



Ocean & River Instruments Products Guide

Vol.4

Ocean & River Instruments Division



JFE Advantech Co., Ltd.

Water Sampler *Pre-programmed autonomous water sampler*

AWS1000



The system has a built-in pressure sensor, but it was also designed to be equipped with our CTDs from ASTD series. This feature allows for more options of sensors to be used and simplifies upgrades.

- 10 water sampling bottles (2 L and/or 5 L)
- Lightweight and compact frame
- Suitable for small vessels
- Easily detachable bottles and CTD

Model name	AWS1000	
Water sampling	1 or 2 bottles simultaneously	
Minimum depth	1 m	
Bottle volume	2 L	5 L
Weight (*)	Approx. 65 kg in air	Approx. 75 kg in air
Number of bottles	10	
Sampling mode	Depth trigger or Time trigger	
Depth Rating	1000 m depth equivalent	
Minimum interval	Depth trigger : 0.5 m Time trigger : 1 s for 1 bottle 2 s for 2 bottles	

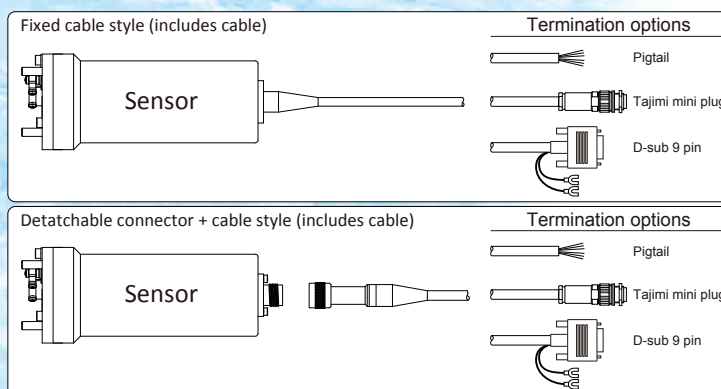
(*) weight considering 10 empty units of 5 L bottles.

Real-time data *For easy integration onto platforms*

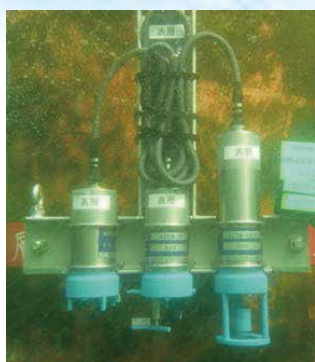
The digital output wired sensors are available, and the model name termination CAR and CAD indicates RS-232C or RS-485 communication protocol, respectively.

Features

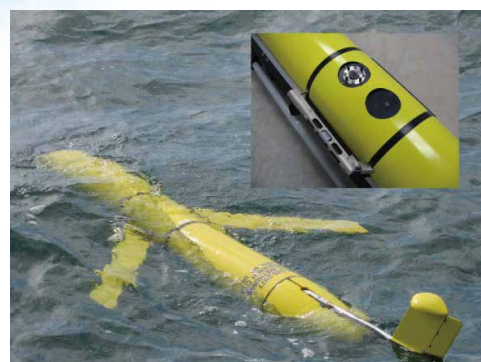
- RS-232C or RS-485 communication
- Operating with DC 12 V
- Cable with D-sub 9pin connector
- Anti-biofouling wiper



ACTW digital output version with D-sub connector



ACTW and ACLW2 on a light buoy (Ise Bay, Japan).



ACTW integrated on the VENUS platform (Courtesy of VENUS project)

RINKO series

Optical DO sensors



DO meter w/ wiper
RINKO W
AROW2-USB/CAR/CAD
Durable



DO logger
RINKO I/ID
ARO-USB
ARO1-USB
Fast response



Digital output DO meter
RINKO II/IID
ARO-CAR/CAD
ARO1-CAR/CAD
Fast response



Analog output DO meter
RINKO III
ARO-CAV
Fast response

Features

- Fast response DO sensor: RINKO I/ID, II/IID, III (90%: < 1 s, at 25 °C in air)
- Increased durability DO sensor: RINKO W (90%: < 30 s, at 25 °C in air)
- Anti-biofouling wiper: RINKO W

Parameter	Temperature	DO	Depth (for ID and IID)
Range	-3 to 45 °C	Air saturation: 0 to 200%	0 to 500 m ⁽¹⁾
Accuracy ⁽²⁾	±0.02 °C	±2% FS	±0.3% FS
Power consumption	-CAR/CAD/CAV: < 35 mA (at 12 VDC) ⁽²⁾		

⁽¹⁾ Depth sensor range option: 50 m, 100 m, 200 m, 500 m

⁽²⁾ AROW2-CAR/CAD: < 40 mA (at 12 VDC)

⁽³⁾ at 25 °C, typical



Fast optical DO sensor for microscale measurements

RINKO EC
ARO-EC

- Eddy covariance measurements of temperature and DO
- Analog output (0 - 5 V)
- Easy integration
- Easy user DO sensing foil replacement

Parameter	Temperature	DO
Range	-3 to 45 °C	Air saturation: 0 to 200%
Repeatability	—	Air saturation: ±1%
Accuracy	±0.02 °C	—
Response time	90%: < 0.5 s (from air to water at 25 °C)	
Power consumption	< 20 mA (at 12 VDC)	

Portable optical DO meter

RINKO PR
ARO-PR

- Data sample directly from BOD bottles
- Accurate calibration using certified traceable gases
- Less calibration cycles



Photo courtesy of JAMSTEC

Fast optical DO sensor for integration

RINKO FT

ARO-FT
AROD-FT

- Long-term stability
- Accurate calibration using certified traceable gases
- Easy installation for various platforms
- Deep sea model available: AROD-FT (6700 m, MCBH connector)



ARO-FT integrated on MRV S3A float



ARO-FT

AROD-FT

Parameter	Temperature	DO
Range	-3 to 45 °C	0 to 625 µmol L ⁻¹
Initial accuracy	±0.01 °C	±1% MV or ±1.5 µmol L ⁻¹
Repeatability ⁽¹⁾	±0.002 °C	±0.1% FS
Response time ⁽¹⁾	99%: < 2 s	99%: < 7 s (from air to water at 25 °C)

⁽¹⁾ at 25 °C, typical

Parameter	Temperature	DO
Range	-3 to 45 °C	0 to 425 µmol L ⁻¹
Initial accuracy	±0.01 °C	±2% MV or ±2.0 µmol L ⁻¹
Response time ⁽¹⁾	63%: < 1 s (at 25 °C in water)	
Power consumption	< 30 mA (at 12 VDC)	

⁽¹⁾ at 25 °C, typical

RINKO-Profiler

Multi-parameter CTD
with fast optical DO sensor

The RINKO-Profiler is a CTD with a fast-responding DO sensor as standard configuration. Fast responsivity reduces observation time, while achieving a detailed DO vertical distribution. The 1 GB internal memory allows for recording up to 1000 profiles (of 100 m depth at 0.1 m of sampling rate) and the internal rechargeable lithium battery allows continuous use up to 10 h.



Parameter	Range	Accuracy	Response time
Temperature	-3 to 45 °C	±0.01 °C	0.2 s
DO	Air saturation: 0 to 200%	±2% FS	0.4 s ⁽²⁾
Depth	0 to 600 m ⁽¹⁾	±0.3% FS	0.2 s
Conductivity	0.5 to 70 mS cm ⁻¹	±0.01 mS cm ⁻¹	0.2 s
Salinity	2 to 42	—	0.2 s
Turbidity	0 to 1,000 FTU	±2% MV or ±0.3 FTU	0.2 s
Chlorophyll	0 to 400 ppb	±1% FS	0.2 s

(1) Standard depth range. 1000m depth version is available upon request.

(2) 63% response time (at 25°C in air)

	Temperature	DO	Depth	Conductivity	Salinity	Turbidity	Chlorophyll
ASTD100/150	●	●	●	●	●	●	●
ASTD101/151	●	●	●	●	●	●	●
ASTD102/152	●	●	●	●	●	●	●
ASTD103/153	●	●	●	●	●	●	●



Available processing unit

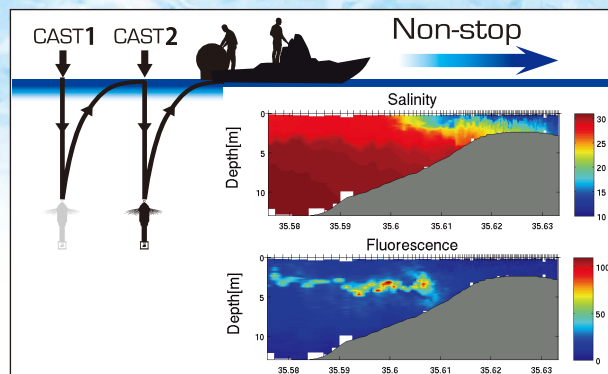


Interface Unit

RINKO-Profiler variations

YODA Profiler

The YODA profiler (“Yoing” Ocean Data Acquisition Profiler) is a “tow-yo” instrument to profile the water column with high spatial resolution from small boats without occupying much space. The brush at the top of the instrument allows for a stabilizing effect on the free-fall sinking speed, which is approximately constant at 0.2 m s⁻¹.



Masunaga and Yamazaki (2014): A new tow-yo instrument to observe high-resolution coastal phenomena. Journal of Marine Systems, 129, 425 - 436.

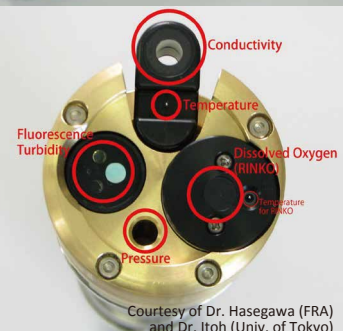
Winch system



Courtesy of Prof. Yamazaki (TUMSAT)

Customized version

Specially designed for off-shore tow-yo winch system.



Courtesy of Dr. Hasegawa (FRA) and Dr. Itoh (Univ. of Tokyo)

AAQ-RINKO

Realtime water quality profiler
with fast optical DO sensor

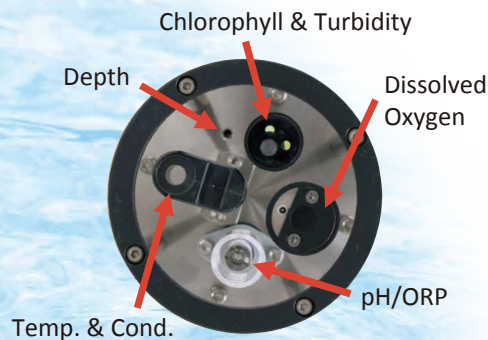
Realtime water quality profiler AAQ-RINKO is equipped with a fast optical DO sensor RINKO. AAQ-RINKO makes vertical measurements possible with a profiling speed of 0.5 m/s.

Parameter	Range	Accuracy	Response time
Temperature	-3 to 45°C	±0.01°C	0.2 s
DO	Air saturation: 0 to 200%	±2% FS	0.4 s ⁽¹⁾
Depth	0 to 100 m	±0.3% FS	0.2 s
Conductivity	0.5 to 70 mS cm ⁻¹	±0.01 mS cm ⁻¹	0.2 s
Salinity	2 to 42	—	0.2 s
Turbidity	0 to 1000 FTU	±2% MV or ±0.3 FTU	0.2 s
Chlorophyll	0 to 400 ppb	±1% FS	0.2 s
PAR	0 to 5000 μmol m ⁻² s ⁻¹	±4% FS	0.2 s
pH	0 to 14	±0.2 pH	10 s
ORP	0 to ±1000 mV	—	10 s

⁽¹⁾ 63% response time (25°C at 1 atm in air)



Underwater cable specifications	
Material	Polyurethane (reinforced with 5-core Kevlar [®] fiber)
Length	50 m or 100 m
Outside diameter	6.1 mm
Tensile strength	30 kg



	Temperature	DO	Depth	Conductivity	Salinity	Turbidity	Chlorophyll	PAR	pH	ORP
AAQ170	●	●	●	●	●	●	●			
AAQ171	●	●	●	●	●	●	●		●	
AAQ172	●	●	●	●	●	●	●		●	●
AAQ175	●	●	●	●	●	●	●		●	
AAQ176	●	●	●	●	●	●	●		●	●
AAQ177	●	●	●	●	●	●	●		●	●

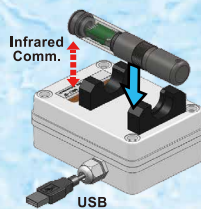
Available processing units



DEFI series

- Small and light weight
- Infrared communication
- Flashing LED light for activation check
- Powered by AA or AAA batteries

Pocket-size data loggers



DEFI2-IF
Interface



DEFI2-L
PAR

Parameter	PAR
Range	0 to 5000 μmol m ⁻² s ⁻¹
Accuracy	±4% FS



DEFI2-CT
Conductivity and Temperature

Parameter	Conductivity	Temperature
Range	2 to 70 mS cm ⁻¹	-3 to 45 °C
Accuracy	±0.05 mS cm ⁻¹	±0.05 °C
Response time ⁽¹⁾	1 s (63%)	10 s (63%)

⁽¹⁾ at 25 °C, typical



DEFI2-D /DHG
Pressure

Parameter	Pressure
Range	0 to 5 MPa
Accuracy	±1% FS ⁽¹⁾
Response time ⁽²⁾	0.05 s (90%)

⁽¹⁾ DEFI2-DHG: ±0.3% FS
⁽²⁾ at 25 °C, typical



DEFI2-T
Temperature

Parameter	Temperature
Range	-3 to 45 °C
Accuracy	±0.01 °C
Response time ⁽¹⁾	12 s (90%)

⁽¹⁾ at 25 °C, typical

INFINITY series

Compact and robust sensors

The INFINITY series has compact and robust sensors controlled by a high-performance 16-bit MCU and allows you to obtain reliable data.



Conductivity & temperature

INFINITY-CT/CTW

ACTW-USB/CAR/CAD
A7CT-USB/CAR/CAD
A7CT2-USB/CAR/CAD

- 7-electrode conductivity sensor
- Compact design
- Wiper to prevent bio-fouling (ACTW)

Parameter	Conductivity	Temperature
Range	0.5 to 70 mS cm ⁻¹	-3 to 45 °C
Accuracy	±0.01 mS cm ⁻¹ (1)	±0.01 °C (2)
Power consumption	-CAR/CAD: < 50 mA (at 12 VDC)	

(1) A7CT2-USB: ±0.05 mS cm⁻¹

(2) A7CT2-USB: ±0.05 °C



Chlorophyll & turbidity

INFINITY-CLW

ACLW2-USB/CAR/CAD

- Suitable for coastal environmental monitoring
- Less influence from particle color and CDOM
- Wiper to prevent bio-fouling

Parameter	Chlorophyll	Turbidity	Temperature
Range	0 to 400 ppb	0 to 1000 FTU	-3 to 45 °C
Accuracy	±1% FS	±2% MV or ±0.3 FTU	±0.02 °C
Power consumption	-CAR/CAD: < 30 mA (at 12 VDC)		



Dual range turbidity

INFINITY-Turbi

ATU75W2-USB/CAR/CAD

- Medium and high density turbidity
- Suitable for long-term measurement
- Wiper to prevent bio-fouling

Parameter	Mid concentration turbidity	High concentration turbidity	Depth	Temperature
Range	0 to 1000 FTU	0 to 100000 ppm	0 to 25 m (1)	-3 to 45 °C
Accuracy	±2% MV or ±0.3 FTU	±5% MV or ±10 ppm	±0.14% FS	±0.02 °C
Power consumption	-CAR/CAD: < 40 mA (at 12 VDC)			

(1) Depth sensor range option: 40 m, 100 m, 200 m



Turbidity and temperature sensor for the deep ocean

ATUD-USB

- Long-term deployment in deep water
- Compact design
- 6000 m depth rating

Parameter	Turbidity	Temperature
Range	0 to 1000 FTU	-3 to 45 °C
Accuracy	±2% MV or ±0.3 FTU	±0.02 °C
Power consumption	approx. 110 mA	



Wave height

INFINITY-WH

AWH-USB/CAR/CAD

- High sampling rate up to 10 Hz
- Wave analysis software (optional)

Parameter	Depth
Range	0 to 25 m
Accuracy	±0.14% FS
Power consumption	-CAR/CAD: < 20 mA (at 12 VDC)



Multi-frequency fluorescence

INFINITY-ME

MFLW-USB/CAD

- 9 wavelength LED excitation
- Algae classification
- Wiper to prevent bio-fouling

Parameter	Excitation spectra	Turbidity	Temperature	Depth
Range	0 to 400 ppb	0 to 1000 FTU	-3 to 45°C	0 to 500 m (1)
Accuracy	±2% FS	±5%	±0.02°C	±0.3% FS
Power consumption	-CAD: Approx. 900 mW			

(1) Depth sensor range option: 50 m, 100 m, 500 m (500m is only available for -USB)

Electromagnetic Current meters

Handy and reliable
single point current measurements



EM current meter INFINITY-EM

AEM-USB/CAR/CAD

- Compact design
- Mooring line attachable



EM current meter INFINITY-Deep

AEMD-USB

- 6000 m depth rated
- No particle required for measurements

Parameter	Velocity	Direction	Temperature
Range	0 to ± 500 cm s ⁻¹	0 to 360 °	-3 to 45 °C
Accuracy	$\pm 2\%$ MV or ± 1 cm s ⁻¹	± 2 °	± 0.02 °C
Power consumption	-CAR/CAD: < 50 mA (at 12 VDC)		

Parameter	Velocity	Direction	Temperature	Pressure	Tilt
Range	0 to ± 100 cm s ⁻¹	0 to 360 °	-3 to 45 °C	0 to 60 MPa	0 to ± 30 °
Accuracy	$\pm 2\%$ MV or ± 1 cm s ⁻¹	± 2 °	± 0.02 °C	$\pm 0.3\%$ FS	± 1 °



Single axis hand-held EM

AEM1-DA

- Robust design
- No moving mechanical parts
- Real time data reading

Parameter	Velocity
Range	0 to 500 cm s ⁻¹
Accuracy	$\pm 2\%$ MV or ± 0.5 cm s ⁻¹
Power	C size alkaline battery



2-axis hand-held EM

AEM213-D

- No moving mechanical parts
- Depth and temperature sensor
- Real time data reading

Parameter	Velocity	Direction	Temperature	Depth
Range	0 to ± 250 cm s ⁻¹	0 to 360 °	-3 to 40 °C	0 to 50 m
Accuracy	$\pm 2\%$ MV or ± 1 cm s ⁻¹	± 2 °	± 0.02 °C	$\pm 0.3\%$ FS
Power	C size alkaline battery or 12 VDC			

ACM2-RS
2-axis



ACM3-RS
3-axis

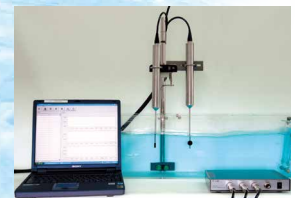
Laboratory electromagnetic current meter

ACM series

- High sampling rate up to 70Hz
- Connect up to 4 sensors
- Analog and digital output

Parameter	Velocity
Range	± 250 cm s ⁻¹
Accuracy	$\pm 2\%$ MV or ± 0.5 cm s ⁻¹
Sampling rate	15 to 70 Hz ⁽¹⁾

⁽¹⁾ ACM3-RS: 15 to 60 Hz



ACM-4IF Interface unit



OEM Single Axis Electromagnetic Speed Sensor

AEM1-G

- Direct measurement of vehicle axial speed
- Digital (RS-232C) and analog (0 to 5V) output
- Easy integration on various underwater vehicles

Parameter	Velocity
Range	0 to 500 cm s ⁻¹
Accuracy	$\pm 2\%$ MV or ± 0.5 cm s ⁻¹
Communication	RS-232C
Operating voltage	DC 4.75 to 5.25 V
Power consumption	85 to 95mA





Ocean & River Instruments Division



JFE Advantech Co., Ltd.

URL <http://www.jfe-advantech.co.jp/>

Head Office	3-48 Takahata cho, Nishinomiya, Hyogo 663-8202	TEL.+81-798-24-2465	FAX.+81-798-66-1654
Tokyo Head Office	JFE Kuramae Bldg. 2F, 2-17-4 Kuramae, Taito-ku, Tokyo 111-0051	TEL.+81-3-5825-5589	FAX.+81-3-5825-5591