NEON SENSOR COMMAND, CONTROL AND CONFIGURATION (C3) DOCUMENT: UNDERWATER PHOTOSYNTHETICALLY ACTIVE RADIATION (UPAR)

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See configuration management system for approval history.

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Change Record

REVISION	DATE	ECO #	DESCRIPTION OF CHANGE
A	01/20/2017	ECO-04390	Initial Release
B	03/08/2022	ECO-06786	• Revised logo

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1 DESCRIPTION

1.1 Purpose

This document specifies the command, control, and configuration details for operating the Underwater PAR and Cable Assembly used to measure photosynthetically active radiation below the water surface at lake inlet and outlet stations. This sensor is also deployed from buoys in lakes and rivers, the command, control, and configuration of those sensors can be found in AD [06], NEON.DOC.003808. This document 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 should be identified.

1.2 Scope

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

A complete set of the Level 0 data products generated in this document can be found in appendix.

The underwater PAR assembly will consist of the following Data Generating Devices (DGD) based on Data Generating Device DGD List and Hierarchies doc (AD [05]):

DGD Agile PN	DGD Agile Description
CA0324000	Lake inlet and outlet, underwater quantum sensor

Further detailed sensor info under each DGD is as follows:

1. Under CA0324000:
    a. NEON PN 0320540000, LI-192SA Li-Cor Underwater PAR, no firmware

2 RELATED DOCUMENTS AND ACRONYMS

2.1 Applicable Documents

Applicable documents contain information that shall be applied in the current document. Examples are higher level requirements documents, standards, rules and regulations.

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.001104	Data Generating Device DGD List and Hierarchies
AD [06]	NEON.DOC.003808	NEON Sensor Command, Control and Configuration (C3) Document: Buoy Meteorological Station and Submerged Sensor Assembly

2.2 Reference Documents

Reference documents contain information complementing, explaining, detailing, or otherwise supporting the information included in the current document.

RD [01]	NEON.DOC.000008	NEON Acronym List
RD [02]	NEON.DOC.000243	NEON Glossary of Terms
RD [03]	Li-Cor Spec Sheet for the Li-192 Quantum Sensor. Li-Cor, Inc. 4421 Superior St, Lincoln, NE 68504	
RD [04]		

2.3 Acronyms

Acronym	Explanation
ATBD	Algorithm Theoretical Basis Document
C^3	Command, Control, and Configuration Document
SOP	Standard Operating Procedures
QA/QC	Quality Assurance/Quality Control
AIS	Aquatic 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
UPAR	Underwater Photosynthetically Active Radiation

3 UNDERWATER PAR INTRODUCTION (CA0324000)

The sensor command, control, and configuration described here are related to the underwater photosynthetically active radiation (PAR) data product (NEON.DOM.SITE.DP0.20261.001) and L0 data streams (Appendix table). The AIS assembly to generate this data product consists of 1 component: underwater PAR sensor. This sensor is also shares a data product with other AIS deployments, specifically lake and river buoys (AD [06]). The data streams are the same for all deployments of this sensor, but the frequency at which data is returned may be different on the buoy compared to AIS deployments.

4 UNDERWATER PAR OVERVIEW OF SENSOR CONFIGURATION (CA0324000)

The PAR data from the sensor shall be unfiltered and uncorrected volt.

Table 1. Sensor configuration settings.

Parameter	Default Setting
inPAR measurement: Acquisition Rate	1 Hz
outPAR measurement: Acquisition Rate	1 Hz
Data acquired from the sensor	PAR (volt)
Measurement mode	Run
Sensor error message	NA

5 UNDERWATER PAR COMMAND AND CONTROL (CA0324000)

5.1 Error handling

This sensor provides no error notification.

5.2 Sensor controls specification

There are no subunits that are actively controlled.

6 ASSEMBLY INTEGRATION

N/A

7 APPENDIX

7.1 List of Level 0 data products

Table 2. List of Level 0 data products associated with DPName: Photosynthetically active radiation below water surface

DGD Agile PN	DPNumber	fieldName	description	Acquisition frequency (Hz)	dataType	units
CA0324000	NEON.DOM.SITE.DP0.20261.001.01320.HOR.VER.000	inPAR	Incoming photosynthetically active radiation (PAR) (irradiance 400-700 nm)	1 Hz	real	volt
	NEON.DOM.SITE.DP0.20261.001.01321.HOR.VER.000	outPAR	Outgoing photosynthetically active radiation (PAR) (radiance 400-700 nm)	1 Hz	real	volt

7.2 Assembly schematic drawing

N/A

8 BIBLIOGRAPHY

N/A