

ELECTRONICS REGIONAL TEST LABORATORY (WEST)		REPORT NO. ERTL (W)/2002E&S 0183	
MINISTRY OF INFORMATION TECHNOLOGY (STQC Dte.)			
SUBJECT: TESTING OF DMM		DATE	PAGE OF
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1. SCOPE

1.1 Service Request No : ERTL (W)/20022146 Dated 12th Nov., 2002

1.1.1 Service Request finalised on : 12th Nov., 2002

1.2 Requested by : Rishabh Instruments Pvt. Ltd.
(Name and address of organisation) F-31, MID C area,
Satpur, Nashik 422007

1.3	Description	Qty	Manufacturer	Type No.	Serial No.
	Digital Multimeter	01 No.	Rishabh Instruments Pvt. Ltd	14 S	023014

1.4 Test specifications Customer's Specifications

1.5 Lab Ambient Temperature : (25 ±2) deg.C
Humidity : (55 ±5) % RH

1.6 Test Equipment used : 1. Calibration System S&C/148

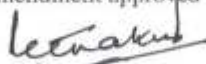
1.7 Environmental Simulators used

1. Vibration Machine	ENV/15
2. Temperature chamber	ENV/21
3. Humidity Chamber	ENV/75
4. Altitude Chamber	ENV/24
5. Temp. Cycling Chamber	ENV/41
6. Bump Machine	TBTS6060
7. Dust Chamber	ENV/052

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2.0 Test Results

Sr. No.	Test Parameter	Test condition	Test Requirement	Observation	Remarks
2.1	Visual Check	UUT shall be visually examined	There shall be no visual damage.	No visual damage observed	Complied
2.2	Accuracy Check				
2.2.1	DC Voltage	Ranges: 30,300 mV 3,30,300,1000 V	Min: $\pm(0.5\%+3 \text{ dgt})$ Max: $\pm(0.35\%+1 \text{ dgt})$	Min: 0 % Max: 0.27 %	Complied
2.2.2	AC Voltage	Ranges: 3,30,300 & 1000 V	Min: $\pm(0.75\%+1 \text{ dgt})$ Max: $\pm(0.75\%+2 \text{ dgt})$	Min: 0 % Max: 0.07 %	Complied
2.2.3	DC Current	Ranges: 300 μ A, 3,30,300 mA 3,10 A	Min: $\pm(1\%+2 \text{ dgt})$ Max: $\pm(1\%+5 \text{ dgt})$	Min: 0.11 % Max: 0.40 %	Complied
2.2.4	AC Current	Ranges: 3, 300 mA 10 A	$\pm(1.5\%+2 \text{ dgt})$	Min: 0 % Max: 0.4 %	Complied
2.2.5	Resistance	Ranges: 30, 300 Ω 3,30,300 k Ω 3,30 M Ω	Min: $\pm(0.4\%+1 \text{ dgt})$ Max: $\pm(0.5\%+35 \text{ dgt})$	Min: 0 % Max: 2.47 %	Complied
2.3	Vibration	<u>JSS 55555</u> Test No: 28 5 to 350 Hz, ± 6 mm constant displacement or $\pm 20 \text{ m/S}^2$ constant acceleration whichever is less.	Conditioning	Conditioned	----
2.4	Post Visual Check	UUT shall be visually examined	There shall be no visual damage.	No visible damage observed	Complied
2.5	Post Accuracy test				
2.5.1	DC Voltage	Ranges: 30,300 mV 3,30,300,1000 V	Min: $\pm(0.5\%+3 \text{ dgt})$ Max: $\pm(0.35\%+1 \text{ dgt})$	Min: 0 % Max: 0.27 %	Complied
2.5.2	AC Voltage	Ranges: 3,30,300 & 1000 V	Min: $\pm(0.75\%+1 \text{ dgt})$ Max: $\pm(0.75\%+2 \text{ dgt})$	Min: 0 % Max: 0.15%	Complied
2.5.3	DC Current	Ranges: 300 μ A, 3,30,300 mA 3,10 A	Min: $\pm(1\%+2 \text{ dgt})$ Max: $\pm(1\%+5 \text{ dgt})$	Min: 0.11 % Max: 0.40%	Complied
2.5.4	AC Current	Ranges: 3, 300 mA 10 A	$\pm(1.5\%+2 \text{ dgt})$	Min: 0.04 % Max: 0.30 %	Complied

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2.0 Test Results (continued....)

Sr. No.	Test Parameter	Test condition	Test Requirement	Observation	Remarks
2.5.5	Resistance	Ranges: 30, 300 Ω 3,30,300 kΩ 3,30 MΩ	Min: $\pm(0.4 \%+1 \text{dgt})$ Max: $\pm(0.5 \%+35 \text{dgt})$	Min: 0 % Max: 1.40 %	Complied
2.6	High Temperature	JSS 55555 Test NO. 17/ Procedure 5 Temp.: $(70 \pm 3)^{\circ} \text{C}$	Conditioning	Conditioned	----
2.7	Post Visual Check	UUT shall be visually examined	There shall be no visual damage.	No visible damage observed	Complied
2.8	Post Accuracy test				
2.2.1	DC Voltage	Ranges: 30,300 mV 3,30,300,1000 V	Min: $\pm(0.5 \%+3 \text{dgt})$ Max: $\pm(0.35 \%+1 \text{dgt})$	Min: 0 % Max: 0.15 %	Complied
2.8.2	AC Voltage	Ranges: 3,30,300 & 1000 V	Min: $\pm(0.75 \%+1 \text{dgt})$ Max: $\pm(0.75 \%+2 \text{dgt})$	Min: 0 % Max: 0.15 %	Complied
2.8.3	DC Current	Ranges: 300 μ A, 3,30,300 mA 3,10 A	Min: $\pm(1 \%+2 \text{dgt})$ Max: $\pm(1 \%+5 \text{dgt})$	Min: 0.04 % Max: 0.15 %	Complied
2.8.4	AC Current	Ranges: 3, 300 mA 10 A	$\pm(1.5 \%+2 \text{dgt})$	Min: 0 % Max: 0.22 %	Complied
2.85	Resistance	Ranges: 30, 300 Ω 3,30,300 kΩ 3,30 MΩ	Min: $\pm(0.4 \%+1 \text{dgt})$ Max: $\pm(0.5 \%+35 \text{dgt})$	Min: 0 % Max: 1.0 %	Complied
2.9	Damp Heat Test	JSS 55555 Test No. 10 40° C \pm 2 °C RH: 95%(Min.) 16 h.	Conditioning	Conditioned	----
2.10	Post Visual Check	UUT shall be visually examined	There shall be no visual damage.	No visible damage observed	Complied
2.11	Post Accuracy test				
2.11.1	DC Voltage	Ranges: 30,300 mV 3,30,300,1000 V	Min: $\pm(0.5 \%+3 \text{dgt})$ Max: $\pm(0.35 \%+1 \text{dgt})$	Min: 0 % Max: 0.20 %	Complied

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2.0 Test Results (Continued...)

Sr. No.	Test Parameter	Test condition	Test Requirement	Observation	Remarks
2.11.2	AC Voltage	Ranges: 3,30,300 & 1000 V	Min: $\pm(0.75\%+1\text{dgt})$ Max: $\pm(0.75\%+2\text{dgt})$	Min: 0 % Max: 0.13 %	Complied
2.11.3	DC Current	Ranges: 300 μ A, 3,30,300 mA 3,10 A	Min: $\pm(1\%+2\text{dgt})$ Max: $\pm(1\%+5\text{dgt})$	Min: 0.11 % Max: 0.33 %	Complied
2.11.4	AC Current	Ranges: 3,300 mA 10 A	$\pm(1.5\%+2\text{dgt})$	Min: 0 % Max: 0.26 %	Complied
2.11.5	Resistance	Ranges: 30, 300 Ω 3,30,300 k Ω 3,30 M Ω	Min: $\pm(0.4\%+1\text{dgt})$ Max: $\pm(0.5\%+35\text{dgt})$	Min: 0 % Max: 2.13 %	Complied
2.12	Low Temperature	JSS 55555 Test No: 20 -10° C \pm 2 °C for 16 h.	Conditioning	Conditioned	----
2.13	Post Visual Check	UUT shall be visually examined	There shall be no visual damage.	No visible damage observed	Complied
2.14	Post Accuracy test				
2.14.1	DC Voltage	Ranges: 30,300 mV 3,30,300,1000 V	Min: $\pm(0.5\%+3\text{dgt})$ Max: $\pm(0.35\%+1\text{dgt})$	Min: 0 % Max: 0.13 %	Complied
2.14.2	AC Voltage	Ranges: 3,30,300 & 1000 V	Min: $\pm(0.75\%+1\text{dgt})$ Max: $\pm(0.75\%+2\text{dgt})$	Min: 0 % Max: 0.13 %	Complied
2.14.3	DC Current	Ranges: 300 μ A, 3,30,300 mA 3,10 A	Min: $\pm(1\%+2\text{dgt})$ Max: $\pm(1\%+5\text{dgt})$	Min: 0.04 % Max: 0.33 %	Complied
2.14.4	AC Current	Ranges: 3,300 mA 10 A	$\pm(1.5\%+2\text{dgt})$	Min: 0.07 % Max: 0.22 %	Complied
2.14.5	Resistance	Ranges: 30, 300 Ω 3,30,300 k Ω 3,30 M Ω	Min: $\pm(0.4\%+1\text{dgt})$ Max: $\pm(0.5\%+35\text{dgt})$	Min: 0 % Max: 2.2 %	Complied

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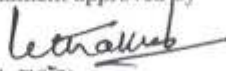
2.0 Test Results (Continued...)

Sr. No.	Test Parameter	Test condition	Test Requirement	Observation	Remarks
2.15	Altitude	<u>JSS 55555</u> Test No: 3 L1, Altitude 2K Meters	Conditioning	Conditioned	---
2.16	Post Visual Check	UUT shall be visually examined	There shall be no visual damage.	No visible damage observed	Complied
2.17	Post Accuracy test				
2.17.1	DC Voltage	Ranges: 30,300 mV 3,30,300,1000 V	Min: $\pm(0.5\%+3 \text{ dgt})$ Max: $\pm(0.35\%+1 \text{ dgt})$	Min: 0 % Max: 0.19 %	Complied
2.17.2	AC Voltage	Ranges: 3,30,300 & 1000 V	Min: $\pm(0.75\%+1 \text{ dgt})$ Max: $\pm(0.75\%+2 \text{ dgt})$	Min: 0 % Max: 0.15 %	Complied
2.17.3	DC Current	Ranges: 300 μ A, 3,30,300 mA 3,10 A	Min: $\pm(1\%+2 \text{ dgt})$ Max: $\pm(1\%+5 \text{ dgt})$	Min: 0.11 % Max: 0.37 %	Complied
2.17.4	AC Current	Ranges: 3,300 mA 10 A	$\pm(1.5\%+2 \text{ dgt})$	Min: 0.07 % Max: 0.30 %	Complied
2.17.5	Resistance	Ranges: 30, 300 Ω 3,30,300 k Ω 3,30 M Ω	Min: $\pm(0.4\%+1 \text{ dgt})$ Max: $\pm(0.5\%+35 \text{ dgt})$	Min: 0.04 % Max: 2.20 %	Complied
2.18	Rapid Change of Temperature	<u>JSS 55555</u> Test No: 22 +55° C RH: < 30% for 3h. -40° C RH: < 95 % for 3h.	Conditioning	Conditioned	---
2.19	Post Visual Check	UUT shall be visually examined	There shall be no visual damage.	No visible damage observed	Complied
2.20	Post Accuracy test				
2.20.1	DC Voltage	Ranges: 30,300 mV 3,30,300,1000 V	Min: $\pm(0.5\%+3 \text{ dgt})$ Max: $\pm(0.35\%+1 \text{ dgt})$	Min: 0 % Max: 0.19 %	Complied

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2.0 Test Results (Continued...)

Sr. No.	Test Parameter	Test condition	Test Requirement	Observation	Remarks
2.20.2	AC Voltage	Ranges: 3,30,300 & 1000 V	Min: $\pm(0.75\%+1\text{dgt})$ Max: $\pm(0.75\%+2\text{dgt})$	Min: 0 % Max: 0.20 %	Complied
2.20.3	DC Current	Ranges: 300 μ A, 3,30,300 mA 3,10 A	Min: $\pm(1\%+2\text{dgt})$ Max: $\pm(1\%+5\text{dgt})$	Min: 0.11 % Max: 0.37 %	Complied
2.20.4	AC Current	Ranges: 3, 300 mA 10 A	$\pm(1.5\%+2\text{dgt})$	Min: 0.07 % Max: 0.33 %	Complied
2.20.5	Resistance	Ranges: 30, 300 Ω 3,30,300 k Ω 3,30 M Ω	Min: $\pm(0.4\%+1\text{dgt})$ Max: $\pm(0.5\%+35\text{dgt})$	Min: 0 % Max: 1.47 %	Complied
2.21	Tropical Exposure	<u>JSS 55555</u> Test No: 27 Cycles of 20 ° C-35° C-20° C 28 Cycles	Conditioning	Conditioned	---
2.21	Post Visual Check	UUT shall be visually examined	There shall be no visual damage.	No visible damage observed	Complied
2.22	Post Accuracy test				
2.22.1	DC Voltage	Ranges: 30,300 mV 3,30,300,1000 V	Min: $\pm(0.5\%+3\text{dgt})$ Max: $\pm(0.35\%+1\text{dgt})$	Min: 0.04 % Max: 0.26 %	Complied
2.22.2	AC Voltage	Ranges: 3,30,300 & 1000 V	Min: $\pm(0.75\%+1\text{dgt})$ Max: $\pm(0.75\%+2\text{dgt})$	Min: 0 % Max: 0.20 %	Complied
2.22.3	DC Current	Ranges: 300 μ A, 3,30,300 mA 3,10 A	Min: $\pm(1\%+2\text{dgt})$ Max: $\pm(1\%+5\text{dgt})$	Min: 0.07 % Max: 0.30 %	Complied
2.22.4	AC Current	Ranges: 3,300 mA 10 A	$\pm(1.5\%+2\text{dgt})$	Min: 0 % Max: 0.40 %	Complied
2.22.5	Resistance	Ranges: 30, 300 Ω 3,30,300 k Ω 3,30 M Ω	Min: $\pm(0.4\%+1\text{dgt})$ Max: $\pm(0.5\%+35\text{dgt})$	Min: 0 % Max: 1.60 %	Complied
2.23	Bump	<u>JSS 55555</u> Test No: 5	Conditioning	Conditioned	---

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2.0 Test Results (Continued...)

Sr. No.	Test Parameter	Test condition	Test Requirement	Observation	Remarks
2.24	Post Visual Check	UUT shall be visually examined	There shall be no visual damage.	No visible damage observed	Complied
2.25	Final Accuracy Check				
2.25.1	DC Voltage	Ranges: 30,300 mV 3,30,300,1000 V	Min: $\pm(0.5\%+3 \text{ dgt})$ Max: $\pm(0.35\%+1 \text{ dgt})$	Min: 0 % Max: 0.33 %	Complied
2.25.2	AC Voltage	Ranges: 3,30,300 & 1000 V	Min: $\pm(0.75\%+1 \text{ dgt})$ Max: $\pm(0.75\%+2 \text{ dgt})$	Min: 0 % Max: 0.13 %	Complied
2.25.3	DC Current	Ranges: 300 μ A, 3,30,300 mA 3,10 A	Min: $\pm(1\%+2 \text{ dgt})$ Max: $\pm(1\%+5 \text{ dgt})$	Min: 0.07 % Max: 0.30 %	Complied
2.25.4	AC Current	Ranges: 3,300 mA 10 A	$\pm(1.5\%+2 \text{ dgt})$	Min: 0.04 % Max: 0.26 %	Complied
2.25.5	Resistance	Ranges: 30, 300 Ω 3,30,300 k Ω 3,30 M Ω	Min: $\pm(0.4\%+1 \text{ dgt})$ Max: $\pm(0.5\%+35 \text{ dgt})$	Min: 0 % Max: 1.47 %	Complied
2.26	Dust	JSS 55555 Test No. 14 Temperature: 40 °C RH: 50% 1 h. dust circulation	Conditioning	Conditioned	---
2.27	Post Visual Check	UUT shall be visually examined	There shall be no visual damage.	No visual damage observed	Complied
2.28	Drop	<u>JSS 55555</u> Test No. 13	Conditioning	Conditioned	---
2.29	Post Visual Check	UUT shall be visually examined	There shall be no visual damage.	No visual damage observed	Complied
2.30	Toppling	<u>JSS 55555</u> Test No. 26	Conditioning	Conditioned	---
2.31	Post Visual Check	UUT shall be visually examined	There shall be no visual damage.	No visual damage observed	Complied

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3.0 General Remarks:-NIL-

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Leena Kishor

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