

CERTIFICADO DE CARACTERIZACIÓN / CHARACTERIZATION CERTIFICATE

INNOVATECIS CIA LTDA

Certificado No. (Certificate #): 55862

General José María Guerrero N69-170 y Alfonso del Hierro

Fecha de Recepción (Reception Date): 2025-04-10

Quito, Ecuador

Fecha de Caracterización (Characterization Date): 2025-04-10

(+593) 02 6040 607

Próxima Fecha de Caracterización (Characterization Due):

innovatec@innovatec.com.ec

Fecha de Emisión (Emission Date): 2025-04-11

Cliente (Client): INSTITUTO NACIONAL DE METEOROLOGIA E HIDROLOGIA
E3 BLASCO NUÑEZ DE VELA N36-15 Y N36A COREA, QUITO, PICHINCHA

Información del Instrumento (Instrument Information)

| | | | | | |
|-----------------------------|------------|---|-------------------|---|--------------------|
| Equipo (Instrument): | INCUBADORA | Int. de Medición: (Measurement Range) | (35 / 44 / 60) °C | Ubicación: (Location): | Incubación |
| Marca (Brand): | MEMMERT | | | | |
| Modelo (Model): | INB 400 | División de escala: (Resolution) | 0.5 °C | Lugar de Calibración: (Place of Calibration): | In Situ On Site |
| Serie (Serial #): | E406.0947 | | | | |
| Código (Code #): | E.LAS.15 | | | | |

Datos de Calibración (Calibration Info)

Condiciones Ambientales (Environmental Conditions)

Procedimiento (Procedure): INN-PC-29

Temp. Inicial (Initial Temp.): 21.85 °C

Hum. Inicial (Initial Hum.): 55.23 %HR

Temp. Final (Final Temp.): 22.33 °C

Hum. Final (Final Hum.): 52.68 %HR

Trazabilidad (Traceability Info)

| Patrón (Standard) | Marca (Brand) | Cert. # | Ultima Calibración (Last Cal.) | Período (Period) |
|-------------------|---------------|---------------|--------------------------------|------------------|
| Datalogger | - | 47495 / 47503 | 2024-06-28 | 1 año |
| Datalogger | - | 47496 / 47497 | 2024-06-28 | 1 año |
| - | - | - | - | - |
| - | - | - | - | - |
| - | - | - | - | - |
| - | - | - | - | - |

Resultados (Results)

Ver Resultados en Hoja Adjunta

See results in attached Sheet

El presente Certificado de Calibración posee la trazabilidad en esta magnitud hacia el Patrón Nacional, a través de la realización de la unidad de medida en el NPL, NIST, u otro Laboratorio Nacional reconocido al Sistema Internacional de Medidas. La calibración fue realizada bajo un Sistema de Gestión de Laboratorio conforme a la Norma ISO/IEC 17025:2017. Los resultados y su incertidumbre reportada con un nivel de confianza de $k=2$, 95% son relacionados a este instrumento y en el tiempo que se realizó las medidas. Este Laboratorio no se responsabiliza de los perjuicios que pueda ocasionar el uso inadecuado del instrumento calibrado. La reproducción parcial es prohibida, la reproducción total deberá hacerse con la autorización escrita aprobada por INNOVATEC Industrial Solutions. *This Certificate of Calibration provides traceability of measurement to the National Standard, through units of measurement realized at the NPL, NIST or other recognized National Standard Laboratories to the International System of Units. The calibration was performed under a Laboratory Management System in accordance with the ISO/IEC 17025:2017 Standard. The results and the reported uncertainty at a confidence level of $k=2$, 95% are related only to this instrument and at the time of measurement. This Laboratory is not responsible for any damages that may result from improper use of the calibrated instrument. Partial reproduction is forbidden, the total reproduction must have an approved written authorization by INNOVATEC Industrial Solutions.*

Comentarios: Los resultados son un promedio de los datos tomados durante la caracterización. El Set Point del equipo para la temperatura de 35 °C = 35.5 °C, El Set Point del equipo para la temperatura de 44 °C = 44.5 °C y el Set Point para la temperatura de 60 °C = 61.0 °C

Caracterizado por:
Characterized by: Ing. Patricio Llerena

Aprobado por:
Approved by:



Fin de Certificado (End of Certificate)

Certificado No.:

55862

Equipo (Instrument):

INCUBADORA

Fecha de Calibración:

2025-04-10

Marca (Brand):

MEMMERT

| Nominal (Nominal) | Patrón (Standard) | UBP (UUT) | Error (Error) | Precisión (Accuracy) | Estabilidad (Stability) | Uniformidad (Uniformity) | Incertidumbre (Uncertainty) |
|----------------------|----------------------|--------------|------------------|-------------------------|----------------------------|-----------------------------|--------------------------------|
| 35 °C | 34.885 °C | 35.5 °C | 0.615 °C | ± 1.0 °C | 0.285 °C | 0.275 °C | ± 0.37 °C |
| 44 °C | 44.018 °C | 44.5 °C | 0.482 °C | ± 1.0 °C | 0.283 °C | 0.250 °C | ± 0.53 °C |
| 60 °C | 58.933 °C | 60.2 °C | 1.267 °C | ± 2.0 °C | 0.233 °C | 0.233 °C | ± 0.49 °C |

Diagram de Posición de Sensores (Sensor Position Diagram)



Leyenda:

- 1: Sensor #1
- 2: Sensor #2
- 3: Sensor #3
- 4: Sensor #4

Las imagenes utilizadas solo son un ejemplo de lo puntos de medida empleados y posición de los sensores.

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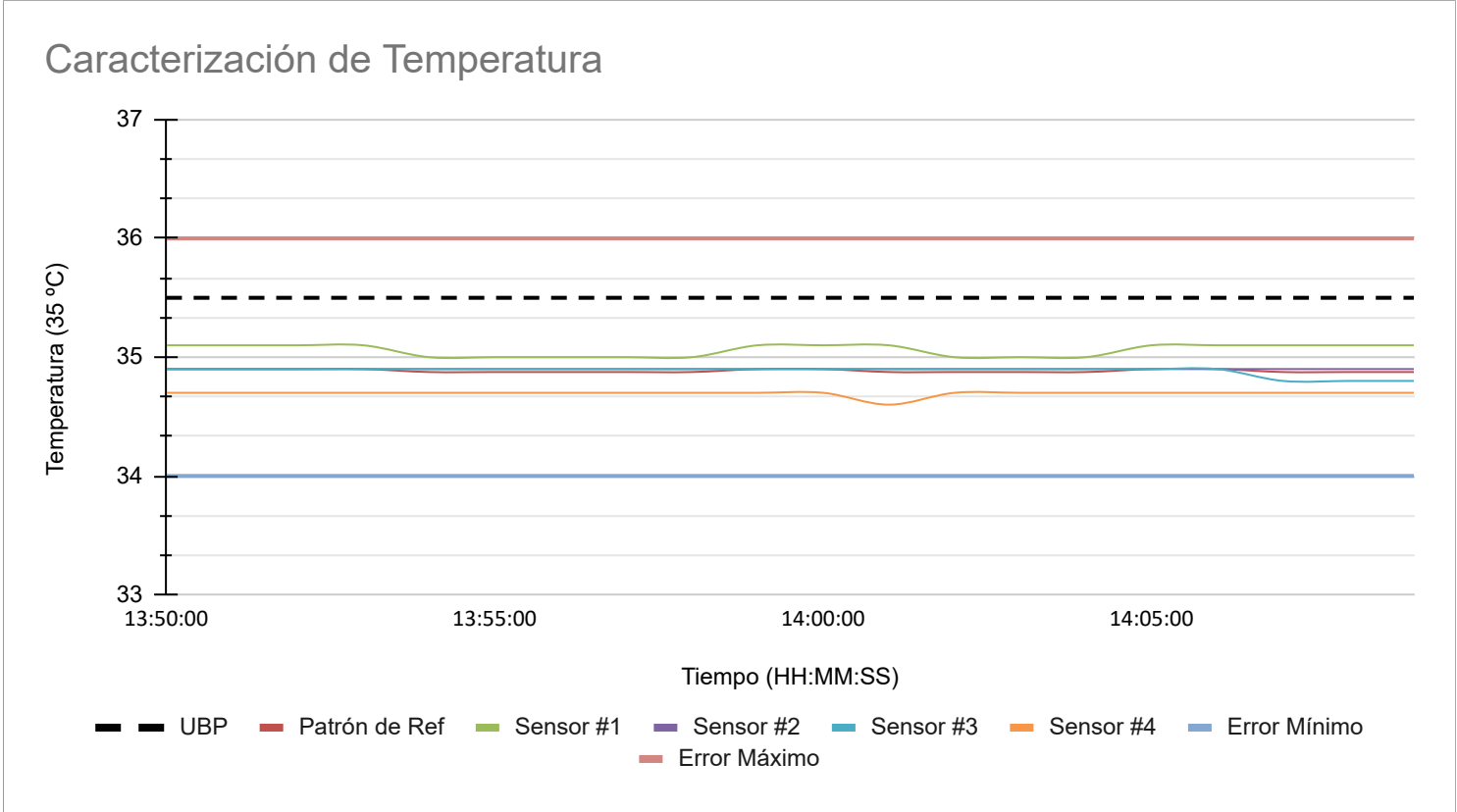
Equipo (Instrument): INCUBADORA

Fecha de Calibración: 2025-04-10

Marca (Brand): MEMMERT

| Hora (Time) | UBP (UUT) | Patrón de Ref (Ref. Standard) | Sensor #1 (Sensor #1) | Sensor #2 (Sensor #2) | Sensor #3 (Sensor #3) | Sensor #4 (Sensor #4) | Sensor #5 (Sensor #5) | Sensor #6 (Sensor #6) | Sensor #7 (Sensor #7) | Sensor #8 (Sensor #8) | Error (Error) |
|----------------|--------------|----------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|------------------|
| 13:50:00 | 35.5 °C | 34.900 °C | 35.1 °C | 34.9 °C | 34.9 °C | 34.7 °C | | | | | 0.600 °C |
| 13:51:00 | 35.5 °C | 34.900 °C | 35.1 °C | 34.9 °C | 34.9 °C | 34.7 °C | | | | | 0.600 °C |
| 13:52:00 | 35.5 °C | 34.900 °C | 35.1 °C | 34.9 °C | 34.9 °C | 34.7 °C | | | | | 0.600 °C |
| 13:53:00 | 35.5 °C | 34.900 °C | 35.1 °C | 34.9 °C | 34.9 °C | 34.7 °C | | | | | 0.600 °C |
| 13:54:00 | 35.5 °C | 34.875 °C | 35.0 °C | 34.9 °C | 34.9 °C | 34.7 °C | | | | | 0.625 °C |
| 13:55:00 | 35.5 °C | 34.875 °C | 35.0 °C | 34.9 °C | 34.9 °C | 34.7 °C | | | | | 0.625 °C |
| 13:56:00 | 35.5 °C | 34.875 °C | 35.0 °C | 34.9 °C | 34.9 °C | 34.7 °C | | | | | 0.625 °C |
| 13:57:00 | 35.5 °C | 34.875 °C | 35.0 °C | 34.9 °C | 34.9 °C | 34.7 °C | | | | | 0.625 °C |
| 13:58:00 | 35.5 °C | 34.875 °C | 35.0 °C | 34.9 °C | 34.9 °C | 34.7 °C | | | | | 0.625 °C |
| 13:59:00 | 35.5 °C | 34.900 °C | 35.1 °C | 34.9 °C | 34.9 °C | 34.7 °C | | | | | 0.600 °C |
| 14:00:00 | 35.5 °C | 34.900 °C | 35.1 °C | 34.9 °C | 34.9 °C | 34.7 °C | | | | | 0.600 °C |
| 14:01:00 | 35.5 °C | 34.875 °C | 35.1 °C | 34.9 °C | 34.9 °C | 34.6 °C | | | | | 0.625 °C |
| 14:02:00 | 35.5 °C | 34.875 °C | 35.0 °C | 34.9 °C | 34.9 °C | 34.7 °C | | | | | 0.625 °C |
| 14:03:00 | 35.5 °C | 34.875 °C | 35.0 °C | 34.9 °C | 34.9 °C | 34.7 °C | | | | | 0.625 °C |
| 14:04:00 | 35.5 °C | 34.875 °C | 35.0 °C | 34.9 °C | 34.9 °C | 34.7 °C | | | | | 0.625 °C |
| 14:05:00 | 35.5 °C | 34.900 °C | 35.1 °C | 34.9 °C | 34.9 °C | 34.7 °C | | | | | 0.600 °C |
| 14:06:00 | 35.5 °C | 34.900 °C | 35.1 °C | 34.9 °C | 34.9 °C | 34.7 °C | | | | | 0.600 °C |
| 14:07:00 | 35.5 °C | 34.875 °C | 35.1 °C | 34.9 °C | 34.8 °C | 34.7 °C | | | | | 0.625 °C |
| 14:08:00 | 35.5 °C | 34.875 °C | 35.1 °C | 34.9 °C | 34.8 °C | 34.7 °C | | | | | 0.625 °C |
| 14:09:00 | 35.5 °C | 34.875 °C | 35.1 °C | 34.9 °C | 34.8 °C | 34.7 °C | | | | | 0.625 °C |

Graficos (Graphs):



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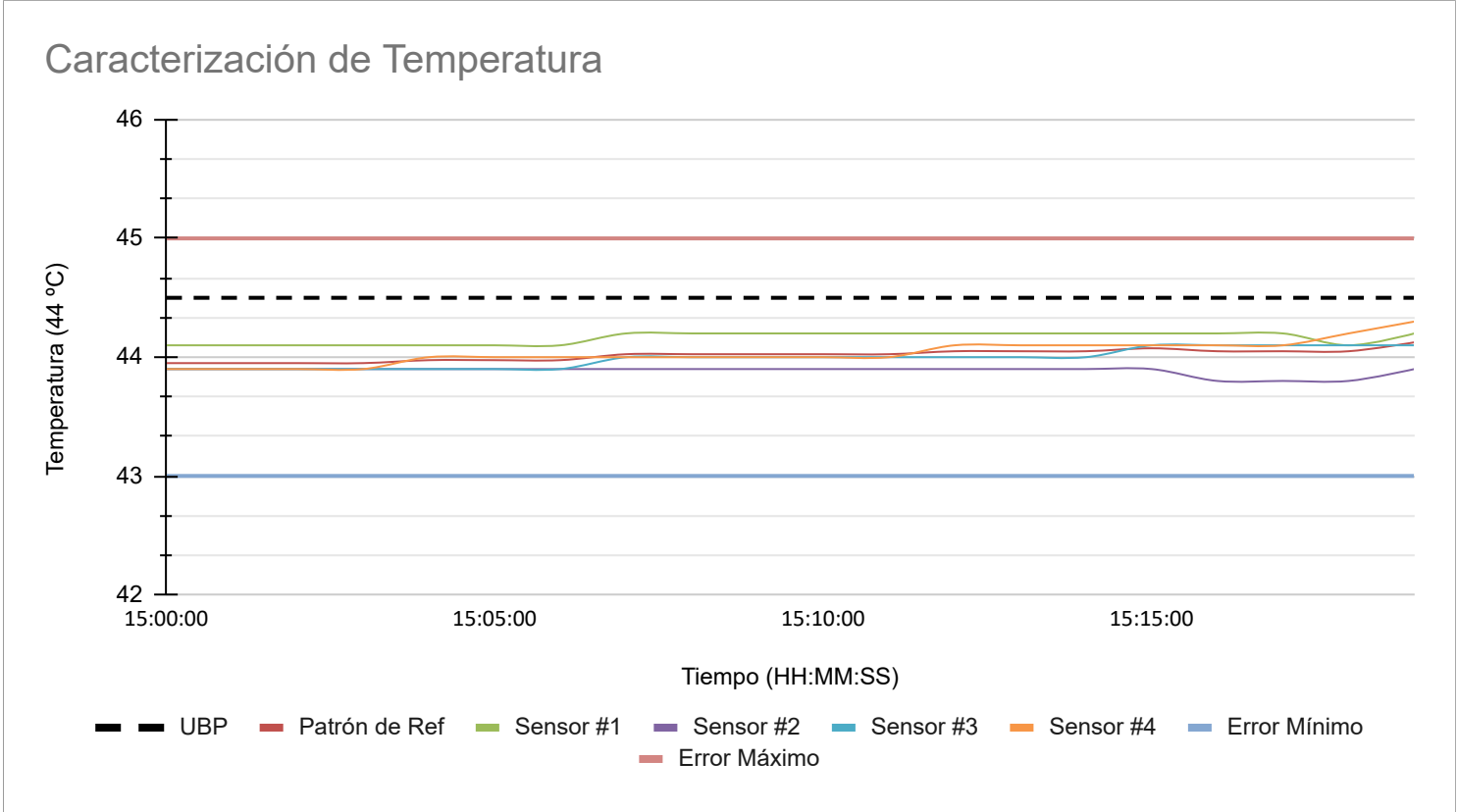
Equipo (Instrument): INCUBADORA

Fecha de Calibración: 2025-04-10

Marca (Brand): MEMMERT

| Hora (Time) | UBP (UUT) | Patrón de Ref (Ref. Standard) | Sensor #1 (Sensor #1) | Sensor #2 (Sensor #2) | Sensor #3 (Sensor #3) | Sensor #4 (Sensor #4) | Sensor #5 (Sensor #5) | Sensor #6 (Sensor #6) | Sensor #7 (Sensor #7) | Sensor #8 (Sensor #8) | Error (Error) |
|----------------|--------------|----------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|------------------|
| 15:00:00 | 44.5 °C | 43.950 °C | 44.1 °C | 43.9 °C | 43.9 °C | 43.9 °C | | | | | 0.550 °C |
| 15:01:00 | 44.5 °C | 43.950 °C | 44.1 °C | 43.9 °C | 43.9 °C | 43.9 °C | | | | | 0.550 °C |
| 15:02:00 | 44.5 °C | 43.950 °C | 44.1 °C | 43.9 °C | 43.9 °C | 43.9 °C | | | | | 0.550 °C |
| 15:03:00 | 44.5 °C | 43.950 °C | 44.1 °C | 43.9 °C | 43.9 °C | 43.9 °C | | | | | 0.550 °C |
| 15:04:00 | 44.5 °C | 43.975 °C | 44.1 °C | 43.9 °C | 43.9 °C | 44.0 °C | | | | | 0.525 °C |
| 15:05:00 | 44.5 °C | 43.975 °C | 44.1 °C | 43.9 °C | 43.9 °C | 44.0 °C | | | | | 0.525 °C |
| 15:06:00 | 44.5 °C | 43.975 °C | 44.1 °C | 43.9 °C | 43.9 °C | 44.0 °C | | | | | 0.525 °C |
| 15:07:00 | 44.5 °C | 44.025 °C | 44.2 °C | 43.9 °C | 44.0 °C | 44.0 °C | | | | | 0.475 °C |
| 15:08:00 | 44.5 °C | 44.025 °C | 44.2 °C | 43.9 °C | 44.0 °C | 44.0 °C | | | | | 0.475 °C |
| 15:09:00 | 44.5 °C | 44.025 °C | 44.2 °C | 43.9 °C | 44.0 °C | 44.0 °C | | | | | 0.475 °C |
| 15:10:00 | 44.5 °C | 44.025 °C | 44.2 °C | 43.9 °C | 44.0 °C | 44.0 °C | | | | | 0.475 °C |
| 15:11:00 | 44.5 °C | 44.025 °C | 44.2 °C | 43.9 °C | 44.0 °C | 44.0 °C | | | | | 0.475 °C |
| 15:12:00 | 44.5 °C | 44.050 °C | 44.2 °C | 43.9 °C | 44.0 °C | 44.1 °C | | | | | 0.450 °C |
| 15:13:00 | 44.5 °C | 44.050 °C | 44.2 °C | 43.9 °C | 44.0 °C | 44.1 °C | | | | | 0.450 °C |
| 15:14:00 | 44.5 °C | 44.050 °C | 44.2 °C | 43.9 °C | 44.0 °C | 44.1 °C | | | | | 0.450 °C |
| 15:15:00 | 44.5 °C | 44.075 °C | 44.2 °C | 43.9 °C | 44.1 °C | 44.1 °C | | | | | 0.425 °C |
| 15:16:00 | 44.5 °C | 44.050 °C | 44.2 °C | 43.8 °C | 44.1 °C | 44.1 °C | | | | | 0.450 °C |
| 15:17:00 | 44.5 °C | 44.050 °C | 44.2 °C | 43.8 °C | 44.1 °C | 44.1 °C | | | | | 0.450 °C |
| 15:18:00 | 44.5 °C | 44.050 °C | 44.1 °C | 43.8 °C | 44.1 °C | 44.2 °C | | | | | 0.450 °C |
| 15:19:00 | 44.5 °C | 44.125 °C | 44.2 °C | 43.9 °C | 44.1 °C | 44.3 °C | | | | | 0.375 °C |

Graficos (Graphs):



| Hora (Time) | UBP (UUT) | Patrón de Ref (Ref. Standard) | Sensor #1 (Sensor #1) | Sensor #2 (Sensor #2) | Sensor #3 (Sensor #3) | Sensor #4 (Sensor #4) | Sensor #5 (Sensor #5) | Sensor #6 (Sensor #6) | Sensor #7 (Sensor #7) | Sensor #8 (Sensor #8) | Error (Error) |
|----------------|--------------|----------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|------------------|
| 16:00:00 | 60.5 °C | 58.900 °C | 59.0 °C | 58.8 °C | 59.0 °C | 58.8 °C | | | | | 1.600 °C |
| 16:01:00 | 60.5 °C | 58.925 °C | 59.1 °C | 58.8 °C | 59.0 °C | 58.8 °C | | | | | 1.575 °C |
| 16:02:00 | 60.5 °C | 58.975 °C | 59.1 °C | 58.8 °C | 59.0 °C | 59.0 °C | | | | | 1.525 °C |
| 16:03:00 | 60.5 °C | 58.950 °C | 59.0 °C | 58.8 °C | 59.0 °C | 59.0 °C | | | | | 1.550 °C |
| 16:04:00 | 60.5 °C | 58.950 °C | 59.0 °C | 58.8 °C | 59.0 °C | 59.0 °C | | | | | 1.550 °C |
| 16:05:00 | 60.5 °C | 58.950 °C | 59.0 °C | 58.8 °C | 59.0 °C | 59.0 °C | | | | | 1.550 °C |
| 16:06:00 | 60.5 °C | 58.925 °C | 58.9 °C | 58.8 °C | 59.0 °C | 59.0 °C | | | | | 1.575 °C |
| 16:07:00 | 60.5 °C | 58.900 °C | 58.8 °C | 58.8 °C | 59.0 °C | 59.0 °C | | | | | 1.600 °C |
| 16:08:00 | 60.5 °C | 58.900 °C | 58.8 °C | 58.8 °C | 59.0 °C | 59.0 °C | | | | | 1.600 °C |
| 16:09:00 | 60.0 °C | 58.950 °C | 58.8 °C | 59.0 °C | 59.0 °C | 59.0 °C | | | | | 1.050 °C |
| 16:10:00 | 60.0 °C | 58.950 °C | 58.8 °C | 59.0 °C | 59.0 °C | 59.0 °C | | | | | 1.050 °C |
| 16:11:00 | 60.0 °C | 58.950 °C | 58.8 °C | 59.0 °C | 59.0 °C | 59.0 °C | | | | | 1.050 °C |
| 16:12:00 | 60.0 °C | 58.925 °C | 58.8 °C | 59.0 °C | 58.9 °C | 59.0 °C | | | | | 1.075 °C |
| 16:13:00 | 60.0 °C | 58.900 °C | 58.7 °C | 59.0 °C | 58.9 °C | 59.0 °C | | | | | 1.100 °C |
| 16:14:00 | 60.0 °C | 58.925 °C | 58.7 °C | 59.0 °C | 59.0 °C | 59.0 °C | | | | | 1.075 °C |
| 16:15:00 | 60.0 °C | 58.925 °C | 58.7 °C | 59.0 °C | 59.0 °C | 59.0 °C | | | | | 1.075 °C |
| 16:16:00 | 60.0 °C | 58.925 °C | 58.8 °C | 59.0 °C | 58.9 °C | 59.0 °C | | | | | 1.075 °C |
| 16:17:00 | 60.0 °C | 58.925 °C | 58.7 °C | 59.0 °C | 59.0 °C | 59.0 °C | | | | | 1.075 °C |
| 16:18:00 | 60.0 °C | 58.950 °C | 58.8 °C | 59.0 °C | 59.0 °C | 59.0 °C | | | | | 1.050 °C |
| 16:19:00 | 60.0 °C | 58.950 °C | 58.8 °C | 59.0 °C | 59.0 °C | 59.0 °C | | | | | 1.050 °C |

Graficos (Graphs):

