

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, Andheri (E), Mumbai-400 093. Phone : (022) 2832 5134, 2830 1468, 2830 1138 Fax : (022) 2822 5713 E-mail : ertlbom@bom4.vsnl.net.in

ELECTRONICS REGIONAL TEST LABORATORY (WEST)	INTERIM TEST REPORT	NO	
DEPARTMENT OF INFORMATION TECHNOLOGY (STQC Dte.)	ERTL(W)/2003E&S258	NO	
			1
SUBJECT: TESTING OF GROUND RESISTANCE & LEAKAGE	DATE	PAGE	OF
CURRENT TESTER	3 0 JAN 2004	1	8
	FULL VIAL V C		

1. **SCOPE**

- : ERTL (W) / 20032546 dated 24th December 2003 Service Request No 1.1
- Service Request finalised on 1.1.1

: 24th December 2003

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

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

- 1.4 Test specifications
- 1.5 Lab Ambient

1.3

1.6 Test Equipment used : Customer's specification

Temperature Humidity	: $(25 \pm 2) \text{ deg.C}$: $(55 \pm 5) \% \text{ RH}$	
1. Energy M	eter Test Bench	E&S/126
	tion Calibrator	S&C/138
		000/100

- 3. Decade Resistance Box S&C/135 ENV/064 4. Environmental Chamber



INTERIM TEST REPORT NO. ERTL(W)/2003E&S258 д ∞ PAGE 2 JAN 2004 SUBJECT : TESTING OF GROUND RESISTANCE & LEAKAGE CURRENT TESTER DEPARTMENT OF INFORMATION TECHNOLOGY (STQC Dte.) ELECTRONICS REGIONAL TEST LABORATORY (WEST)

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						NORY (W) +
Remark	Complied	Complied	Complied	Complied	Complied	
Observation	More than 2000 M ohm	No breakdown/ flashover observed.	The results were within the limits	The results were within the limits	The results were within the Con limits	Released in the second se
Requirement	Not less than 5 M ohm	There shall not be any breakdown/ flashover.	$\begin{array}{llllllllllllllllllllllllllllllllllll$	$0.200 - 1.000 \text{ mA}: \pm 2.5\% \pm 0.05 \text{ mA}$ $1.00 - 10.00 \text{ mA}: \pm 2.5\% \pm 0.05 \text{ mA}$ $10.0 - 10.00 \text{ mA}: \pm 2.0\% \pm 0.3 \text{ mA}$ $100 - 1000 \text{ mA}: \pm 2.0\% \pm 3 \text{ mA}$	0.20 – 15.00 A : <u>±</u> 2.0 % <u>±</u> 0.03 A	
Test Condition	At 500 V DC for 1 min. between terminals shorted together and body	AT 2 kV AC (rms) for 1 min. between terminals shorted together and foil wrapped on body.	Ground resistance range 0.01 Ohm 1 Ohm 90 Ohm 190 Ohm 600 Ohm 1500 Ohm	Ground/ Leakage current (50 Hz) 0.2 mA 1.0 mA 2.0 mA 10 mA 20 mA	Ground/ Leakage current (50 Hz) 0.05 A 0.2 A 0.5 A 1 A 5 A 10 A	
Ref. Clause No.	7.1 of IS 1248-Part 1	7.1 of IS 1248-Part 1	4 of IS 1248-Part 7. 4.2 of IS 13875-Part 1.			
I est/Parameter	Insulation Resistance	High Voltage Test	Intrinsic Error			
Sr.No.	2.1	. 2.2	5.3			

Complied Complied Complied Remark INTERIM TEST REPORT NO. ERTL(W//2003E&S258 oF ∞ ANONA STREEM The results were within the limits The results were within the limits The results were within the limits 60.1 Ó, PAGE 3 Observation Releaseds 2004 **A**N Variation shall not exceed Variation shall not exceed Variation shall not exceed Requirement ന class index class index class index 10 Ohm 100 Ohm 3.0 mA 4.0 mA 10 mA 20 mA 100 mA 0.2 A 5.A 0.5 A 2.0 A 0.2 mA 1000 Ohm 10 A Ground/ Leakage current (50 HZ) Ground/ Leakage current (50 HZ) SUBJECT : TESTING OF GROUND RESISTANCE & LEAKAGE CURRENT TESTER Test Condition Variation due to influencial quantities Variation due | Table 2 of IS 1248-Part 1. | Ground resistance range DEPARTMENT OF INFORMATION TECHNOLOGY (STQC Dte.) ELECTRONICS REGIONAL TEST LABORATORY (WEST) Ref. Clause No. 2.0 Test Results (Continued..) Test/Parameter to ambient temp. Sr.No. 2.4.1 2.4

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158	8 8	Remark Complied Complied Complied
INTERIM TEST REPORT NO. ERTL(W)/2003E&S258	2004 PAGE (The results were within the limits Comp The results were within the limits Comp The results were within the limits Comp
INTERIM TEST	3 0 JAN	Requirement Variation shall not exceed class index Variation shall not exceed class index Variation shall not exceed class index
ST) TQC Dte.)	SUBJECT : TESTING OF GROUND RESISTANCE & LEAKAGE CURRENT TESTER	Test Condition 10 Ohm Ground resistance range 10 Ohm 100 Ohm 1000 Ohm Ground/ Leakage current (50 HZ) 0.2 mJ Ground/ Leakage current (50 HZ) 0.2 mJ Ground/ Leakage current (50 HZ) 0.2 mJ Ground/ Leakage current (50 HZ) 0.2 A 100 mA 20 mJ Ground/ Leakage current (50 HZ) 0.2 A
DEPARTMENT OF INFORMATION TECHNOLOGY (STQC Due.)	JROUND RESISTANCE & L	Ref. Clause No. Table 2 of IS 1248-Part 1.
TMENT OF INFOF	CT : TESTING OF (Test/Parameter Variation due to humidity
DEPAR	SUBJE	Sr.No. 2.4.2

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258	% OF	Remark Complied	Complied	Complied	Complied	NOLOGI STAR
INTERIM TEST REPORT NO. ERTL(W)/2003E&S258	2004 PAGE C	Observation The results were within the limits	The results were within the limits	The results were within the limits	The results were within the limits	Relation of the relation of th
INTERIM TEST RE	3 0 JAN	Requirement Variation shall not exceed class Tr index	Variation shall not exceed class Thindex	Variation shall not exceed class Thindex	Variation shall not exceed class Thindex	
VEST) (STQC Dte.)	LEAKAGE CURRENT TESTER	Test Condition V Ground/ Leakage current (50 HZ) V 0.2 mA i 7.0 mA 8.0 mA		Ground/ Leakage current (50 HZ) 10 A 0.2 mA 0.2 mA 10.0 mA 10.0 mA 10.0 mA 10.0 mA 10.0 mA 10 mA 10 mA 20 mA	Ground/ Leakage current (50 HZ) V i 0.2 A i 0.5 A 4.0 A 4.0 A 5 A 5 A 5 A 10 A 10 A	
ELECTRONICS REGIONAL TEST LABORATORY (WEST) DEPARTMENT OF INFORMATION TECHNOLOGY (STQ	SUBJECT : TESTING OF GROUND RESISTANCE & LEAKAGE	Ref. Clause No. Table 2 of IS 1248-Part 1.		Table 2 of IS 1248-Part 1. 3.13 of IS 13875-Part 2.		
ONICS REGION/ MENT OF INFOF	T : TESTING OF (Test/Parameter Variation due to distortion of AC measured quantity.		Variation due to frequency of AC measured quantity.		
ELECTR	SUBJEC	Sr.No. 2.4.3		2.4.4		

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ELECTRONICS REGIONAL TEST LABORATORY (WEST)	INTERIM TEST DEBART NO ERTI (WAYDONSE & \$255	CONTRACT CUNNING	1F.8.9.50
DEPARTMENT OF INFORMATION TECHNOLOGY (STQC Dtc.)			00700010
SUBJECT : TESTING OF GROUND RESISTANCE & LEAKAGE CURRENT TESTER	DATE	PAGE	GF
	2 D IAN 7014	9	œ

									DRMATION C	
Remark	Complied	Complied	Complied	Complied	Complied	Complied	Complied	Complied	Complete Control	10/3/W
Observation	The results were within the Column timits	The results were within the C limits	The results were within the C limits	The results were within the C limits	The results were within the C limits	The results were within the C limits	The results were within the C limits	The results were within the C limits	The results were within the C limits	
Requirement	Variation shall not exceed class index	Variation shall not exceed class index	Variation shall not exceed class index	Variation shall not exceed class index	Variation shall not exceed class index	Variation shall not exceed class index	Variation shall not exceed élass index	Variation shall not exceed class index	Variation shall not exceed class index	
Test Condition	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	Ground/ Leakage current (50 HZ) 0.2 A 0.5 A 5.0 A 5 A 10 A	Ground resistance range 10 Ohm 100 Ohm 1000 Ohm	Ground/ Leakage current (50 Hz) 100 mA	Ground/ Leakage current (50 Hz) 10 A	Ground resistance range	Ground/ Leakage current (50 Hz) 100 mÅ	Ground/ Leakage current (50 Hz) 10 A	
Ref. Clause No.	Table 2 of IS 1248-Part 1. 4.6 of IS 13875-Part 1.			Table 2 of IS 1248-Part 1. 4.7 of IS 13875-Part 1.			7.3 of IS 1248-Part 1. 3.16 of IS 13875-Part 2.		· · · · ·	
Test/Parameter	Variation due to position			Variation due to magnetic field of	external origin		Self heating			
Sr.No.	2.4.5			2.4.6			2.5			

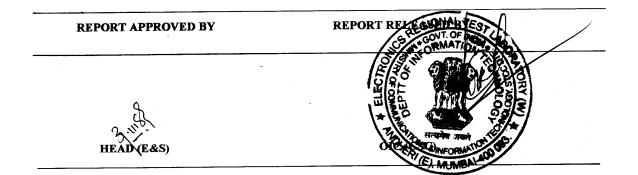
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&S258	% OF	Remark		Complied	Complied	Complied	
INTERIM TEST REPORT NO. ERTL(W//2003E&S258	PAGE 7	Ohservation	0.0041	The results were within the limits	The results were within the limits	The results were within the limits	Released in the second se
INTERIM TEST RE	3 0 JAN	Deministration		± 1.5 % ± 0.05 Ω ± 1.5 % ± 0.1 Ω ± 2.0 % ± 0.3 Ω ± 3.0 % ± 1.0 Ω ± 5.0 % ± 5 Ω ± 10 % ± 10 Ω ± 20 % ± (Approx.)	±2.5 % ± 0.05 mA ±2.5 % ± 0.05 mA ±2.0 % ± 0.3 mA ±2.0 % ± 3 mA	± 2.0 % ± 0.03 A	
		Penni		0.025 - 0.250 Ω: 0.250 - 9.999 Ω: 10.00 - 99.99 Ω: 100.0 - 199.9 Ω: 200.0 - 400.0 Ω: 400.0 - 600.0 Ω: 600.0 - 1500 Ω:	0.200 – 1.000 mA: 1.00 – 10.00 mA: 10.0 – 100.0 mA: 100 – 100.0 mA:	0.20 – 15.00 A : <u>+</u>	
ELECTRONICS REGIONAL TEST LABORATOR T (WEST) DEPARTMENT OF INFORMATION TECHNOLOGY (STQC Die.)	& LEAKAGE CURRENT TESTER	Taet Mandition	40 deg.C for 16h & -10 deg.C for 8h. 3 cycles	Ground resistance range 0.01 Ohm 1 Ohm 90 Ohm 190 Ohm 400 Ohm 500 Ohm	Ground/ Leakage current (50 Hz) 0.2 mA 13.0mA 14.0mA 10 mA 20 mA	Ground/ Leakage current (50 Hz) 0.05 A 0.2 A 0.5 A 1 A 5 A 10 A	
	SUBJECT : TESTING OF GROUND RESISTANCE & LEAKAGE	Daf Clause Mo	7.5.3 of IS 1248-Part 1.	4 of IS 1248-Part 7. 4.2 of IS 13875-Part 1.			
MENT OF INFO	T : TESTING OF (Tati	Temp. cycling	Intrinsic Error			
DEPART	SUBJEC	C-No	2.6	2.6.1			

ELECTRONICS REGIONAL TEST LABORATORY (WEST)	INTERIM TEST REPORT NO.		
DEPARTMENT OF INFORMATION TECHNOLOGY (STQC Dte.)	ERTL(W)/2003E&S258		
SUBJECT: TESTING OF GROUND RESISTANCE & LEAKAGE	3 0 JAN 2004	PAGE	OF
CURRENT TESTER		8	8

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



	RONICS REGIONAL TEST LABORA RTMENT OF INFORMATION TECHN		RE	PORT NO. ERTL	_(W)/2004E&S46	5
SUBJE	CT: TESTING OF GROUND RESIST CURRENT TESTER	ANCE & LE	4.	date 3 MAR 200	PAGE 1	OF 5
ĺ.	SCOPE					
1.1	Service Request No : ERTL (W) / 20040370 dated 25 th Feb. 2004					
1.1.1	Service Request finalised on		: 25 th Feb. 2004			
1.2	Requested by (Name and address of organisation)	on)		•		
1.3	Description	Qty	Manufacturer	Model	<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
- Condition of item on its receipt 1.6
- Test Equipment used : 1.7

Temperature	:	(25 <u>+</u> 2) deg.C
Humidity	:	(55 <u>+</u> 5) % RH

Good

1.	Multifunction Calibrator	S&C/138
2.	Decade Resistance Box	S&C/135
3.	Vibration system	ENV/008
		ENTR/010

4. Shock Test Machine ENV/018



ELECTRONICS REGIONAL TEST LABORATORY (WEST)	DEPODT NO EDTI (WA)2004E& S46	WA/7004F& SA6	
DEPARTMENT OF INFORMATION TECHNOLOGY (STQC Dtc.)			
SUBJECT : TESTING OF GROUND RESISTANCE & LEAKAGE CURRENT TESTER	DATE	PAGE	Ч. Ч
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Sr.No. Test/Parameter	- Ref. Clause No.	Test Condition	Requirement	Observation	Remark
Intrinsic Error	4 of IS 1248-Part 7.	Ground resistance range		The results were within the	Complied
	4.2 of IS 13875-Part 1.	10 Ohm	$10.00 - 99.99 \Omega$: $\pm 2.0 \% \pm 0.3 \Omega$	limits	
		90 Ohm	$100.0 - 199.9 \Omega$: $\pm 3.0 \% \pm 1.0 \Omega$		
		190 Ohm	$200.0 - 400.0 \Omega$; $\pm 5.0 \% \pm 5 \Omega$		
		400 Ohm			
		600 Ohm 1500 Ohm	$600.0 - 1500 \Omega$; $\pm 20 \% \pm (Approx.)$		
		Ground/ Leakage current (50 Hz)		The results were within the	Complied
		0.2 mA	0.200 - 1.000 mA:	limits	
		1.0 mA	1.00 - 10.00 mA:		
		2.0 mA			
		10 mA	100 – 1000 mA:		
		20 mA			
		100 mA			
		Ground/ Leakage current (50 Hz)		The results were within the	Complied
		0.05 A	$0.20 - 15.00 \text{ A}$: $\pm 2.0 \% \pm 0.03 \text{ A}$	limits	
		0.2 A			
		0.5 A			
		1 A			
		5 A			
		10 A			

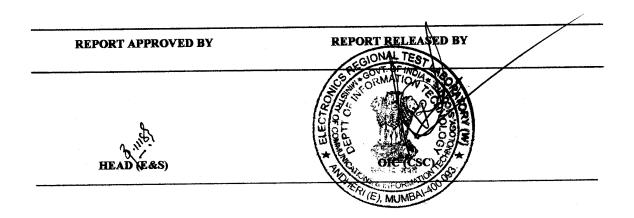
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	S 5		Remark	1	Complied	1	PATOdu
REPORT NO. ERTL(W)/2004E&S46	PAGE 3	-	Observation Re	Conditioned	Percentage error observed Com with in the specified limit of each function.	Conditioned	
REPORT N	2 3 MAR 2004		Requirement	3	Accuracy of each Pe function Shall be wi within the specified ea		
VEST) (STQC Dte.)	SUBJECT : TESTING OF GROUND RESISTANCE & LEAKAGE CURRENT TESTER		Test Condition	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 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	To be conditioned	
ELECTRONICS REGIONAL TEST LABORATORY (WEST) DEPARTMENT OF INFORMATION TECHNOLOGY (STQC Dtc.)	OF GROUND RESISTANCE &	2.0 Test Results (Continued)	Ref. Clause No.	8.7.1 of IS 1248-Part 1. 4.9.2 of IS 13875-Part 1.	4 of IS 1248-Part 7. 4.9.1 of IS 13875-Part 1.	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)	
ONICS REGI	r : testing	Results (C	Test/ Parameter	Vibration	Intrinsic Error	Shock Test	
ELECTR	SUBJEC	2.0 Test	Sr.No.	2.2	2.2.1	2.3	

· .	OF A	,	Remark	Complied				,	Complied					Complied		-		RAT	Rola	TW ACT		500
REPORT NO. ERTL(W)/2004E&S46	PAGE	-	Observation	The results were within the					The results were within the					The results were within the limits			COUNT TEST	Contraction of the second second	KON THE REAL PROPERTY IN THE REAL PROPERTY INTERNAL PROPE			The Stand Andreas and on 600
NO. ER		1001		The resu	limits				The resu	limits				The rest limits					NALS KON		HE EL	AN
REPORT	DATE	2 3 MAR 2004	Requirement		± 2.0 % ± 0.3 Ω + 3 0 % + 1 0 O	$\pm 5.0 \% \pm 5 \Omega$	$\pm 10\% \pm 10\Omega$	± 20 % ± (Approx.)		± 2.5 % ± 0.05 mA + 2 5 % + 0.05 mA	± 2.0 % ± 0.3 mA	±2.0 % ± 3 mA		2.0 % + 0.03 A								
			Redu		10.00 - 99.99 Q:			600.0 – 1500 Ω:		0.200 - 1.000 mA	10.0 - 100.0 mA:	100 - 1000 mA:		0 20 – 15 00 A : + 2 0 % + 0 03 A								
(WEST) Y (STQC Dte.)	& LEAKAGE CURRENT TESTER		Test Condition		10 Ohm 90 Ohm	190 Ohm	400 Ohm	800 Omn 1500 Ohm	Ground/ Leakage current (50 Hz)	0.2 mA	4.0 mA	10 mA	20 mA	Ground/ Leakage current (50 Hz) 0.05 A	0.2 A	V I	5A	W 01				
ELECTRONICS REGIONAL TEST LABORATORY (WEST) DEPARTMENT OF INFORMATION TECHNOLOGY (STQC Die.)	SUBJECT : TESTING OF GROUND RESISTANCE & LEAKAGE		Ref. Clause No.	4 of IS 1248-Part 7.	4.2 of IS 13875-Part 1.				and a first of the second s													
RONICS REGIONA TMENT OF INFORU	CT : TESTING OF G		Test/Parameter	+																		
ELECT	SUBJE		Sr.No.	2.3.1																		

ELECTRONICS REGIONAL TEST LABORATORY (WEST) DEPARTMENT OF INFORMATION TECHNOLOGY (STQC Dtc.)	REPORT NO. ERTL(W)/200	4E&S46	
SUBJECT: TESTING OF GROUND RESISTANCE & LEAKAGE	3 MAR 2004	PAGE	OF
CURRENT TESTER		5	5

3.0 General Remarks: Nil



OUR ACCREDITATION STATUS

ERTL (W) set up under the STQC Directorate, Ministry of Communications & Information Technology, Govt. of India has been accreditated 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 Resistors (Fixed) Capacitors (Fixed) 	Accreditated as ITL (Independent Test Laboratory)
NABL (C), India National Accreditational Board for Test & Calibration laboratories (Calibration System)	Calibration • Electro-technical discipline • Thermal discipline • Mechanical discipline	Accreditated Calibration Laboratory
NABL(T), India National Accreditational Board for Test & Calibration laboratories (Testing System)	Electronic & Electrical Testing	Accreditated Test Laboratory
IECEE-CE-Scheme	Mains Operated Electronic Consumer Products	Approved as a CB test Laboratory
Other recognisation		Recognised by CSPO of State Govt., DOT, Naval Docyard, LCSO etc.