NEON SENSOR COMMAND, CONTROL AND CONFIGURATION (C3) DOCUMENT: SOIL WATER CONTENT AND SOIL WATER ION CONTENT

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See configuration management system for approval history.

Change Record

REVISION	DATE	ECO #	DESCRIPTION OF CHANGE
A	04/30/2013	ECO-00634	Initial Release
B	2/11/2015	ECO-02519	Values for calibration coefficients have been added for circumstances where soil water content sensors may need to be deployed prior to the site- and depth-specific coefficients being known
C	1/13/2016	ECO-03567	Updated to new template, updated DP numbers to new format

Title: NEON Sensor Command, Control and Configuration (C3) Document: SOIL WATER CONTENT AND SOIL WATER ION CONTENT		Date: 1/13/2016
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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.

1.2   Scope

The Soil Water Content Profile measurements shall be made using the Sensor TriSCAN Soil Water Content and Salinity Sensor (NEON P/N: 0318950000) and Sensor Accessory EnviroSCAN RS-232 Modbus Probe Interface Firmware Version 1.3.5 (NEON P/N: 0319390000), as well as the manufacturer specified rod, tube, top cap, and plastic expandable bung. Each DGD listed in the table below contains one RS-232 Modbus Probe Interface and 1, 2, 3, 4, 6, or 8 Sensor TriSCAN sensors.

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.

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

The Soil Water Content Profile assembly will consist of following Data Generating Device (DGD) based on Data Generating Device DGD List and Hierarchies doc (AD [05]):

DGD Agile PN	DGD Agile Description
CF00810000	Assembly, Soil Water Content Profile, Population, 2 Meter
CF00810010	Assembly, Soil Water Content Profile, Population, 2 Meter, 1 Sensor
CF00810020	Assembly, Soil Water Content Profile, Population, 2 Meter, 2 Sensors
CF00810030	Assembly, Soil Water Content Profile, Population, 2 Meter, 3 Sensors
CF00810040	Assembly, Soil Water Content Profile, Population, 2 Meter, 4 Sensors
CF00810060	Assembly, Soil Water Content Profile, Population, 2 Meter, 6 Sensors
CF00813000	Assembly, Soil Water Content Profile, Population, 3 Meter

Further detailed sensor info under each DGD is as following:

1. Under CF00810000:
    a. NEON P/N: 0318950000, Sensor TriSCAN Soil Water Content and Salinity Sensor , no firmware.

b. NEON P/N: 0319390000, Sensor Accessory EnviroSCAN RS-232 Modbus Probe Interface Firmware Version 1.3.5.

……….

2. Under CF00810010:
    a. NEON P/N: 0318950000, Sensor TriSCAN Soil Water Content and Salinity Sensor, no firmware.
    b. NEON P/N: 0319390000, Sensor Accessory EnviroSCAN RS-232 Modbus Probe Interface Firmware Version 1.3.5.

……….

3. Under CF00810020:
    a. NEON P/N: 0318950000, Sensor TriSCAN Soil Water Content and Salinity Sensor, no firmware.
    b. NEON P/N: 0319390000, Sensor Accessory EnviroSCAN RS-232 Modbus Probe Interface Firmware Version 1.3.5.

……….

4. Under CF00810030:
    a. NEON P/N: 0318950000, Sensor TriSCAN Soil Water Content and Salinity Sensor, no firmware.
    b. NEON P/N: 0319390000, Sensor Accessory EnviroSCAN RS-232 Modbus Probe Interface Firmware Version 1.3.5.

……….

5. Under CF00810040:
    a. NEON P/N: 0318950000, Sensor TriSCAN Soil Water Content and Salinity Sensor, no firmware.
    b. NEON P/N: 0319390000, Sensor Accessory EnviroSCAN RS-232 Modbus Probe Interface Firmware Version 1.3.5.

……….

6. Under CF00810060:
    a. NEON P/N: 0318950000, Sensor TriSCAN Soil Water Content and Salinity Sensor, no firmware.
    b. NEON P/N: 0319390000, Sensor Accessory EnviroSCAN RS-232 Modbus Probe Interface Firmware Version 1.3.5.

……….

7. Under CF00813000:
    a. NEON P/N: 0318950000, Sensor TriSCAN Soil Water Content and Salinity Sensor, no firmware.
    b. NEON P/N: 0319390000, Sensor Accessory EnviroSCAN RS-232 Modbus Probe Interface Firmware Version 1.3.5.

    ……….

Other important parts that are not a DGD:

    c. Manufacturer specified mounting rod: NEON P/N: 0319390001, Sensor Accessory EnviroSCAN Probe 0.5m Rod
    d. Manufacturer specified mounting rod: NEON P/N: 0319390002, Sensor Accessory EnviroSCAN Probe 1m Rod
    e. Manufacturer specified mounting rod: NEON P/N: 0319390003, Sensor Accessory EnviroSCAN Probe 1.5m Rod
    f. Manufacturer specified mounting rod: NEON P/N: 0319390004, Sensor Accessory EnviroSCAN Probe 2m Rod
    g. Manufacturer specified tube: NEON P/N: 0319390005, Sensor Accessory EnviroSCAN 1m Access Tube
    h. Manufacturer specified tube NEON P/N: 0319390006, Sensor Accessory EnviroSCAN 1.5m Access Tube
    i. Manufacturer specified tube NEON P/N: 0319390007, Sensor Accessory EnviroSCAN 2m Access Tube
    j. Manufacturer specified tube NEON P/N: 0319390008, Sensor Accessory EnviroSCAN 2.5m Access Tube

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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.000007 NEON Algorithm Theoretical Basis Document (ATBD) – Soil Water Content and Soil Water Ion Content

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]	NEON.DOC.000007 ALGORITHM THEORETICAL BASIS DOCUMENT (ATBD) SOIL WATER CONTENT AND SOIL WATER ION CONTENT
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
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
$\#_{CVAL}$	Value provided by CVAL

3   ASSEMBLY, SOIL WATER CONTENT PROFILE, POPULATION, 2 METER INTRODUCTION (CF00810000)

Soil Water Content Profile subsystem data product name and number are Soil water content and salinity and NEON.DOM.SIT.DP0.00094, respectively. A description of how sensor readings shall be converted to the data product is presented in the associated ATBD (AD[06]).

4 ASSEMBLY, SOIL WATER CONTENT PROFILE, POPULATION, 2 METER OVERVIEW OF SENSOR CONFIGURATION (CF00810000)

4.1 TriSCAN sensors

Table 1. Sensor configuration settings.

Parameter	Default Setting
Acquisition rate: Soil water content	0.1 Hz
Acquisition rate: Soil water ion content	0.1 Hz
Water content high normalization value ($SWCF_{air}$)	$\#_{CVAL}$
Water content low normalization value ($SWCF_{water}$)	$\#_{CVAL}$
Water ion content high normalization value ($SWICF_{air}$)	$\#_{CVAL}$
Water ion content low normalization value ($SWICF_{water}$)	$\#_{CVAL}$
Water content calibration coefficient A	Value TBD*
Water content calibration coefficient B	Value TBD*
Water content calibration coefficient C	Value TBD*
Ion content calibration coefficient A	1
Ion content calibration coefficient B	1
Ion content calibration coefficient C	0

* Water content coefficients A, B, and C will be set to site- and depth-specific values. These values will be stored in the CI database. They will be calculated by FIU using soil samples collected from the TIS Soil Pit (Megapit). If the site- and depth-specific coefficient values are not known prior to sensor deployment, they shall be set to the manufacturer default values (i.e., A = 0.1957, B = 0.404, and C = 0.02852) (Sentek 2003).

4.2 RS-232 interface and other assembly components

No configuration is required.

5 ASSEMBLY, SOIL WATER CONTENT PROFILE, POPULATION, 2 METER COMMAND AND CONTROL (CF00810000)

There is no command and control for this assembly.

5.1 Error handling

NA

5.2   Sensor controls specification

NA

6   ASSEMBLY, SOIL WATER CONTENT PROFILE, POPULATION, 2 METER, 1 SENSOR INTRODUCTION (CF00810010)

Soil Water Content Profile subsystem data product name and number are Soil water content and salinity and NEON.DOM.SIT.DP0.00094, respectively. A description of how sensor readings shall be converted to the data product is presented in the associated ATBD (AD[03]).

7   ASSEMBLY, SOIL WATER CONTENT PROFILE, POPULATION, 2 METER, 1 SENSOR OVERVIEW OF SENSOR CONFIGURATION (CF00810010)

7.1   TriSCAN sensors

Table 2. Sensor configuration settings.

Parameter	Default Setting
Acquisition rate: Soil water content	0.1 Hz
Acquisition rate: Soil water ion content	0.1 Hz
Water content high normalization value (SWCF$_{air}$)	#$_{CVAL}$
Water content low normalization value (SWCF$_{water}$)	#$_{CVAL}$
Water ion content high normalization value (SWICF$_{air}$)	#$_{CVAL}$
Water ion content low normalization value (SWICF$_{water}$)	#$_{CVAL}$
Water content calibration coefficient A	Value TBD*
Water content calibration coefficient B	Value TBD*
Water content calibration coefficient C	Value TBD*
Ion content calibration coefficient A	1
Ion content calibration coefficient B	1
Ion content calibration coefficient C	0

* Water content coefficients A, B, and C will be set to site- and depth-specific values. These values will be stored in the CI database. They will be calculated by FIU using soil samples collected from the TIS Soil Pit (Megapit). If the site- and depth-specific coefficient values are not known prior to sensor deployment, they shall be set to the manufacturer default values (i.e., A = 0.1957, B = 0.404, and C = 0.02852) (Sentek 2003).

7.2 RS-232 interface and other assembly components

No configuration is required.

8 ASSEMBLY, SOIL WATER CONTENT PROFILE, POPULATION, 2 METER, 1 SENSOR COMMAND AND CONTROL (CF00810010)

There is no command and control for this assembly.

8.1 Error handling

NA

8.2 Sensor controls specification

NA

9 ASSEMBLY, SOIL WATER CONTENT PROFILE, POPULATION, 2 METER, 2 SENSORS INTRODUCTION (CF00810020)

Soil Water Content Profile subsystem data product name and number are Soil water content and salinity and NEON.DOM.SIT.DP0.00094, respectively. A description of how sensor readings shall be converted to the data product is presented in the associated ATBD (AD[03]).

10 ASSEMBLY, SOIL WATER CONTENT PROFILE, POPULATION, 2 METER, 2 SENSORS OVERVIEW OF SENSOR CONFIGURATION (CF00810020)

10.1 TriSCAN sensors

Table 3. Sensor configuration settings.

Parameter	Default Setting
Acquisition rate: Soil water content	0.1 Hz
Acquisition rate: Soil water ion content	0.1 Hz
Water content high normalization value ($SWCF_{air}$)	$\#_{CVAL}$
Water content low normalization value ($SWCF_{water}$)	$\#_{CVAL}$
Water ion content high normalization value ($SWICF_{air}$)	$\#_{CVAL}$
Water ion content low normalization value ($SWICF_{water}$)	$\#_{CVAL}$

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Water content calibration coefficient A	Value TBD*
Water content calibration coefficient B	Value TBD*
Water content calibration coefficient C	Value TBD*
Ion content calibration coefficient A	1
Ion content calibration coefficient B	1
Ion content calibration coefficient C	0

* Water content coefficients A, B, and C will be set to site- and depth-specific values. These values will be stored in the CI database. They will be calculated by FIU using soil samples collected from the TIS Soil Pit (Megapit). If the site- and depth-specific coefficient values are not known prior to sensor deployment, they shall be set to the manufacturer default values (i.e., A = 0.1957, B = 0.404, and C = 0.02852) (Sentek 2003).

10.2 RS-232 interface and other assembly components

No configuration is required.

11 ASSEMBLY, SOIL WATER CONTENT PROFILE, POPULATION, 2 METER, 2 SENSORS COMMAND AND CONTROL (CF00810020)

There is no command and control for this assembly.

11.1 Error handling

NA

11.2 Sensor controls specification

NA

12 ASSEMBLY, SOIL WATER CONTENT PROFILE, POPULATION, 2 METER, 3 SENSORS INTRODUCTION (CF00810030)

Soil Water Content Profile subsystem data product name and number are Soil water content and salinity and NEON.DOM.SIT.DP0.00094, respectively. A description of how sensor readings shall be converted to the data product is presented in the associated ATBD (AD[03]).

13 ASSEMBLY, SOIL WATER CONTENT PROFILE, POPULATION, 2 METER, 3 SENSORS OVERVIEW OF SENSOR CONFIGURATION (CF00810030)

13.1 TriSCAN sensors

Table 4. Sensor configuration settings.

Parameter	Default Setting
Acquisition rate: Soil water content	0.1 Hz
Acquisition rate: Soil water ion content	0.1 Hz
Water content high normalization value ($SWCF_{air}$)	$\#_{CVAL}$
Water content low normalization value ($SWCF_{water}$)	$\#_{CVAL}$
Water ion content high normalization value ($SWICF_{air}$)	$\#_{CVAL}$
Water ion content low normalization value ($SWICF_{water}$)	$\#_{CVAL}$
Water content calibration coefficient A	Value TBD*
Water content calibration coefficient B	Value TBD*
Water content calibration coefficient C	Value TBD*
Ion content calibration coefficient A	1
Ion content calibration coefficient B	1
Ion content calibration coefficient C	0

* Water content coefficients A, B, and C will be set to site- and depth-specific values. These values will be stored in the CI database. They will be calculated by FIU using soil samples collected from the TIS Soil Pit (Megapit). If the site- and depth-specific coefficient values are not known prior to sensor deployment, they shall be set to the manufacturer default values (i.e., A = 0.1957, B = 0.404, and C = 0.02852) (Sentek 2003).

13.2 RS-232 interface and other assembly components

No configuration is required.

14 ASSEMBLY, SOIL WATER CONTENT PROFILE, POPULATION, 2 METER, 3 SENSORS COMMAND AND CONTROL (CF00810030)

There is no command and control for this assembly.

14.1 Error handling

NA

14.2 Sensor controls specification

NA

15 ASSEMBLY, SOIL WATER CONTENT PROFILE, POPULATION, 2 METER, 4 SENSORS INTRODUCTION (CF00810040)

Soil Water Content Profile subsystem data product name and number are Soil water content and salinity and NEON.DOM.SIT.DP0.00094, respectively. A description of how sensor readings shall be converted to the data product is presented in the associated ATBD (AD[03]).

16 ASSEMBLY, SOIL WATER CONTENT PROFILE, POPULATION, 2 METER, 4 SENSORS OVERVIEW OF SENSOR CONFIGURATION (CF00810040)

16.1 TriSCAN sensors

Table 5. Sensor configuration settings.

Parameter	Default Setting
Acquisition rate: Soil water content	0.1 Hz
Acquisition rate: Soil water ion content	0.1 Hz
Water content high normalization value ($SWCF_{air}$)	$\#_{CVAL}$
Water content low normalization value ($SWCF_{water}$)	$\#_{CVAL}$
Water ion content high normalization value ($SWICF_{air}$)	$\#_{CVAL}$
Water ion content low normalization value ($SWICF_{water}$)	$\#_{CVAL}$
Water content calibration coefficient A	Value TBD*
Water content calibration coefficient B	Value TBD*
Water content calibration coefficient C	Value TBD*
Ion content calibration coefficient A	1
Ion content calibration coefficient B	1
Ion content calibration coefficient C	0

* Water content coefficients A, B, and C will be set to site- and depth-specific values. These values will be stored in the CI database. They will be calculated by FIU using soil samples collected from the TIS Soil Pit (Megapit). If the site- and depth-specific coefficient values are not known prior to sensor deployment, they shall be set to the manufacturer default values (i.e., A = 0.1957, B = 0.404, and C = 0.02852) (Sentek 2003).

16.2 RS-232 interface and other assembly components

No configuration is required.

17 ASSEMBLY, SOIL WATER CONTENT PROFILE, POPULATION, 2 METER, 4 SENSORS COMMAND AND CONTROL (CF00810040)

There is no command and control for this assembly.

17.1 Error handling

NA

17.2 Sensor controls specification

NA

18 ASSEMBLY, SOIL WATER CONTENT PROFILE, POPULATION, 2 METER, 6 SENSORS INTRODUCTION (CF00810060)

Soil Water Content Profile subsystem data product name and number are Soil water content and salinity and NEON.DOM.SIT.DP0.00094, respectively. A description of how sensor readings shall be converted to the data product is presented in the associated ATBD (AD[03]).

19 ASSEMBLY, SOIL WATER CONTENT PROFILE, POPULATION, 2 METER, 6 SENSORS OVERVIEW OF SENSOR CONFIGURATION (CF00810060)

19.1 TriSCAN sensors

Table 6. Sensor configuration settings.

Parameter	Default Setting
Acquisition rate: Soil water content	0.1 Hz
Acquisition rate: Soil water ion content	0.1 Hz
Water content high normalization value ($SWCF_{air}$)	$\#_{CVAL}$
Water content low normalization value ($SWCF_{water}$)	$\#_{CVAL}$
Water ion content high normalization value ($SWICF_{air}$)	$\#_{CVAL}$
Water ion content low normalization value ($SWICF_{water}$)	$\#_{CVAL}$

Water content calibration coefficient A	Value TBD*
Water content calibration coefficient B	Value TBD*
Water content calibration coefficient C	Value TBD*
Ion content calibration coefficient A	1
Ion content calibration coefficient B	1
Ion content calibration coefficient C	0

* Water content coefficients A, B, and C will be set to site- and depth-specific values. These values will be stored in the CI database. They will be calculated by FIU using soil samples collected from the TIS Soil Pit (Megapit). If the site- and depth-specific coefficient values are not known prior to sensor deployment, they shall be set to the manufacturer default values (i.e., A = 0.1957, B = 0.404, and C = 0.02852) (Sentek 2003).

19.2 RS-232 interface and other assembly components

No configuration is required.

20 ASSEMBLY, SOIL WATER CONTENT PROFILE, POPULATION, 2 METER, 6 SENSORS COMMAND AND CONTROL (CF00810060)

There is no command and control for this assembly.

20.1 Error handling

NA

20.2 Sensor controls specification

NA

21 ASSEMBLY, SOIL WATER CONTENT PROFILE, POPULATION, 3 METER INTRODUCTION (CF00813000)

Soil Water Content Profile subsystem data product name and number are Soil water content and salinity and NEON.DOM.SIT.DP0.00094, respectively. A description of how sensor readings shall be converted to the data product is presented in the associated ATBD (AD[03]).

22 ASSEMBLY, SOIL WATER CONTENT PROFILE, POPULATION, 3 METER OVERVIEW OF SENSOR CONFIGURATION (CF00813000)

22.1 TriSCAN sensors

Table 7. Sensor configuration settings.

Parameter	Default Setting
Acquisition rate: Soil water content	0.1 Hz
Acquisition rate: Soil water ion content	0.1 Hz
Water content high normalization value ($SWCF_{air}$)	$\#_{CVAL}$
Water content low normalization value ($SWCF_{water}$)	$\#_{CVAL}$
Water ion content high normalization value ($SWICF_{air}$)	$\#_{CVAL}$
Water ion content low normalization value ($SWICF_{water}$)	$\#_{CVAL}$
Water content calibration coefficient A	Value TBD*
Water content calibration coefficient B	Value TBD*
Water content calibration coefficient C	Value TBD*
Ion content calibration coefficient A	1
Ion content calibration coefficient B	1
Ion content calibration coefficient C	0

* Water content coefficients A, B, and C will be set to site- and depth-specific values. These values will be stored in the CI database. They will be calculated by FIU using soil samples collected from the TIS Soil Pit (Megapit). If the site- and depth-specific coefficient values are not known prior to sensor deployment, they shall be set to the manufacturer default values (i.e., A = 0.1957, B = 0.404, and C = 0.02852) (Sentek 2003).

22.2 RS-232 interface and other assembly components

No configuration is required.

23 ASSEMBLY, SOIL WATER CONTENT PROFILE, POPULATION, 3 METER COMMAND AND CONTROL (CF00813000)

There is no command and control for this assembly.

23.1 Error handling

NA

23.2 Sensor controls specification

NA

24 ASSEMBLY INTEGRATION

The shallowest TriSCAN sensors in the profile, or only sensor if the profile consists of one sensor, produces two data streams (Stream:00 : raw volumetric soil water content and Stream:01 : raw volumetric soil ion content). The 2nd shallowest sensor produces the same data streams, which are assigned to the next sequential stream number (i.e., Stream:02 : raw volumetric soil water content and Stream:03 : raw volumetric soil ion content). If additional deeper sensors are present they produce the same data streams, which are assigned sequentially (shallowest to deepest) to the next stream number. The maximum number of TriSCAN sensors within a profile is limited to 8, therefore, the higheststream number will be Stream:15.

25 APPENDIX

NA

25.1 List of Level 0 data product

Table 8. List of Level 0 data product associated with DPName: Soil water content and salinity

DGD Agile PN	DPNumber	fieldName	description	Acquisition frequency (Hz)	dataType	units
	NEON.DOM.SITE.DP0.00094.001.02081.HOR.VER.000	rawVSWC0	Raw measurement of volumetric soil water content from shallowest depth	0.1	real	percent
	NEON.DOM.SITE.DP0.00094.001.02082.HOR.VER.000	rawVSIC0	Raw measurement of volumetric soil ion content from shallowest depth	0.1	real	NA
CF00810000	NEON.DOM.SITE.DP0.00094.001.02083.HOR.VER.000	rawVSWC1	Raw measurement of volumetric soil water content from 2nd shallowest depth	0.1	real	percent
	NEON.DOM.SITE.DP0.00094.001.02084.HOR.VER.000	rawVSIC1	Raw measurement of volumetric soil ion content from 2nd shallowest depth	0.1	real	NA
	NEON.DOM.SITE.DP0.00094.001.02085.HOR.VER.000	rawVSWC2	Raw measurement of volumetric soil water content from 3rd shallowest depth	0.1	real	percent
	NEON.DOM.SITE.DP0.00094.001.02086.HOR.VER.000	rawVSIC2	Raw measurement of volumetric soil ion content from 3rd	0.1	real	NA

		shallowest depth			
NEON.DOM.SITE.DP0.00094.001.02087.HOR.VER.000	rawVSWC3	Raw measurement of volumetric soil water content from 4th shallowest depth	0.1	real	percent
NEON.DOM.SITE.DP0.00094.001.02088.HOR.VER.000	rawVSIC3	Raw measurement of volumetric soil ion content from 4th shallowest depth	0.1	real	NA
NEON.DOM.SITE.DP0.00094.001.02089.HOR.VER.000	rawVSWC4	Raw measurement of volumetric soil water content from 5th shallowest depth	0.1	real	percent
NEON.DOM.SITE.DP0.00094.001.02090.HOR.VER.000	rawVSIC4	Raw measurement of volumetric soil ion content from 5th shallowest depth	0.1	real	NA
NEON.DOM.SITE.DP0.00094.001.02091.HOR.VER.000	rawVSWC5	Raw measurement of volumetric soil water content from 6th shallowest depth	0.1	real	percent
NEON.DOM.SITE.DP0.00094.001.02092.HOR.VER.000	rawVSIC5	Raw measurement of volumetric soil ion content from 6th shallowest depth	0.1	real	NA

	NEON.DOM.SITE.DP0.00094.001.02093.HOR.VER.000	rawVSWC6	Raw measurement of volumetric soil water content from 7th shallowest depth	0.1		real	percent
	NEON.DOM.SITE.DP0.00094.001.02094.HOR.VER.000	rawVSIC6	Raw measurement of volumetric soil ion content from 7th shallowest depth	0.1		real	NA
	NEON.DOM.SITE.DP0.00094.001.02095.HOR.VER.000	rawVSWC7	Raw measurement of volumetric soil water content from 8th shallowest depth	0.1		real	percent
	NEON.DOM.SITE.DP0.00094.001.02096.HOR.VER.000	rawVSIC7	Raw measurement of volumetric soil ion content from 8th shallowest depth	0.1		real	NA
CF00810010	NEON.DOM.SITE.DP0.00094.001.02081.HOR.VER.000	rawVSWC0	Raw measurement of volumetric soil water content from shallowest depth	0.1		real	percent
	NEON.DOM.SITE.DP0.00094.001.02082.HOR.VER.000	rawVSIC0	Raw measurement of volumetric soil ion content from shallowest depth	0.1		real	NA
CF00810020	NEON.DOM.SITE.DP0.00094.001.02081.HOR.VER.000	rawVSWC0	Raw measurement of volumetric soil water	0.1		real	percent

			content from shallowest depth			
	NEON.DOM.SITE.DP0.00094.001.02082.HOR.VER.000	rawVSIC0	Raw measurement of volumetric soil ion content from shallowest depth	0.1	real	NA
	NEON.DOM.SITE.DP0.00094.001.02083.HOR.VER.000	rawVSWC1	Raw measurement of volumetric soil water content from 2nd shallowest depth	0.1	real	percent
	NEON.DOM.SITE.DP0.00094.001.02084.HOR.VER.000	rawVSIC1	Raw measurement of volumetric soil ion content from 2nd shallowest depth	0.1	real	NA
CF00810030	NEON.DOM.SITE.DP0.00094.001.02081.HOR.VER.000	rawVSWC0	Raw measurement of volumetric soil water content from shallowest depth	0.1	real	percent
	NEON.DOM.SITE.DP0.00094.001.02082.HOR.VER.000	rawVSIC0	Raw measurement of volumetric soil ion content from shallowest depth	0.1	real	NA
	NEON.DOM.SITE.DP0.00094.001.02083.HOR.VER.000	rawVSWC1	Raw measurement of volumetric soil water content from 2nd	0.1	real	percent

			shallowest depth			
	NEON.DOM.SITE.DP0.00094.001.02084.HOR.VER.000	rawVSIC1	Raw measurement of volumetric soil ion content from 2nd shallowest depth	0.1	real	NA
	NEON.DOM.SITE.DP0.00094.001.02085.HOR.VER.000	rawVSWC2	Raw measurement of volumetric soil water content from 3rd shallowest depth	0.1	real	percent
	NEON.DOM.SITE.DP0.00094.001.02086.HOR.VER.000	rawVSIC2	Raw measurement of volumetric soil ion content from 3rd shallowest depth	0.1	real	NA
CF00810040	NEON.DOM.SITE.DP0.00094.001.02081.HOR.VER.000	rawVSWC0	Raw measurement of volumetric soil water content from shallowest depth	0.1	real	percent
	NEON.DOM.SITE.DP0.00094.001.02082.HOR.VER.000	rawVSIC0	Raw measurement of volumetric soil ion content from shallowest depth	0.1	real	NA
	NEON.DOM.SITE.DP0.00094.001.02083.HOR.VER.000	rawVSWC1	Raw measurement of volumetric soil water content from 2nd shallowest depth	0.1	real	percent

	NEON.DOM.SITE.DP0.00094.001.02084.HOR.VER.000	rawVSIC1	Raw measurement of volumetric soil ion content from 2nd shallowest depth	0.1	real	NA
	NEON.DOM.SITE.DP0.00094.001.02085.HOR.VER.000	rawVSWC2	Raw measurement of volumetric soil water content from 3rd shallowest depth	0.1	real	percent
	NEON.DOM.SITE.DP0.00094.001.02086.HOR.VER.000	rawVSIC2	Raw measurement of volumetric soil ion content from 3rd shallowest depth	0.1	real	NA
	NEON.DOM.SITE.DP0.00094.001.02087.HOR.VER.000	rawVSWC3	Raw measurement of volumetric soil water content from 4th shallowest depth	0.1	real	percent
	NEON.DOM.SITE.DP0.00094.001.02088.HOR.VER.000	rawVSIC3	Raw measurement of volumetric soil ion content from 4th shallowest depth	0.1	real	NA
CF00810060	NEON.DOM.SITE.DP0.00094.001.02081.HOR.VER.000	rawVSWC0	Raw measurement of volumetric soil water content from shallowest depth	0.1	real	percent
	NEON.DOM.SITE.DP0.00094.001.02082.HOR.VER.000	rawVSIC0	Raw measurement of volumetric soil ion	0.1	real	NA

		content from shallowest depth			
NEON.DOM.SITE.DP0.00094.001.02083.HOR.VER.000	rawVSWC1	Raw measurement of volumetric soil water content from 2nd shallowest depth	0.1	real	percent
NEON.DOM.SITE.DP0.00094.001.02084.HOR.VER.000	rawVSIC1	Raw measurement of volumetric soil ion content from 2nd shallowest depth	0.1	real	NA
NEON.DOM.SITE.DP0.00094.001.02085.HOR.VER.000	rawVSWC2	Raw measurement of volumetric soil water content from 3rd shallowest depth	0.1	real	percent
NEON.DOM.SITE.DP0.00094.001.02086.HOR.VER.000	rawVSIC2	Raw measurement of volumetric soil ion content from 3rd shallowest depth	0.1	real	NA
NEON.DOM.SITE.DP0.00094.001.02087.HOR.VER.000	rawVSWC3	Raw measurement of volumetric soil water content from 4th shallowest depth	0.1	real	percent
NEON.DOM.SITE.DP0.00094.001.02088.HOR.VER.000	rawVSIC3	Raw measurement of volumetric soil ion content from 4th	0.1	real	NA

			shallowest depth			
	NEON.DOM.SITE.DP0.00094.001.02089.HOR.VER.000	rawVSWC4	Raw measurement of volumetric soil water content from 5th shallowest depth	0.1	real	percent
	NEON.DOM.SITE.DP0.00094.001.02090.HOR.VER.000	rawVSIC4	Raw measurement of volumetric soil ion content from 5th shallowest depth	0.1	real	NA
	NEON.DOM.SITE.DP0.00094.001.02091.HOR.VER.000	rawVSWC5	Raw measurement of volumetric soil water content from 6th shallowest depth	0.1	real	percent
	NEON.DOM.SITE.DP0.00094.001.02092.HOR.VER.000	rawVSIC5	Raw measurement of volumetric soil ion content from 6th shallowest depth	0.1	real	NA
CF00813000	NEON.DOM.SITE.DP0.00094.001.02081.HOR.VER.000	rawVSWC0	Raw measurement of volumetric soil water content from shallowest depth	0.1	real	percent
	NEON.DOM.SITE.DP0.00094.001.02082.HOR.VER.000	rawVSIC0	Raw measurement of volumetric soil ion content from shallowest depth	0.1	real	NA

NEON.DOM.SITE.DP0.00094.001.02083.HOR.VER.000	rawVSWC1	Raw measurement of volumetric soil water content from 2nd shallowest depth	0.1	real	percent
NEON.DOM.SITE.DP0.00094.001.02084.HOR.VER.000	rawVSIC1	Raw measurement of volumetric soil ion content from 2nd shallowest depth	0.1	real	NA
NEON.DOM.SITE.DP0.00094.001.02085.HOR.VER.000	rawVSWC2	Raw measurement of volumetric soil water content from 3rd shallowest depth	0.1	real	percent
NEON.DOM.SITE.DP0.00094.001.02086.HOR.VER.000	rawVSIC2	Raw measurement of volumetric soil ion content from 3rd shallowest depth	0.1	real	NA
NEON.DOM.SITE.DP0.00094.001.02087.HOR.VER.000	rawVSWC3	Raw measurement of volumetric soil water content from 4th shallowest depth	0.1	real	percent
NEON.DOM.SITE.DP0.00094.001.02088.HOR.VER.000	rawVSIC3	Raw measurement of volumetric soil ion content from 4th shallowest depth	0.1	real	NA
NEON.DOM.SITE.DP0.00094.001.02089.HOR.VER.000	rawVSWC4	Raw measurement of volumetric soil water	0.1	real	percent

			content from 5th shallowest depth			
	NEON.DOM.SITE.DP0.00094.001.02090.HOR.VER.000	rawVSIC4	Raw measurement of volumetric soil ion content from 5th shallowest depth	0.1	real	NA
	NEON.DOM.SITE.DP0.00094.001.02091.HOR.VER.000	rawVSWC5	Raw measurement of volumetric soil water content from 6th shallowest depth	0.1	real	percent
	NEON.DOM.SITE.DP0.00094.001.02092.HOR.VER.000	rawVSIC5	Raw measurement of volumetric soil ion content from 6th shallowest depth	0.1	real	NA
	NEON.DOM.SITE.DP0.00094.001.02093.HOR.VER.000	rawVSWC6	Raw measurement of volumetric soil water content from 7th shallowest depth	0.1	real	percent
	NEON.DOM.SITE.DP0.00094.001.02094.HOR.VER.000	rawVSIC6	Raw measurement of volumetric soil ion content from 7th shallowest depth	0.1	real	NA
	NEON.DOM.SITE.DP0.00094.001.02095.HOR.VER.000	rawVSWC7	Raw measurement of volumetric soil water content from 8th	0.1	real	percent

			shallowest depth			
	NEON.DOM.SITE.DP0.00094.001.02096.HOR.VER.000	rawVSIC7	Raw measurement of volumetric soil ion content from 8th shallowest depth	0.1	real	NA

25.2 Assembly schematic drawing

NA

26   BIBLIOGRAPHY

Sentek. 2003. TriSCAN Agronomic User Manual, Version 1.2a. Sentek, Stepney, South Australia.