



<i>Title:</i> NEON Sensor Command, Control and Configuration (C3) Document: Quantum Line Sensor		<i>Date:</i> 05/16/2022
<i>NEON Doc. #:</i> NEON.DOC.000603	<i>Author:</i> N. Pingintha-Durden	<i>Revision:</i> B

## NEON SENSOR COMMAND, CONTROL AND CONFIGURATION (C3) DOCUMENT: QUANTUM LINE SENSOR

PREPARED BY	ORGANIZATION	DATE
Natchaya Pingintha-Durden	FIU	05/28/2013

APPROVALS	ORGANIZATION	APPROVAL DATE
Kate Thibault	SCI	05/16/2022

RELEASED BY	ORGANIZATION	RELEASE DATE
Tanisha Waters	CM	05/16/2022

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## Change Record

REVISION	DATE	ECO #	DESCRIPTION OF CHANGE
A	05/28/2013	ECO-00770	Initial Release
B	05/16/2022	ECO-06818	<ul style="list-style-type: none"><li>Revised logo and fine print</li></ul>



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## **1 DESCRIPTION**

### **1.1 Purpose**

This document specifies the command, control, and configuration details for operating the LI-191SL Quantum Line Sensors. It includes a detailed discussion of all necessary requirements for operational control parameters, conditions/constraints, set points, and any necessary error handling. All Level 0 Data Products generated by the sensor are identified. Raw data from the sensor are acquired by the DAS, but received at HQ for further processing as a L0 unfiltered and uncorrected data products until its associated algorithms are applied to produce a QA/QC-d L1 data product in Standard Scientific Units.

### **1.2 Scope**

The LI-191SL Quantum Line Sensor (NEON P/N: 0300300000) will be deployed in the soil array to measure photosynthetically active radiation averaged over its one meter length. The LI-191SL is fixed with a millivolt adapter containing a 604 ohm resistor to provide a standardized millivolt output (RD [03]). There is no firmware required for this sensor.

This document specifies the command, control, and configuration that is needed for operating this sensor. It does not provide implementation details, except for cases where these stem directly from the sensor conditions as described here.



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## 2 RELATED DOCUMENTS AND ACRONYMS

### 2.1 Applicable Documents

AD [01]	NEON.DOC.000001	NEON Observatory Design (NOD) Requirements
AD [02]	NEON.DOC.000291	NEON Configured Sensor List
AD [03]	NEON.DOC.005003	NEON Scientific Data Products Catalog
AD [04]	NEON.DOC.005005	NEON Level 0 Data Products Catalog
AD [05]	NEON.DOC.000254	NEON Data Product Naming Convention
AD [06]	NEON.DOC.000813	Quantum Line Sensor ATBD

### 2.2 Reference Documents

RD [01]	NEON.DOC.000008	NEON Acronym List
RD [02]	NEON.DOC.000243	NEON Glossary of Terms
RD [03]	LI-COR Terrestrial Radiation Sensors Instruction Manual	

### 2.3 Acronyms

Acronym	Explanation
ATBD	Algorithm Theoretical Basis Document
C <sup>3</sup>	Command, Control, and Configuration Document
SOP	Standard Operating Procedures
QA/QC	Quality Assurance/Quality Control
TIS	Terrestrial Instrument System
L0	Level 0
L1	Level 1
ENG	NEON Engineering group
CI	NEON Cyberinfrastructure group
DPS	NEON Data Products group
CVAL	NEON Calibration, Validation, and Audit Laboratory

### 2.4 Verb Convention

“Shall” is used whenever a statement expresses a convention that is binding. The verbs “should” and “may” express non-mandatory provisions. “Will” is used to express a declaration of purpose on the part of the design activity.



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### 3 INTRODUCTION

The sensor configuration and sensor command and control described here are related to the photosynthetically active radiation-line (PAR-line) data product (NEON.DOM.SIT.DP0.000066.001.001.00X.000.001 (AD [04] & AD [05])). A description of how sensor readings shall be converted to standard PAR units of  $\mu\text{mol}\cdot\text{s}^{-1}\cdot\text{m}^{-2}$  is presented in the associated ATBD (AD [06]).



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#### 4 OVERVIEW OF SENSOR CONFIGURATION

The PAR-line data from the sensor shall be unfiltered and uncorrected mV. Note that all sensor readings will be reported in unit of Volts due to signal processing for analog sensors by the GRAPE.

**Table 1.** Sensor configuration settings.

Parameter	Default Setting
PAR measurement: acquisition rate	1 Hz
Data acquired from the GRAPE	V



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## **5 COMMAND AND CONTROL**

### **5.1 Error Handling**

This sensor provides no error notification.

### **5.2 Sensor Unit Controls Specification**

This sensor has no associated devices.