

CALIBRATION CERTIFICATE

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



JFE

JFE Advantech Co., Ltd.

Temperature Calibration Certificate

Model : ARO-CAR-Z10
 Serial No. : 0041
 Date : October 20, 2015
 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 x N+C x N²+D x N³+E x N⁴+F x N⁵ N: A/D value

2. Coefficients A = -6.100687e+00 D = +2.786836e-13
 B = +1.063527e-03 E = -3.296774e-18
 C = -1.231398e-08 F = +2.374580e-23

3. Calibration results

Reference temperature [°C]	A/D value	Instrument temperature [°C]	Residual error [°C]	Acceptance [°C]	OK/NG
0.093	6212	0.093	0.000	±0.010	OK
5.047	11701	5.048	0.001	±0.010	OK
10.033	17583	10.032	-0.001	±0.010	OK
15.082	23758	15.083	0.001	±0.010	OK
20.092	29925	20.092	0.000	±0.010	OK
25.091	35955	25.090	-0.001	±0.010	OK
30.090	41724	30.091	0.001	±0.010	OK
35.081	47088	35.061	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
12.553	12.550	-0.003	±0.018	Passed

Examined R. Kashida

Approved A. Fukuo Ka

Dissolved Oxygen Calibration Certificate

Model : ARO-CAR-Z10
 Serial No. : 0041
 Date : November 04, 2015
 Location : Production Section
 Method : Calibration is performed with the nitrogen gas (zero) and the oxygen saturated water (span) kept by air bubbling.
 Film No. : 144601B

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

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

2. Coefficients
 A = $-4.299396e+01$ E = $+4.400000e-03$
 B = $+2.268692e+06$ F = $+5.380000e-05$
 C = $-6.296315e+03$ G = $+0.000000e+00$
 D = $+1.001100e-02$ 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	1025.1	0.00	-0.03	-0.03	± 1.00	Passed
2nd	1025.1	0.00	-0.01	-0.01	± 1.00	Passed
3rd	1025.1	0.00	-0.01	-0.01	± 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	1025.0	101.20	100.86	-0.34	± 1.00	Passed
2nd	25.1	1025.0	101.20	100.58	-0.62	± 1.00	Passed
3rd	25.0	1025.0	101.20	100.56	-0.64	± 1.00	Passed

Examined *R. Kashida*

Approved *A. Fukuo Ka*