



सत्यमेव जयते

TEST / CALIBRATION REPORT

TYPE TEST REPORT

for

MECO Clamp-On Earth / Ground Resistance & Leakage Current Tester

Testing as Per I.S. 1248 and I.S. 13875



ELECTRONICS REGIONAL TEST LABORATORY (WEST)
MINISTRY OF COMMUNICATIONS & INFORMATION TECHNOLOGY, (STQC Dte.)
Government of India

Plot No. F 7 & 8, MIDC Area, Opp. SEEPZ,
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ELECTRONICS REGIONAL TEST LABORATORY (WEST) DEPARTMENT OF INFORMATION TECHNOLOGY (STQC Dte.)	INTERIM TEST REPORT NO. ERTL(W)/2003E&S258		
SUBJECT: TESTING OF GROUND RESISTANCE & LEAKAGE CURRENT TESTER	DATE 30 JAN 2004	PAGE 1	OF 8

1. **SCOPE**

1.1 Service Request No : ERTL (W) / 20032546 dated 24th December 2003

1.1.1 Service Request finalised on : 24th December 2003

1.2 Requested by : MECO INSTRUMENTS PVT. LTD.
(Name and address of organisation) : 301, BHARAT INDUSTRIAL ESTATE,
T.J. ROAD, SEWRI,
MUMBAI - 400 015

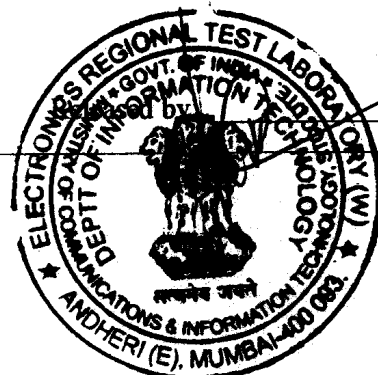
1.3	<u>Description</u>	<u>Qty</u>	<u>Manufacturer</u>	<u>Model</u>	<u>Serial Nos.</u>
	GROUND RESISTANCE & LEAKAGE CURRENT TESTER	01 No.	MECO	4680	02410256

1.4 Test specifications : Customer's specification

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

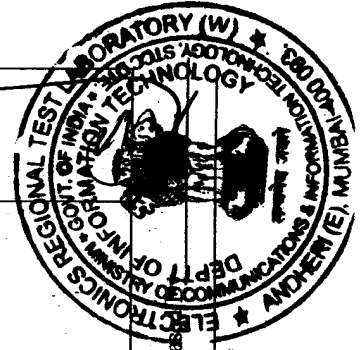
1.6 Test Equipment used :

1. Energy Meter Test Bench	E&S/126
2. Multifunction Calibrator	S&C/138
3. Decade Resistance Box	S&C/135
4. Environmental Chamber	ENV/064



2.0 Test Results

Sr.No.	Test/Parameter	Ref. Clause No.	Test Condition	Requirement	Observation	Remark
2.1	Insulation Resistance	7.1 of IS 1248-Part 1	At 500 V DC for 1 min. between terminals shorted together and body.	Not less than 5 M ohm	More than 2000 M ohm	Complied
2.2	High Voltage Test	7.1 of IS 1248-Part 1	AT 2 kV AC (rms) for 1 min. between terminals shorted together and foil wrapped on body.	There shall not be any breakdown/flashover.	No breakdown/flashover observed.	Complied
2.3	Intrinsic Error	4 of IS 1248-Part 7. 4.2 of IS 13875-Part 1.	Ground resistance range 0.01 Ohm 1 Ohm 10 Ohm 90 Ohm 190 Ohm 400 Ohm 600 Ohm 1500 Ohm	0.025 - 0.250 Ω: ± 1.5 % ± 0.05 Ω 0.250 - 9.999 Ω: ± 1.5 % ± 0.1 Ω 10.00 - 99.99 Ω: ± 2.0 % ± 0.3 Ω 100.0 - 199.9 Ω: ± 3.0 % ± 1.0 Ω 200.0 - 400.0 Ω: ± 5.0 % ± 5 Ω 400.0 - 600.0 Ω: ± 10 % ± 10 Ω 600.0 - 1500 Ω: ± 20 % ± (Approx.)	The results were within the limits	Complied
			Ground/ Leakage current (50 Hz) 0.2 mA 1.0 mA 2.0 mA 10 mA 20 mA 100 mA	0.200 - 1.000 mA: ± 2.5 % ± 0.05 mA 1.00 - 10.00 mA: ± 2.5 % ± 0.05 mA 10.0 - 100.0 mA: ± 2.0 % ± 0.3 mA 100 - 1000 mA: ± 2.0 % ± 3 mA	The results were within the limits	Complied
			Ground/ Leakage current (50 Hz) 0.05 A 0.2 A 0.5 A 1 A 5 A 10 A	0.20 - 15.00 A : ± 2.0 % ± 0.03 A	The results were within the limits	Complied



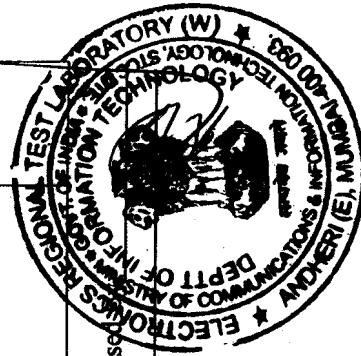
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2.0 Test Results (Continued..)

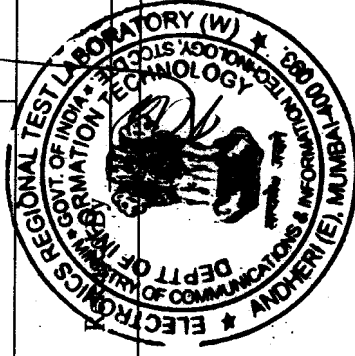
Sr.No.	Test/Parameter	Ref. Clause No.	Test Condition	Requirement	Observation	Remark
2.4	Variation due to influential quantities					
2.4.1	Variation due to ambient temp.	Table 2 of IS 1248-Part 1.	Ground resistance range 10 Ohm 100 Ohm 1000 Ohm	Variation shall not exceed class index	The results were within the limits	Complied
			Ground/ Leakage current (50 HZ) 0.2 mA 3.0 mA 4.0 mA 10 mA 20 mA 100 mA	Variation shall not exceed class index	The results were within the limits	Complied
			Ground/ Leakage current (50 HZ) 0.2 A 0.5 A 2.0 A 5 A 10 A	Variation shall not exceed class index	The results were within the limits	Complied

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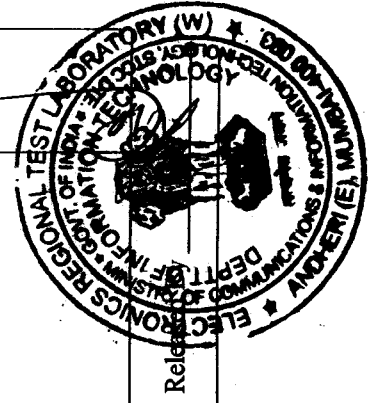
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Sr.No.	Test/Parameter	Ref. Clause No.	Test Condition	Requirement	Observation	Remark
2.4.2	Variation due to humidity	Table 2 of IS 1248-Part 1.	Ground resistance range 10 Ohm 100 Ohm 1000 Ohm	Variation shall not exceed class index	The results were within the limits	Complied
			Ground/ Leakage current (50 HZ) 0.2 mA 5.0 mA 6.0 mA 10 mA 20 mA 100 mA	Variation shall not exceed class index	The results were within the limits	Complied
			Ground/ Leakage current (50 HZ) 0.2 A 0.5 A 2.0 A 5 A 10 A	Variation shall not exceed class index	The results were within the limits	Complied



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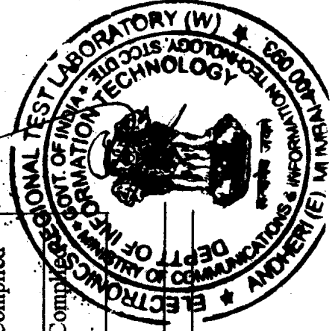
Sr.No.	Test/Parameter	Ref. Clause No.	Test Condition	Requirement	Observation	Remark
2.4.3	Variation due to distortion of AC measured quantity.	Table 2 of IS 1248-Part 1.	Ground/ Leakage current (50 HZ) 0.2 mA 7.0 mA 8.0 mA 10 mA 20 mA 100 mA	Variation shall not exceed class index	The results were within the limits	Complied
			Ground/ Leakage current (50 HZ) 0.2 A 0.5 A 3.0 A 5 A 10 A	Variation shall not exceed class index	The results were within the limits	Complied
2.4.4	Variation due to frequency of AC measured quantity.	Table 2 of IS 1248-Part 1. 3.13 of IS 13875-Part 2.	Ground/ Leakage current (50 HZ) 0.2 mA 9.0 mA 10.0mA 10 mA 20 mA 100 mA	Variation shall not exceed class index	The results were within the limits	Complied
			Ground/ Leakage current (50 HZ) 0.2 A 0.5 A 4.0 A 5 A 10 A	Variation shall not exceed class index	The results were within the limits	Complied



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Sr.No.	Test/Parameter	Ref. Clause No.	Test Condition	Requirement	Observation	Remark
2.4.5	Variation due to position	Table 2 of IS 1248-Part 1. 4.6 of IS 13875-Part 1.	Ground resistance range 10 Ohm 100 Ohm 1000 Ohm Ground/ Leakage current (50 Hz) 0.2 mA 11.0mA 12.0mA 10 mA 20 mA 100 mA	Variation shall not exceed class index Variation shall not exceed class index	The results were within the limits The results were within the limits	Complied Complied
2.4.6	Variation due to magnetic field of external origin	Table 2 of IS 1248-Part 1. 4.7 of IS 13875-Part 1.	Ground resistance range 10 Ohm 100 Ohm 1000 Ohm Ground/ Leakage current (50 Hz) 0.2 A 0.5 A 5.0 A 5 A 10 A	Variation shall not exceed class index Variation shall not exceed class index	The results were within the limits The results were within the limits	Complied Complied
2.5	Self heating	7.3 of IS 1248-Part 1. 3.16 of IS 13875-Part 2.	Ground resistance range Ground/ Leakage current (50 Hz) 100 mA 10 A Ground resistance range Ground/ Leakage current (50 Hz) 100 mA 10 A	Variation shall not exceed class index Variation shall not exceed class index Variation shall not exceed class index Variation shall not exceed class index	The results were within the limits The results were within the limits The results were within the limits The results were within the limits	Complied Complied Complied Complied



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Sr.No.	Test/Parameter	Ref. Clause No.	Test Condition	Requirement	Observation	Remark
2.6	Temp. cycling	7.5.3 of IS 1248-Part 1.	40 deg.C for 16h & -10 deg.C for 8h. 3 cycles			
2.6.1	Intrinsic Error	4 of IS 1248-Part 7. 4.2 of IS 13875-Part 1.	Ground resistance range 0.01 Ohm 1 Ohm 10 Ohm 90 Ohm 190 Ohm 400 Ohm 600 Ohm 1500 Ohm	0.025 - 0.250 Ω : ± 1.5 % ± 0.05 Ω 0.250 - 9.999 Ω : ± 1.5 % ± 0.1 Ω 10.00 - 99.99 Ω : ± 2.0 % ± 0.3 Ω 100.0 - 199.9 Ω : ± 3.0 % ± 1.0 Ω 200.0 - 400.0 Ω : ± 5.0 % ± 5 Ω 400.0 - 600.0 Ω : ± 10 % ± 10 Ω 600.0 - 1500 Ω : ± 20 % ± (Approx.)	The results were within the limits	Complied
			Ground/ Leakage current (50 Hz) 0.2 mA 13.0mA 14.0mA 10 mA 20 mA 100 mA	0.200 - 1.000 mA : ± 2.5 % ± 0.05 mA 1.00 - 10.00 mA : ± 2.5 % ± 0.05 mA 10.0 - 100.0 mA : ± 2.0 % ± 0.3 mA 100 - 1000 mA : ± 2.0 % ± 3 mA	The results were within the limits	Complied
			Ground/ Leakage current (50 Hz) 0.05 A 0.2 A 0.5 A 1 A 5 A 10 A	0.20 - 15.00 A : ± 2.0 % ± 0.03 A	The results were within the limits	Complied



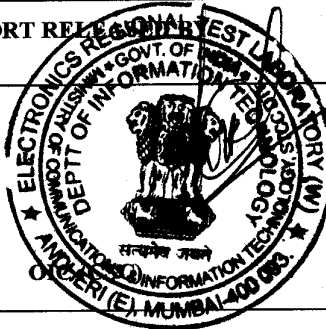
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3.0 **General Remarks:** This is an interim test report for J.C. No. 2004E&S032 dated 30-01-2004. The detailed test report will be issued in due course of time.

REPORT APPROVED BY

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ELECTRONICS REGIONAL TEST LABORATORY (WEST)	REPORT NO. ERTL(W)/2004E&S46		
DEPARTMENT OF INFORMATION TECHNOLOGY (STQC Dte.)			
SUBJECT: TESTING OF GROUND RESISTANCE & LEAKAGE CURRENT TESTER	DATE	PAGE	OF
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1. **SCOPE**

1.1 Service Request No : ERTL (W) / 20040370 dated 25th Feb. 2004

1.1.1 Service Request finalised on : 25th Feb. 2004

1.2 Requested by (Name and address of organisation) : MECO INSTRUMENTS PVT. LTD.
301, BHARAT INDUSTRIAL ESTATE,
T.J. ROAD, SEWRI,
MUMBAI - 400 015

1.3 Description	Qty	Manufacturer	Model	Serial Nos.
GROUND RESISTANCE & LEAKAGE CURRENT TESTER	01 No.	MECO	4680	02410256

1.4 Test specifications : Customer's specification

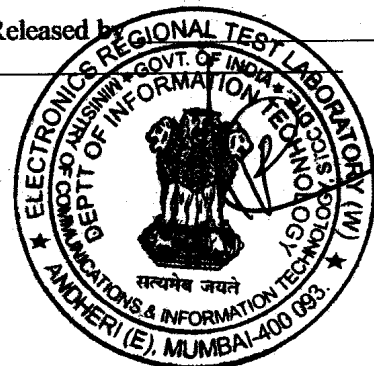
1.5 Lab Ambient : Temperature : (25 ±2) deg.C
Humidity : (55 ±5) % RH

1.6 Condition of item on its receipt : Good

1.7 Test Equipment used :

1. Multifunction Calibrator	S&C/138
2. Decade Resistance Box	S&C/135
3. Vibration system	ENV/008
4. Shock Test Machine	ENV/018

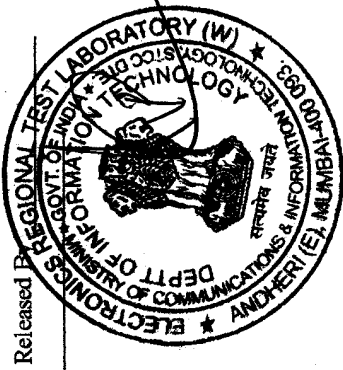
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ELECTRONICS REGIONAL TEST LABORATORY (WEST) DEPARTMENT OF INFORMATION TECHNOLOGY (STQC Dte.)		REPORT NO. ERTL(W)/2004E&S46	
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2.0 Test Results

Sr.No.	Test/Parameter	Ref. Clause No.	Test Condition	Requirement	Observation	Remark
2.1	Intrinsic Error	4 of IS 1248-Part 7. 4.2 of IS 13875-Part 1.	Ground resistance range 10 Ohm 90 Ohm 190 Ohm 400 Ohm 600 Ohm 1500 Ohm	10.00 - 99.99 Ω: ± 2.0 % ± 0.3 Ω 100.0 - 199.9 Ω: ± 3.0 % ± 1.0 Ω 200.0 - 400.0 Ω: ± 5.0 % ± 5 Ω 400.0 - 600.0 Ω: ± 10 % ± 10 Ω 600.0 - 1500 Ω: ± 20 % ± (Approx.)	The results were within the limits	Complied
			Ground/ Leakage current (50 Hz) 0.2 mA 1.0 mA 2.0 mA 10 mA 20 mA 100 mA	0.200 - 1.000 mA: ± 2.5 % ± 0.05 mA 1.00 - 10.00 mA: ± 2.5 % ± 0.05 mA 10.0 - 100.0 mA: ± 2.0 % ± 0.3 mA 100 - 1000 mA: ± 2.0 % ± 3 mA	The results were within the limits	Complied
			Ground/ Leakage current (50 Hz) 0.05 A 0.2 A 0.5 A 1 A 5 A 10 A	0.20 - 15.00 A : ± 2.0 % ± 0.03 A	The results were within the limits	Complied

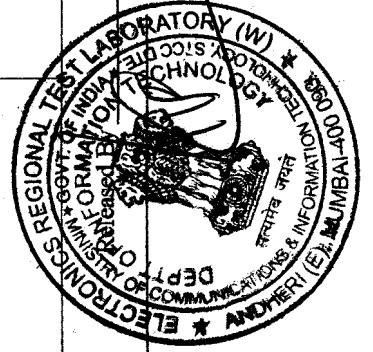


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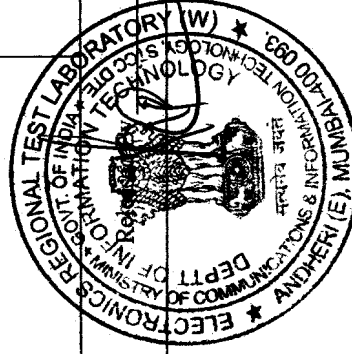
2.0 Test Results (Continued..)

Sr.No.	Test/Parameter	Ref. Clause No.	Test Condition	Requirement	Observation	Remark
2.2	Vibration	8.7.1 of IS 1248-Part 1. 4.9.2 of IS 13875-Part 1.	As per IS 9000 Part 8, Sweep range: 10-150-10 Hz Displacement amplitude: 0.15 mm peak in the range 10-60 Hz, Acceleration: 2g in the range: 60-150 Hz, Sweep Rate: 1 octave/min., Duration : 6 h. Endurance shall be performed at resonance frequency. Vibration shall be applied at the resonance frequency for 6h in that direction. If the resonance is observed in any of these 3 directions, the equipment shall be subjected to vibration at each of the frequencies 25, 50, 100 and 150 Hz in each of the 3 mutually perpendicular direction so that the total duration shall not exceed 6 h. Same as in Sr. No. 2.1	Accuracy of each function Shall be within the specified limit.	Conditioned	--
2.2.1	Intrinsic Error	4 of IS 1248-Part 7. 4.9.1 of IS 13875-Part 1.			Percentage error observed with in the specified limit of each function.	Complied
2.3	Shock Test	As per IS 9000 (Part-7/Sec.1) Peak Acceleration: 15g, Pulse shape: half sine, Duration: 11 ms, 3 shocks in both directions of 3 mutually perpendicular axes (total 18 shocks)	To be conditioned		Conditioned	--



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Sr.No.	Test/Parameter	Ref. Clause No.	Test Condition	Requirement	Observation	Remark
2.3.1	Intrinsic Error	4 of IS 1248-Part 7. 4.2 of IS 13875-Part 1.	Ground resistance range 10 Ohm 90 Ohm 190 Ohm 400 Ohm 600 Ohm 1500 Ohm	10.00 - 99.99 Ω: ± 2.0 % ± 0.3 Ω 100.0 - 199.9 Ω: ± 3.0 % ± 1.0 Ω 200.0 - 400.0 Ω: ± 5.0 % ± 5 Ω 400.0 - 600.0 Ω: ± 10 % ± 10 Ω 600.0 - 1500 Ω: ± 20 % ± (Approx.)	The results were within the limits	Complied
			Ground/ Leakage current (50 Hz) 0.2 mA 3.0 mA 4.0 mA 10 mA 20 mA 100 mA	0.200 - 1.000 mA: ± 2.5 % ± 0.05 mA 1.00 - 10.00 mA: ± 2.5 % ± 0.05 mA 10.0 - 100.0 mA: ± 2.0 % ± 0.3 mA 100 - 1000 mA: ± 2.0 % ± 3 mA	The results were within the limits	Complied
			Ground/ Leakage current (50 Hz) 0.05 A 0.2 A 0.5 A 1 A 5 A 10 A	0.20 - 15.00 A : ± 2.0 % ± 0.03 A	The results were within the limits	Complied



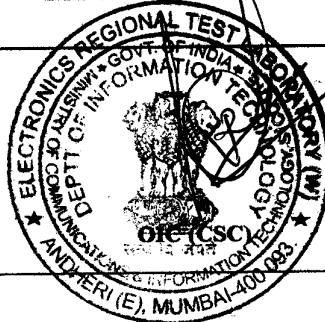
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3.0 General Remarks: Nil

REPORT APPROVED BY

REPORT RELEASED BY

[Signature]
HEAD (E&S)



OUR ACCREDITATION STATUS

ERTL (W) set up under the STQC Directorate, Ministry of Communications & Information Technology, Govt. of India has been accredited under number of national / international systems as follows :

SYSTEM	AREA	STATUS
IECQ (International Electro-technical Commission on Quality Assessment System for Electronic Components)	Component Testing <ul style="list-style-type: none"> ● Resistors (Fixed) ● Capacitors (Fixed) 	Accredited as ITL (Independent Test Laboratory)
NABL (C), India National Accredital Board for Test & Calibration laboratories (Calibration System)	Calibration <ul style="list-style-type: none"> ● Electro-technical discipline ● Thermal discipline ● Mechanical discipline 	Accredited Calibration Laboratory
NABL(T), India National Accredital Board for Test & Calibration laboratories (Testing System)	Electronic & Electrical Testing	Accredited Test Laboratory
IECEE-CE-Scheme	<ul style="list-style-type: none"> ● Mains Operated Electronic Consumer Products 	Approved as a CB test Laboratory
Other recognition		Recognised by CSPO of State Govt., DOT, Naval Docyard, LCSO etc.