



CALIBRATION CERTIFICATE

NAME	:	RINKO II
MODEL	:	ARO-CAR-Z10
SERIAL No.	:	0070
Parameter	:	Temperature Dissolved Oxygen



JFE Advantech Co., Ltd.

Temperature Calibration Certificate

Model : ARO-CAR-Z10
 Serial No. : 0070
 Date : February 08, 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
 Instrument temperature[°C] = $A+B \times N+C \times N^2+D \times N^3+E \times N^4+F \times N^5$ N: A/D value

2. Coefficients

A =	-1.278452e+01	D =	+5.827523e-13
B =	+1.471042e-03	E =	-7.151106e-18
C =	-2.562044e-08	F =	+4.564806e-23

3. Calibration results

Reference temperature [°C]	A/D value	Instrument temperature [°C]	Residual error [°C]	Acceptance [°C]	OK/NG
-0.072	10044	-0.072	0.000	±0.010	OK
4.934	14781	4.934	0.000	±0.010	OK
9.925	19867	9.925	0.000	±0.010	OK
14.977	25260	14.977	0.000	±0.010	OK
19.919	30631	19.920	0.001	±0.010	OK
24.929	36024	24.929	0.000	±0.010	OK
29.935	41234	29.936	0.001	±0.010	OK
34.899	46117	34.899	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
12.516	12.514	-0.002	±0.018	Passed

Examined M. TAKEISHI
 Approved M. Ujinaki

Dissolved Oxygen Calibration Certificate

Model : ARO-CAR-Z10
 Serial No. : 0070
 Date : February 10, 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. : 211042BA

1. Equation

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

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

2. Coefficients

A = -3.973117e+01 E = +4.200000e-03
 B = +2.021143e+06 F = +7.240000e-05
 C = -6.909537e+03 G = +0.000000e+00
 D = +1.048100e-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	1016.5	0.00	-0.03	-0.03	± 1.00	Passed
2nd	1016.5	0.00	-0.02	-0.02	± 1.00	Passed
3rd	1016.6	0.00	-0.02	-0.02	± 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	1017.2	100.40	100.14	-0.26	± 1.00	Passed
2nd	25.1	1017.2	100.40	100.11	-0.29	± 1.00	Passed
3rd	25.1	1017.2	100.40	100.11	-0.29	± 1.00	Passed

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