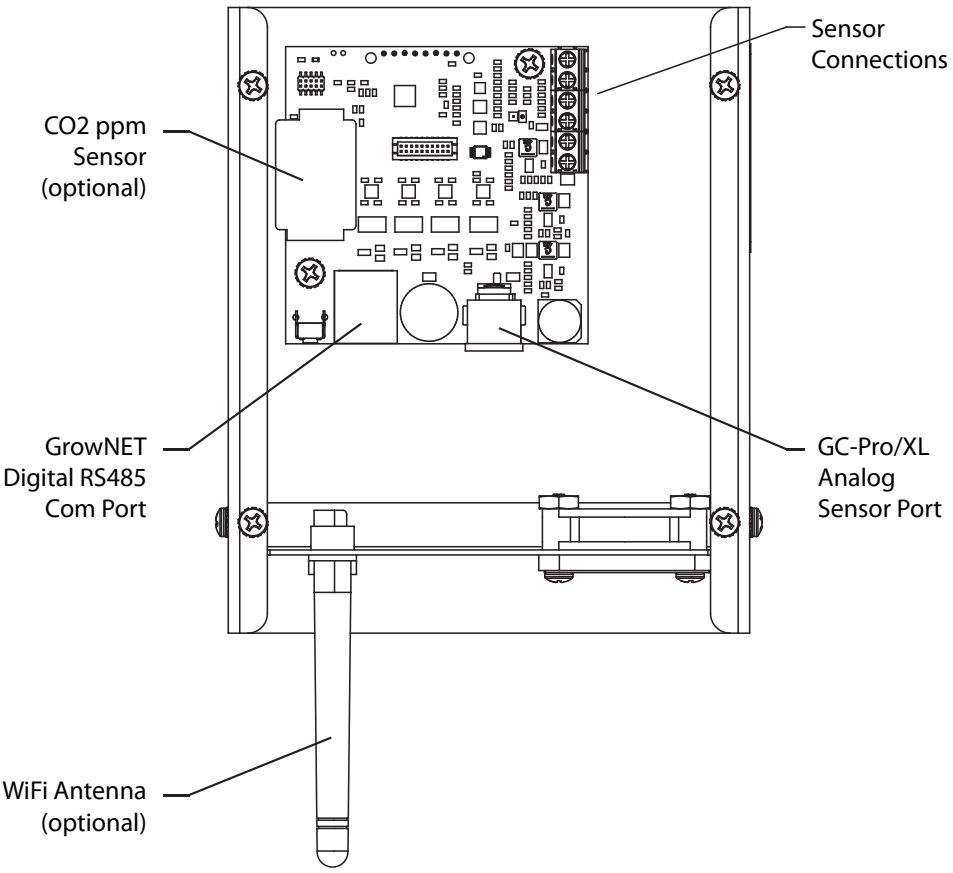
Install the sensor box in a vertical orientation with the openings facing down. The top of the box is rain proof when oriented properly. Positition the light sensor facing South for maximum light sensing accuracy.

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



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 as desired.

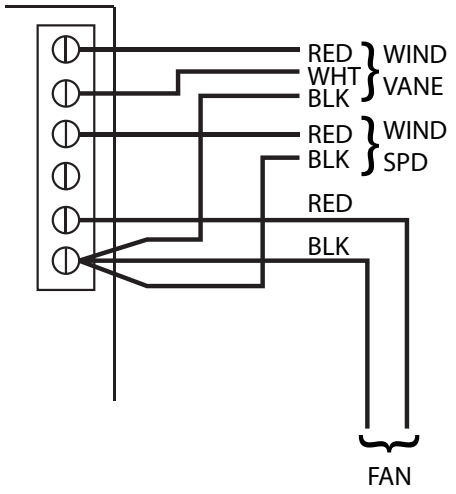


⚠ **Do NOT connect the GrowNET port to Ethernet networks.**

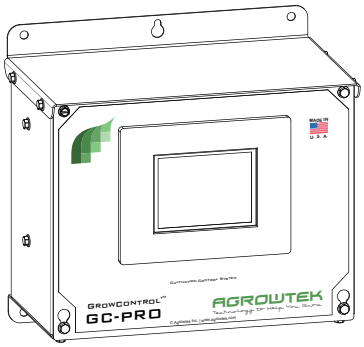
⚠ **Disconnect power while making connections to prevent damage to any components.**

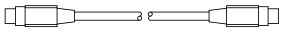
Wire wind sensors according to the diagram below:

TERMINAL BLOCK WIRING DIAGRAM

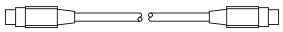


Connection to GC-Pro/XL Controller

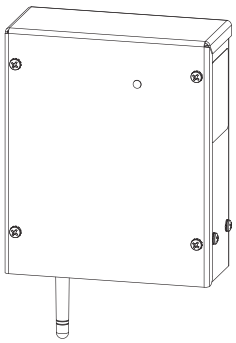




50 ft. Extension Cable(s)
(optional)



15 ft. Sensor Cable
(standard)



Sensors with analog output connect to Agrowtek's GC-Pro and GC-ProXL controllers using the standard MINI-DIN 6 analog sensor cable. Power is provided to the sensor through this cable.

Plug the cable firmly into the analog port on the sensor and into the desired sensor port inside the GC-Pro/XL controller. Sensor ports are located on "modules" inside of the controller. Route sensor cables through the sensor cable slot on the bottom of the controller.

50ft extension cables are available and may be used to extend up to 1000ft distance from the controller.

Sensor Mapping

Sensors must be "mapped" in the controller so it knows which sensors are connected to the sensor ports.

Each port has four "channels" which must be mapped according to the sensor's channels.

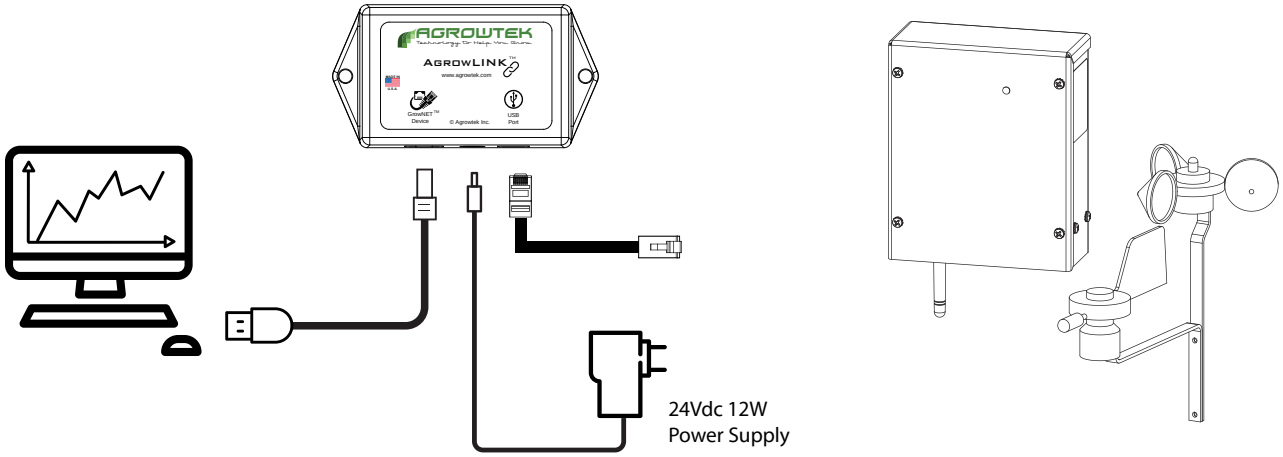
Controller Channels:
Port 1 = Channels 1-4
Port 2 = Channels 5-8
Port 3 = Channels 9-12
Port 4 = Channels 13-16

Sensor Outputs:
Output 1 = Wind Speed
Output 2 = Wind Direction
Output 3 = Temperature
Output 4 = Light

Example mapping zone 1 weather sensor connected to port#2:

Speed = 5
Direction = 6
Temperature = 7
Light = 8

Connection to USB AgrowLINK



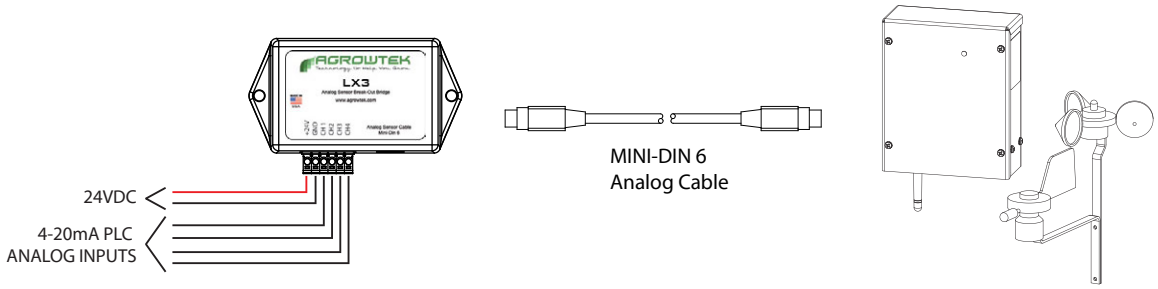
LX1 USB AgrowLINK connects Agrowtek's devices to a computer's USB port for:

- Firmware Updates
- Calibration
- Configuration
- Data Logging Download
- Live Graphing
- Email Alerts
- More

Sensor devices may be powered either by the power jack on the sensor, or by the power jack on the Agrow-LINK. These options allow a single connection to the sensor through the Ethernet cable simplifying instal-lation. Standard FTDI drivers automatically install in Windows. GrowNET protocol available for custom soft-ware applications; sample C# code available. See software manual for more information.

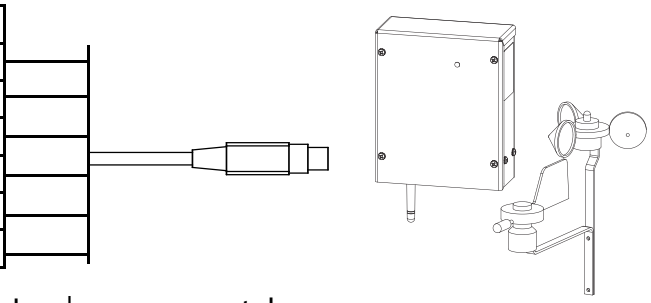
Connection to 4-20mA Outputs

Option 1: Use the LX3 Analog Bridge with Mini-Din 6 analog sensor port connection and removable terminal block for wire connections. Terminal block includes 24V power terminals and four terminals for the analog channels. 4-20mA linear outputs correspond to the ranges in the specifications table.



Option 2: Create a cable for direct connection to a PLC from a Mini-Din 6 cable.

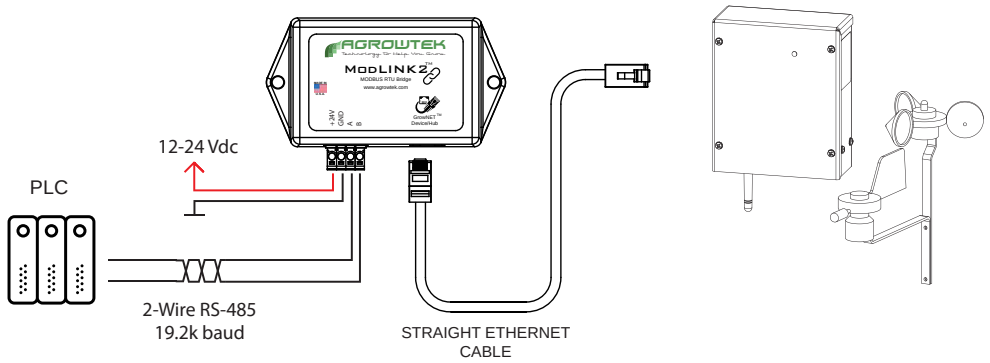
PIN	CONNECTION
1	+24VDC
2	GND
3	CH 1 (SPEED)
4	CH 2 (DIRECTION)
5	CH 3 (TEMPERATURE)
6	CH 4 (LIGHT)



Connection to MODBUS RTU

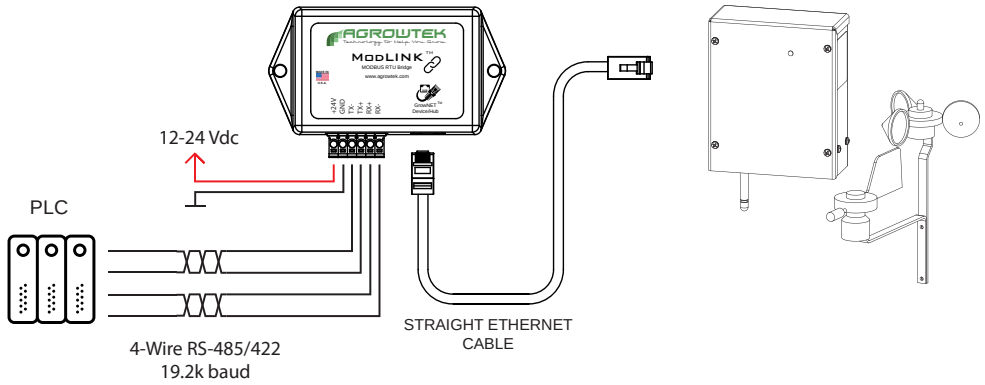
5V Half-Duplex RS-485

Use the LX2 ModLINK to connect 2-wire (half-duplex) RS-485 devices to the GrowNET port. Sensors may be powered through the Ethernet cable with 24Vdc supplied to the ModLINK's power input terminals.



5V Full-Duplex RS-422

Use the LX4 ModLINK to connect 4-wire (full-duplex) RS-422 devices to the GrowNET port. Sensors may be powered through the Ethernet cable with 24Vdc supplied to the ModLINK's power input terminals.



Serial Speed & Format

The standard serial data speeds and format for LX2 and LX4 ModLINK interfaces are detailed below.
Alternate speeds and formats are available upon request.

Baud Rate	Data Format
19,200	8-N-2

Supported Commands

0x03 Read Multiple Registers
0x06 Write Single Register
0x10 Write Multiple Register

Register Types

All 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)
2	Humidity	x10	0 - 1000 (0 - 100.0%)
3	Light	x1	0 - 1000 W/m2
4	CO2	x1	0 - 2000 ppm
5	Speed	x1	0-125mph
6	Direction	x1	0-359°
7	Barometric Pressure		
8	Rain		

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

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 arithmatic 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 regsiter (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
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.

±1 calibration bit = ±0.005mA adjustment

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

MODBUS Register Map

Parameter	Function	Type	Scale	Access	Address
Device Address	Slave Address	Value, 1-247	8 bit	R/W	40001
Serial#	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
Sensor 1 Value	Sensor output	Signed Int	16 bit	R	40101
Sensor 2 Value	Sensor output	Signed Int	16 bit	R	40102
Sensor 3 Value	Sensor output	Signed Int	16 bit	R	40103
Sensor 4 Value	Sensor output	Signed Int	16 bit	R	40104
Sensor 5 Value	Sensor output	Signed Int	16 bit	R	40105
Sensor 6 Value	Sensor output	Signed Int	16 bit	R	40106
Sensor 7 Value	Sensor output	Signed Int	16 bit	R	40107
Sensor 8 Value	Sensor output	Signed Int	16 bit	R	40108
Sensor 1 Value	Sensor output	Float	32-bit	R	40201
Sensor 2 Value	Sensor output	Float	32-bit	R	40203
Sensor 3 Value	Sensor output	Float	32-bit	R	40205
Sensor 4 Value	Sensor output	Float	32-bit	R	40207
Sensor 5 Value	Sensor output	Float	32-bit	R	40209
Sensor 6 Value	Sensor output	Float	32-bit	R	40211
Sensor 7 Value	Sensor output	Float	32-bit	R	40213
Sensor 8 Value	Sensor output	Float	32-bit	R	40215
Sensor 1 Offset Cal	Calibration Input	Signed Int	16 bit	W	41101
Sensor 2 Offset Cal	Calibration Input	Signed Int	16 bit	W	41102
Sensor 3 Offset Cal	Calibration Input	Signed Int	16 bit	W	41103
Sensor 4 Offset Cal	Calibration Input	Signed Int	16 bit	W	41104
Sensor 5 Offset Cal	Calibration Input	Signed Int	16 bit	W	41105
Sensor 6 Offset Cal	Calibration Input	Signed Int	16 bit	W	41106
Sensor 7 Offset Cal	Calibration Input	Signed Int	16 bit	W	41107
Sensor 8 Offset Cal	Calibration Input	Signed Int	16 bit	W	41108
Sensor 1 Analog Cal	Calibration Input	Signed Int	16 bit	W	41301
Sensor 2 Analog Cal	Calibration Input	Signed Int	16 bit	W	41302
Sensor 3 Analog Cal	Calibration Input	Signed Int	16 bit	W	41303
Sensor 4 Analog Cal	Calibration Input	Signed Int	16 bit	W	41304

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.