



<i>Title:</i> NEON Command, Control, and Configuration (C3): Net Radiometer		<i>Date:</i> 05/16/2022
<i>NEON Doc. #:</i> NEON.DOC.000418	<i>Author:</i> M. SanClements	<i>Revision:</i> B

NEON SENSOR COMMAND, CONTROL AND CONFIGURATION (C3) DOCUMENT: NET RADIOMETER

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1 DESCRIPTION

1.1 Purpose

This document specifies the command, control, and configuration details for operating a NEON sensor used for instrumental observations. 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 should be identified. All Level 0 Data Products generated by the sensor are identified. The raw data are compensated by the DAS, but received at HQ for further processing as L0 unfiltered and uncorrected data product until its associated algorithms are applied to produce a QA/QC'd L1 data product in Standard Scientific Units.

1.2 Scope

The expectation is that the NR01 Net Radiation Sensor (NEON P/N: 0300070002; no firmware required) will be used to make measurements of net radiation (AD [01]). The reference document for the NR01 Net Radiation Sensor is RD [03].

This document specifies the command, control, and configuration that are 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.



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.XXXXXX	Net Radiometer ATBD (TBW)

2.2 Reference Documents

RD [01]	NEON.DOC.000008	NEON Acronym List
RD [02]	NEON.DOC.000243	NEON Glossary of Terms
RD [03]	Hukesflux Thermal Sensors NR01 RA01 Manual Version 0715. Hukesflux Thermal Sensors Elektronikaweg 25, 2628 XG Delft. The Netherlands	

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
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
SW	Short Wave
LW	Long Wave

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 net radiation data products; incoming secondary SW radiation (FIU.0.0023.001), reflected secondary SW radiation (FIU.0.0027.001), incoming secondary LW radiation (FIU.0.0021.001), reflected secondary LW radiation (FIU.0.0026.001), sensor body temperature (FIU.0.0021.002), and heater diagnostic flag (FIU.0.0021.003) (AD[04]). A description of how sensor readings shall be converted to net radiation in units of W/m^2 is presented in the associated ATBD (AD[05]).



4 OVERVIEW OF SENSOR CONFIGURATION

The radiation data from the sensor shall be unfiltered and uncorrected V. Sensor body temperature will be unfiltered, and uncorrected ohms.

Table 1. Sensor configuration settings.

Parameter	Default Setting
Heater	Off
Temperature compensation	NA
Incoming radiation SW: Acquisition rate	1 Hz
Reflected radiation SW: Acquisition rate	1 Hz
Incoming radiation LW: Acquisition rate	1 Hz
Reflected radiation LW: Acquisition rate	1 Hz
Sensor body temperature	1 Hz
Heater diagnostic flag	1 Hz
Data acquisition streams	Incoming Radiation SW Secondary Reflected Radiation SW Secondary Incoming Radiation LW Secondary Reflected Radiation LW Secondary Body Temp Diagnostic flag - heater : (0 or 1)
Measurement mode	Run
Sensor error message	NA



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5 COMMAND AND CONTROL

5.1 Error Handling

This sensor provides no error notification.

5.2 Sensor <device> Controls Specification

Heater control is recommended to prevent condensation from forming on the sensor, resulting in inaccurate data. The heater shall be turned on at sunset and turned off at sunrise. **Table 2** specifies the command and control structure for the heater. The sunrise and sunset times corresponding to heater on/off commands shall be determined by local sunrise/sunset tables appropriate to the date of data collection.

Table 2. Truth table for controlling sensor heater.

Control parameter(s)	Condition	Data acquisition system action	Output to CI
Length of daylight	Time of local sunset	Turn heater on	Heater flag (FIU.0.0021.003)
Length of night	Time of local sunrise	Turn heater off	Heater flag (FIU.0.0021.003)



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6 ASSEMBLY INTEGRATION

N/A



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7 APPENDIX & BIBLIOGRAPHY

N/A