

Name of Accreditation Program	JCSS Accreditation Program
Accreditation Identification	JCSS 0155 Calibration
Name of Conformity Assessment Body	Measurement Standards Section, Technology Standardization Department, Azbil Corporation
Name of Legal Entity	Azbil Corporation JCN 9010001096367
Inquiry Point	Measurement Standards Section Tel: +81-466-20-2135      FAX: +81-466-20-2291

\*JCN: Japan Corporate Number



23·03·07-NITE-027  
2 0 2 3 - 0 8 - 2 0

## Certificate of Accreditation

International Accreditation Japan (IAJapan) hereby accredits the following conformity assessment body as a calibration laboratory of Japan Calibration Service System.

Accreditation Identification: JCSS 0155 Calibration

Name of Conformity Assessment Body: Measurement Standards Section,  
Technology Standardization Department,  
Azbil Corporation

Name of Legal Entity: Azbil Corporation

Location of Conformity Assessment Body: 1-12-2 Kawana, Fujisawa-shi, Kanagawa 251-8522,  
JAPAN

Scope of Accreditation: Time & Frequency & Rotational speed, Temperature,  
Fluid flow, Electricity (Direct Current & Low Frequency),  
Pressure, Humidity (as the following pages)

Accreditation Requirement: ISO/IEC 17025:2017\*

\* The relevant accreditation requirements described in the Accreditation Scheme Document for JCSS are also applied.

Effective Date of Accreditation: 2023-08-20

Expiry Date of Accreditation: 2027-08-19

Date of Initial Accreditation: 2007-10-01

SAITO Kazunori

Chief Executive, International Accreditation Japan (IAJapan)

National Institute of Technology and Evaluation

- International Accreditation Japan (IAJapan) is a laboratory accreditation body which has signed MRAs of ILAC (International Laboratory Accreditation Cooperation) and APAC (Asia Pacific Accreditation Cooperation).

- MRA requirements are, in addition to relevant international standards and guides, requirements for participation in proficiency testing programs, surveillance and reassessment, and the policy for the traceability of measurement for MRA purpose.

- This laboratory fulfills ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories. This accreditation means this laboratory meets both the technical competence requirements and management system requirements that are necessary for it to consistently deliver technically valid test results and calibrations (refer to joint ISO-ILAC-IAF Communiqué dated April 2017).

- The latest accreditation information is publicly available on IAJapan Website as an accreditation certificate.

General Field of Calibration: Time & Frequency & Rotational speed

Date of Initial Accreditation of the Field: 2019-10-10

Laboratory's permanent facility/On-site Calibration: Laboratory's permanent facility

Calibration and Measurement Capabilities

Calibration Procedures# and Type of Instruments/Materials to be calibrated		Range	Expanded Uncertainty (Level of Confidence Approximately 95 %)
Time & Frequency Counter, etc.	Frequency Standard	1 MHz, 5 MHz, 10 MHz	$4.0 \times 10^{-11}$
	Frequency Generator	1 MHz, 5 MHz, 10 MHz	$4.0 \times 10^{-11}$
	Frequency Counter	1 MHz, 5 MHz, 10 MHz	$4.0 \times 10^{-11}$

#All Calibration Procedures are in-house procedures developed by this laboratory.

\*The values in the Expanded Uncertainty column of Frequency Standard, Frequency Generator and Frequency Counter exclude sources of uncertainty attributed to a unit under test.

General Field of Calibration: Time & Frequency & Rotational speed

Date of Initial Accreditation of the Field: 2019-10-10

Laboratory's permanent facility/On-site Calibration: Non-Permanent Laboratory (Remote Calibration)

Calibration and Measurement Capabilities

Calibration Procedures# and Type of Instruments/Materials to be calibrated		Range	Service Area (Baseline)	Expanded Uncertainty (Level of Confidence Approximately 95 %)
Time & Frequency Counter, etc.	Frequency Standard	10 MHz	Up to 50 km	$4.0 \times 10^{-6}$ Hz
			More than 50 km up to 500 km	$4.0 \times 10^{-6}$ Hz
			More than 500 km up to 1600 km	$7.0 \times 10^{-6}$ Hz

#All Calibration Procedures are in-house procedures developed by this laboratory.

\*The values in the Expanded Uncertainty column of Frequency Standard exclude sources of uncertainty attributed to a unit under test.

General Field of Calibration: TemperatureDate of Initial Accreditation of the Field: 2007-10-01Laboratory's permanent facility/On-site Calibration: Laboratory's permanent facilityCalibration and Measurement Capabilities

Calibration Procedures# and Type of Instruments/Materials to be calibrated		Range	Expanded Uncertainty (Level of Confidence Approximately 95 %)		
Contact Type Thermometer	Fixed point apparatus	Triple point of water	0.5 mK		
		Melting point of Gallium	2.2 mK		
		Freezing point of Indium	2.4 mK		
	Resistance thermometer (Fixed point calibration)			$W(T_{90})$ (*1)	$R(T_{90})$ (*2)
		Triple point of water	-	0.7 mK	
		Melting point of Gallium	2.3 mK	2.4 mK	
		Freezing point of Indium	2.5 mK	2.5 mK	
	Resistance thermometer (Comparative calibration)	From 0 °C up to 200 °C	-	22 mK	
	Thermometer with indicator (Fixed point calibration)	Triple point of water	2.4 mK		
		Melting point of Gallium	3.2 mK		
		Freezing point of Indium	3.3 mK		
	Thermometer with indicator (Comparative calibration)	From 0 °C up to 200 °C	22 mK		

#All Calibration Procedures are in-house procedures developed by this laboratory.

(\*1) Temperature conversion of the expanded uncertainty of the ratio of the resistance  $R(T_{90})$  to  $R(273.16 \text{ K})$ ,  $W(T_{90})$ (\*2) Temperature conversion of the expanded uncertainty of the resistance  $W(T_{90})$ Laboratory's permanent facility/On-site Calibration: On-site CalibrationCalibration and Measurement Capabilities

Calibration Procedures# and Type of Instruments/Materials to be calibrated		Range	Expanded Uncertainty (Level of Confidence Approximately 95 %)
Contact Type Thermometer	Thermometer with indicator (Comparative calibration)	From 0 °C up to 80 °C	60 mK
		More than 80 °C up to 200 °C	70 mK

#All Calibration Procedures are in-house procedures developed by this laboratory.

General Field of Calibration: Fluid flow

Date of Initial Accreditation of the Field: 2019-10-10

Laboratory's permanent facility/On-site Calibration: Laboratory's permanent facility

Calibration and Measurement Capabilities

Calibration Procedures# and Type of Instruments/Materials to be calibrated			Range		Expanded Uncertainty (*1) (Level of Confidence Approximately 95 %)
Liquid	Micro flow meters		From 1 g/min up to 30 g/min		0.15 %
Gas flow meters	Gas flow meters	Critical flow venturi nozzles	Dry air	From 0.12 g/min up to 65 g/min (From 0.1 L/min up to 50 L/min)	0.30 %
				More than 65 g/min up to 130 g/min (More than 50 L/min up to 100 L/min)	$0.36Q \times 10^{-2} - 0.039 \text{ g/min}$
				More than 130 g/min up to 260 g/min (More than 100 L/min up to 200 L/min)	0.35 %
	Flow meters	Dry air	From 0.12 g/min up to 650 g/min (From 0.1 L/min up to 500 L/min)	0.40 %	

#All Calibration Procedures are in-house procedures developed by this laboratory.

(\*1)  $Q$ : measured quantity of air [g/min]

## General Field of Calibration: Electricity (Direct Current &amp; Low Frequency)

Date of Initial Accreditation of the Field: 2008-09-10

Laboratory's permanent facility/On-site Calibration: Laboratory's permanent facility  
Calibration and Measurement Capabilities

Calibration Procedures# and Type of Instruments/Materials to be calibrated		Range	Expanded Uncertainty (*1) (Level of Confidence Approximately 95 %)
Direct Current & Low Frequency Measuring Equipment, etc.	DC Resistance Box	From 0.1 $\Omega$ less than 1 $\Omega$	1.0 ppm
		From 1 $\Omega$ up to 10 k $\Omega$	0.60 ppm
		More than 10 k $\Omega$ up to 100 k $\Omega$	1.0 ppm
		More than 100 k $\Omega$ up to 1 M $\Omega$	2.5 ppm
		More than 1 M $\Omega$ up to 10 M $\Omega$	4.0 ppm
		More than 10 M $\Omega$ up to 100 M $\Omega$	6.0 ppm
		More than 100 M $\Omega$ up to 1 G $\Omega$	10 ppm
		More than 1 G $\Omega$ up to 10 G $\Omega$	20 ppm
	DC Resistance Measuring Equipment	0.1 $\Omega$	16 ppm
		1 $\Omega$	3.0 ppm
		More than 1 $\Omega$ less than 10 $\Omega$	8.0 ppm
		10 $\Omega$	3.0 ppm
		More than 10 $\Omega$ less than 100 $\Omega$	8.0 ppm
		100 $\Omega$	3.0 ppm
		More than 100 $\Omega$ less than 1 k $\Omega$	8.0 ppm
		1 k $\Omega$	3.0 ppm
		More than 1 k $\Omega$ less than 10 k $\Omega$	8.0 ppm
		10 k $\Omega$	3.0 ppm
		100 k $\Omega$	3.0 ppm
		1 M $\Omega$	4.0 ppm
		10 M $\Omega$	6.0 ppm
		100 M $\Omega$	16 ppm
		1 G $\Omega$	30 ppm
	10 G $\Omega$	60 ppm	
	DC Voltage Source	From 1 $\mu$ V up to 1 mV	0.120 $\mu$ V
		More than 1 mV less than 3 mV	120 ppm
		From 3 mV less than 100 mV	50 ppm
		From 100 mV less than 250 mV	$1.2 V_x \times 10^{-6} + 0.35 \mu$ V
		From 100 mV less than 1 V	2.5 ppm
		1 V	2.1 ppm
		More than 1 V less than 3 V	$0.6 V_x \times 10^{-6} + 2.7 \mu$ V
		From 3 V less than 10 V	1.5 ppm
		10 V	0.68 ppm
More than 10 V up to 100 V		5.6 ppm	
More than 100 V up to 1.1 kV	6.5 ppm		
DC Voltage	From 1 $\mu$ V less than 5.5 mV	0.09 $\mu$ V	

	Measuring Equipment	From 5.5 mV less than 100 mV	$5.4 V_x \times 10^{-6} + 0.06 \mu\text{V}$
		100 mV	5.0 ppm
		More than 100 mV less than 200 mV	5.2 ppm
		From 200 mV less than 1 V	4.0 ppm
		1 V	1.7 ppm
		More than 1 V less than 10 V	3.0 ppm
		10 V	1.2 ppm
		More than 10 V up to 1.1 kV	8.0 ppm
	Direct Current Source	From 20 $\mu\text{A}$ up to 200 $\mu\text{A}$	5.3 ppm
		More than 200 $\mu\text{A}$ up to 20 mA	5.0 ppm
		More than 20 mA up to 200 mA	6.0 ppm
		More than 200 mA up to 2000 mA	14 ppm
	Direct Current Measuring Equipment	From 20 $\mu\text{A}$ less than 100 $\mu\text{A}$	25 ppm
		From 100 $\mu\text{A}$ up to 200 mA	15 ppm
		More than 200 mA up to 2 A	35 ppm

#All Calibration Procedures are in-house procedures developed by this laboratory.

(\*1)  $V_x$ : measured voltage [mV]

Laboratory's permanent facility/On-site Calibration: Laboratory's permanent facility  
Calibration and Measurement Capabilities

Calibration Procedures# and Type of Instruments/Materials to be calibrated		Range (*1)		Expanded Uncertainty (*2) (Level of Confidence Approximately 95 %)
Direct Current & Low Frequency Measuring Equipment, etc.	Temperature Indicator	Thermocouple B, with Reference Junction	From 1.7919 mV up to 13.8203 mV (From 600 °C less than 1820 °C)	$(0.0049 + 0.00157E - 0.000068E^2)$ mV
		Thermocouple B, without Reference Junction	From 1.7919 mV up to 13.8203 mV (From 600 °C less than 1820 °C)	$(0.0014 + 0.00032E - 0.000013E^2)$ mV
		Thermocouple E, with Reference Junction	From -9.7184 mV less than 0.0000 mV (From -250 °C less than 0 °C)	$(0.0278 + 0.00002E - 0.000200E^2)$ mV
			From 0.0000 mV less than 37.0054 mV (From 0 °C less than 500 °C)	$(0.0270 + 0.00053E - 0.000007E^2)$ mV
			From 37.0054 mV up to 76.3728 mV (From 500 °C up to 1000 °C)	$(0.0400 - 0.00008E)$ mV
		Thermocouple E, without Reference Junction	From -9.7184 mV less than 0.0000 mV (From -250 °C less than 0 °C)	$(0.0165 - 0.000110E^2)$ mV
			From 0.0000 mV less than 37.0054 mV (From 0 °C less than 500 °C)	$(0.0160 + 0.00034E - 0.000005E^2)$ mV
			From 37.0054 mV up to 76.3728 mV (From 500 °C up to 1000 °C)	$(0.0230 - 0.00003E)$ mV
		Thermocouple J, with Reference Junction	From -8.0954 mV less than 0.0000 mV (From -210 °C less than 0 °C)	$(0.0240 + 0.00001E - 0.000200E^2)$ mV
			From 0.0000 mV less than 45.4944 mV (From 0 °C less than 800 °C)	$(0.0240 + 0.00011E)$ mV
			From 45.4944 mV up to 69.5532 mV (From 800 °C up to 1200 °C)	$(0.0360 - 0.00014E)$ mV
		Thermocouple J, without Reference	From -8.0954 mV less than 0.0000 mV (From -210 °C less than 0 °C)	$(0.0150 + 0.00002E - 0.000110E^2)$ mV

Junction	From 0.0000 mV less than 45.4944 mV (From 0 °C less than 800 °C)	(0.0150 + 0.00005E) mV
	From 45.4944 mV up to 69.5532 mV (From 800 °C up to 1200 °C)	(0.0210 - 0.00007E) mV
Thermocouple K, with Reference Junction	From -5.8914 mV less than 0.0000 mV (From -200 °C less than 0 °C)	(0.0190 + 0.00054E - 0.000200E <sup>2</sup> ) mV
	From 0.0000 mV less than 29.1290 mV (From 0 °C less than 700 °C)	(0.0190 + 0.00002E) mV
	From 29.1290 mV up to 54.8864 mV (From 700 °C up to 1372 °C)	(0.0230 - 0.00012E) mV
Thermocouple K, without Reference Junction	From -5.8914 mV less than 0.0000 mV (From -200 °C less than 0 °C)	(0.0113 + 0.00030E - 0.000110E <sup>2</sup> ) mV
	From 0.0000 mV less than 29.1290 mV (From 0 °C less than 700 °C)	(0.0112 + 0.00003E) mV
	From 29.1290 mV up to 54.8864 mV (From 700 °C up to 1372 °C)	(0.0137 - 0.00006E) mV
Thermocouple N, with Reference Junction	From -3.9904 mV less than 0.0000 mV (From -200 °C less than 0 °C)	(0.0128 + 0.00032E - 0.000330E <sup>2</sup> ) mV
	From 0.0000 mV less than 24.5267 mV (From 0 °C less than 700 °C)	(0.0124 + 0.00052E - 0.000012E <sup>2</sup> ) mV
	From 24.5267 mV up to 47.5128 mV (From 700 °C up to 1300 °C)	(0.0197 - 0.00006E) mV
Thermocouple N, without Reference Junction	From -3.9904 mV less than 0.0000 mV (From -200 °C less than 0 °C)	(0.0080 + 0.00017E - 0.000170E <sup>2</sup> ) mV
	From 0.0000 mV less than 24.5267 mV (From 0 °C less than 700 °C)	(0.0080 + 0.00029E - 0.000007E <sup>2</sup> ) mV
	From 24.5267 mV up to 47.5128 mV (From 700 °C up to 1300 °C)	(0.0119 - 0.00003E) mV
Thermocouple R, with Reference Junction	From 0.0000 mV less than 2.4006 mV (From 0 °C less than 300 °C)	(0.0029 + 0.00140E - 0.000300E <sup>2</sup> ) mV
	From 2.4006 mV less than 14.6287 mV (From 300 °C less than 1300 °C)	(0.0041 + 0.00026E - 0.000006E <sup>2</sup> ) mV
	From 14.6287 mV up to 21.0892 mV (From 1300 °C up to 1767 °C)	(-0.0032 + 0.00120E - 0.000036E <sup>2</sup> ) mV
Thermocouple R, without Reference Junction	From 0.0000 mV less than 2.4006 mV (From 0 °C less than 300 °C)	(0.0018 + 0.00086E - 0.000190E <sup>2</sup> ) mV
	From 2.4006 mV less than 14.6287 mV (From 300 °C less than 1300 °C)	(0.0024 + 0.00016E - 0.000003E <sup>2</sup> ) mV
	From 14.6287 mV up to 21.0892 mV (From 1300 °C up to 1767 °C)	(-0.0018 + 0.00071E - 0.000021E <sup>2</sup> ) mV
Thermocouple S, with Reference Junction	From 0.0000 mV less than 2.3230 mV (From 0 °C less than 300 °C)	(0.0029 + 0.00130E - 0.000270E <sup>2</sup> ) mV
	From 2.3230 mV less than 13.1591 mV (From 300 °C less than 1300 °C)	(0.0040 + 0.00020E - 0.000005E <sup>2</sup> ) mV
	From 13.1591 mV up to 18.6822 mV (From 1300 °C up to 1767 °C)	(-0.0042 + 0.00140E - 0.000048E <sup>2</sup> ) mV
Thermocouple S, without Reference Junction	From 0.0000 mV less than 2.3230 mV (From 0 °C less than 300 °C)	(0.0018 + 0.00071E - 0.000150E <sup>2</sup> ) mV
	From 2.3230 mV less than 13.1591 mV (From 300 °C less than 1300 °C)	(0.0024 + 0.00012E - 0.000002E <sup>2</sup> ) mV
	From 13.1591 mV up to 18.6822 mV (From 1300 °C up to 1767 °C)	(-0.0038 + 0.00100E - 0.000033E <sup>2</sup> ) mV
Thermocouple T, with Reference	From -6.1804 mV less than 0.0000 mV (From -250 °C less than 0 °C)	(0.0180 + 0.00035E - 0.000250E <sup>2</sup> ) mV



		Junction	From 0.0000 mV up to 20.8720 mV (From 0 °C up to 400 °C)	$(0.0189 + 0.00063E - 0.000010E^2)$ mV
		Thermocouple T, without Reference Junction	From -6.1804 mV less than 0.0000 mV (From -250 °C less than 0 °C)	$(0.0109 + 0.00023E - 0.000120E^2)$ mV
			From 0.0000 mV up to 20.8720 mV (From 0 °C up to 400 °C)	$(0.0109 + 0.00046E - 0.000009E^2)$ mV
		Resistance thermometer Sensor	From 18.52 Ω up to 390.48 Ω (From -200 °C up to 850 °C)	$60 R \times 10^{-6} + 0.0002 \Omega$

#All Calibration Procedures are in-house procedures developed by this laboratory.

(\*1) For Temperature Indicator with thermocouple input:

The values stated as temperature are informative and are calculated values from the Electromotive Force (EMF) for the relevant thermocouple type in JIS C 1602.

For Temperature Indicator with Resistance thermometer Sensor input:

The values stated as temperature are informative and are calculated values from the reference resistance for Pt100 in JIS C 1604.

(\*2) The units of coefficient of “( a + bE + cE<sup>2</sup> )mV” are as follows.

a [ ( mV ) / ( mV ) ], b [ 1 / ( mV ) ], c [ 1 / ( mV )<sup>2</sup> ]

E: measured voltage [mV]

R: measured resistance [Ω]

#### Laboratory's permanent facility/On-site Calibration: On-site Calibration

##### Calibration and Measurement Capabilities

Calibration Procedures# and Type of Instruments/Materials to be calibrated		Range	Expanded Uncertainty (*1) (Level of Confidence Approximately 95 %)
Direct Current & Low Frequency Measuring Equipment, etc.	DC Voltage Source	From 100 mV up to 1 V	$52 V_x \times 10^{-6} + 7.0 \mu\text{V}$
		More than 1 V up to 10 V	$40 V_x \times 10^{-6} + 60 \mu\text{V}$
		More than 10 V up to 100 V	$50 V_x \times 10^{-6} + 700 \mu\text{V}$
	DC Voltage Measuring Equipment	More than 100 mV less than 300 mV	$75 V_x \times 10^{-6} + 4.5 \mu\text{V}$
		More than 300 mV up to 1 V	90 ppm
		More than 1 V less than 3 V	$75 V_x \times 10^{-6} + 55 \mu\text{V}$
		More than 3 V up to 15 V	90 ppm
	Direct Current Source	From 1 mA up to 4 mA	$60 I_x \times 10^{-6} + 0.02 \mu\text{A}$
		More than 4 mA up to 22 mA	$50 I_x \times 10^{-6} + 0.2 \mu\text{A}$
		More than 22 mA up to 30 mA	$110 I_x \times 10^{-6} + 6.0 \mu\text{A}$
		More than 30 mA up to 100 mA	$120 I_x \times 10^{-6} + 20 \mu\text{A}$
	Direct Current Measuring Equipment	From 1 mA up to 4 mA	$50 I_x \times 10^{-6} + 0.05 \mu\text{A}$
More than 4 mA up to 22 mA		$50 I_x \times 10^{-6} + 0.2 \mu\text{A}$	

#All Calibration Procedures are in-house procedures developed by this laboratory.

(\*1)  $V_x$ : measured voltage [mV]

$I_x$ : measured current [mA]

## Laboratory's permanent facility/On-site Calibration: On-site Calibration

## Calibration and Measurement Capabilities

Calibration Procedures# and Type of Instruments/Materials to be calibrated		Range (*1)		Expanded Uncertainty (*2) (Level of Confidence Approximately 95 %)
Direct Current & Low Frequency Measuring Equipment, etc.	Temperature Indicator	Thermocouple B, with Reference Junction	From 1.7919 mV up to 13.8203 mV (From 600 °C up to 1820 °C)	$(0.0120 + 0.00387E - 0.000168E^2)$ mV
		Thermocouple B, without Reference Junction	From 1.7919 mV up to 13.8203 mV (From 600 °C up to 1820 °C)	$(0.0027 + 0.00032E - 0.000013E^2)$ mV
		Thermocouple E, with Reference Junction	From -9.7184 mV less than 0.0000 mV (From -250 °C less than 0 °C)	$(0.0350 + 0.00010E - 0.000240E^2)$ mV
			From 0.0000 mV less than 37.0054 mV (From 0 °C less than 500 °C)	$(0.0340 + 0.00066E - 0.000009E^2)$ mV
			From 37.0054 mV up to 76.3728 mV (From 500 °C up to 1000 °C)	$(0.0500 - 0.00009E)$ mV
		Thermocouple E, without Reference Junction	From -9.7184 mV less than 0.0000 mV (From -250 °C less than 0 °C)	$(0.0180 - 0.000110E^2)$ mV
			From 0.0000 mV less than 37.0054 mV (From 0 °C less than 500 °C)	$(0.0180 + 0.00028E - 0.000004E^2)$ mV
			From 37.0054 mV up to 76.3728 mV (From 500 °C up to 1000 °C)	$(0.0240 - 0.00003E)$ mV
		Thermocouple J, with Reference Junction	From -8.0954 mV less than 0.0000 mV (From -210 °C less than 0 °C)	$(0.0310 + 0.00015E - 0.000250E^2)$ mV
			From 0.0000 mV less than 45.4944 mV (From 0 °C less than 800 °C)	$(0.0305 + 0.00013E)$ mV
			From 45.4944 mV up to 69.5532 mV (From 800 °C up to 1200 °C)	$(0.0450 - 0.00018E)$ mV
		Thermocouple J, without Reference Junction	From -8.0954 mV less than 0.0000 mV (From -210 °C less than 0 °C)	$(0.0150 + 0.00002E - 0.000110E^2)$ mV
			From 0.0000 mV less than 45.4944 mV (From 0 °C less than 800 °C)	$(0.0150 + 0.00007E)$ mV
			From 45.4944 mV up to 69.5532 mV (From 800 °C up to 1200 °C)	$(0.0210 - 0.00006E)$ mV
		Thermocouple K, with Reference Junction	From -5.8914 mV less than 0.0000 mV (From -200 °C less than 0 °C)	$(0.0240 + 0.00065E - 0.000260E^2)$ mV
			From 0.0000 mV less than 29.1290 mV (From 0 °C less than 700 °C)	$(0.0235 + 0.00003E)$ mV
			From 29.1290 mV up to 54.8864 mV (From 700 °C up to 1372 °C)	$(0.0290 - 0.00016E)$ mV
		Thermocouple K, without Reference Junction	From -5.8914 mV less than 0.0000 mV (From -200 °C less than 0 °C)	$(0.0123 + 0.00030E - 0.000110E^2)$ mV
			From 0.0000 mV less than 29.1290 mV (From 0 °C less than 700 °C)	$(0.0120 + 0.00002E)$ mV
			From 29.1290 mV up to 54.8864 mV (From 700 °C up to 1372 °C)	$(0.0145 - 0.00007E)$ mV
		Thermocouple N, with Reference Junction	From -3.9904 mV less than 0.0000 mV (From -200 °C less than 0 °C)	$(0.0167 + 0.00044E - 0.000440E^2)$ mV
From 0.0000 mV less than 32.3713 mV (From 0 °C less than 900 °C)	$(0.0165 + 0.00060E - 0.000012E^2)$ mV			
From 32.3713 mV up to 47.5128 mV (From 900 °C up to 1300 °C)	$(0.0260 - 0.00010E)$ mV			

		Thermocouple N, without Reference Junction	From -3.9904 mV less than 0.0000 mV (From -200 °C less than 0 °C)	$(0.0095 + 0.00025E - 0.000200E^2)$ mV
			From 0.0000 mV less than 32.3713 mV (From 0 °C less than 900 °C)	$(0.0095 + 0.00033E - 0.000007E^2)$ mV
			From 32.3713 mV up to 47.5128 mV (From 900 °C up to 1300 °C)	$(0.0167 - 0.00012E)$ mV
		Thermocouple R, with Reference Junction	From 0.0000 mV less than 2.4006 mV (From 0 °C less than 300 °C)	$(0.0160 + 0.01140E - 0.002720E^2)$ mV
			From 2.4006 mV less than 14.6287 mV (From 300 °C less than 1300 °C)	$(0.0250 + 0.00176E - 0.000044E^2)$ mV
			From 14.6287 mV up to 21.0892 mV (From 1300 °C up to 1767 °C)	$(-0.0240 + 0.00800E - 0.000240E^2)$ mV
		Thermocouple R, without Reference Junction	From 0.0000 mV less than 2.4006 mV (From 0 °C less than 300 °C)	$(0.0032 + 0.00112E - 0.000283E^2)$ mV
			From 2.4006 mV less than 14.6287 mV (From 300 °C less than 1300 °C)	$(0.0038 + 0.00022E - 0.000005E^2)$ mV
			From 14.6287 mV up to 21.0892 mV (From 1300 °C up to 1767 °C)	$(-0.0023 + 0.00100E - 0.000030E^2)$ mV
		Thermocouple S, with Reference Junction	From 0.0000 mV less than 2.3230 mV (From 0 °C less than 300 °C)	$(0.0170 + 0.01040E - 0.002700E^2)$ mV
			From 2.3230 mV less than 13.1591 mV (From 300 °C less than 1300 °C)	$(0.0240 + 0.00143E - 0.000041E^2)$ mV
			From 13.1591 mV up to 18.6822 mV (From 1300 °C up to 1767 °C)	$(-0.0705 + 0.01390E - 0.000450E^2)$ mV
		Thermocouple S, without Reference Junction	From 0.0000 mV less than 2.3230 mV (From 0 °C less than 300 °C)	$(0.0032 + 0.00150E - 0.000500E^2)$ mV
			From 2.3230 mV less than 13.1591 mV (From 300 °C less than 1300 °C)	$(0.0037 + 0.00018E - 0.000005E^2)$ mV
			From 13.1591 mV up to 18.6822 mV (From 1300 °C up to 1767 °C)	$(-0.0072 + 0.00163E - 0.000053E^2)$ mV
Thermocouple T, with Reference Junction	From -6.1804 mV less than 0.0000 mV (From -250 °C less than 0 °C)	$(0.0230 + 0.00100E - 0.000180E^2)$ mV		
	From 0.0000 mV up to 20.8720 mV (From 0 °C up to 400 °C)	$(0.0230 + 0.00100E - 0.000020E^2)$ mV		
Thermocouple T, without Reference Junction	From -6.1804 mV less than 0.0000 mV (From -250 °C less than 0 °C)	$(0.0120 + 0.00047E - 0.000062E^2)$ mV		
	From 0.0000 mV up to 20.8720 mV (From 0 °C up to 400 °C)	$(0.0115 + 0.00046E - 0.000009E^2)$ mV		
Resistance thermometer Sensor	From 18.52 Ω up to 390.48 Ω (From -200 °C up to 850 °C)	$80 R \times 10^{-6} + 0.0003 \Omega$		

#All Calibration Procedures are in-house procedures developed by this laboratory.

(\*1) For Temperature Indicator with thermocouple input:

The values stated as temperature are informative and are calculated values from the Electromotive Force (EMF) for the relevant thermocouple type in JIS C 1602.

For Temperature Indicator with Resistance thermometer Sensor input:

The values stated as temperature are informative and are calculated values from the reference resistance for Pt100 in JIS C 1604.

(\*2) The units of coefficient of “ $(a + bE + cE^2)$  mV” are as follows.

a [(mV)/(mV)], b [1/(mV)], c [1/(mV)<sup>2</sup>]

E: measured voltage [mV]

R: measured resistance [Ω]

General Field of Calibration: PressureDate of Initial Accreditation of the Field: 2007-10-01Laboratory's permanent facility/On-site Calibration: Laboratory's permanent facilityCalibration and Measurement Capabilities

Calibration Procedures# and Type of Instruments/Materials to be calibrated		Range		Expanded Uncertainty (*1) (Level of Confidence Approximately 95 %)		
Pressure Gauge	Pressure Balance	Gas	Gauge Pressure	From 23 kPa up to 353 kPa	28 ppm or 0.7 Pa, whichever is larger	
				More than 353 kPa up to 7 000 kPa	32 ppm or 16 Pa, whichever is larger	
		Liquid	Gauge Pressure	From 1 MPa up to 100 MPa	48 ppm or 350 Pa, whichever is larger	
	Pressure Gauges (Digital Pressure Gauges, Pressure Transducers)	Gas	Absolute Pressure		From 13 kPa up to 453 kPa	35 ppm or 2.5 Pa, whichever is larger
					More than 453 kPa up to 7 000 kPa	40 ppm or 22 Pa, whichever is larger
			Gauge Pressure		From 13 kPa up to 353 kPa	31 ppm or 1.0 Pa, whichever is larger
					More than 353 kPa up to 7 000 kPa	35 ppm or 17 Pa, whichever is larger
		Liquid	Absolute Pressure	From 1.1 MPa up to 100 MPa	50 ppm or 350 Pa whichever is larger	
			Gauge Pressure	From 1 MPa up to 100 MPa	50 ppm or 350 Pa whichever is larger	
	Vacuum Gauge	Vacuum Gauge	From 0.1 Pa up to 1 Pa		$0.24 P \times 10^{-2} + 0.00015 \text{ Pa}$	
More than 1 Pa up to 4 Pa			$0.20 P \times 10^{-2} + 0.0015 \text{ Pa}$			
More than 4 Pa up to 40 Pa			0.20 %			
More than 40 Pa up to 133.32 Pa			$0.12 P \times 10^{-2} + 0.010 \text{ Pa}$			
More than 133.32 Pa up to 1.3332 kPa			$0.085 P \times 10^{-2} + 0.15 \text{ Pa}$			
More than 1.3332 kPa up to 13.332 kPa			$0.060 P \times 10^{-2} + 1.5 \text{ Pa}$			
More than 13.332 kPa up to 133.32 kPa			$0.010 P \times 10^{-2} + 10 \text{ Pa}$			

#All Calibration Procedures are in-house procedures developed by this laboratory.

(\*1)  $P$ : measured pressure [Pa]

General Field of Calibration: HumidityDate of Initial Accreditation of the Field: 2007-10-01Laboratory's permanent facility/On-site Calibration: Laboratory's permanent facilityCalibration and Measurement Capabilities

Calibration Procedures# and Type of Instruments/Materials to be calibrated		Range	Expanded Uncertainty (Level of Confidence Approximately 95 %)
Humidity Measuring Instrument, etc.	Dew point hygrometer	Frost point From -50 °C less than -30 °C	Frost point 0.20 °C
		Frost point From -30 °C up to -10 °C	Frost point 0.14 °C
		Dew point From -10 °C up to 40 °C	Dew point 0.12 °C
		Dew point More than 40 °C up to 85 °C	Dew point 0.20 °C
		Relative humidity from 10 % up to 50 % at calibration temperature from 10 °C less than 20 °C	Relative humidity 0.80 %
		Relative humidity more than 50 % up to 90 % at calibration temperature from 10 °C less than 20 °C	Relative humidity 1.2 %
		Relative humidity from 10 % up to 50 % at calibration temperature from 20 °C up to 25 °C	Relative humidity 0.60 %
		Relative humidity more than 50 % up to 90 % at calibration temperature from 20 °C up to 25 °C	Relative humidity 0.90 %
		Relative humidity from 10 % up to 50 % at calibration temperature more than 25 °C up to 40 °C	Relative humidity 0.80 %
		Relative humidity more than 50 % up to 90 % at calibration temperature more than 25 °C up to 40 °C	Relative humidity 1.2 %
	Capacitive Hygrometers	Frost point From -50 °C up to -10 °C	Frost point 0.80 °C
	Electronic Hygrometer	Relative humidity from 10 % up to 50 % at calibration temperature from 10 °C less than 20 °C	Relative humidity 0.80 %
		Relative humidity more than 50 % up to 90 % at calibration temperature from 10 °C less than 20 °C	Relative humidity 1.2 %
		Relative humidity from 10 % up to 50 % at calibration temperature from 20 °C up to 25 °C	Relative humidity 0.60 %
		Relative humidity more than 50 % up to 90 % at calibration temperature from 20 °C up to 25 °C	Relative humidity 0.90 %
Relative humidity from 10 % up to 50 % at calibration temperature		Relative humidity 0.80 %	

		more than 25 °C up to 40 °C	
		Relative humidity more than 50 % up to 90 % at calibration temperature more than 25 °C up to 40 °C	Relative humidity 1.2 %
		Dew point from -10 °C at calibration temperature from 10 °C less than 20 °C where Relative humidity from 10 % up to 90 %	Dew point 0.30 °C
		Dew point from -10 °C less than 0 °C at calibration temperature from 20 °C up to 25 °C where Relative humidity from 10 %	Dew point 0.30 °C
		Dew point from 0 °C at calibration temperature from 20 °C up to 25 °C where Relative humidity up to 90 %	Dew point 0.20 °C
		Dew point from -10 °C up to 38.1 °C at calibration temperature more than 25 °C up to 40 °C where Relative humidity from 10 % up to 90 %	Dew point 0.30 °C

#All Calibration Procedures are in-house procedures developed by this laboratory.

Laboratory's permanent facility/On-site Calibration: On-site Calibration  
Calibration and Measurement Capabilities

Calibration Procedures# and Type of Instruments/Materials to be calibrated		Range	Expanded Uncertainty (Level of Confidence Approximately 95 %)
Humidity Measuring Instrument, etc.	Electronic Hygrometer	Relative humidity from 10 % up to 90 % at calibration temperature from 10 °C up to 40 °C	Relative humidity 2.0 %

#All Calibration Procedures are in-house procedures developed by this laboratory.