NEON SENSOR COMMAND, CONTROL, AND CONFIGURATION: THROUGHFALL COLLECTOR

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Change Record

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1   DESCRIPTION

1.1   Purpose

This document specifies the command, control, and configuration details for operating NEON's throughfall collectors. It includes a detailed discussion of all necessary requirements for operational control parameters, conditions/constraints, set points, and any necessary error handling.

1.2   Scope

Met One's 372C (non-heated; NEON P/N: 0308070001) tipping bucket (ER [01], ER [02]) will be used throughout NEON's Observatory to monitor throughfall. Each tipping bucket will be accompanied by trough-type collectors (NEON P/N: 0330320000). There is no firmware associated with these sensors because they are analog devices. This document specifies the command, control, and configuration that are needed for operating these sensors. 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

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
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	NEON Standard Operating Procedures for Throughfall (TBW)
AD[06]	NEON.DOC.001963	NEON Algorithm Theoretical Basis Document: Throughfall

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

2.3   External References

External references contain information pertinent to this document, but are not NEON configuration-controlled. Examples include manuals, brochures, technical notes, and external websites.

ER [01]	Met One Instruments. 2005. Operational Manual: Model 375C 8" Rain Gauge. Document # 375C-9800.
ER [02]	Met One Instruments. 2010. 370 – 380 Series Precipitation Gauges (datasheet).

2.4   Acronyms

Acronym	Definition
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

3 INTRODUCTION

The United States Geological Survey (USGS; 2009) defines throughfall as precipitation that falls directly to the ground or rainwater / snowmelt that falls through the canopy. Measuring throughfall is of importance for hydrologic and ecologic communities because its chemical composition varies greatly more than that of precipitation (Likens and Bormann 1995) and it is used as an indirect way to measure interception. Interception is defined as the amount of precipitation that evaporates or is absorbed by trees (Leonard 1961). This document describes the configuration, command, and control related with the throughfall collectors and their corresponding data products (Table 1). For information regarding maintenance or topics concerning computer algorithms, please refer to the SOP (AD [5]) and ATBD (AD [6]) documents, respectively.

Table 1. Throughfall data products

Data Product Name	Data Product Number	Units
Tip (reed closure)	NEON.DXX.XXX.DP0.00067.001.001.00N.000.001	N/A

4 OVERVIEW OF SENSOR CONFIGURATION

Met One's 372C precipitation gauge configurations are presented in Table 2.

Table 2. Sensor configuration settings

Parameter	Default Setting
Data acquisition streams	Tip (reed closure / pulses)
Acquisition rate	N/A
Tipping threshold	0.5mm

5 COMMAND AND CONTROL

5.1 Error Handling

Given that the tipping buckets do not acknowledge any errors, there are no command and control requirements for the 372C. In the event of no sensor output or erroneous data readings, manual repairs to the tipping bucket and/or wiring shall be completed.

5.2 Heater Controls

The throughfall collectors and accessories (i.e. troughs) shall not be heated.

6   REFERENCES

Likens, G. E., and F. H. Bormann, 1995: *Biogeochemistry of a Forested Ecosystem*. Springer – Verlag, 159 pp.

Leonard, R. E., 1961: Interception of Precipitation by Northern Hardwoods. Station Paper No. 159, Northeastern Forest

Experiment Station, USDA Forest Service, Upper Darby, PA, 16 pp.

United States Geological Survey (USGS), 2012: General Introduction and Hydrologic Definitions. [Available online at http://water.usgs.gov/wsc/glossary.html]