

CERTIFICATE OF CALIBRATION No. 137689-101

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Customer: Licht Eletro Eletrônica Ltda.
Rua Dr. Gastão R. Monteiro, 480
05594-030 – Jd. Bonfiglioli – São Paulo – SP

Item: Digital Temperature Controller

Reference Form for approval of budget on 05/04/2014

ITEM DESCRIPTION

Digital Temperature Controller, manufacturer: Licht, model MFC-300 and serial no. 4.913.

Note: Registered at LME under no. 0562/14.

INFORMATION RELATED TO THE CALIBRATION

1. Calibration Procedure

The calibrated capacitance values were requested by the customer.

The calibration execution has been based on internal procedure CME-LME-G07 (Version 8).

The calibration was performed by comparison method against the measurement standard used, configured at the frequency of 1 kHz.

The Nominal Values were provided by the customer.

2. Uncertainty

The reported expanded uncertainty of measurement in the RESULTS item is stated as the standard uncertainty of measurement multiplied by the coverage factor k , which for a t-distribution with v_{eff} effective degrees of freedom corresponds to a coverage probability of approximately 95 %. The standard uncertainty of measurement has been determined in accordance with EA-4/02 publication.

3. Standard(s) used

Description	Model	Serial No.	Certificate No.	Origin	Valid till
Precision LCR Meter	1920	3344822	136478-101	IPT-LME	Feb-2015

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Electrical Metrology Laboratory / CME

Calibration laboratory accredited by Cgcre according with ABNT NBR ISO/IEC 17025 under number CAL 0047

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4. Traceability

This certificate is issued in accordance with accreditation requirements of Cgcre, which recognized the competence of the laboratory and confirmed its traceability to national measurement standards (or to the International System of Units - SI).

5. Calibration environmental conditions

The measurements have been made under ambient air temperature of $(23 \pm 3) ^\circ\text{C}$ and relative humidity of $(60 \pm 20) \%$.

6. Legend for abbreviation used on reported results

NV = Nominal Value (indication of the unit under test)

RV = Reference Value (indication of the measurement standard)

Error = NV - RV (error indication of the unit under test)


U = Expanded uncertainty of measurement

k = Coverage factor (multiplier factor)

v_{eff} = Effective degree of freedom


7. Calibration date: 09 May 2014.

Calibration performed by: Technician Felipe Santiago Apolinário 

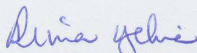
Checked by: Electrical Engineer Tomie Yokoji 

São Paulo, 09 May 2014.

MECHANICAL AND ELECTRICAL METROLOGY CENTER
Electrical Metrology Laboratory


Physicist Regis Renato Dias
Calibration Supervisor
RE no. 8825

MECHANICAL AND ELECTRICAL METROLOGY CENTER
Electrical Metrology Laboratory


Physicist Rima Yehia
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RESULTS

Pt100 Input (Terminals 38+39+40) and RS485 (Terminals 66+59+58+28+27)

Unit	NV	RV	Error	U	k	V _{eff}
pF	22	21,64	0,36	0,19	2,00	∞

Pt100 Input (Terminals 38+39+40) and Current Output (Terminals 31 a 36)

Unit	NV	RV	Error	U	k	V _{eff}
pF	25	24,91	0,09	0,20	2,00	∞

Pt100 Input (Terminals 38+39+40) and Auxiliar Source (Terminals 1+2)

Unit	NV	RV	Error	U	k	V _{eff}
pF	25	25,6	-0,6	1,1	2,00	∞

Current Output (Terminals 31 a 36) and Auxiliar Source Auxiliar Source (Terminals 1+2)

Unit	NV	RV	Error	U	k	V _{eff}
pF	16	15,81	0,19	0,17	2,00	∞

Current Output (Terminals 31 a 36) and RS485 (Terminals 66+59+58+28+27)

Unit	NV	RV	Error	U	k	V _{eff}
pF	15	12,95	2,05	0,16	2,00	∞

RS485 (Terminals 66+59+58+28+27) and Auxiliar Source (Terminals 1+2)

Unit	NV	RV	Error	U	k	V _{eff}
pF	11	9,64	1,36	0,14	2,00	∞

Relay 1 (Terminals 3+4) and Other Terminals

Unit	NV	RV	Error	U	k	V _{eff}
pF	7	5,68	1,32	0,12	2,00	∞

TC1 Input (Bornes 62+63) and Other Terminals

Unit	NV	RV	Error	U	k	V _{eff}
pF	9	7,44	1,56	0,13	2,00	∞

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