

Fast optical DO sensors

RINKO series

ISO9001



JQA-0950

Incredibly fast DO measurements for any aquatic environment.

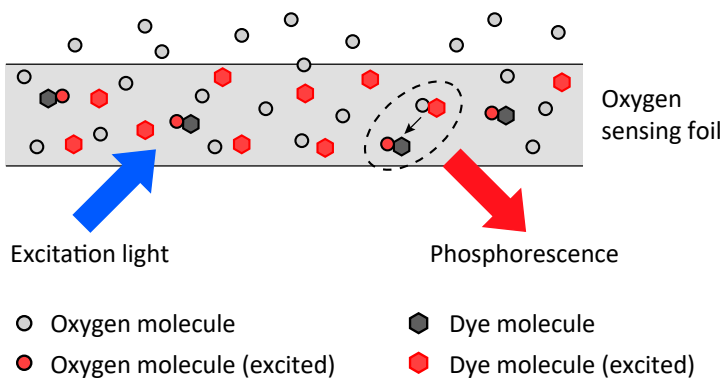
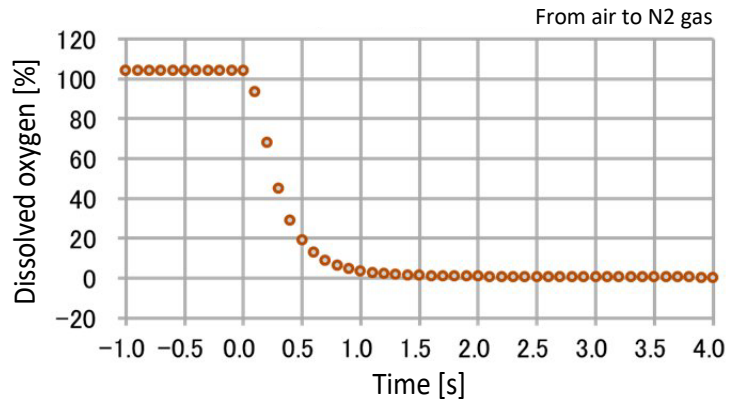


- Fast response (90%: less than 1s in air)
- High accuracy
- DO distribution at high spatial resolution
- Continuous vertical data sampling at 0.5 m s^{-1}



JFE Advantech Co., Ltd.

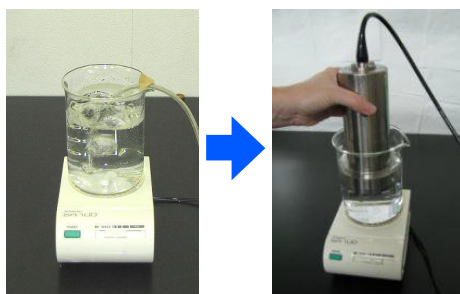
RINKO is a fast-response, high-accuracy, and high-resolution dissolved oxygen (DO) sensor based on phosphorescence principle. Compared to commercial galvanic, Clark-cell, and optical DO sensors, **RINKO** has the fastest response time of less than 1 s in air (90% response, typical). This notable feature enables DO measurements with continuous DO profiling at high speed ($\sim 0.5 \text{ m s}^{-1}$) and to acquire high resolution DO distributions.



The DO sensor is coated with photostimulable phosphor (PSP) on the outside of the pressure-resistant acrylic optical window, measuring phosphorescence quenching phase shift. The excitation blue LED pulse generates a red phosphorescence pulse, which in turn has an inverse correlation with the oxygen partial pressure in the water. Since oxygen molecules are not consumed in this process, there is NO need for stirring.

The 2-point calibration compensates the time-drift of the sensing foil, ensuring reliable and accurate DO data. The method consists in recalibrating the DO sensor in two points using an air-bubbled water for DO 100% and a sodium sulfite solution for DO 0%.

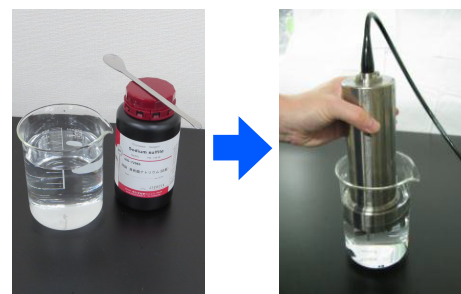
First calibration (DO 100%)



Air bubbling water

Span calibration

Second calibration (DO 0%)



Sodium sulfite solution

Zero calibration

■ Sensor specifications

Product name	RINKO I / RINKO II / RINKO III	
Model name	ARO-USB, ARO-CAR/CAD, ARO-CAV-CM	
Parameter	DO	Temperature
Principle	Phosphorescence	Thermistor
Range	Air saturation 0 to 200%	-3 to 45 °C
Resolution	0.01 to 0.04%	0.001 °C
Accuracy	Non-linearity $\pm 2\%$ of full scale (at 1 atm, 25 °C)	± 0.02 °C (ARO-CAV: 3 to 31 °C) (Others: 0 to 35 °C)

RINKO I



RINKO I (ARO-USB) is an autonomously deployable data logger. The instrument has various operating modes, offering flexibility when carrying out observations. The compact housing containing the data logger and batteries allows for being easily integrated on different platforms.

RINKO II (ARO-CAR/CAD) is a digital output model. The instrument can be easily integrated on various platforms (e.g., gliders) since it works with RS-232C (CAR) or RS-485 (CAD) communication protocols and external power (12 – 24 VDC).

RINKO II



RINKO III



RINKO III (ARO-CAV-CM) is an analog output model. It is powered by an external power (12 – 24 VDC) and seamlessly outputs the analog data (0 – 5 V). **RINKO III** can be easily installed on various platforms and provides high accurate DO data without limiting profiling speed.

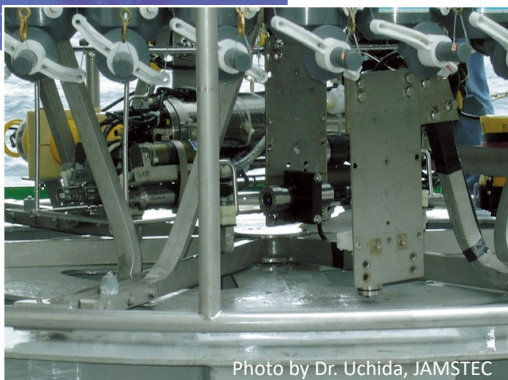
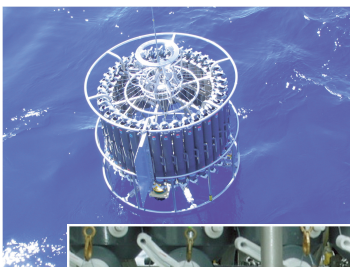
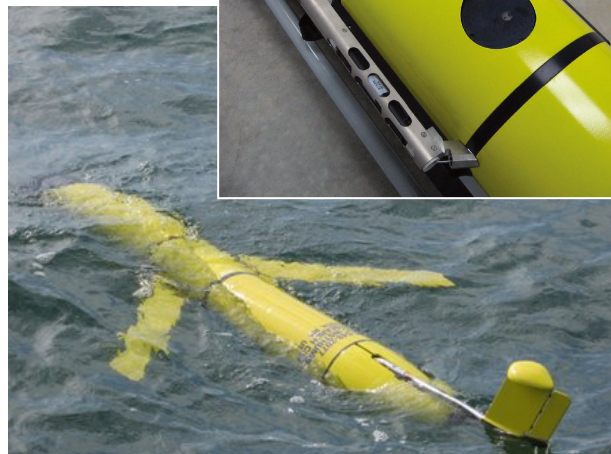


Photo by Dr. Uchida, JAMSTEC

RINKO on CTD-RMS

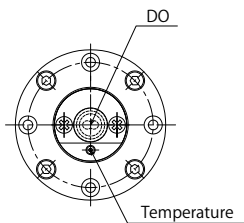


RINKO on Glider

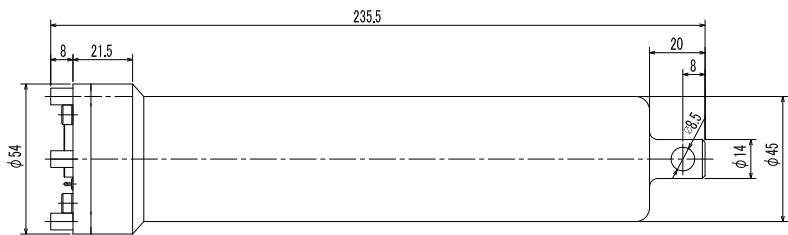
■ Instrument specifications

Product name	RLNKO I	
Model name	ARO-USB	
Measuring mode	Continuous mode, Burst mode	
Measuring interval	0.1 to 0.9 s (0.1 s increment), 1 to 600 s (1 s increment)	
Burst sampling interval	1 to 1,440 min	
Number of samples	1 to 18,000	
Memory medium	1 GB miniSD card	
Communication	USB 2.0 (ver. 1.1 compatible)	
AD converter	16 bit digital conversion	
Battery	CR-V3 3.3Ah Lithium battery / max 2 pieces	
Current drain	125 mA	
Material	Titanium (Ti-6Al-4V)	
Dimensions	Φ54 × 235.5 mm	
Weight	Approx. 0.9 kg in air, 0.6 kg in water	
Pressure rating	7,000 m depth equivalent	
Product name	RLNKO II	RLNKO III
Model name	ARO-CAR/CAD	ARO-CAV-CM
Signal output	CAR: RS-232C, CAD: RS-485	0 to 5 V analog
Communication	Handshake	—
AD converter	16 bit digital conversion	—
Power	12 to 24 VDC	—
Current drain	35 mA	—
Material	Titanium (grade 2)	Titanium (Ti-6Al-4V)
Dimensions	Φ54 × 185 mm (w/o connector)	Φ54 × 164.5 mm (w/o connector)
Weight	Approx. 0.5 kg in air, 0.3 kg in water	Approx. 0.8 kg in air, 0.5 kg in water
Pressure rating	1,000 m depth equivalent	7,000 m depth equivalent
Connector	Fixed type (standard) or detachable type	Standard: MCBH8MTI or Option: AG306-HP

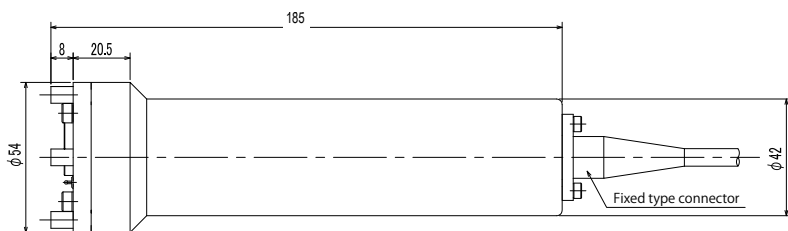
■ Drawings



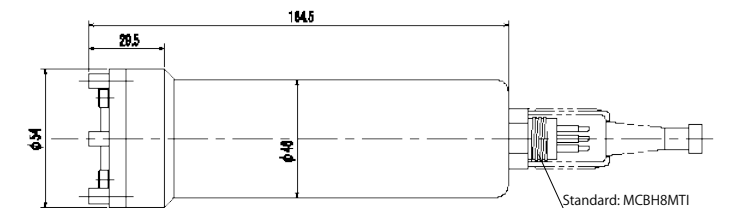
RLNKO I



RLNKO II



RLNKO III



Dimensions are in mm.

※ All specifications on this leaflet are subject to change without notice.



JFE Ocean & River Instruments Division
URL: <https://www.jfe-advantech.co.jp/>

Head Office 3-48 Takahata cho, Nishinomiya, Hyogo 663-8202
TEL. +81-798-66-1783 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
Tohoku Sales Office TM Bldg. 2F, 1-3-1, Ichiban cho, Aoba ku, Sendai, Miyagi 980-0811
TEL. +81-22-711-7535 FAX. +81-22-711-7534