



सत्यमेव जयते

TEST / CALIBRATION REPORT

EMC TEST FOR 3½ DIGIT AC CURRENT PANEL METER



ELECTRONICS REGIONAL TEST LABORATORY (WEST)

MINISTRY OF COMMUNICATIONS & INFORMATION TECHNOLOGY, (STQC Dte.)

Government of India

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ELECTRONICS REGIONAL TEST LABORATORY (WEST)		REPORT NO.	
MINISTRY OF COMMUNICATIONS AND INFORMATION TECHNOLOGY (STQC DTE)		ERTL (W)/ 2004EMI 365	
SUBJECT: EMC TESTING ON 3 ½ DIGITAL PANNEL METER, AC CURRENT		DATE	PAGE
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1. SCOPE

1.1 Service Request No : ERTL (W)/20042011

1.1.1 Service Request finalised on : 06th - Oct. - 2004

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

1.3	Item No.	Description	Qty	Manufacturer and	Type No.	Serial No
	1.	3 ½ DIGITAL PANNEL METER, AC CURRENT	01 No.	MECO INSTRUMENTS PVT. LTD.	SMP35SRS	0411986

1.4 Test specifications : EN 61326, 1998

1.5 Lab Ambient
Temperature : (25 +_2) deg.C
Humidity : (55 +_5) % RH

1.6 Test Equipment used:

1. CPU/064 : EMI receiver (HP8568B)
2. EMI/044 : EMI Test System(EFT & ESD Simulator)
3. EMI/036 : HP8648 RF Signal Generator
4. EMI/024 : AR 25A100 RF Amplifier
5. EMI/038 : CDN
6. EMI/034 : G-Srip chamber
7. EMI/037 : G-Srip Amplifier
8. EMI/008 : Antennae Kit
9. HP Plotter



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2.0 EQUIPMENT UNDER TEST (EUT)**2.1 Description**

EUT is 3 ½ Digital Panel Meter, AC current operates on mains supply of 230 V AC/50Hz. & 5 A, AC, 50 Hz Input.

Connection of screw terminal as follows :

Terminal nos.	Description
6, 8	230 V AC, 50 Hz, (Auxiliary supply, single phase)
2, 5	5 A, AC, 50 Hz (Input)

EUT is classified under class 'B' continues unmonitored as per EN 61326 standard.

2.2 Functional performance test of Equipment Under Test (EUT) to be carried out at the end of each test

EUT is supplied with an Auxiliary supply of 230 V AC, 50 Hz, single phase between terminal 6 and 8.

EUT has an input of 5 A, AC, 50 Hz between terminal 2 and 5.

After above two connections EUT display should indicate 160.0 ~ AC

2.3 Functional check for all immunity tests.**Performance Criteria- 'A'**

The EUT shall continue to operate as intended during and after the test. No degradation of performance or loss of function is allowed.

Performance Criteria –'B'

The EUT shall continue to operate as intended during and after the test. During the test, degradation of performance is however allowed. No change of actual operating state or stored data is allowed.

Performance Criteria – 'C'

Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls.



TEST RESULTS:

3.2 RADIATED EMISSION

Test Rationale : To measure emissions of the EUT radiated into space and to compare them with specified limits to ascertain that the EUT will not disturb other equipment by generating such emissions above a certain limit.

a) Test Condition

Secification EN 61326 (1998)
Set-up As per CISPR 22
Frequency Range 30 MHz – 1000 MHz

EUT in normal operating condition at rated conventional load.

b) Reciever

Bandwidth 120 KHz
Detectors QP
Antenna Bi-Conical (For 30 – 200 MHz)
Log-Periodic (For 200 – 1000 MHz)
Configuration Conforming to CISPR 16

c) Test procedure

- Emission measurements were carried out in an Open Area Test Site (OATS)
- Ambient measurements carried out first with EUT "off" and peaks noted
- EUT was switched "ON" and Emission peaks noted.
- Antenna height and position were changed to maximize Emissions.
- A table of Emission and corresponding Ambients was then drawn up.
- "Ambient" and "Emission" peaks were compared. Peaks with a difference of less than 5 dB were discarded.

d) Requirements

EUT emissions shall be below following limits

Freq. (MHz)	Limits (dBuV/m) (@3 meters) QP
30-230	40
230-1000	47

e) Observations

Emission Peaks were found to be within the specified limits. (See Annexure)

f) Results
Complied



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3.2 ELECTROSTATIC DISCHARGE (ESD)

Test Rationale:

To check immunity characteristics of the EUT against Discharge of Static Electricity that may occur when a charged operator touches the EUT.

a) Test Condition:

Set-up As per BS EN 61000-4-2/ IEC 61000-4-2- 1995

Mode of simulation: Contact Discharge on conductive surfaces & Air Discharge on non- conductive surfaces

Test Voltage: **Contact Discharge:** 4 kV (Not applicable)
Air Discharge: 8 kV

No. of Discharges 10

Polarity Positive and Negative

Points of Discharge **Contact Discharge** (Not applicable)

➤ Metallic screws,

Air Discharge:

➤ Insulating surfaces

Simulation Using ESD Gun

EUT in normal operating condition at rated load.

c Test procedure:

- EUT initially subjected to indirect discharge on VCP and HCP.
- EUT was then screened in continuous discharge mode.
- At susceptible points, ten single discharges were applied.

d Requirement:

After the test EUT shall function as per serial no.2.2.

Performance Criterion 'B'

e Observations

EUT performance was normal during and after the test as per serial no.2.2.

Performance Criterion 'B'

f Results

Complied.



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3.3 ELECTRICAL FAST TRANSIENTS (EFT)

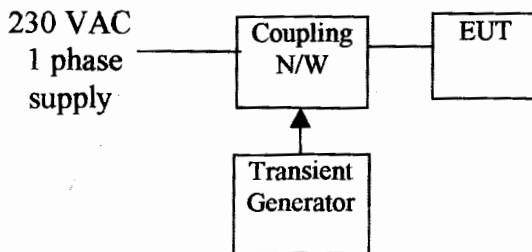
Test Rationale:

To check immunity characteristics of the EUT against transients generated by inductive load switching, Relay contact bouncing, switching of high voltage switchgear and the like

a Test Condition:

Set-up	As per BS EN 61000-4-4/ IEC 61000-4-4 - 1995
Pulse	5/50 ns
Modes	Differential
Pulse Amplitude	0.5kV
Pulse Rep. Rate	5 kHz
Polarity	Positive and Negative
Duration of test in each mode	60 s
Simulation	On 230 V single phase AC supply by Direct Injection
EUT in normal operating condition at rated load.	

c Test procedure:



➤ Transients generated by the generator were coupled to the 230 VAC Supply through a coupling N/W.

d Requirements:

Operation of EUT shall be normal as per Sr. No. 2.2 after the test.
Performance Criterion 'B'

e Observations

During and after the test EUT operation found normal as per Sr. No. 2.2.

f Results Complied



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3.3 RADIATED RF ELECTROMAGNETIC FIELD (Radiated Susceptibility)

Test Rationale : To check immunity characteristics of the EUT in the presence of radiated fields generated by intentional emitters like Radio /TV transmitters, wireless equipment and the like by illuminating the EUT by such frequency

a) Test Condition :

Set-up As per IEC 61000-4-3 / IEC 1000-4-3 (1995)
Frequency Range 80 MHz – 1000 MHz
Modulation 80 % AM @ 1 kHz
Dwell time 0.5 s
Amplitude 10 V/m
Simulation Using G-Strip RF immunity Chamber

EUT in normal operating condition at rated load.

b) Test procedure

EUT was illuminated with the required field strength inside the test chamber, and operation was monitored.

c) Requirements

During testing normal performance of the EUT within the specification limits shall be there.

Performance Criterion 'A'.

d) Observations

During the test minor variation in display reading is observed. After the test EUT operation found normal as per Sr. No. 2.2.

Performance Criterion 'B'.

e) Results

Complied with criterion 'B'.



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3.3 CONDUCTED RF SUSCEPTIBILITY

Test Rationale:

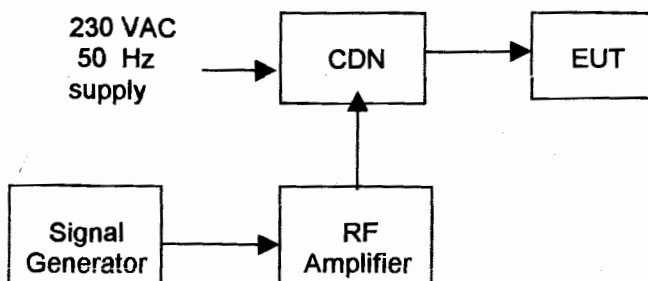
To study immunity characteristics of the EUT when subjected to continuous conducted Noise.

a Test Condition:

Set-up	As per EN 61000 – 4 – 6 : 1996
Frequency	150 kHz – 80 MHz
Modulation	80 % AM @ 1 kHz
Amplitude	10 V
Simulation	On 230 VAC, Single Phase Mains through CDN M3

EUT in normal operating condition.

c Test procedure:



- The required simulation signal was generated by the Signal Generator and the Amplifier
- It was then coupled onto 230 VAC/50Hz I/P using CDN and operation of EUT was monitored

d Requirements:

The EUT shall continue to operate as intended during and after the test . No degradation of performance or loss of function is allowed.

Performance Criterion: 'A'.

e Observations:

The EUT was found to operate as intended during and after the test as per Sr. No. 2.2.

Performance Criterion 'A' .

f Results:

Complied.



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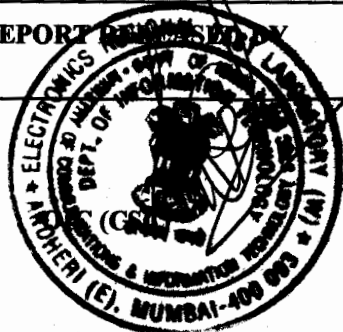
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4.0 General Remarks: Nil

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HEAD (EMI/EMC)



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ANNEXTURE

Radiated Emission Test Result

Sr.No	Frequency (MHz)	Emission dBµV/m	Limit dBµV/m	Results
1.	38.19	19.85	50.00	PASS
2.	41.76	21.40	50.00	PASS
3.	102.53	29.10	50.00	*
4.	107.00	39.45	50.00	*
5.	117.48	23.65	50.00	PASS
6.	186.30	27.50	50.00	*

- Note: 1) Testing has been carried out at 3 meters test distance and limits have been modified accordingly.
 2) '*' Indicates local noise from known sources

