SPECIFICATIONS FOR DISSOLVED OXYGEN INSTRUMENTS ON FIXED PLATFORMS

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Document Control Sheet

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Signature Page

This document has been reviewed and approved for release to Configuration Management.

OOI Senior Systems Engineer: _____

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1 General

1.1 Ocean Observatories Initiative (OOI) Overview

See “Common Specifications for Instruments on Fixed Platforms”

1.2 Document Scope and Purpose

This document contains specifications for instruments that measure dissolved oxygen in seawater. Dissolved oxygen instruments will be deployed on fixed platforms.

The instrument shall meet the requirements in this document and those specified in the “Common Specifications for Instruments on Fixed Platforms”, document control number 1336-00000. Parameters specified in neither the “Common Specifications for Instruments on Fixed Platforms” nor in this document are not applicable. This instrument specification shall have precedence over the Common Specification for conflicting items.

1.3 Documents

1.3.1 Informational

The documents listed in this section are for informational purposes only and may not have been referenced in this specification.

- Consortium for Ocean Leadership, Inc. 2010, “Final Network Design”, Washington, D.C. [Online] Available: http://www.oceanleadership.org/programs-and-partnerships/ocean-observing/ooi/network-design/

1.3.2 Applicable

These documents contain requirements and specifications applicable to the instrument specified. The referenced section, requirement, or specification shall be met by the instrument specified herein.

“Common Specifications for Instruments on Fixed Platforms”, document control number 1336-00000

1.4 Definitions

1.4.1 Glossary and Acronyms

See “Common Specifications for Instruments on Fixed Platforms”

1.4.2 Conventions

All values contained in this document are Threshold Values unless specifically stated otherwise.

The bidder shall ignore the references in angle brackets < > at the end of each specification. They are for internal OOI use only.

2 Specifications

2.1 Measurement

Values provided are threshold unless otherwise stated.

2.1.1 Dissolved oxygen (O_2) concentrations

a) Measurement with unit(s)

Concentration of dissolved oxygen (µmol/kg)

b) Minimum Value

DO2-001 The instrument shall measure dissolved O_2 concentrations in seawater over a range with a minimum value of 0 µmol/kg. <L2-SR-RQ-3128, L4-CG-IP-RQ-187, L4-RSN-IP-RQ-311>

c) Maximum Value

DO2-002 The instrument shall measure dissolved O_2 concentrations in seawater over a range with a maximum value of 500 µmol/kg. <L2-SR-RQ-3128, L4-CG-IP-RQ-187, L4-RSN-IP-RQ-311>

d) Accuracy

DO2-003 The instrument shall measure dissolved O_2 concentrations with an accuracy in the laboratory within ± 2% of the value provided by a Winkler titration of a corresponding water sample. <L2-SR-RQ-3495, L4-CG-IP-RQ-182, L4-RSN-IP-RQ-312>

e) Precision

Not specified.

f) Resolution

DO2-004 The instrument shall measure dissolved O_2 concentrations with a resolution of 1.0 µmol/kg. < L2-SR-RQ-3496, L4-CG-IP-RQ-183, L4-RSN-IP-RQ-313>

g) Drift

DO2-005 The instrument shall measure dissolved O_2 concentrations with an annual drift of less than 10 µmol/kg. < L2-SR-RQ-3498, L4-CG-IP-RQ-348, L4-RSN-IP-RQ-316>

h) Response Times

DO2-006 The instrument shall have a response time of 60 seconds or less for measuring 95% of the changes in values that are greater than or equal to the resolution. (L2-SR-RQ-3797, L4-CG-IP-RQ-559, L4-RSN-IP-RQ-616)

i) Sampling Frequency

DO2-007 Instruments on cabled, open ocean shallow/surface piercing profilers shall be capable of sampling at a rate of 1 sample every second or faster. <L4-RSN-IP-618>

DO2-008 The instrument, except for those on cabled, open ocean shallow/surface piercing profilers, shall be capable of sampling at a rate of 1 sample every 2 seconds or faster. <L2-SR-IP-RQ-3501, L4-CG-IP-RQ-186, L4-RSN-IP-RQ-318)

DO2-009 The instrument, except for those on cabled, open ocean shallow/surface piercing profilers, should be capable of sampling at a rate of 1 sample every second or faster. This is an objective. <L2-SR-IP-RQ-3798, L4-CG-IP-RQ-560, L4-RSN-IP-RQ-617>

See Appendix A-1 for typical sampling frequencies.

j) Dependencies

Not specified.

2.2 Operational

2.2.1 Operational Depth Range

See Appendix A-1 for operational depths.

2.2.2 Environmental

See “Common Specifications for Instruments on Fixed Platforms”

2.2.3 Service Requirements

See “Common Specifications for Instruments on Fixed Platforms”

2.2.4 Calibration Requirement

See “Common Specifications for Instruments on Fixed Platforms”

2.2.5 Maintenance Interval

See “Common Specifications for Instruments on Fixed Platforms”

2.3 Mechanical/Physical

See “Common Specifications for Instruments on Fixed Platforms”

2.4 Electrical

See “Common Specifications for Instruments on Fixed Platforms”

2.5 Data Storage and Processing

See Appendix A-1 for data storage specifications.

See also “Common Specifications for Instruments on Fixed Platforms” for additional data storage and processing specifications.

2.6 Software/Firmware

See “Common Specifications for Instruments on Fixed Platforms”

2.7 Platform Interfaces

2.7.1 Mechanical

See “Common Specifications for Instruments on Fixed Platforms”

2.7.2 Electrical

a) Voltage

See “Common Specifications for Instruments on Fixed Platforms”

b) Current

See “Common Specifications for Instruments on Fixed Platforms”

c) Power

See “Common Specifications for Instruments on Fixed Platforms”

d) Connector

See “Common Specifications for Instruments on Fixed Platforms”

e) Control and Power

INTF-001 Instruments on cabled open ocean platforms shall be capable of being powered, controlled, and flushed by a Seabird pumped CTD model 16plusV2 CTD instrument. (L4-RSN-IP-RQ-619)

INTF-002 Instruments on cabled coastal, uncabled coastal, and uncabled open ocean platforms should be capable of being powered and controlled by a Seabird pumped CTD model 16plusV2 CTD instrument. This is an objective. (The CTD may provide additional functionality such as pumping/flushing a sample volume or providing an inductive communications link.)

2.7.3 Data and Communication

a) Timing

See “Common Specifications for Instruments on Fixed Platforms”

b) Clock Synchronization

See “Common Specifications for Instruments on Fixed Platforms”

c) Data Rate

See “Common Specifications for Instruments on Fixed Platforms”

d) Data Format

See “Common Specifications for Instruments on Fixed Platforms”

e) Protocols

See “Common Specifications for Instruments on Fixed Platforms”

f) Physical Interface

See “Common Specifications for Instruments on Fixed Platforms”

g) Electrical Interface

See “Common Specifications for Instruments on Fixed Platforms”

h) Remote Access

See “Common Specifications for Instruments on Fixed Platforms”

i) Modes

See “Common Specifications for Instruments on Fixed Platforms”

j) Data Transfer

See “Common Specifications for Instruments on Fixed Platforms”

2.8 Compliance

See “Common Specifications for Instruments on Fixed Platforms”

2.9 Safety

See “Common Specifications for Instruments on Fixed Platforms”

2.10 Shipping and Storage

See “Common Specifications for Instruments on Fixed Platforms”

2.11 Identification

See “Common Specifications for Instruments on Fixed Platforms”

2.12 Quality

See “Common Specifications for Instruments on Fixed Platforms”

3 Appendices

A-1. Specification Values by the Platform on Which the Dissolved Oxygen Instruments are Deployed

The following table describes the performance and operational constraints, limits, etc. that are different between the different OOI platforms.

DO2 Series	Cabled	Location	Operational depth range (m)	Typical Sampling Frequency	Deployment Interval (months)	Inductive Modem Required	Internal Batteries Required	Internal data Storage Required (# of samples)
A	C	O	0-300	1 Hz	13	N	N	N
B	C	O	0-300	4/hr	13	N	N	N
C	C	O	0-3,500	4/hr	13	N	N	N
D	C	C	0-600	4/hr	13	N	N	N
E	U	C	0-600	4/hr	7	N	(see note 1)	Y(22,000)
F	U	O	0-500	4/hr	13	N (see note 2)	Y (see note 3)	Y(40,000)

Key:

Cabled:
- C denotes platforms attached to the electro-optic cable in the Pacific Northwest (cabled)
- U denotes platforms that have no cable connection to shore for power or data (uncabled)

Location:
- O is open ocean
- C is coastal

Series A may be on a shallow profiler.

Note 1: Internal batteries are optional on some of the DO2 series E platforms. These batteries shall be capable of providing power for the specified Deployment Interval while sampling at the indicated Typical Sampling Frequency.

Note 2: Inductive modems are optional on some of the Series F platforms, but communication via inductive modem is required by specification INTF-015 in the Common Specifications for Instruments on Fixed Platforms. This could be implemented by an attached instrument.

Note 3: Per specification ELEC-003 in “Common Specifications for Instruments on Fixed Platforms”, the internal batteries for instruments on the Global mooring arrays shall be capable of providing power for the specified Deployment Interval while sampling at the indicated Typical Sampling Frequency.