CALIBRATION CERTIFICATE

NAME	:	INFINITY-CT
MODEL	:	A7CT-USB-ZF
SERIAL No.	:	0145
Parameter	:	Temperature

JFE Advantech Co., Ltd.

Temperature Calibration Certificate

Model	:	A7CT-USB-ZF
Serial No.	:	0145
Date	:	February 02, 2021
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 =	−7.160230e+00	D =	+3.192582e−13
B =	+1.144021e−03	E =	−3.924896e−18
C =	−1.358304e−08	F =	+2.847051e−23

3. Calibration results

Reference temperature [°C]	A/D value	Instrument temperature [°C]	Residual error [°C]	Acceptance [°C]	OK/NG
0.042	6758.1	0.042	0.000	±0.005	OK
5.027	11933.5	5.027	0.000	±0.005	OK
10.039	17441.6	10.038	−0.001	±0.005	OK
15.075	23159.7	15.076	0.001	±0.005	OK
20.061	28855.8	20.061	0.000	±0.005	OK
25.063	34478.0	25.062	−0.001	±0.005	OK
30.039	39864.7	30.040	0.001	±0.005	OK
35.006	44940.5	35.006	0.000	±0.005	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
12.549	12.548	−0.001	±0.008	Passed

Examined M. TAKEISHI

Approved M. Ujinaki

JFE Advantech Co., Ltd.

CALIBRATION SHEET

Name: INFINITY-CT

Model: A7CT2-USB-ZF

Serial No. 0145

Parameters: Conductivity (Fresh Water)

JFE Advantech Co., Ltd.

Fresh Water Conductivity Calibration Sheet

MODEL : **A7CT2-USB-ZF**

SERIAL : **0145**

Date : 8-Feb-2021

Facility : Calibration facility

Method : The instrument is submerged in a constant-temperature tank filled with distilled water, where potassium chloride is gradually dissolved from 0 µS/cm to 2000 µS/cm (water is stirred to avoid thermal gradient and inhomogeneity). After that, the AD value output (current output value / voltage output value) is calculated from current and voltage output of the conductivity sensor. These values are then used to estimate conductivity through a polynomial regression approach.

Reference Unit : "METTLER" SevenEasy Conductivity adjusted with InLab730 standard solution (1413 µS/cm)

Equation : **Conductivity [mS/cm] = $A + B \times AD + C \times AD^2 + D \times AD^3$**

A = -5.887606E-01
B = 2.260580E+00
C = -2.256099E-01
D = 6.622906E-02

Reference [25 °C, mS/cm]	Temperature [°C]	C-equivalent *[mS/cm]	Output-AD	Calculated [mS/cm]	Error [mS/cm]	Assessment
0.0000	0.000	0.0000	0.267004	0.0000	0.0000	OK
0.0502	25.140	0.0503	0.290072	0.0496	-0.0007	OK
0.1002	24.955	0.1001	0.313205	0.0992	-0.0009	OK
0.4010	24.958	0.4007	0.455144	0.3996	-0.0010	OK
0.7520	24.960	0.7514	0.624730	0.7516	0.0002	OK
1.0000	24.963	0.9993	0.747031	1.0017	0.0024	OK
1.3030	24.967	1.3021	0.894639	1.3005	-0.0016	OK
1.6010	24.955	1.5996	1.043203	1.5991	-0.0004	OK
1.9100	24.960	1.9085	1.197697	1.9089	0.0004	OK

*Conductivity equivalent (C-equivalent) is corrected by the following equation to the value at respective temperature,

$$\text{C-equivalent} = (1 + ((T - 25) \times 0.02)) \times C,$$

where C is conductivity measured at 25 °C and T is the temperature of the water.

Criteria :
1. The results should be within an error of ±0.002 mS/cm (0 ~ 0.2000 mS/cm) and ±0.01 mS/cm (0.2000 ~ 2.0000 mS/cm).
2. During the sampling check, an arbitrary value from a standard solution is chosen and the and the output error from the instrument should be within 0.01 mS/cm.

Arbitrary value [mS/cm]	Output [mS/cm]	Error [mS/cm]	Assessment
1.4150	1.4130	-0.0020	OK

Final Assessment : **O K**

Calibration group

Ocean and River Instruments Division

JFE Advantech Co.,Ltd.