



OCEAN OBSERVATORIES INITIATIVE

SPECIFICATIONS FOR WATER VELOCITY PROFILE INSTRUMENTS ON FIXED PLATFORMS

Version 1-00
Document Control Number 1336-00010
2011-11-08

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Specifications for Water Velocity Profile Instruments on Fixed Platforms

Document Control Sheet

Version	Date	Description	Originator
0-01	12/28/2010	Initial Draft	Jennifer Dorton
0-02	12/29/2010	Minor corrections based on feedback from Lorraine	Jennifer Dorton
0-03	1/4/2011	Minor changes based on comments from Lorraine	Jennifer Dorton & Rob DeICoco
0-04	1/6/2010	Comments added based on review	Jennifer Dorton & Lorraine Brasseur
0-05	1/12/2011	Updates made based on DOORs requirements updates and approved velocity profiles from mobile assets	Jennifer Dorton
0-06	1/2011	notes and some changes based on discussions	Lorraine Brasseur
0-07	1/21/2011	Changes and comments from webex with Lorraine, Ed D, Skip D, Al P, Jennifer D	Lorraine Brasseur
0-08	2/02/2011	Changes from 1/31 webex	Lorraine Brasseur
0-09	2/14/2011	Additional changes from webex based emails.	Lorraine Brasseur
0-10	2/17/2011	Changes based on discussion and email with J Fram. Accepted all changes to make a clean version for review	Lorraine Brasseur
0-11	2/22/2011	Added Table, cleaned up	Lorraine Brasseur
0-12	2/22/2011	Clean up.	Ed Chapman
0-13	2/23/2011	Fixed table, removed comments and markup prior to 5 day review	Lorraine Brasseur
0-14	2/24/2011	Updated references to requirements	Arthur Salwin
0-15	2/27/2011	Updated references to match errata sheet; updated title in header; reworded accuracy requirement; re-ordered table columns	Arthur Salwin
0-16	03/01/2011	Editorial fixes	Arthur Salwin
0-17	03/17/2011	Revised based on 5 day review and errata review and table review	Lorraine Brasseur
0-18	03/22/2011	Updated references to requirements	Arthur Salwin (Noblis)
0-19	03/22/2011	Edited appendix table	Arthur Salwin (Noblis)
0-20	04/06/2011	Updated per CCB on requirements	Arthur Salwin (Noblis)
0-21	04/08/2011	Change document number	Arthur Salwin (Noblis)
0-22	07/11/2011	Reference revised requirements per ECR	Arthur Salwin (Noblis)
1-00	11/08/2011	Initial Release	Ed Chapman

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Signature Page

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

OOI Senior Systems Engineer:



A handwritten signature in black ink, consisting of several loops and a long horizontal stroke, is written over a horizontal line.

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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 provides specifications for instruments that measure profiles of horizontal water velocity.

The instruments 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

- **ADCP** – Acoustic Doppler Current Profiler
- **Burst sampling** - Sampling at an interval T1 for a short duration within a regularly scheduled interval T2. Typically $T1 \ll T2$.
- See “Common Specifications for Instruments on Fixed Platforms” for other definitions.

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

The instrument shall meet the requirements 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.

2.1 Measurement

Values provided are threshold unless otherwise stated.

2.1.1 Water Velocity

a) Measurement with unit(s)

The specifications below for mean water velocity will be measured in m s^{-1} in magnetic earth coordinates (magnetic North, magnetic East, Up). Direction will be measured in compass degrees relative to magnetic north.

b) Minimum Value

ADCP-001 Velocity profile instruments shall have a speed range with a minimum value of 0 m s^{-1} . <L2-SR-RQ-3565, L4-CG-IP-RQ-276, L4-RSN-IP-RQ-480>

ADCP-002 Velocity profile instruments shall have a direction range with a minimum value of 0 degrees. <L2-SR-RQ-3863, L4-CG-IP-RQ-613>

c) Maximum Value

ADCP-003 Velocity profile instruments shall have a speed range with a maximum value of 3 m s^{-1} . <L2-SR-RQ-3565, L4-CG-IP-RQ-276, L4-RSN-IP-RQ-480>

ADCP-004 Velocity profile instruments shall have a direction range with a maximum value of 360 degrees. <L2-SR-RQ-3863, L4-CG-IP-RQ-613>

d) Accuracy

ADCP-005 Velocity profile instruments shall have a speed accuracy of $\pm(0.01 \text{ m s}^{-1} + 1\% \text{ of the measured value})$. <L2-SR-RQ-3137, L4-CG-IP-RQ-269, L4-RSN-IP-RQ-302>

ADCP-006 Velocity profile instruments shall have an absolute direction accuracy of ± 2 degrees. <L2-SR-RQ-3864, L4-CG-IP-RQ-614>

e) Precision

ADCP-007 Velocity profile measurements shall have a burst averaged precision of 0.03 m s^{-1} for the threshold profiling range, threshold bin size, and burst sampling time listed in Appendix A-1. < L2-SR-RQ-3568, L2-SR-RQ-3865, L4-CG-IP-RQ-284>

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f) Resolution

ADCP-008 Velocity profile instruments shall have a speed resolution of 0.001 m s^{-1} . <L2-SR-RQ-3566, L4-CG-IP-RQ-271, L4-RSN-IP-RQ-301>

g) Drift

Not specified.

h) Response Times

Not specified.

i) Sampling Rate

ADCP-009 Velocity profile instruments shall be capable of burst sampling. <L2-SR-RQ-3190, L2-SR-RQ-3869, L4-CG-IP-RQ-616>

ADCP-010 See Appendix A-1 for required and typical sampling rates. <L2-SR-RQ-3567, L4-CG-IP-RQ-275, L4-RSN-IP-RQ-300>

j) Dependencies

Not specified.

k) Profile Characteristics

ADCP-011 Velocity profile instruments shall have a variable number of bins numbering no less than 90. <L2-SR-RQ-3868, L4-CG-IP-RQ-615>

ADCP-012 Velocity profile instruments shall have a variable bin size with a minimum bin size as defined in Appendix A-1 in the *minimum user-settable bin size* column. <L2-SR-RQ-3884, L2-SR-RQ-3885, L2-SR-RQ-3886, L4-CG-IP-RQ-622, L4-CG-IP-RQ-623, L4-CG-IP-RQ-624>

ADCP-013 Velocity profile instruments shall have a threshold profiling range for the threshold bin size. Threshold bin sizes for specified depths are listed in Appendix A-1. < L2-SR-RQ-3879, L2-SR-RQ-3880, L2-SR-RQ-3881, L2-SR-RQ-3882, L2-SR-RQ-3883, L4-CG-IP-RQ-621, L4-CG-IP-RQ-620, L4-CG-IP-RQ-619, L4-CG-IP-RQ-618, L4-CG-IP-RQ-617>

The instrument does not have to meet threshold profiling range for bin sizes smaller than the threshold bin size.

l) Backscatter

ADCP-014 Velocity profile instruments shall provide a measure of acoustic backscatter intensity for each bin. <L2-SR-RQ-3887, L4-CG-IP-RQ-625, L4-RSN-IP-RQ-iii>

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m) Waves

ADCP-015 Velocity profile instruments with depth range less than 80 m should have the ability to measure directional wave spectra. This is an objective.

2.2 Operational

2.2.1 Operational Depth Range

See Appendix A-1 for operational depth range requirements

2.2.2 Service Requirements

See "Common Specifications for Instruments on Fixed Platforms"

2.2.3 Calibration Requirements

See "Common Specifications for Instruments on Fixed Platforms"

2.2.4 Maintenance

See "Common Specifications for Instruments on Fixed Platforms"

2.2.5 Survivable Depth

See Appendix A-1 for instrument survivable depth requirements.

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

DATA-001 Velocity profile instruments shall be capable of recording raw single ping acoustic backscatter intensity measurements for each bin. <L2-SR-RQ-3683, L4-CG-IP-RQ-281>

DATA-002 Velocity profile instruments shall be capable of recording raw single ping velocity measurements in each of the following coordinate systems for each bin: beam, instrument, and magnetic earth coordinates. <L2-SR-RQ-3683, L2-SR-RQ-3888, L2-SR-RQ-3889, L4-CG-IP-RQ-626, L4-CG-IP-RQ-627, L4-CG-IP-RQ-628>

DATA-003 Velocity profile instruments shall be capable of storing/output burst averaged samples. <L4-CG-IP-RQ-277, L4-CG-IP-RQ-280>

See "Common Specifications for Instruments on Fixed Platforms" for additional Data Storage and Processing requirements.

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2.6 Software/Firmware

See “Common Specifications for Instruments on Fixed Platforms”

2.7 Platform Interfaces

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”

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3 Appendices

A-1 Specification Values by the Platform on Which the Water Velocity Profile Instruments are Deployed

Series	Cabled	Location	Deployment (months)	Burst sampling time (minutes)	Minimum user-settable bin size (meters)	Threshold bin size (meters)	Threshold profiling range at threshold bin size (meters)	Objective profiling range (meters)	Operational Depth (meters)	Survivable Depth (meters)	Internal Batteries	Required Sample Rate	Typical Sample Rate	Internal Storage	# Samples to store (see note 1)	Inductive Modem
A	U	C	7	5	0.5	0.5	30		100	600	Y	1 burst/ 5 min	1 burst/ 15 min	Y	24,000	N
B	C	C	13	5	0.5	1	80		100	600	N	1 burst/ 5 min	1 burst/ 5 min*	N	N/A	N
C	U	C	7	5	0.5	1	80		100	600	Y	1 burst/ 5 min	1 burst/ 15 min	Y	24,000	N
D	C	O	13	1	1	8	200		300	300	N	1 burst/ 1 min	1 burst/ 1 min*	N	N/A	N
E	C	O	13	1	4	8	200	300	3500	3500	N	1 burst/ 1 min	1 burst/ 1 min*	N	N/A	N
F	U	C	7	5	1	2	200		100	600	Y	1 burst/ 5 min	1 burst/ 15 minute	Y	24,000	N
G	U	C	7	5	1	2	200		300	600	Y	1 burst/ 5 min	1 burst/ 15 min	Y	24,000	N
H	U	C	7	5	4	8	500	700	600	600	Y	1 burst/ 5 min	1 burst/ 15 min	Y	24,000	N
I	C	C	13	5	4	16	600	700	600	600	N	1 burst/ 5 min	1 burst/ 5 min*	N	N/A	N
J	U	C	7	5	4	16	600	700	600	600	Y	1 burst/ 5 min	1 burst/ 15 min	Y	24,000	N
K	C	O	13	5	4	16	600	700	1000	1000	N	1 burst/ 5 min	1 burst/ 5 min*	N	N/A	N
L	U	O	13	5	4	16	600	700	1000	6000	Y	1 burst/ 5 min	1 burst/ 30 min	Y	24,000	Y

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Key:

Cabled: C denotes platforms attached to the fiberoptic 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

* Asterisk in the Typical Sample Rate column denotes continuous sampling

Note 1: A sample contains a velocity profile with a separate data point for each of the bins.