

# LI-COR Underwater PAR Sensors

LI-192  
LI-193

## Sensor Interface Manual



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## Overview

The LI-192 Underwater Quantum sensor uses cosine correction according to Lambert's cosine law to measure photosynthetically active radiation (PAR) in freshwater or marine environments.

The LI-193 Underwater Spherical Quantum Sensor gives an added dimension to underwater PAR measurements, as it measures photon flux from all directions. This measurement is referred to as Photosynthetic Photon Flux Fluence Rate (PPFFR) or Quantum Scalar Irradiance. This is important, for example, when studying phytoplankton, which utilize radiation from all directions for photosynthesis.



**Figure 1:** LI-COR LI-193 (left) underwater spherical quantum sensor and LI-192 (right) underwater quantum sensor

## Installation

It is recommended that the LI-COR 2009S lowering frame be used to deploy LI-COR underwater PAR sensors. The frame is designed to accommodate two LI-192 sensors, typically used to measure upwelling and downwelling radiation simultaneously, or a single underwater spherical sensor. All LI-COR underwater PAR sensors include three 6-32 mounting holes for connection to integral mounting rings on the lowering frame.

### **NOTE**

**Underwater PAR sensors are not designed for continuous, long-term deployment.**

Underwater PAR sensors are not designed for continuous, long-term deployment. Sensor output degradation due to the effects of internal humidity will occur over time during long-term deployment.

Other factors such as mineral content, salinity, and turbidity may promote algae growth and affect the function of the light collecting diffuser, effectively degrading sensor performance.

## Connecting to an iSIC Data Logger

To wire the sensor into the iSIC, route the cable and wires through a gland fitting installed in the enclosure, and then unplug the green terminal strip from the data logger before securing individual wires according to the wiring diagram below. Avoid clamping on wire insulation.



**Figure 2:** Unplug the green terminal strip from the data logger before wiring the sensor

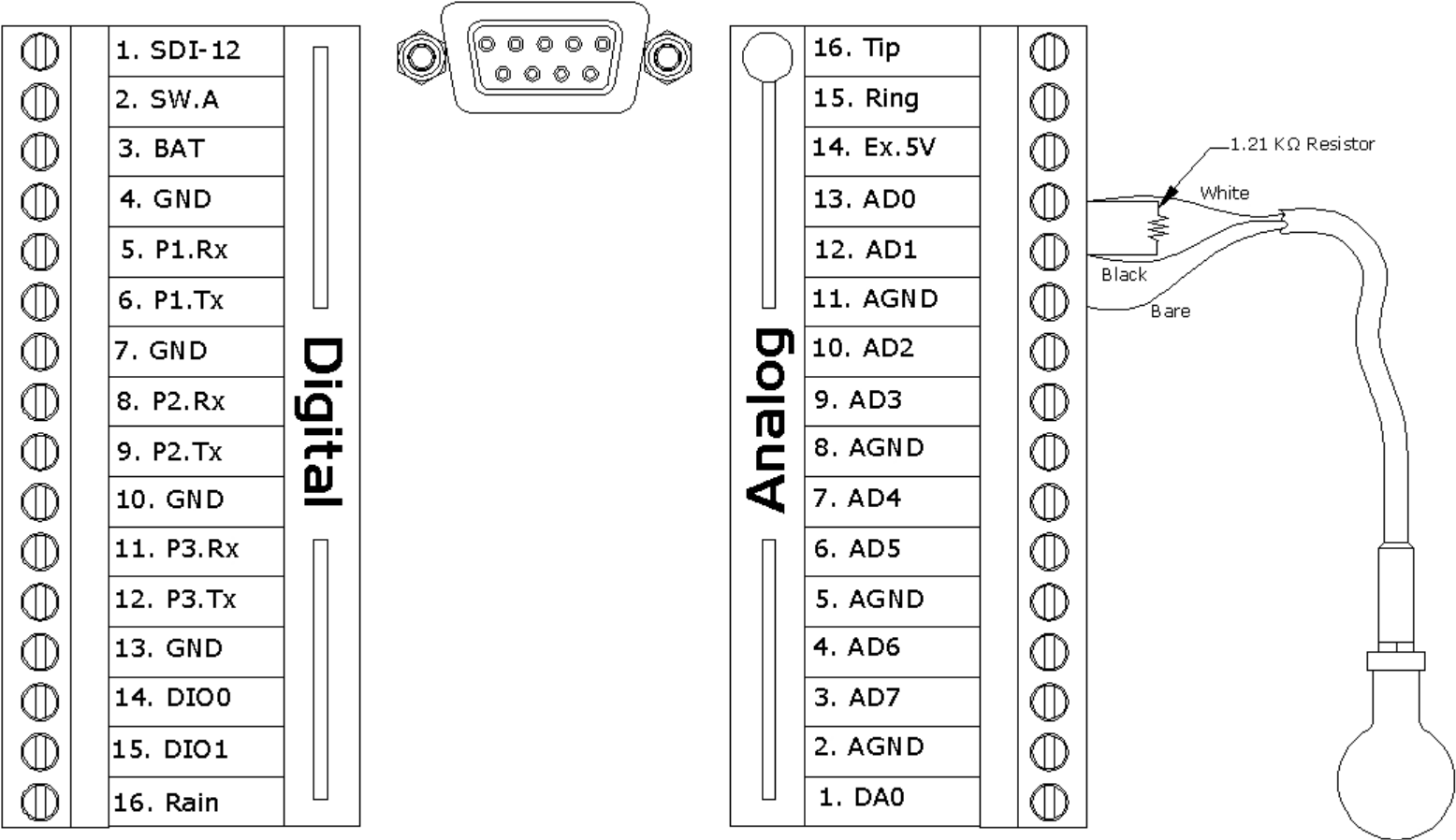


Figure 3: Physical wiring of an LI-193 spherical underwater PAR sensor (wiring of LI-192 is equivalent)

**Table 1:** Table for wiring a LI-COR Li-192 or LI-193 underwater PAR sensor to an iSIC data logger

Digital		Analog	
<b>1. SDI-12</b>	NC	<b>16. Tip</b>	NC
<b>2. SW.A</b>	NC	<b>15. Ring</b>	NC
<b>3. BAT</b>	NC	<b>14. Ex.5V</b>	NC
<b>4. GND</b>	NC	<b>13. AD0</b>	White (Positive) Resistor (1.21 K $\Omega$ )
<b>5. P1.Rx</b>	NC	<b>12. AD1</b>	Black (Negative) Resistor (1.21 K $\Omega$ )
<b>6. P1.Tx</b>	NC	<b>11. AGND</b>	Bare (Shield)
<b>7. GND</b>	NC	<b>10. AD2</b>	NC
<b>8. P2.Rx</b>	NC	<b>9. AD3</b>	NC
<b>9. P2.Tx</b>	NC	<b>8. AGND</b>	NC
<b>10. GND</b>	NC	<b>7. AD4</b>	NC
<b>11. P3.Rx</b>	NC	<b>6. AD5</b>	NC
<b>12. P3.Tx</b>	NC	<b>5. AGND</b>	NC
<b>13. GND</b>	NC	<b>4. AD6</b>	NC
<b>14. DIO0</b>	NC	<b>3. AD7</b>	NC
<b>15. DIO1</b>	NC	<b>2. AGND</b>	NC
<b>16. Rain</b>	NC	<b>1. DA0</b>	NC

**Notes:**

- A 1210  $\Omega$  resistor must be used with the LI-COR LI-192 and LI-193 underwater PAR sensors.

## Computer Interface

iChart software is used to set up the iSIC data logger, as well as to acquire and process data.

Launch the software and select **File | New Project**. Follow the Setup Device Wizard to create a project file. Additional information is available in the iChart manual.



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