



CALIBRATION CERTIFICATE

NAME	:	RINKO II
MODEL	:	ARO-CAR-Z10
SERIAL No.	:	0041
Parameter	:	Temperature Dissolved Oxygen



JFE Advantech Co., Ltd.

Temperature Calibration Certificate

Model : ARO-CAR-Z10
 Serial No. : 0041
 Date : March 18, 2022
 Location : Production Section
 Method : Calibration equation is determined from fifth order regression of samples of the reference temperature against A/D values. Samples are taken at approximately 0, 5, 10, 15, 20, 25, 30, and 35 °C.

1. Equation

$$\text{Instrument temperature}[\text{°C}] = A+B \times N+C \times N^2+D \times N^3+E \times N^4+F \times N^5 \quad N: \text{A/D value}$$

2. Coefficients

A = -6.110800e+00 D = +2.949708e-13
 B = +1.066841e-03 E = -3.614217e-18
 C = -1.267603e-08 F = +2.597135e-23

3. Calibration results

Reference temperature [°C]	A/D value	Instrument temperature [°C]	Residual error [°C]	Acceptance [°C]	OK/NG
0.028	6143	0.028	0.000	±0.010	OK
5.013	11662	5.013	0.000	±0.010	OK
10.028	17580	10.028	0.000	±0.010	OK
15.075	23750	15.075	0.000	±0.010	OK
20.055	29881	20.057	0.002	±0.010	OK
25.066	35923	25.064	-0.002	±0.010	OK
30.048	41677	30.049	0.001	±0.010	OK
35.013	47040	35.013	0.000	±0.010	OK

4. Verification

Criteria of judgement : Residual error of the instrument temperature at arbitrary point is within the acceptance value.

Reference temperature [°C]	Instrument temperature [°C]	Residual error [°C]	Acceptance [°C]	Judgement
12.533	12.531	-0.002	±0.018	Passed

Examined M. TAKEISHI

Approved M. Ujiwaki

JFE Advantech Co., Ltd.

Dissolved Oxygen Calibration Certificate

Model : ARO-CAR-Z10
 Serial No. : 0041
 Date : March 18, 2022
 Location : Production Section
 Method : Calibration is performed with the nitrogen gas (zero) and the oxygen saturated water (span) kept by air bubbling.
 Film No. : 211043BA

1. Equation

$$DO[\%] = G + H \times P'$$

Here, P'[%] consists of the coefficients A-F determined by the initial calibration.

2. Coefficients

A = -4.729217e+01 E = +4.200000e-03
 B = +2.425409e+06 F = +8.200000e-05
 C = -5.430363e+03 G = +0.000000e+00
 D = +1.128400e-02 H = +1.000000e+00

3. Verification

Criteria of judgement : Residual error of the instrument DO at arbitrary point is within the acceptance value. The test is performed 3 times.

Acceptance: $\pm 0.5\%$ of full scale

Test for DO 0 %

	Test condition		Instrument DO [%]	Residual error [%]	Acceptance [%]	Judgement
	Atm. pressure [hPa]	Reference DO [%]				
1st	1000.7	0.00	-0.03	-0.03	± 1.00	Passed
2nd	1000.6	0.00	-0.03	-0.03	± 1.00	Passed
3rd	1000.6	0.00	-0.03	-0.03	± 1.00	Passed

Test for DO 100 %

	Test condition			Instrument DO [%]	Residual error [%]	Acceptance [%]	Judgement
	Water T. [°C]	Atm. pressure [hPa]	Reference DO [%]				
1st	25.1	998.7	98.52	99.05	0.53	± 1.00	Passed
2nd	25.1	998.7	98.52	99.10	0.58	± 1.00	Passed
3rd	25.1	998.5	98.50	99.11	0.61	± 1.00	Passed

Examined T. KIKUCHI

Approved M. Ujinaki

JFE Advantech Co., Ltd.