METER SQ-521 Apogee Quantum Digital Output Full Spectrum User Manual

METER

APOGEE QUANTUM
USING APOGEE QUANTUM SENSORS WITH ZENTRA SYSTEM

Contents [hide

INTRODUCTION

The SQ-521 Full-Spectrum Quantum sensors from Apogee Instruments, Inc. are high accuracy, single-band radiometers designed for continuous measurement of photosynthetic photon flux density (PPFD) or photosynthetically active radiation (PAR) measurement in indoor or outdoor environments. The Apogee Full-Spectrum Quantum sensor has nearly equal sensitivity across the spectral range from 389–692 nm (PAR band is 400–700 nm) and is, therefore, a good choice for both above- and below-canopy measurement in outdoor environments and also for indoor environments, where artificial light sources are used.
The information in this document explains how to install the required hardware to mount Apogee SQ-521 sensors that have been preconfigured by METER Group to work seamlessly with METER ZENTRA series data loggers. Details of how the ZENTRA system handles the data are also included. Please read this document carefully in its entirety before going out to the field.
For more information on Apogee Full-Spectrum Quantum Sensor, please review the SQ-521 user manual (apogeeinstruments.com/sq-521-ss-sdi-12-digital-output-full- spectrum-Quantum-sensor).

INSTALLATION

Follow the steps listed in Table 1 to install Apogee sensors in the field. A cable, mounting bracket, leveling plate, and nylon screws are included with the sensor. Other tools will need to be provided.

Table 1 Installation

Tools Needed	**Wrench 13 mm (0.5 in)** Flathead screwdriver Mounting post 33.0 to 53.3 mm (1.3 to 2.1 in) diameter post, pole, tripod, tower, or other si milar infrastructure that extends above the canopy **Mounting bracket + leveling plate Model AL-120** Nylon screw 10-32 x 3/8 METER ZENTRA series data logger ZL6 or EM60 METER ZENTRA software ZENTRA Utility, ZENTRA Utility Mobile, or ZENTRA Cloud
Preparation	**Conduct System Check** METER strongly recommends setting up and testing the system (sensors and data logger s) in the lab or office. Inspect and verify all components are intact. Visit the data logger product page for the most up-to-date software and firmware. Verify all sensors are functional and read within expected ranges. **Consider the Surroundings** For measurement of incoming PPFD in the outdoor environment, choose a the location th at allows the hemispherical view Quantum sensor to be above the plant canopy or in a po sition where the view of the sky is unobstructed (such as a large canopy gap or forest clearing). Ensure the sensor is not shaded from nearby objects (weather stations, mounting posts, e tc.).
Mounting	**Install on Mounting Post** Use the U-bolt to mount the mounting bracket and sensor assembly (Section 2.1). The U-bolt is compatible with most meteorological stands, poles, tripods, and other mounts. Ensure the sensor is oriented so the cable points toward true North (in the Northern hemis phere) or true south (in the Southern hemisphere) to reduce azimuth error. **Secure the System** Tighten the U-bolt nuts by hand until hand-tight, and then tighten with a wrench. **CAUTION:** Do not overtighten U-bolt. Adjust the three machine screws on the leveling plate until the integrated bubble level indi cates that the sensor is level **Secure and Protect Cables** **NOTE:** Improperly protected cables can lead to severed cables or disconnected sensors. Cabling issues can be caused by many factors such as rodent damage, driving over sens or cables, tripping over cables, not leaving enough cable slack during installation or poor s ensor wiring connections. Install cables in conduit or plastic cladding when near the ground to avoid rodent damage. Gather and secure cables between the sensors and the data logger to the mounting post i n one or more places to ensure cable weight does not pull the plug free from its port. **Connect to Data Logger** Plug the sensor into a data logger. Use the data logger to make sure the sensor is reading properly. Verify these readings are within expected ranges. For more instructions on connecting to data loggers, refer to Section 2.2.

SET UP MOUNTING ASSEMBLY

Apogee Quantum sensors must be level to accurately measure PPFD incidents on a horizontal surface. Each

Apogee Quantum sensor purchased from METER comes with an AL-120 Solar Mounting Bracket with Leveling Plate. The AL-120 can be mounted to either a horizontal or vertical post, depending on which set of holes is used.

1. Align the cable M8 connector with the sensor M8 connector and seat connectors fully.
2. Tighten the cable screw to maximum hand-tight (Figure 1).

   M8 connectors are easy to overtighten. Do not use pliers or other tools to tighten this connector.

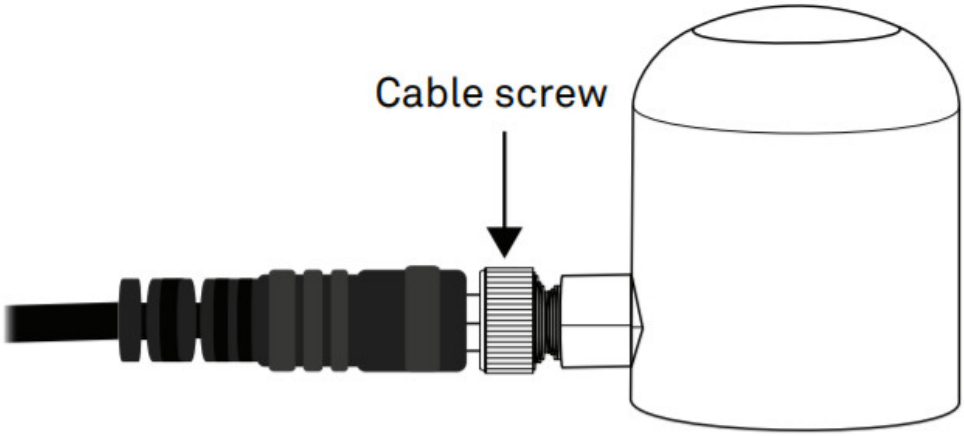

Figure 1 Attach M8 connector

3. Mount the sensor to the leveling plate (Figure 2) with the included nylon screw.

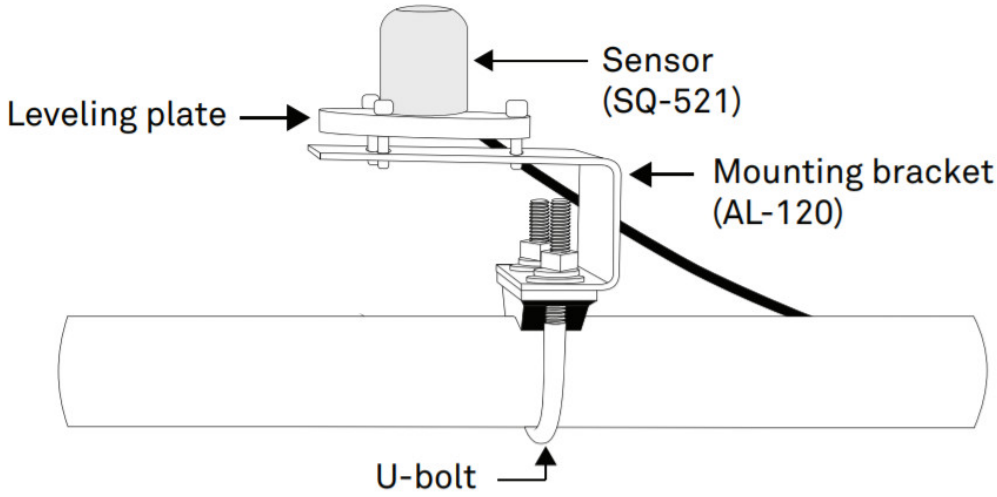

Figure 2 Apogee Quantum sensor mounting assembly

4. Attach the leveling plate to the mounting bracket using the three machine screws included.
5. Attach the mounting bracket either to a horizontal arm (Figure 2) or vertical post using the included U-bolt.

CONNECT TO METER ZENTRA SERIES LOGGER

Apogee Quantum sensors are preconfigured by METER and work seamlessly with METER ZENTRA series data loggers. The sensors come with a 3.5-mm stereo plug connector (Figure 3) to facilitate easy connection with the data loggers. Apogee sensors come standard with a 5-m cable.

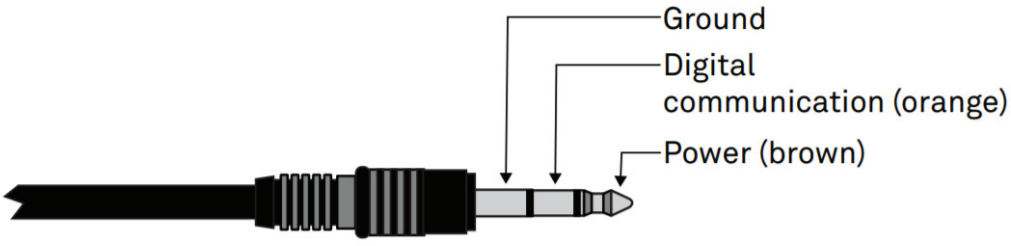

Figure 3 3.5-mm stereo plug connector wiring

Check the METER download webpage for the most recent data logger firmware. Logger configuration may be done using either ZENTRA Utility (desktop and mobile application) or ZENTRA Cloud (web-based application for cell-enabled ZENTRA data loggers).

1. Plug the stereo plug connector into one of the sensor ports on the logger (Figure 4).

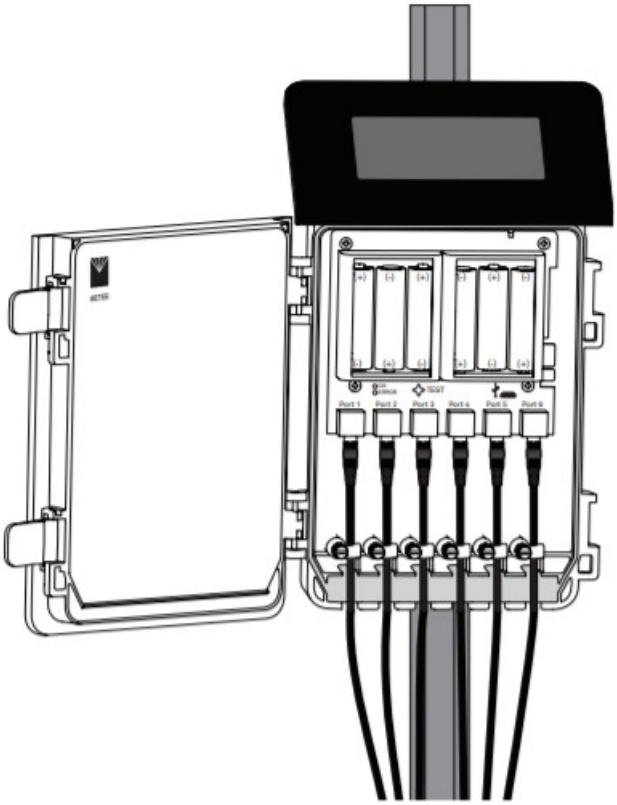

Figure 4 Logger connection

2. Connect to the data logger via ZENTRA Utility with a laptop and USB cable or ZENTRA Utility Mobile app with a mobile device supporting Bluetooth ® communication.
3. Use ZENTRA Utility to scan the ports and make sure the sensors were properly identified by the logger and are reading properly.
   METER data loggers should automatically recognize the Apogee sensor.
4. Use ZENTRA Utility to set the measurement interval.
5. Use ZENTRA Utility to configure communication settings for data transfer to ZENTRA Cloud.

Sensor data can be downloaded from METER data loggers using either ZENTRA Utility or ZENTRA Cloud. Refer to the logger user manual for more information.

DATA INTERPRETATION

Apogee Quantum sensors used with the ZENTRA system report PPFD in units of micromoles per square meter per second. Additionally, the sensor orientation information is provided in the metadata tab of ZENTRA Cloud and ZENTRA Utility Microsoft ® Excel ® file downloads. Sensor orientation is reported as the zenith angle in units of degrees, with a zenith angle of 0° indicating a sensor oriented straight up.

TROUBLESHOOTING

This troubleshooting section details possible major problems and their solutions. If the problem is not listed or these solutions do not solve the issue, contact Customer Support.

Table 2 Troubleshooting

Problem	Possible Solution
Sensor not responding	Check power to the sensor and logger. Check sensor cable and stereo plug connector integrity. Check that the SDI-12 address of the sensor is 0 (factory default).Check this with Z ENTRA Utility by going to Actions, selecting Digital sensor terminal, choosing the po rt that sensor is on, and sending the ?I! command to the sensor from the dropdown menu.
Sensor values are not r easonable	Verify the sensor is not shaded. Verify the angle of sensors.
Cable or stereo plug co nnector failure	If the stereo plug connector is damaged or needs to be replaced, contact Customer Support for a replacement connector or splice kit. If a cable is damaged refer to the METER wire-splicing guide for cable repair.

It is recommended that Apogee Quantum sensors are returned for factory recalibration every 2 years. Visit Apogee repairs (**apogeeinstruments.com/recalibration-and-repairs**) or contact Apogee Technical Support (**techsupport@apogeeinstruments.com**) for details.

CUSTOMER SUPPORT

NORTH AMERICA
Customer support representatives are available for questions, problems, or feedback
Monday through Friday, 7:00 am to 5:00 pm Pacific time.
Email: support.**environment@metergroup.com**
sales.environment@metergroup.com
Phone: +1.509.332.5600
Fax: +1.509.332.5158
Website: **metergroup.com**
EUROPE
Customer support representatives are available for questions, problems, or feedback Monday through Friday, 8:00 to 17:00 Central European time.
Email: **support.europe@metergroup.com**
sales.europe@metergroup.com
Phone: +49 89 12 66 52 0
Fax: +49 89 12 66 52 20
Website: **metergroup.de**
If contacting METER by email, please include the following information:
Name…..
Address……
Phone…….
Email address……
Instrument serial number…….
Description of the problem……..

METER Group, Inc. USA
2365 NE Hopkins Court Pullman, WA 99163
T: +1.509.332.2756 F: +1.509.332.5158
E: **info@metergroup.com** W: **metergroup.com**
METER Group AG
Mettlacher Straße 8, 81379 München
T: +49 89 1266520 F: +49 89 12665220
E: **info.europe@metergroup.com** W: **metergroup.de**

Documents / Resources

	**METER SQ-521 Apogee Quantum Digital Output Full Spectrum** [pdf] User Manual SQ-521, Apogee Quantum Digital Output Full Spectrum, Digital Output Full Spectrum, Output Full Spectrum, Full Spectrum, Apogee Quantum

References

- Recalibration and Repair | Apogee Instruments
- Home of METER | METER Group, Inc. USA
- Home of METER | METER Group, Inc. USA