



Techsystems Services & Integration Asia Pte Ltd

2 Loyang Lane #06-03 | Loyang Industrial Estate | Singapore 508913

T: +65 6543 2855 | F: +65 6543 1329 | W: www.tsiasia.com

[Co Reg No: 199202282R | GST Reg No: M2-0106585-2]

CALIBRATION CERTIFICATE

Ref. No. : FMS / 2629

Page : 1 of 5

Customer : Flextronics Manufacturing (Singapore) Pte Ltd
Address : 1 Kallang Place
Singapore 339211

REVIEWED & ACCEPTED
SIGN: CHANG MEI LAN
DATE: 20 DEC 19
REMARKS: EQID 0245
Movd Shang sui 20 Dec 19

Equipment ID : 0245
Description : Multimeter
Model : 110
Manufacturer : Fluke
Serial No. : 85730619

Co-ordinator : Neo Hui Hui
Telephone : 6543 2855
Ext : 207

Date Calibrated : 16 Dec 2019
Next Due Date : 16 Dec 2020
Location : Electrical Laboratory

Temperature : $(23 \pm 3) ^\circ\text{C}$
Humidity : $(35 \sim 65) \% \text{rh}$

The above instrument has been tested in general accordance with its manufacturer's published specifications and Performance Test Procedure in Calibration Information PN1608592.

The measurement report attached to this certificate indicates all the test results obtained at the time of testing.
The intended use of the instrument shall be ascertained based on the end user's requirement.
Recalibration interval was determined based on end user's requirements.

As Found : ☒ In / ☐ Out Tolerance
As Left : In Tolerance

Adjustment Done : ☐ Yes / ☒ No

The measurement standards are traceable to SI Units through National Metrology Centre (NMC), Singapore; National Institute of Standards and Technology (NIST), USA; National Physical Laboratory (NPL), UK or other recognised National Standard Laboratories.

The Laboratory's Quality System is in accordance with the Quality Standard ISO 9001:2015.

Conformance terms of "In Tolerance" and "Out of Tolerance" used in this certificate are determined by comparison of measured values against warranted specifications and do not take measurement uncertainties into account.

Test Performed By

Sj

Sandra Lim
Associate Engineer

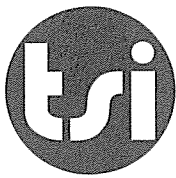


Approved By

lcu

Gee Chen Loong
Manager, Technical Services
16-Dec-2019

zby



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MEASUREMENT REPORT

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Date : 16 Dec 2019

Reference : FMS / 2629

Description : Multimeter

Model : 110

Manufacturer : Fluke

Serial Number : 85730619

Measuring Instruments used in this performance test :-

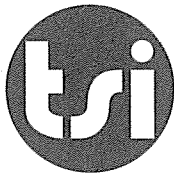
Instrument	Serial No. (Cal Report No.)	Eqpt ID	Due Date	Remarks
MULTI-PRODUCT CALIBRATOR	6775016 (EL007672)	S0269	24 Apr 2020	

Legend and Explanations for Measurement Report:

- [*] - if shown next to the result recorded, it means the reading is out of the specified limits
- [Deviation] - if shown, is computed as $[Deviation] = [UUT Reading] - [True Value]$ {Reference: Int Volcab in Metrology JCGM 200:2008}
- [Correction] - if shown, is computed as $[Correction] = [True Value] - [UUT Reading]$.
Correction is used to apply to the UUT reading (add) to give a true reading.

Test Performed By

Sandra Lim



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Date : 16 Dec 2019

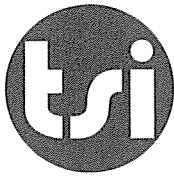
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Test			Specified Limits		Results	Comments
AC Voltage Test						
Range (V)	Freq (Hz)	Input (V)	Min (V)	Max (V)	Reading (V)	
6	50	300 m	0.294	0.306	0.301	
6	500	300 m	0.294	0.306	0.301	
6	50	5	4.947	5.053	5.000	
6	500	5	4.947	5.053	5.002	
60	500	50	49.47	50.53	50.25	
600	500	600	593.7	606.3	602.4	
Frequency Test						
Voltage : 5 V						
Range (kHz)		Input (kHz)	Min (kHz)	Max (kHz)	Reading (kHz)	
50		50	49.93	50.07	49.97	
DC Voltage Test						
Range (V)		Input (V)	Min (V)	Max (V)	Reading (V)	
6		0	-0.002	0.002	0.000	
6		5	4.963	5.037	5.001	
60		-50	-50.37	-49.63	-50.05	
600		600	595.6	604.4	600.4	
Continuity Test						
Beeper On @ 20 Ω			Pass / Fail		Pass	
Beeper Off @ 250 Ω			Pass / Fail		Pass	
Resistance Test						
Range (Ω)		Input (Ω)	Min (Ω)	Max (Ω)	Reading (Ω)	
600		0	-0.2	0.2	0.2	
600		500	495.3	504.7	500.2	
6 k		5 k	4.954 k	5.046 k	4.999 k	
60 k		50 k	49.54 k	50.46 k	49.97 k	
600 k		500 k	495.4 k	504.6 k	500.0 k	
6 M		5 M	4.954 M	5.046 M	4.984 M	
40 M		30 M	29.52 M	30.48 M	29.58 M	

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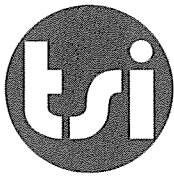
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Test		Specified Limits		Results	Comments
Diode Test					
Range (V)	Input (V)	Min (V)	Max (V)	Reading (V)	
2.2	2	1.980	2.020	2.001	
Capacitance Test					
Range (nF)	Input (nF)	Min (nF)	Max (nF)	Reading (nF)	
1000	800	783	817	799	

				Test Completed	

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The Expanded Uncertainties of measurement (excluding the uncertainties of the Unit Under Test) for the results given in this report, with a confidence level of approximately 95% at Coverage Factor $k = 2$, are as follows:

Parameters	Range		Uncertainty
AC Voltage Generation	33 ~ 329.999 mV	45 Hz ~ 10 kHz	0.0058 % + 23 μ V
	3.3 ~ 32.9999 V	45 Hz ~ 10 kHz	0.05 % + 693 μ V
	33 ~ 329.999 V	45 Hz ~ 1 kHz	0.06 % + 8 mV
	330 ~ 1000 V	45 Hz ~ 1 kHz	0.06 % + 92 mV
Frequency Generation	1.2 ~ 11.999 kHz		29 ppm + 1 mHz
DC Voltage Generation	0 ~ 32.99999 V		0.0058 % + 50 μ V
	30 ~ 329.9999 V		0.0064 % + 500 μ V
	100 ~ 1000 V		0.0064 % + 1.5 mV
Resistance Generation	330 ohm ~ 1.09999 k Ω		0.17 % + 0.07 Ω
	3.3 ~ 10.9999 k Ω		0.010 % + 0.7 Ω
	33 ~ 109.999 k Ω		0.013 % + 7 Ω
	330 k Ω ~ 1.09999 M Ω		0.017 % + 63 Ω
	3.3 ~ 10.9999 M Ω		0.07 % + 635 Ω
	11 ~ 32.9999 M Ω		0.12 % + 635 Ω
Capacitance Generation	0.33 ~ 1.0999 μ F		0.29 % + 1.2 nF

Sandra Lim