



1. **Product:**
TEMPERATURE CONTROLLER MOD. MFC-300/T-3 – SERIAL N° 4983
2. **Client:** TOSHIBA INFRAESTRUTURA AMERICA DO SUL
3. **Purchase Order:** 435579 – Item 007 (**Material Code** Z40902896P001) – **NF 972**
4. **Date:** 30/06/2014
5. **Network MAC Interface Address:** N.A.
6. **Tests Performed:**
 - 6.1. Voltage Withstand Test at Industrial Frequency – **HIPOT TEST**
IEC 60255-5:00 Standard (Galvanic Isolation Tests, in 9 Modes)

TEST NO.	CIRCUIT / SUB-CIRCUIT	AGAINST	LEVEL (kV / 60 HZ / 1 MIN.)	LICHT DIFFERENTIAL
1	Ground (terminal 0)	All terminals together	2.0	
2	Auxiliary Voltage (terminals 1 + 2)	All terminals except the ground together	2.0	
3	AC Current Input A (50/60 Hz) - 5 A (terminals 62 + 63)	All terminals except the ground together	2.0	
4	AC Current Input B (50/60 Hz) - 5 A (terminals 60 + 61)	All terminals except the ground together	2.0	
5	AC Current Input C (50/60 Hz) - 5 A (terminals 64 + 65)	All terminals except the ground together	2.0	
6	AC Voltage Input (50/60 Hz) 0 – 200 V (terminals 62 + 63)	All terminals except the ground together	N.A.	
7	RTDs Input - Pt100 (terminals 38 + 39 + 40)	All terminals except the ground together	2.0	
8	RS-485 Interface (terminals 66 + 58 + 59)	All terminals except the ground together	2.0	
9	Output Current (terminals 31 a 36)	All terminals except the ground together	2.0	
10	Relays Output	All terminals except the ground together	2.0	

GALVANIC ISOLATION TEST: To learn more about this test, visit: http://en.wikipedia.org/wiki/Galvanic_isolation



6.2. **Keyboard**

Verified correct operation

6.3. **LEDs**

Verified correct operation

6.4. **Relays**

Verified correct operation

6.5. **Serial Communication**

Verified correct operation of the MODBUS RTU or DNP3 protocols up to the rate of 57600 bps

6.6. **IEC 61850 Communication** (when applicable)

Verified TCP / IP connectivity, correct association, correct readings, successful writes, Dynamic DataSets, and Control Blocks

6.7. **USB Interface** (when applicable)

Verified correct operation

6.8. **Accuracy / Linearity – Pt100 Inputs***

Pt100 Input (Ω)	Pt100 - 1 Measured Value (Ω)	Pt100 - 2 Measured Value (Ω)	Pt100 - 3 Measured Value (Ω)
0.0	0.0	N.A.	N.A.
100.0	100.0	N.A.	N.A.
200.0	200.0	N.A.	N.A.

6.9. **Accuracy / Linearity – AC Inputs**

Input (A)	Input 1 Measured Value (A)	Input 2 Measured Value (A)	Input 3 Measured Value (A)
0.00	0.02	0.02	0.02
2.50	2.51	2.51	2.51
5.00	5.00	5.01	5.01

* The linearity of the measured values (Pt100 input and output current) is guaranteed by design, such that the correct measurement of two points guarantees accuracy over the entire range.



6.10. **Current transformers (CT) power at 10 A:** 0.58 VA/0.60 VA/0.57 VA

6.11. **Measured values for the current loop outputs** (for input current = 0.00A)

Pt100 Input		Theoretical value (mA)	Output 1 (mA)	Output 2 (mA)	Output 3 (mA)	Output 4 (mA)
100.00 Ω	0.0 °C	4.00	4.00	4.00	3.99	4.00
128.99 Ω	75.0 °C	12.00	11.99	11.99	11.99	11.99
157.33 Ω	150.0 °C	20.00	19.99	19.99	19.99	19.99

N.A.: Not Applicable

6.12. **Clock**

Verified proper operation of the clock

7. **Instrumentation**

Fluke Multimeter Mod. 8845A, serial no. 2402015

Resistive Decade General Radio Mod. 1433-W, Serial N° 7749

Hi-pot HOHL Mod. TAV 5CA, serial no. 021505

8. **Temperature / Ambient Humidity**

20 °C / 49 %

LICHT ELETRO ELETRÔNICA LTDA.