

Standard Installation Locations

Midway between the diffuser plate and the water surface

Inside bath: W = 36 (cm) D = 32 (cm) H = 34 (cm) Volume = 39 (Liters)

Standard Locations #1: w = 5 (cm) d = 5 (cm)

Standard Locations #2: w = 5 (cm) d = 5 (cm)

Standard Locations #3: w = 5 (cm) d = 5 (cm)

Standard Locations #4: w = 5 (cm) d = 5 (cm)

Standard Locations #5: Center of any probes. (#1 - #4)

Position of Std	#1	#2	#3	#4	#5
Channel of Logger	1	2	3	4	5

Definitions

Indicating Temperature: The average reading of indicating device which forms the integral part of the bath.

Measured Temperature: The average reading of standards at any positions or location.

Measured Uniformity: The maximum difference of measured temperatures between of any probes and the measured temperature at the reference location which are observed at same time or at close observation time as possible to determine the temperature pattern or homogeneity with the bath at steady-state. The reference probe is preferably located in the geometric center of the bath.

Measured Stability: The one-half of greatest maximum difference of measured temperatures at any one probe.

Overall Variation: The difference of maximum and minimum measured temperatures throughout observation time.

DKSH Technology Limited
2533 Sukhumvit Road, Bangkok, Phrakhanong, Bangkok 10260
Phone: +66 2638 7000 Email: info.calibration@dksh.com Website: www.dksh.com/certificatio-thailand

Delivering Growth - in Asia and Beyond.

CAL-FM-C13-13: 12 Sep 2022

Calibration Results:

Without adjustment

Measurement Temperature at Spread Locations, Indicating of Unit Under Calibration: 85 °C

Locations	Measured Temperature (°C)	Correction of UUC. (°C)	Uncertainty (± °C)
#1	85.42	0.42	1.1
#2	85.33	0.33	1.1
#3	85.38	0.38	1.2
#4	85.44	0.44	1.1
#5	85.34	0.34	1.1

Temperature Distribution

Desired (°C)	Setting (°C)	Indicating (°C)	Measured Temperature at Spread Locations (°C)					Uncertainty (± °C)*
			#1	#2	#3	#4	#5	
85	85	85	85.42	85.33	85.38	85.44	85.34	1.2

Bath Characterization

Indicating (°C)	Measured Uniformity (°C)	Measured Stability (± °C)	Overall Variation (°C)
85	0.29	0.54	1.10

Note: * Maximum uncertainty of the each position

The End of Certificate

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CAL-FM-C13-13: 12 Sep 2022

ใบตรวจสอบสภาพเครื่องควบคุมอุณหภูมิ

เลขที่ใบงาน: KSPR2213523

ชนิดเครื่องมือ: Liquid Bath

รุ่น: WNB22/TCN4L

หมายเลขเครื่อง: L508.0973

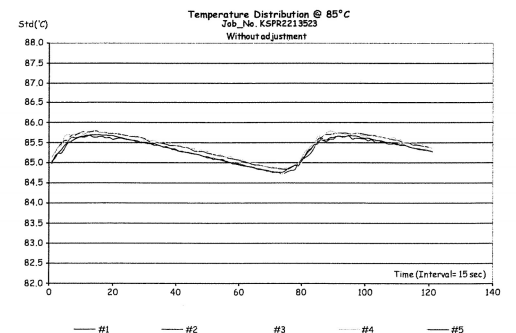
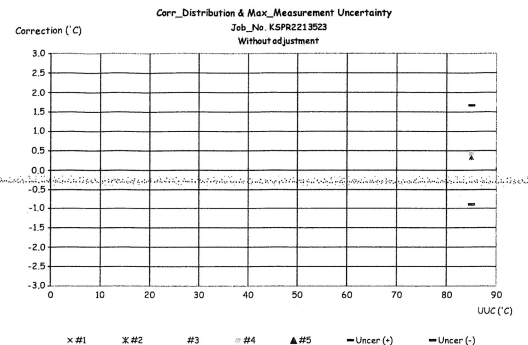
ตรวจสอบ (รับ)		รายการตรวจเช็ค	ตรวจสอบ (ส่ง)		หมายเหตุ
31 Oct 2022			31 Oct 2022		
ปกติ	ไม่ปกติ		ปกติ	ไม่ปกติ	
		General			
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1. สายไฟ	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	2. การทำงาน Main Switch	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	3. การทำงาน Selector Key	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	4. การแสดงผล Display	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	5. การทำงาน Circulator	<input type="checkbox"/>	<input type="checkbox"/>	ไม่มี
<input checked="" type="checkbox"/>	<input type="checkbox"/>	6. สภาพ Lever door open / close	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	7. พอร์ระบายน้ำทิ้ง (DRAIN)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	8. การทำงานของระบบทำความเย็น	<input type="checkbox"/>	<input type="checkbox"/>	ไม่มี
<input checked="" type="checkbox"/>	<input type="checkbox"/>	9. สภาพตู้เครื่อง	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	10. สภาวะแวดล้อม ณ สถานที่ตั้งเครื่อง	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

ข้อแนะนำ :

Mr. Chaiwat Srisanguan
Service Engineer

DKSH Technology Limited
2533 Sukhumvit Road, Bangkok, Phrakhanong, Bangkok 10260
Phone: +66 2638 7000 Email: info.calibration@dksh.com Website: www.dksh.com/certificatio-thailand

Delivering Growth - in Asia and Beyond.



Certificate Number CPH-0018-22

Calibration Certificate
Seven2Go™ Polarographic DO S4

Customer

Company: INTEGRATED RESEARCH CENTER CO., LTD.

Address: 122 Moo 2,
T. Toom, A.Srinahaphole
PRACHINBURI 25140

Customer ID number: 301604799

Order Number: 

Instrument

Type Seven2Go™ Polarographic DO S4 Instrument Serial Number C136508714

Internal Identification - Firmware version 1.00

Technical specifications

Measuring Range 0.00 ... 99.9 mg/L (ppm) 0.0 ... 600 %
Resolution 0.01 mg/L 0.1 %
Limit of Error ± 0.2 mg/L in range 0 ... 15 ± 10 %
 ± 10 % in range 15 ... 60

Temperature range ATC -5 ... 105 °C Pressure range 500 ... 1105 mbar
Resolution 0.1 °C Resolution 1 mbar
Limit of Error ± 0.2 °C Limit of Error ± 2 %

Procedure Statement

METTLER TOLEDO Seven2Go Service Manual Section B (Doc. No. 30232219) will be used as reference documentation to adjust and certify the instrument indicated in the "Type" and "Serial number" section. The measurement results of this certification were obtained at ambient conditions.

Certificate Number CPH-0018-22

Certification Tools

Certified digital voltmeter Manufacturer Xitron Technologies Serial number 2000-01-1512-00003
Control No. ANA81 Certificate number EU1211393
Date of Certification April 1, 2022

DO Calibration Kit Manufacturer METTLER TOLEDO / ME-51302345 Serial number 0206
Type 51302345 Certificate number 56145
Control No. ANA30 Due Date October 27, 2022

DO resistors

Designation	Nominal value	Certified value
DO 10 mQ	10.000 MΩ	10.0542 MΩ
DO 1 mQ	1.000 MΩ	1.0151 MΩ

Temperature resistors

Designation	Nominal value	Certified value
NTC 22 kΩ, 0 °C	66.180 kΩ	66.1659 kΩ
NTC 22 kΩ, 25 °C	22.000 kΩ	21.9932 kΩ
NTC 22 kΩ, 50 °C	8.448 kΩ	8.4487 kΩ

Barometric pressure meter Manufacturer TESTO / 0560 5113 Serial number 30605905
(Testo 511) Control No. ANA31 Certificate number 20P4131
Due Date October 7, 2022



Certificate Number CPH-0018-22

Certification Measurements

Designation	Theoretical current	Measured value	Max. Tolerance	Passed / Failed
Empty	460 mV	-660.89 mV	10 mV	Passed
10 MΩ	-65.967 nA	-65.94 nA	0.5 %	Passed
1 MΩ	-651.059 nA	-651.8 nA	0.5 %	Passed

Designation	Nominal value	Measured value	Max. Tolerance	Passed / Failed
NTC 22 kΩ, 0 °C	3.0 °C	3.0 °C	0.2 °C	Passed
NTC 22 kΩ, 25 °C	25.0 °C	25.0 °C	0.2 °C	Passed
NTC 22 kΩ, 50 °C	50.0 °C	50.0 °C	0.2 °C	Passed

Designation	Measured value Certified meter	Measured value DO meter	Max. Tolerance	Passed / Failed
Ambient pressure	1015.8 mbar	1015 mbar	2 %	Passed

Summary of Certification

Certification of instrument **Passed**

The instrument referred to in this certificate has fulfilled the criteria of the certification. This is indicated by the notation Passed in the column above.

Remarks

Certification of the instrument was performed by

Service Specialist: Sookjai Sriwisait Place: Laboratory room

Calibration Date: January 13, 2022 Signature: ELECTRONIC SIGNATURE



Mettler-Toledo (Thailand) Limited

METTLER TOLEDO

Performance Test

Control No. CPH-0018-22 / 1

Company: INTEGRATED RESEARCH CENTER CO., LTD.
Address: 122 Moo 2, T. Toom, A.Srinahaphole
PRACHINBURI 25140 Assignment ID: *0370182673*

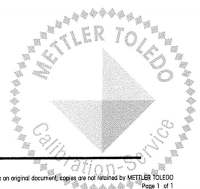
DO Electrode

Type: InLab 605-ISM S/N: 1471235

Measurement

Test	Measurement Probe	
	Before Adjustment	After Adjustment
Air	98.8%	95.4%
Pressure	1014 mbar	1014 mbar
Temperature	26.4 °C	26.3 °C

Remarks: -
Place: Laboratory room Calibration Date: January 13, 2022
Service Specialist: Sookjai Sriwisait Signature: Electronic Signature



Agilent CrossLab Start Up Services

Agilent 5100 5110 ICP-OES Preventive Maintenance

Agilent Preventive Maintenance provides factory recommended service for your analytical instruments to assure reliable operation and the accuracy of your results

Delivered by highly trained and certified service engineers using genuine Agilent parts and supplies, Agilent Preventive Maintenance provides what you need to reduce unplanned downtime and keep your systems operating at their peak performance.

This checklist is used as a guide for completing the preventive maintenance tasks. A signed copy of this checklist is provided for your records.

Introduction

Customer Information

- Customers should provide all necessary operating supplies upon request of the engineer.
- A customer representative should be available to the engineer while performing the preventive maintenance procedures. Customers are responsible for regular maintenance and are encouraged to observe the service representative.
- Any parts not included in the Parts Lists section of this document are not part of the recommended Preventive Maintenance service nor are they included in the price of this service.
- If a system requires the use of extra or special procedures and/or parts for the maintenance service, then these must be ordered separately and charged as a repair, which may incur additional costs.
- For customers using HF applications, the instrument should be returned to its standard sample introduction system.

Important Customer Web Links

- To access **Agilent University**, visit <http://www.agilent.com/crosslab/university/> to learn about training options, which include online, classroom and onsite delivery. A training specialist can work directly with you to help determine your best options.
- To access the **Agilent Resource Center** web page, visit <https://www.agilent.com/en-us/agilentresources>. The following information topics are available:
 - Sample Prep and Containment
 - Chemical Standards
 - Analysis
 - Service and Support
 - Application Workflows
- The **Agilent Community** is an excellent place to get answers, collaborate with others about applications and Agilent products, and find in-depth documents and videos relevant to Agilent technologies. Visit <https://community.agilent.com/welcome>
- Videos about specific preparation requirements for your instrument can be found by searching the **Agilent YouTube** channel at <https://www.youtube.com/user/agilent>
- Need to place a service call?** Flexible Repair Options | Agilent

Service Engineer's Responsibilities

- Contact the customer and ensure that all necessary supplies are available before the preventive maintenance visit.
- Only select those pages that relate to the system or module being serviced.
- Complete empty fields with the relevant information.
- Complete the relevant checkboxes in the checklist using either a "X" or tick mark "✓".
- Check **"Service not applicable"** check boxes to indicate services/tasks not delivered, as appropriate.
- Complete the Preventive Maintenance services in the most logical order relevant to the individual system service in the order of the tasks listed.
- Complete the **Service Review** section together with the customer.
- Complete the fields for page numbers at the foot of each selected page
- Add relevant page numbers to selected pages and complete the total number of pages field in the Service Completion section
- Ask the customer to sign the Service Verification section including the customer's and your signature.**

Instrument Maintenance

System Information

- ☐ Check this box if an instrument configuration report is attached instead of completing the table.

Instrument System Name and ID	5110 ICP-OES
Instrument System Site and Location	Integrated Research Center

List System Component Product Numbers	List the Serial Numbers of each Component
1. G8015 A	MY 19351008
2. G8481 A	1907 - 00426
3.	
4.	
5.	
6.	
7.	
8.	
9.	

ICP-OES Configuration Table	Circle the type or write in the type if other
Nebulizer Type	SeaSpray OneNeb Conikal Other
Spray Chamber	Cyclonic Single Pass Cyclonic Double Pass Other
Torch	Radial Dual View Other
Torch Type	One Piece Semi Demountable Fully Demountable Other
Injector Diameter	2.4mm 1.8mm 1.4mm 0.8mm Other
Injector Material	Quartz Ceramic Other

Preparation

- ☒ Discuss any specific issues with the customer before starting.
- ☒ Review the instrument logbook for recorded problems and comments.
- ☒ Save instrument control settings before starting the procedure.
- ☒ Perform a general inspection of the system for cleanliness.
- ☒ Check for proper installation of parts, assemblies, sensors etc.
- ☒ Check system for required installation of components and implementation of Service Notes
- ☒ Check for required firmware/software updates and verify with customers if they would like them installed.
- ☒ For HF application systems, if standard sample introduction system was not installed, ask the customer to install it.
- ☒ Ask the customer to remove any samples from the ICP-OES sample introduction area, auto sampler or around the ICP-OES.

Preventive Maintenance Procedures

Record Pre-PM instrument performance

- ☒ Run Instrument Performance test.
- ☒ Record results in Instrument Performance Test Results Table – Pre-PM.

Clean and inspect ICP-OES system

- ☒ Look for any obvious external damage or problems.
- ☒ Inspect water cooling hoses, gas lines and power cord for excessive wear or damage.
- ☒ Perform a general internal inspection of the system for excessive dust accumulation, clean if necessary.
- ☒ Inspect sample introduction components and record any required maintenance in the Service Engineer Comments and notify the customer as the required actions required.
- ☒ Record the instrument operating conditions in the ICP-OES Status Results Table.
- ☒ Replace the polychromator purge filter.
- ☒ Replace the radial pre-optics window
- ☒ Replace the axial pre-optics window for SVDV and VDV instruments.
- ☒ Check exhaust flow for the correct positive extraction at the exhaust duct to insure they meet minimum specifications.
- ☒ Replace air inlet dust filter.
- ☒ Replace high capacity air inlet dust filter element if installed.
- ☒ Remove and clean instrument water inlet filter.

Agilent Water Recirculator

- ☐ Service not applicable
- ☒ Drain cooling fluid and remove any particles from the chiller reservoir
- ☒ Remove, clean and reinstall water inlet metal mesh filter if present.
- ☒ Re fill with Agilent Cool Clear cooling fluid.
- ☒ Clean the cooling system Air filter and the condenser.

SPS 3 Auto Sampler

- ☒ Service not applicable
- ☐ Power cycle the autosampler and verify successful initialization.
- ☐ Inspect X and Z axis belts for cracks. Replace is necessary.
- ☐ Clean X and Z axis slide shafts.
- ☐ Using customer's racks and the Agilent software move the sample probe to the 4 outermost corners and rinse port, ensure that the probe is approximately centered in the vial.

SPS 4 Auto sampler

- ☒ Service not applicable
- ☐ Clean the spill tray, rack location mat, end frames and chassis with a damp soft cloth and diluted mild detergent.
- ☐ Clean the auto sampler cover panels, if cover kit is installed, with domestic window cleaner.
- ☐ Check the X-axis and Z-axis drive belts for cracks, splits, damaged teeth, excessive fraying, color changes or degradation from fumes.
- ☐ Check the X-axis, Theta-axis and Z-axis FFC cables for cracks, incorrect positioning, damaged edges or damaged connectors.
- ☐ Pump Tubing Replacement. Replace peristaltic pump tubing. Replace all tubing that goes from the rinse station to the pump and from the pump to the waste/rinse bottles
- ☐ Test using customer's tray and move the sample probe to the sample vial 1, wash vial and rinse port and ensure that the probe is centered in the vial. If not use calibration wizard and calibrate the position.

AVS 4, 6, 7 Advanced Valve System

- ☒ Service not applicable
- ☐ Replace valve rotor seal
- ☐ Check fittings for signs of leaks
- ☐ Check tubing including autosampler tubing for kinks or excessive wear
- ☐ Check high flow pump for signs of leaks

ICP-OES adjustment

- ☒ Check position of Zn peak, adjust if required.
- ☒ Check Argon Ratio, adjust to specified value if required.
- ☒ Perform Detector Calibration.
- ☒ Perform Instrument Calibration.

Record Post-PM instrument performance

- ☒ Run Instrument Performance test.
- ☒ Record results in Instrument Performance Test Results Table - Post PM.
- ☒ For systems using ICP Expert version 7.3 and above, run the following Instrument tests
 - ☒ Subsystem Communications Test
 - ☒ Air Flow
 - ☒ Water Flow
 - ☒ Gas Flows
 - ☒ RF Generator
 - ☒ Camera Test
 - ☒ Optics Test
 - ☒ Nebulizer Test
- ☒ Record the result in the Instrument Test Results Table

Restore Instrument

- ☒ For HF applications, ask the customer to reinstall their sample introduction system.
- ☒ Leave system in an idle state: on and purging.
- ☒ Guidance: If the PM service is performed prior to a qualification service, then use the qualification procedure as a guide for final instrument set up and checkout.

Service Review

- ☒ Attach available reports/printouts of all tests to this documentation.
- ☒ Record the Preventive Maintenance service activity in the customer's records/logbook.
- ☒ Record the PM event in the Smart Alerts logbook, if applicable.
- ☒ Update/reset instrument maintenance counters as appropriate.
- ☒ Affix the PM sticker to the system or instrument logbook based on the customer's request.
- ☒ Complete the Service Engineer Comments section if there are additional comments.
- ☒ Review this service, parts replaced, and test results obtained with the customer.
- ☒ If the instrument firmware was updated, record the details of the change in the Service Engineer's Comments box. Systems in a compliant environment may need additional documentation.
- ☒ Complete the Signature Page with both Service Engineer and Customer signatures.

Test Results

Instrument Performance Test Results Table

Note: These measurements do not form part of any specification and are for reference only.

	Pre PM Sensitivity Check		Post PM Sensitivity Check	
	Radial	Axial *	Radial	Axial*
Zn 213.857 nm SRBR	1635.4	4472.2	2482.1	7041.7
Mn 257.610 nm SRBR	6804.5	24554.9	9363.6	33365.1
Al 396.152 nm SBR	6.4	16.3	8.1	20.2
K 766.491 nm SBR	6.4	90.1	6.5	86.6

* Axial result is not applicable for G8016AA, G8012AA Radial View instruments.

Instrument Test Results Table

Note: The Instrument Test results are for systems using ICP Expert version 7.3 and above only.

Instrument Test	Result
Subsystem Communications Test	Pass
Air Flow	Pass
Water Flow	Pass
Gas Flows	Pass
RF Generator	Pass
Camera Test	Pass
Optics Test	Pass
Nebulizer test	Pass

ICP-OES Status Results Table

Note: These measurements do not form part of any specification and are for reference only.

Measurement	Standby Mode	Plasma On
Mains Voltage	229.767 VAC	227.965 VAC
Mains Current	0.093 A	0.262 A
Instrument Temperature	23.5 °C	24.2 °C
RF Air Flow (sensor speed)	12.0 Hz	16.0 Hz
Plasma Exhaust Temperature	No measurement	59.2 °C
Water Flow Oscillator	No measurement	1.51 L/min
Water Flow Detector	1.17 L/min	1.17 L/min
Water Inlet Temperature	21.0 °C	21.4 °C
Polychromator Temperature	35.6 °C	35.0 °C
COD Temperature	-39.6 °C	-39.5 °C
Thermal Stabilizer	35.0 °C	35.0 °C
Argon Supply Pressure	586.17 kPa	544.17 kPa
Purge Gas Supply Pressure*1	584.71 kPa	568.57 kPa
Option Gas Supply Pressure*1	0.16 kPa	0.94 kPa
Nebulizer Flow	No measurement	0.70 L/min
Nebulizer Back Pressure	No measurement	291.75 kPa
Plasma Gas Flow	No measurement	12.05 L/min
Auxiliary Gas Flow	No measurement	1.00 L/min
RF Power	No measurement	1202.1 W
RF Supply Current	No measurement	8.500 A
RF Supply Voltage	No measurement	188.730 V

*1 If option installed

Consumed PM Parts

Part Description	Part Number	Product or Model# where used	Quantity consumed
Axial Pre-Optic Window	G8010-68014	G8010A, G8011A, G8014A/G8015A	1
Radial Pre-Optic Window	G8010-68015	All	1
Agilent Cool Clear Coolant Fluid	5799-0037	Agilent Water Recirculator	
Purge Gas Filter	G8010-60136	All	1
Air inlet filter	G8000-68002	All	1
High Capacity Air Filter	G8010-60189	Optional	
Rotor seal for 6-7 port valve for AVS6/7	G8494-60002	G8494A/G8495	
Rotor seal for 4 port valve for AVS4	G8493-60002	G8493A	
Rinse solution to rinse station 2.5mm id x 1m	G8410-80123	SPS 4	
Barb connector 2.5mm-1.5mm ID	G8410-80124	SPS 4	
PVC waste tubing, 8mm od x 5mm id, 2m	G8410-80122	SPS 4	
Additional Parts may be required from engineer's stock:			
X axis drive belt	5410047500	SPS 3	
Z axis drive belt	5410047400	SPS 3	
Peristaltic pump tubing, PVC SolvaFlex, 3 bridged,	3710049000	SPS 4	

Consumed Parts Reference
(Purchased by customer, not included as part of PM)

☒ Section Not Applicable

Part Description	Part Number	Product or Model# where used	Quantity consumed
------------------	-------------	------------------------------	-------------------



Signature Page

Service Engineer Comments (optional)

If there are any specific points you wish to note as part of performing the installation or other items of interest for the customer, please write in this box.

Service Verification

Service Request Number: 6005669849 Date Service Completed:

Service Engineer Name: Uthai Ngamerttsirichai Customer Name:

Service Engineer Signature: Uthai Ng. Customer Signature:

Total number of pages in this document: 14



MIRACLE INTERNATIONAL TECHNOLOGY CO., LTD
214 Bangwaek Rd. Bangnai Bangkok 10160
Tel.: 0-2865-4647-8 Fax: 0-2865-4649 http://www.mit.in.th



CALIBRATION CERTIFICATE

Certificate No. : S2022100447-0001
Date Issued : 02-Nov-22

Customer : Integrated Research Center Co., Ltd.
122 Moo 2, Thatoon, Srimahaphote, Prachinburi 25140

Equipment : Conductivity Meter

Manufacturer : METTLER TOLEDO

Model : Seven Eacy

Serial No. : 1232025828

ID No./Tag No. : DARC-TE11047

Date Received : 31-Oct-22

Date Calibrated : 31-Oct-22

Calibrated by : Mr. Chanon Konyawong

Calibration Method or Calibration Procedure Used

In-house method : CP-148 by direct measurement with certified reference material.

This certificate is traceable to national standards, which realize the units of measurement according to the International System of Units (SI).

Result of Calibration

The reported uncertainty of measurement was based on standard uncertainty multiplied by a coverage factor $k = 2$, providing a level confidence approximately 95 percent.

This certificate may not be reproduced other than in full except with the prior written approval of the Miracle International Technology Company Limited.

Approved



Certificate No. : S2022100447-0001

Environment : Ambient Temperature : Start record 27.9 °C, Stop record 27.6 °C
Relative Humidity : Start record 53.4 %RH, Stop record 53.6 %RH

Adjustment :

X Without Adjustment				
STD	Before Adjusted	After Adjusted	Error	Uncertainty
Conductivity Solution	UUC Reading	UUC Reading		(±)
1409 µS/cm at 24.80°C	1411 µS/cm at 24.8 °C	- µS/cm -	2 µS/cm	7.7 µS/cm $k = 2.00$

STD = Standard

UUC = Unit Under Calibration

Description of UUC : Scale Division 1 µS/cm

Condition As-Received : Used Item
The measurement results and statements of conformity with specification only relate to the item calibrated.

Standard Conductivity Solution :

Standard Conductivity Solution & Traceability :

The International System of Units (SI) through
MIT Certificate No. AD2203-084-0005 for Density solution 1.0 g/ml Serial No. D1713161117, Due 04-Mar-23
Hanna Certificate No. 27D23 for Conductivity 1413 µS/cm @ 25°C Lot No. 7666, Due 04 APR 2027

End of Certificate



CALIBRATION CERTIFICATE

Certificate No. : S2022100447-0002
Date Issued : 02-Nov-22

Customer : Integrated Research Center Co., Ltd.
122 Moo 2, Thatoom, Srimahaphote, Prachinburi 25140

Equipment : pH/DO Meter

Manufacturer : METTLER TOLEDO
Model : Seven Go Duo
Serial No. : B932068736
ID No./Tag No. : -
Date Received : 31-Oct-22
Date Calibrated : 31-Oct-22

Calibrated by : Mr. Chanon Konyawong

Calibration Method or Calibration Procedure Used

In-house method : CP-42 by direct measurement with pH buffer solution.

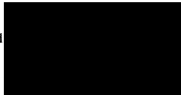
This certificate is traceable to national standards, which realize the units of measurement according to the International System of Units (SI).

Result of Calibration

The reported uncertainty of measurement was based on standard uncertainty multiplied by a coverage factor $k = 2$, providing a level confidence approximately 95 percent.

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Approved



Page 1 of 2

Certificate No : S2022100447-0002

Environment : Ambient Temperature : Start record 26.7 °C, Stop record 26.8 °C
Relative Humidity : Start record 53.4 %RH, Stop record 53.6 %RH

DC Voltage Measurement Results Part

Nominal Value (pH)	STD Applied DC Voltage (mV)	UUC Reading (mV)	UUC Reading (pH)	UUC Error (mV)	Uncertainty (± mV)
0.00	414.12	414.1	0.00	-0.02	0.17
4.00	177.48	177.5	4.00	0.02	0.12
7.00	0.00	0.0	7.00	0.00	0.059
10.00	-177.48	-177.5	10.00	-0.02	0.12
14.00	-414.12	-414.2	14.00	-0.08	0.17

Electrode Test Results Part

3 points calibration using standard buffer solutions of pH 4.01, pH 7.01, pH 10.01

Percent Slope : 100.02 at pH 7.01 and 4.01, 100.12 at pH 7.01 and 10.007

Set Slope :

- Hanna Lot No. 7439 for pH 4.01 Buffer Solution, Due 18 FEB 2027

- Hanna Lot No. 7252 for pH 7.01 Buffer Solution, Due 13 DEC 2026

- Hanna Lot No. 7480 for pH 10.01 Buffer Solution, Due 24 FEB 2024

Standard pH Solution @ 25° C (pH)	Before Adjusted UUC Reading (pH)	After Adjusted UUC Reading (pH)	UUC Error (pH)	Uncertainty (± mV)
4.000	4.09	4.00	0.000	0.0084
6.985	7.11	7.02	0.035	0.0091
10.007	10.15	10.01	0.003	0.0085

STD = Standard

UUC = Unit Under Calibration

Description of UUC : Range pH 0 to pH 14
-2000 mV to 2000 mV

Condition As-Received : Used Item

The measurement results and statements of conformity with specification only relate to the item calibrated.

Certified Reference Material & Traceability of Certificate :

The International System of Units (SI) through

- YOKOGAWA Certificate No. SCL-22B-0176 for HANDY CAL CA150 Serial No. 23L2009, Due 25-Feb-23

- NIMT Lot No. 160221 for pH 4.000 Buffer Solution, Due 14 DEC 2022

- CPA chem Lot No. 800652 for pH 6.985 Buffer Solution, Due 07 MAR 2023

- NIMT Lot No. 180121 for pH 10.007 Buffer Solution, Due 14 DEC 2022

End of Certificate

Page 2 of 2



CALIBRATION CERTIFICATE

Certificate No. : S2022100447-0003
Date Issued : 02-Nov-22

Customer : Integrated Research Center Co., Ltd.
122 Moo 2, Thatoom, Srimahaphote, Prachinburi 25140

Equipment : Oven

Manufacturer : Binder
Model : ED 115
Serial No. : 950360
ID No./Tag No. : -
Date Received : 31-Oct-22
Date Calibrated : 31-Oct-22

Calibrated by : Mr. Chanon Konyawong

Calibration Method or Calibration Procedure Used

Standard method : CP-05 TLAS G-20.

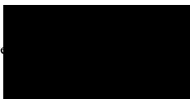
This certificate is traceable to national standards, which realize the units of measurement according to the International System of Units (SI).

Result of Calibration

The reported uncertainty of measurement was based on standard uncertainty multiplied by a coverage factor $k = 2$, providing a level confidence approximately 95 percent.

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Page 1 of 3

Certificate No. : S2022100447-0003

Environment : Ambient Temperature : Start record 25.5 °C, Stop record 25.3 °C
Relative Humidity : Start record 53.6 %RH, Stop record 53.8 %RH

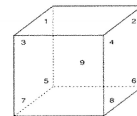
Calibration Temperature (°C)	Setting Temperature (°C)	Indicating Temperature (°C)	Measured Stability ¹ (°C)	Measured Uniformity ² (°C)	Overall Variation ³ (°C)
104	104	104	0.13	0.74	0.79

Without adjustment

Calibration Temperature (°C)	STD No. 1 (°C)	STD No. 2 (°C)	STD No. 3 (°C)	STD No. 4 (°C)	STD No. 5 (°C)	STD No. 6 (°C)	STD No. 7 (°C)	STD No. 8 (°C)	STD No. 9 (°C)	Uncertainty ⁴ ±°C
104	103.93	103.90	103.84	104.18	103.86	104.22	103.80	104.08	104.44	1.1

Note : Probe No. 9 is Reference Probe

Setting Air Fresh No. -



Condition As-Received : Used Item

The measurement results and statements of conformity with specification only relate to the item calibrated.

Measurement Standards Used & Traceability :

The International System of Units (SI) through

MIT Certificate No. AD2206-272-0002 for Data Acquisition STD-286 Module 2 Serial No. MY44023139, Due 30-Dec-22

Notes : 1. The temperature stability is the one-half of greatest maximum difference of measured temperatures at any one probe.

2. The temperature uniformity is the maximum difference of measured temperatures between of any probes and the measured temperature at the reference location which are observed at same time.

3. Overall variation is the difference of maximum and minimum measured temperatures throughout observation time.

4. The uncertainty of measurement is included temperature stability.

5. The temperature uniformity, stability, overall variation and indicating temperature is applicable to all air or gas filled temperature controlled enclosures at atmospheric pressure.

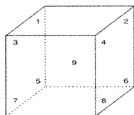
Page 2 of 3

Certificate No. : S2022100447-0003
Environment : Ambient Temperature : Start record 25.5 °C, Stop record 25.3 °C
Relative Humidity : Start record 53.6 %RH, Stop record 53.8 %RH

Calibration Temperature (°C)	Setting Temperature (°C)	Indicating Temperature (°C)		Measured Stability ¹ (°C)	Measured Uniformity ² (°C)		Overall Variation ³ (°C)			
180	180	180		0.20	0.97		1.46			
Without adjustment										
Calibration Temperature (°C)	STD No. 1 (°C)	STD No. 2 (°C)	STD No. 3 (°C)	STD No. 4 (°C)	STD No. 5 (°C)	STD No. 6 (°C)	STD No. 7 (°C)	STD No. 8 (°C)	STD No. 9 (°C)	Uncertainty ⁴ ±°C
180	180.47	180.28	180.34	180.28	179.95	179.40	179.91	179.51	179.67	1.1

Note : Probe No. 9 is Reference Probe

Setting Air Fresh No. -



Condition As-Received : Used Item

The measurement results and statements of conformity with specification only relate to the item calibrated.

Measurement Standards Used & Traceability :

The International System of Units (SI) through

MIT Certificate No. AD2206-272-0002 for Data Acquisition STD-286 Module 2 Serial No. MY44023139, Due 30-Dec-22

- Notes : 1. The temperature stability is the one-half of greatest maximum difference of measured temperatures at any one probe.
2. The temperature uniformity is the maximum difference of measured temperatures between of any probes and the measured temperature at the reference location which are observed at same time.
3. Overall variation is the difference of maximum and minimum measured temperatures throughout observation time.
4. The uncertainty of measurement is included temperature stability.
5. The temperature uniformity, stability, overall variation and indicating temperature is applicable to all air or gas filled temperature controlled enclosures at atmospheric pressure.

End of Certificate

Page 3 of 3



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214 Bangwaek Rd. Bangpai Bangkok 10160
Tel.: 0-2865-4647-8 Fax: 0-2865-4649 http://www.mit.in.th



CALIBRATION CERTIFICATE

Certificate No. : S2022100447-0004

Date Issued : 02-Nov-22

Customer : Integrated Research Center Co., Ltd.
122 Moo 2, Thatoom, Srimahaphote, Prachinburi 25140

Equipment : Oven

Manufacturer : Binder
Model : ED 115
Serial No. : 2019000012946
ID No./Tag No. : -
Date Received : 31-Oct-22
Date Calibrated : 31-Oct-22

Calibrated by : Mr. Chanon Konyawong

Calibration Method or Calibration Procedure Used

Standard method : CP-05 TLAS G-20.

This certificate is traceable to national standards, which realize the units of measurement according to the International System of Units (SI).

Result of Calibration

The reported uncertainty of measurement was based on standard uncertainty multiplied by a coverage factor $k = 2$, providing a level confidence approximately 95 percent.

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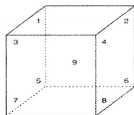
Page 1 of 3

Certificate No. : S2022100447-0004
Environment : Ambient Temperature : Start record 25.5 °C, Stop record 25.3 °C
Relative Humidity : Start record 53.6 %RH, Stop record 53.8 %RH

Calibration Temperature (°C)	Setting Temperature (°C)	Indicating Temperature (°C)			Measured Stability ¹ (°C)	Measured Uniformity ² (°C)			Overall Variation ³ (°C)	
104	104	104			0.15	0.48			0.53	
Without adjustment										
Calibration Temperature (°C)	STD No. 1 (°C)	STD No. 2 (°C)	STD No. 3 (°C)	STD No. 4 (°C)	STD No. 5 (°C)	STD No. 6 (°C)	STD No. 7 (°C)	STD No. 8 (°C)	STD No. 9 (°C)	Uncertainty ⁴ ±°C
104	104.16	104.52	104.10	104.31	104.12	104.48	104.42	104.38	104.15	1.1

Note : Probe No. 9 is Reference Probe

Setting Air Fresh No. -



Condition As-Received : Used Item

The measurement results and statements of conformity with specification only relate to the item calibrated.

Measurement Standards Used & Traceability :

The International System of Units (SI) through

MIT Certificate No. AD2206-272-0002 for Data Acquisition STD-286 Module 2 Serial No. MY44023139, Due 30-Dec-22

- Notes : 1. The temperature stability is the one-half of greatest maximum difference of measured temperatures at any one probe.
2. The temperature uniformity is the maximum difference of measured temperatures between of any probes and the measured temperature at the reference location which are observed at same time.
3. Overall variation is the difference of maximum and minimum measured temperatures throughout observation time.
4. The uncertainty of measurement is included temperature stability.
5. The temperature uniformity, stability, overall variation and indicating temperature is applicable to all air or gas filled temperature controlled enclosures at atmospheric pressure.

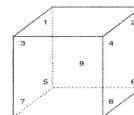
Page 2 of 3

Certificate No. : S2022100447-0004
Environment : Ambient Temperature : Start record 25.5 °C, Stop record 25.3 °C
Relative Humidity : Start record 53.6 %RH, Stop record 53.8 %RH

Calibration Temperature	Setting Temperature	Indicating Temperature			Measured Stability ¹	Measured Uniformity ²			Overall Variation ³	
(°C)	(°C)	(°C)			(°C)	(°C)			(°C)	
180	180	180			0.39	0.66			1.02	
Without adjustment										
Calibration Temperature	STD No. 1	STD No. 2	STD No. 3	STD No. 4	STD No. 5	STD No. 6	STD No. 7	STD No. 8	STD No. 9	Uncertainty
(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	±°C
180	180.68	180.42	180.27	180.34	180.01	180.21	180.25	180.25	180.25	1.2

Note : Probe No. 9 is Reference Probe

Setting Air Fresh No. -



Condition As-Received : Used Item

The measurement results and statements of conformity with specification only relate to the item calibrated.

Measurement Standards Used & Traceability :

The International System of Units (SI) through

MIT Certificate No. AD2206-272-0002 for Data Acquisition STD-286 Module 2 Serial No. MY44023139, Due 30-Dec-22

- Notes : 1. The temperature stability is the one-half of greatest maximum difference of measured temperatures at any one probe.
2. The temperature uniformity is the maximum difference of measured temperatures between of any probes and the measured temperature at the reference location which are observed at same time.
3. Overall variation is the difference of maximum and minimum measured temperatures throughout observation time.
4. The uncertainty of measurement is included temperature stability.
5. The temperature uniformity, stability, overall variation and indicating temperature is applicable to all air or gas filled temperature controlled enclosures at atmospheric pressure.

End of Certificate

Page 3 of 3



CALIBRATION CERTIFICATE

Certificate No. : S2022100447-0005
Date Issued : 02-Nov-22

Customer : Integrated Research Center Co., Ltd.
 122 Moo 2, Thatoom, Srimahaphote, Prachinburi 25140

Equipment : Oven

Manufacturer : Memmert
Model : UF110
Serial No. : B.417.1014
ID No./Tag No. : DARC-TE17006
Date Received : 31-Oct-22
Date Calibrated : 31-Oct-22
Calibrated by : Mr. Chanon Konyawong

Calibration Method or Calibration Procedure Used

Standard method : CP-05 TLAS G-20.

This certificate is traceable to national standards, which realize the units of measurement according to the International System of Units (SI).

Result of Calibration

The reported uncertainty of measurement was based on standard uncertainty multiplied by a coverage factor $k = 2$, providing a level confidence approximately 95 percent.

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Page 1 of 3

Certificate No. : S2022100447-0005
Environment : Ambient Temperature : Start record 25.6 °C, Stop record 25.3 °C
 Relative Humidity : Start record 53.4 %RH, Stop record 53.8 %RH

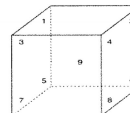
Calibration Temperature (°C)	Setting Temperature (°C)	Indicating Temperature (°C)	Measured Stability ¹ (°C)	Measured Uniformity ² (°C)	Overall Variation ³ (°C)
104	104.0	104.0	0.20	0.58	0.91

Without adjustment

Calibration Temperature (°C)	STD No. 1 (°C)	STD No. 2 (°C)	STD No. 3 (°C)	STD No. 4 (°C)	STD No. 5 (°C)	STD No. 6 (°C)	STD No. 7 (°C)	STD No. 8 (°C)	STD No. 9 (°C)	Uncertainty ⁴ ±°C
104	104.03	103.71	104.21	103.81	103.95	104.05	103.82	104.26	104.19	0.99

Note : Probe No. 9 is Reference Probe

Setting Air Fresh No. -



Condition As-Received : Used Item

The measurement results and statements of conformity with specification only relate to the item calibrated.

Measurement Standards Used & Traceability :

The International System of Units (SI) through

MIT Certificate No. AD2206-271-0002 for Temperature Indicator with Sensor Serial No. US37020317, Due 29-Dec-22

Notes : 1. The temperature stability is the one-half of greatest maximum difference of measured temperatures at any one probe.

2. The temperature uniformity is the maximum difference of measured temperatures between of any probes and the measured temperature at the reference location which are observed at same time.

3. Overall variation is the difference of maximum and minimum measured temperatures throughout observation time.

4. The uncertainty of measurement is included temperature stability.

5. The temperature uniformity, stability, overall variation and indicating temperature is applicable to all air or gas filled temperature controlled enclosures at atmospheric pressure.

Page 2 of 3

Certificate No. : S2022100447-0005
Environment : Ambient Temperature : Start record 25.6 °C, Stop record 25.3 °C
 Relative Humidity : Start record 53.4 %RH, Stop record 53.8 %RH

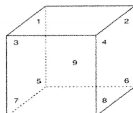
Calibration Temperature (°C)	Setting Temperature (°C)	Indicating Temperature (°C)	Measured Stability ¹ (°C)	Measured Uniformity ² (°C)	Overall Variation ³ (°C)
180	180.0	180.0	0.24	0.51	1.07

Without adjustment

Calibration Temperature (°C)	STD No. 1 (°C)	STD No. 2 (°C)	STD No. 3 (°C)	STD No. 4 (°C)	STD No. 5 (°C)	STD No. 6 (°C)	STD No. 7 (°C)	STD No. 8 (°C)	STD No. 9 (°C)	Uncertainty ⁴ ±°C
180	180.56	180.05	180.65	180.15	180.20	180.63	180.08	180.74	180.41	1.1

Note : Probe No. 9 is Reference Probe

Setting Air Fresh No. -



Condition As-Received : Used Item

The measurement results and statements of conformity with specification only relate to the item calibrated.

Measurement Standards Used & Traceability :

The International System of Units (SI) through

MIT Certificate No. AD2206-271-0002 for Temperature Indicator with Sensor Serial No. US37020317, Due 29-Dec-22

Notes : 1. The temperature stability is the one-half of greatest maximum difference of measured temperatures at any one probe.

2. The temperature uniformity is the maximum difference of measured temperatures between of any probes and the measured temperature at the reference location which are observed at same time.

3. Overall variation is the difference of maximum and minimum measured temperatures throughout observation time.

4. The uncertainty of measurement is included temperature stability.

5. The temperature uniformity, stability, overall variation and indicating temperature is applicable to all air or gas filled temperature controlled enclosures at atmospheric pressure.

End of Certificate

Page 3 of 3



CALIBRATION CERTIFICATE

Certificate No. : S2022100447-0010
Date Issued : 02-Nov-22

Customer : Integrated Research Center Co., Ltd.
 122 Moo 2, Thatoom, Srimahaphote, Prachinburi 25140

Equipment : Block Digestion for ICP

Manufacturer : Environmental Express
Model : SC1831
Serial No. : 2021CPC-W256
ID No./Tag No. : -
Date Received : 31-Oct-22
Date Calibrated : 31-Oct-22
Calibrated by : Mr. Chanon Konyawong

Calibration Method or Calibration Procedure Used

In-house method : CP-49 base on TLAS G-20 by comparing against Standard Thermometer.

This certificate is traceable to national standards, which realize the units of measurement according to the International System of Units (SI).

Result of Calibration

The reported uncertainty of measurement was based on standard uncertainty multiplied by a coverage factor $k = 2$, providing a level confidence approximately 95 percent.

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Page 1 of 3

Certificate No. : S2022100447-0010

Environment : Ambient Temperature : Start record 25.7 °C, Stop record 25.4 °C
Relative Humidity : Start record 53.5 %RH, Stop record 53.8 %RH

Calibration Temperature (°C)	Setting Temperature (°C)	Indicating Temperature (°C)	Measured Stability ¹ (°C)	Measured Uniformity ² (°C)	Overall Variation ³ (°C)
95	95	95	0.41	2.25	2.06

Calibration Temperature (°C)	Standard Reading (°C), Probe No. 18 is Reference Probe					Uncertainty ⁴ (±°C)
95	No. 1	No. 2	No. 3	No. 4	No. 5	1.2
	94.60	94.38	94.64	94.67	94.68	
	No. 6	No. 7	No. 8	No. 9	No. 10	
	94.93	95.38	94.36	95.39	94.26	
	No. 11	No. 12	No. 13	No. 14	No. 15	
	94.94	94.43	94.73	94.40	94.83	
	No. 16	No. 17	No. 18	No. 19	No. 20	
	94.71	94.69	95.00	95.25	94.67	
	No. 21	No. 22	No. 23	No. 24	No. 25	
	95.03	94.92	95.28	94.95	95.22	
	No. 26	No. 27	No. 28	No. 29	No. 30	
	95.03	95.15	95.18	95.66	94.03	
	No. 31	No. 32	No. 33	No. 34	No. 35	
	94.96	95.20	95.29	95.09	95.04	

Without adjustment	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7
	No. 8	No. 9	No. 10	No. 11	No. 12	No. 13	No. 14
	No. 15	No. 16	No. 17	No. 18	No. 19	No. 20	No. 21
	No. 22	No. 23	No. 24	No. 25	No. 26	No. 27	No. 28
	No. 29	No. 30	No. 31	No. 32	No. 33	No. 34	No. 35
	Top view position						

Condition As-Received : Used Item
The measurement results and statements of conformity with specification only relate to the item calibrated.

Measurement Standards Used & Traceability :
The International System of Units (SI) through

MIT Certificate No. AD2206-271-0001 for Temperature Indicator with Sensor Serial No. US37020317, Due 29-Dec-22

MIT Certificate No. AD2206-271-0002 for Temperature Indicator with Sensor Serial No. US37020317, Due 29-Dec-22

- Notes : 1. The temperature stability is the one-half of greatest maximum difference of measured temperatures at any one probe.
2. The temperature uniformity is the maximum difference of measured temperatures between of any probes and the measured temperature at the reference location which are observed at same time.
3. Overall variation is the difference of maximum and minimum measured temperatures throughout observation time.
4. The uncertainty of measurement is included temperature stability.

Page 2 of 3

Certificate No. : S2022100447-0010

Environment : Ambient Temperature : Start record 25.7 °C, Stop record 25.4 °C
Relative Humidity : Start record 53.5 %RH, Stop record 53.8 %RH

Calibration Temperature (°C)	Setting Temperature (°C)	Indicating Temperature (°C)	Measured Stability ¹ (°C)	Measured Uniformity ² (°C)	Overall Variation ³ (°C)
105	105	105	0.41	9.94	2.09

Calibration Temperature (°C)	Standard Reading (°C), Probe No. 18 is Reference Probe					Uncertainty ⁴ (±°C)
105	No. 1	No. 2	No. 3	No. 4	No. 5	2.5
	104.95	104.66	104.92	104.96	104.96	
	No. 6	No. 7	No. 8	No. 9	No. 10	
	104.93	105.38	104.82	105.39	104.54	
	No. 11	No. 12	No. 13	No. 14	No. 15	
	104.94	104.92	104.72	104.69	104.84	
	No. 16	No. 17	No. 18	No. 19	No. 20	
	104.71	104.68	105.01	105.25	104.67	
	No. 21	No. 22	No. 23	No. 24	No. 25	
	105.06	104.94	105.30	104.97	105.24	
	No. 26	No. 27	No. 28	No. 29	No. 30	
	105.05	105.17	105.20	105.70	104.04	
	No. 31	No. 32	No. 33	No. 34	No. 35	
	105.08	104.84	105.48	105.05	105.00	

Without adjustment	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7
	No. 8	No. 9	No. 10	No. 11	No. 12	No. 13	No. 14
	No. 15	No. 16	No. 17	No. 18	No. 19	No. 20	No. 21
	No. 22	No. 23	No. 24	No. 25	No. 26	No. 27	No. 28
	No. 29	No. 30	No. 31	No. 32	No. 33	No. 34	No. 35
	Top view position						

Condition As-Received : Used Item
The measurement results and statements of conformity with specification only relate to the item calibrated.

Measurement Standards Used & Traceability :
The International System of Units (SI) through


MIT Certificate No. AD2206-271-0001 for Temperature Indicator with Sensor Serial No. US37020317, Due 29-Dec-22

MIT Certificate No. AD2206-271-0002 for Temperature Indicator with Sensor Serial No. US37020317, Due 29-Dec-22

- Notes : 1. The temperature stability is the one-half of greatest maximum difference of measured temperatures at any one probe.
2. The temperature uniformity is the maximum difference of measured temperatures between of any probes and the measured temperature at the reference location which are observed at same time.
3. Overall variation is the difference of maximum and minimum measured temperatures throughout observation time.
4. The uncertainty of measurement is included temperature stability.

End of Certificate

Page 3 of 3

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Tel.: 0-2865-4647-8 Fax: 0-2865-4649 http://www.mit.in.th



CALIBRATION CERTIFICATE

Certificate No. : S2022100447-0008
Date Issued : 02-Nov-22

Customer : Integrated Research Center Co., Ltd.
122 Moo 2, Thatoom, Srimahaphote, Prachinburi 25140

Equipment : Cool room

Manufacturer : Dixell
Model : XRO6CX-5NOC1
Serial No. : LIOGBXB500
ID No./Tag No. : DARC-TE15028
Date Received : 31-Oct-22
Date Calibrated : 31-Oct-22
Calibrated by : Mr. Chanon Konyawong

Calibration Method or Calibration Procedure Used

Standard method : CP-05 TLAS G-20.

This certificate is traceable to national standards, which realize the units of measurement according to the International System of Units (SI).

Result of Calibration

The reported uncertainty of measurement was based on standard uncertainty multiplied by a coverage factor $k = 2$, providing a level confidence approximately 95 percent.

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Page 1 of 2

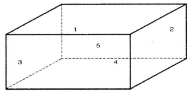
Certificate No. : S2022100447-0008

Environment : Ambient Temperature : Start record 25.5 °C, Stop record 25.8 °C
Relative Humidity : Start record 53.6 %RH, Stop record 53.2 %RH

Calibration Temperature (°C)	Setting Temperature (°C)	Indicating Temperature (°C)	Measured Stability ¹ (°C)	Measured Uniformity ² (°C)	Overall Variation ³ (°C)
4	4.0	4.0	1.52	1.11	3.03

Calibration Temperature (°C)	STD No. 1 (°C)	STD No. 2 (°C)	STD No. 3 (°C)	STD No. 4 (°C)	STD No. 5 (°C)	Uncertainty ⁴ (±°C)
4	4.11	4.14	4.60	4.22	4.47	1.8

Note : Probe No. 5 is Reference Probe



Condition As-Received : Used Item

The measurement results and statements of conformity with specification only relate to the item calibrated.

Measurement Standards Used & Traceability :

The International System of Units (SI) through

MIT Certificate No. L202209095-004 for Digital Thermometer with Probe (Agilent) M1 (166) Pt1000 Serial No. MY44009836, Due 11-Mar-23

- Notes : 1. The temperature stability is the one-half of greatest maximum difference of measured temperatures at any one probe.
2. The temperature uniformity is the maximum difference of measured temperatures between of any probes and the measured temperature at the reference location which are observed at same time.
3. Overall variation is the difference of maximum and minimum measured temperatures throughout observation time.
4. The uncertainty of measurement is included temperature stability.

End of Certificate

Page 2 of 2