AGROWTEK SXQ Quantum Light Sensor Spectrometer


# AGROWTEK SXQ Quantum Light Sensor Spectrometer Instruction Manual



Contents



## AGROWTEK SXQ Quantum Light Sensor Spectrometer


## Product Information

### Specifications

- **Product:** AGROWtEK SXQ Quantum Light Sensor & Spectrometer
- **PPFD Data Range:** Standard PAR (400-700nm) or extended PAR (400-750nm)
- **DLI Control:** Manage daily lighting integral based on plant canopy measurements
- **Spectrometer:** Analyze light spectrum with real-time spectral intensity plotting
- **Waterproof:** Weather-proof enclosure for indoor or outdoor mounting
- **Mounting:** Stainless steel bracket for pole or vertical surface mounting
- **Cable Length:** 10ft / 3m

## Product Usage Instructions

### Installation Instructions

To install the sensor:

- Use the included stainless steel bracket for wall or pole mounting.
- For pole mounting, connect the provided EMT or PVC conduit through the hole in the bracket.
- Secure the sensor using standard conduit fitting and nut.

### Cleaning and Maintenance

Do not spray harsh chemicals on the sensor. Clean gently to avoid damage that may affect accuracy.

### Cable Connections

The sensor comes with a 10ft cable terminated with an RJ-45 plug. Use the female coupler to connect to an

extension cable or plug directly into an HX8 or GCX controller port.

**FAQ**

- **Q: Can the sensor be used outdoors?**
  A: Yes, the sensor is housed in a weather-proof enclosure for both indoor and outdoor use.
- **Q: How is the sensor mounted?**
  A: The sensor can be mounted on a pole, vertical surface, or custom bracket using the provided stainless steel bracket.

## Specifications

| | |
|---|---|
| Power, GrowNET/MODBUS | 24Vdc ,1mA |
| Max Cable Distance | 1000 ft |
| Lux, lx | 0 -500,000 Lux ±5% |
| CCT (°K) | 0-10,000 °K |
| Flicker, Hz | 0/50/60Hz |
| PPFD, umol/m2/s | ±2% Typical ±5% mAX |
| Spectral Intensity | 0 – 100% Relative |
| Communication | GrowNET™ or MODBUS RTU |

## Features

SXQ Quantum Light and Spectrum sensor provides precision data on the light quality and energy delivered to your crop in real-time. SXQ sensor detects light intensity in Lux and “ePAR” PPFD, colour temperature (°K) and relative spectral intensity in one compact package.

- **PPFD**
  Accurate digital sensors provide the same PPFD data as popular quantum light meters with calculation options for standard PAR (400-700nm) or extended PAR (400-750nm) ranges. In addition, a full spectral intensity plot is generated providing data on the composition of your light spectrum.
- **DLI**
  Control your daily lighting integral (DLI) by managing supplementary lighting and more based on accurate plant canopy measurements. Rugged design and low cost allow the sensors to be permanently mounted in the growing environment.
- **Spectrometer**
  Analyze the light spectrum reaching your plants and fine-tune your spectrum recipes with relative spectral intensity plotted in real-time.


- **Water Proof**

  Housed in a weather-proof enclosure for indoor or outdoor mounting with outdoor-rated cable. Includes a stainless steel bracket for mounting on a pole or vertical surface. Designed for standard 1/2” EMT or PVC conduit.
- **Pole Mount Bracket**

  A stainless steel bracket is included with screws to secure the sensor to a standard 1/2” EMT or PVC conduit, or to any vertical surface using the two mounting slots. Pole mounting allows the sensor to be extended into the canopy area and adjusted as the canopy height changes. The sensor cable can be conveniently run inside or along the pole.


## Dimensions

## Installation Instructions

A stainless steel bracket is included for wall or pole mounting the sensor. The bracket screws to the bottom of the SXQ sensor with the included screws. Various options are available for mounting the sensor:

**Pole Mounting**
Customer-provided EMT or PVC conduit connects through the 7/8” diameter hole in the bracket and secures with a standard conduit fitting and nut. Pole mounting allows the sensor to be mounted in the canopy. Additionally, the pole may be mounted or bent in such a way that its height and location are easily adjustable.

**Wall/Strut Mounting**
The bracket also includes two slots for mounting to a vertical surface using standard bolts or screws.

**Custom Mount**
The enclosure has holes on the back with included screws for the bracket, however, a custom bracket may be fabricated to mount the sensor in an alternative fashion.

**Installation Location Requirements:**

- Indoor or Outdoor
- Suggest shielding cable for outdoor applications.
- Ideally above the canopy approximately ~1 ft. (0.3m) on adjustable pole mount.
- Servicable location for sensor cleaning.

**Sensor Window**
It is essential to keep the sensor window clean for accurate sensor readings.

- Avoid contaminating the surface with fingerprints and dirt.
- Avoid scratching the window or label surface.
- Protect the sensor surface during installation.

Do not spray the sensor with chemicals or use harsh solvents or cleaners on the surfaces. Damage to plastics and the sensor may occur which can affect the accuracy of the sensor readings.

**Cable Connections**
The sensor is supplied with a 10ft cable terminated with an RJ-45 plug. A female coupler is included with the sensor to couple to an extension cable, or the cable may be plugged directly into an HX8 or GCX controller port. Couplings must be protected from weather. See notes regarding dielectric grease in humid environments.

Do not connect the GrowNET™ cable to Ethernet networks. Equipment damage may result.

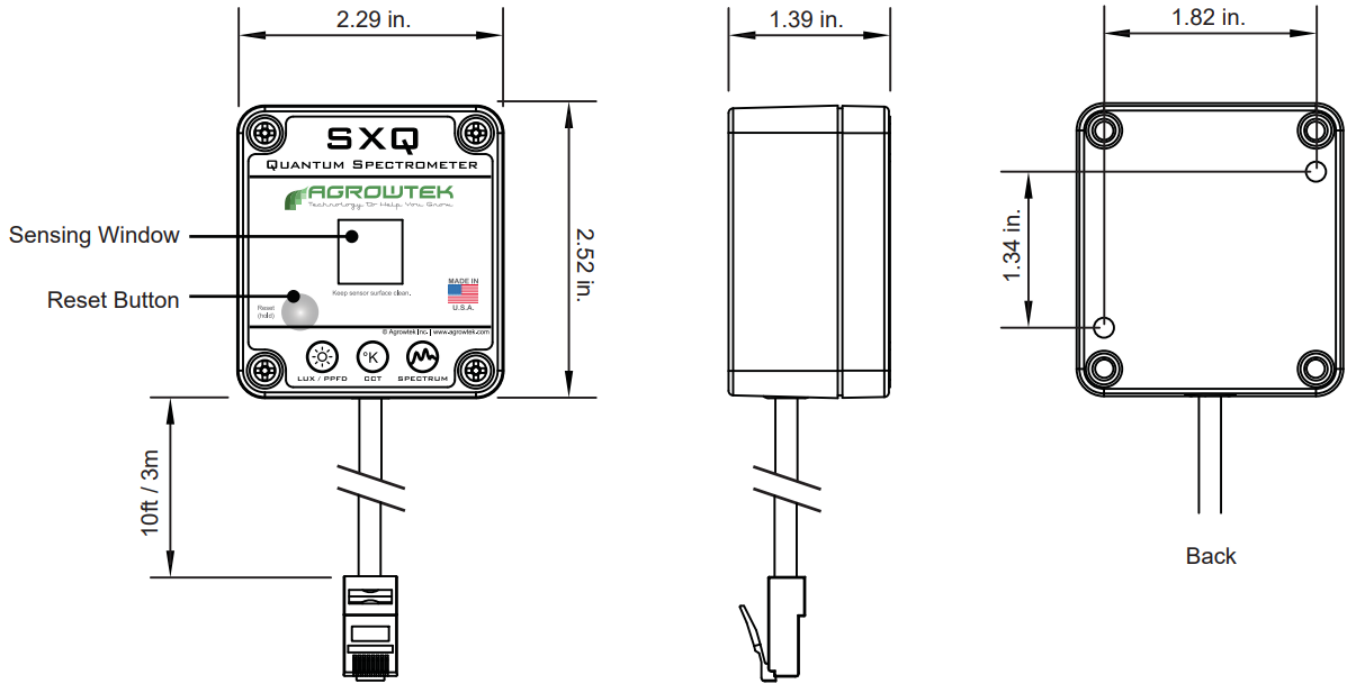
**Installation Notes**

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

## 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 hallways 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.

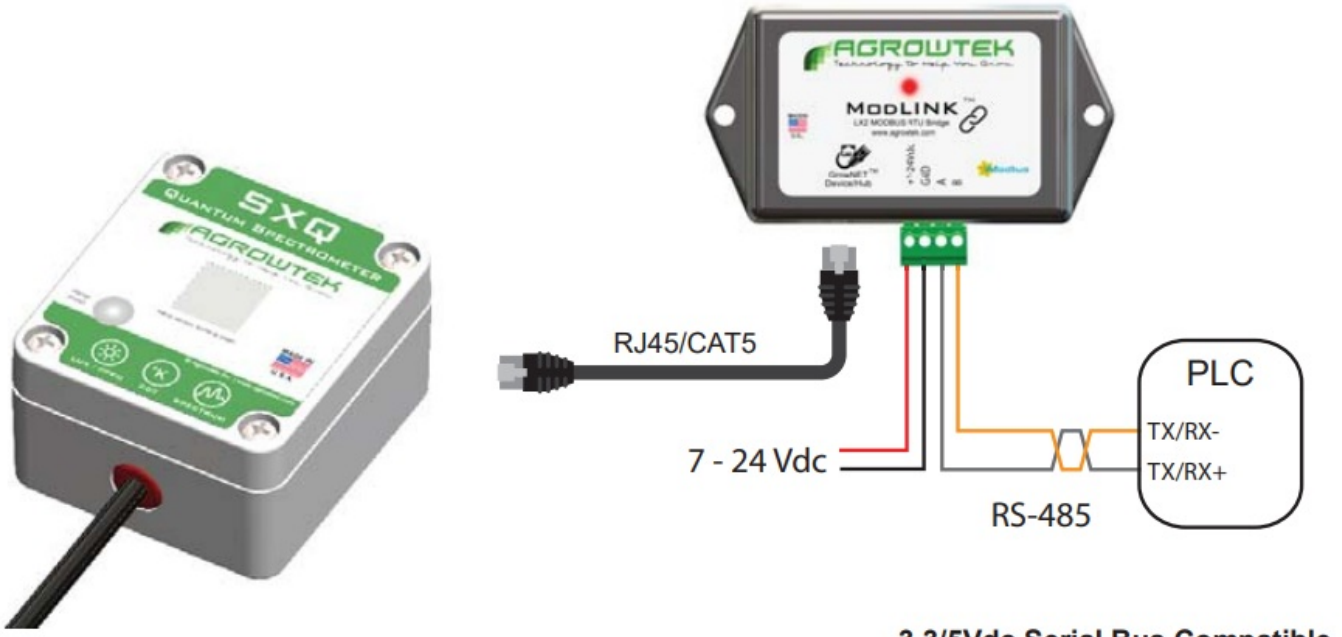
**GrowNET™ Hubs**

- 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 transcievers 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 MODBUS RTU

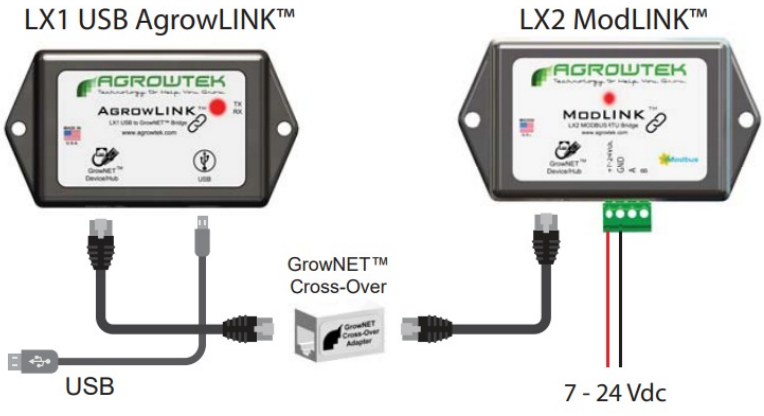
**RS-485**
Use the LX2 ModLINK to connect MODBUS devices to the GrowNET™ port.

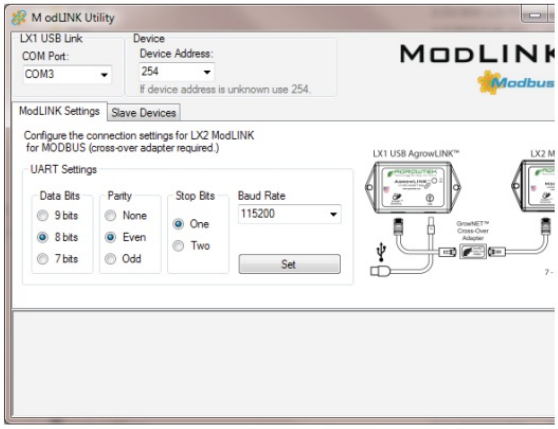



**3.3/5Vdc Serial Bus Compatible.**
Include required bus terminating resistors per EIA standard.

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.


**Serial Speed & Format**
The default serial data format for the LX2 ModLINK interface is: 19,200 baud, 8-N-1.
Alternate speeds and formats between 9,600 – 115,200 baud may be configured with the free AgrowLINK PC utility using an LX1 USB AgrowLINK and the cross-over adapter supplied with the LX2 ModLINK.




**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.

**Intensity BIN Registers**
Intensity “BIN” data is used to calculate the spectral intensity to produce a relative spectral intensity graph and to calculate the PPFD (photosythetic photon fl ux density, umol/m2/s.) The calculation is done in conju-tion with a spectral reconstruction matrix and calculations detailed in the application note available from Agrowtek Inc.

**MODBUS Holding Registers**

| Parameter | Description | Range | Type | Access | Address |
|---|---|---|---|---|---|
| Address | Device Slave Addres s | 1 – 247 | 8 bit | R/W | 40001 |
| Serial# | Device Serial Numbe r | 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 Reading, Flo at | Lux | 0 – 500,000 Lux | 32 bit, floating pt | R | 40201 |
| | CCT | 0 – 10,000 °K | | | 40203 |
| | Frequency | 0 / 50 / 60 Hz | | | 40205 |
| BIN Values, Float | F1 | | | | 40207 |
| | F2 | | | | 40209 |
| | F3 | | | | 40211 |
| | F4 | | | | 40213 |
| | F5 | | | | 40215 |
| | F6 | | | | 40217 |
| | F7 | | | | 40219 |
| | F8 | | | | 40221 |
| | F9 | | | | 40223 |
| | F10 | | | | 40225 |
| | F11 | | | | 40227 |
| | F12 | | | | 40229 |
| | F13 | | | | 40231 |

## Maintenance & Service

Sensors require periodic maintenance to ensure proper performance. Calibration is not required in the field.

### Cleaning

It is essential to keep the sensor window clean for accurate sensor readings. Avoid contaminating the surface with fingerprints and dirt. Wipe exterior and label surfaces with a damp cloth with mild dish detergent, then wipe dry. Avoid scratching the window or label surface; use a soft cloth.

- Do not use abrasive cleaners, cloths or pads or damage to the surfaces will occur.
- Do not spray the sensor with chemicals or use harsh solvents or cleaners on the surfaces. Damage to plastics and the sensor may occur which can affect accuracy of the sensor readings.

## Storage and Disposal

### Storage

Store equipment in a clean, dry environment with ambient temperature between10-50°C.

### Disposal

This indsutrial 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 that have been claimed and comply with the aforementioned restrictions shall be replaced or repaired at the sole discretion of Agrowtek Inc. at no charge. This warranty is provided in lieu of all other warranty provisions, express or implied. It includes 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.



## Documents / Resources

[AGROWTEK SXQ Quantum Light Sensor Spectrometer] [pdf] Instruction Manual
SXQ Quantum Light Sensor Spectrometer, SXQ, Quantum Light Sensor Spectrometer, Light Sensor Spectrometer, Sensor Spectrometer, Spectrometer

## References

- Agrowtek Inc. :: Grow Controls for Greenhouses, Hydroponics & Indoor Growing
- User Manual