



सत्यमेव जयते

# **TEST / CALIBRATION REPORT**

## **EMC / EMI Test Report for**

### **MECO Watt Transducer With 85V To 265V AC Aux. Supply**

Testing as per BS EN61326 (Edition 1999)



## **ELECTRONICS REGIONAL TEST LABORATORY (WEST)**

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

**Government of India**

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### **MEMORANDUM**

The Test/Calibration Report issued by ERTL (W) is a record of the measurements conducted on the products submitted to it for testing / calibration and the results thereof. Unless otherwise specified in the report, the results are applicable only to those products which have been tested / calibrated and do not apply to other products even though declared to be identical.

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### **LIABILITY CLAUSE**

1. ERTL (W) shall not be liable for any change in test / calibration data and performance specification on account of malfunctioning of the standard / instrument / equipment due to any damage caused to it after the report, in respect of it has been issued.
2. The report shall not be regarded in any way diminishing the normal contractual responsibilities / obligations between the customer and ERTL (W).
3. The results reported in this report are valid only at the time of and under the stated conditions of the measurements.

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1. SCOPE

1.1 Service Request No : ERTL (W)/20031936

1.1.1 Service Request finalised on : 1<sup>ST</sup> - OCT - 2003

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

1.3 Item No.	Description	Qty	Manufacturer and Type No.*	Serial No*
1.	ELECTRICAL TRANSDUCER	01	MECO INSTRUMENTS PVT. LTD / WT11	016

1.4 Test specifications : BS EN 61326 : 1999

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

1.6 Test Equipment used :

1. EMI/034 : RS Chamber ( Keytek, G-Strip)
2. EMI/036 : RF Signal Generator (HP, 8648 A) for C.S and R.S. tests
3. EMI/037 : RF Amplifier (AR, 25A100) for R.S test
4. EMI/044 : Three Phase Immunity Test System
5. CPU/064 : Spectrum Analyser (HP8568B) for CE
6. EMI/048 : ESD Gun for ESD test

\* As declared by Manufacturer



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## 2.0 EQUIPMENT UNDER TEST (EUT)

### 2.1 Description

EUT is a Electrical Transducer **WT 11** , which operates on auxiliary supply between 85 V AC to 265 V AC, 50Hz, single phase. EUT was made operational.

### 2.2 Operating modes during normal testing.

EUT is supplied with an auxiliary supply between 85 V AC to 265 V AC, 50 Hz Single Phase. An Input supply of 0 to 63.5 V AC , 50Hz, Single phase is given at input terminals 13 and 14 and 5 A AC, 50Hz current is passed through terminals 17 & 18. The output of EUT shall be loaded with rated resistive load for normal operations & all applicable tests. The output current shall remain in the range of (-) 10 - 0 - (+) 10 mA DC at output 1 & 2, during after & before all tests. EUT was made operational with rated input voltage & output was loaded with resistive load during immunity tests.

### 2.3 Functional check for all immunity tests.

#### Performance Criterion - 'A'

During testing, normal performance within specification limits.

#### Performance Criterion - 'B'

During testing temporary degradation or loss of function is allowed which is self recovering e. g. during testing output observed current may deviate by allowed margin  $\pm 0.5$  %. However after the test EUT shall function normal within specified limits.

#### Performance Criterion - 'C'

During testing, temporary degradation or loss of function or performance which requires operator intervention or system reset occurs.



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### 3.0 Test Results

#### 3.1 CONDUCTED EMISSION

**Test Rationale:** To measure emissions of the EUT\* (referenced to Earth) on Power Mains 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

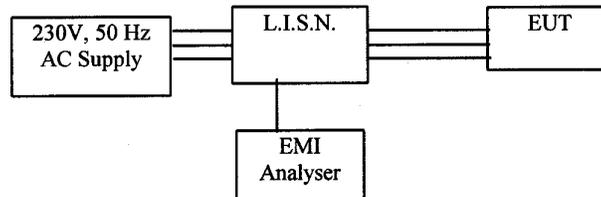
**a) Test Condition**

Set-up	As per BS EN 55022 : 1995
Measurement Range	150 kHz – 30 MHz
Measurement On	Spectrum Analyser
Line Voltage	230 V AC single phase, 50 Hz supply
Line Frequency	50 Hz

**b) Receiver**

Bandwidth	9 KHz
Detectors	Quasi – peak and Average
Configuration	Conforming to CISPR 16 - 1

**c) Test procedure**



EUT supplied with 230V 3 phase, 50 Hz AC supply through an LISN. Emission of the EUT were measured with a Spectrum Analyser .

**d) Requirements**

EUT emissions shall be below following Class 'B' limits

Freq. (MHz)	Limits (dBuV)	
	Quasi-Peak	Average
0.15-0.5	79	66
0.5-5	73	60
5-30	73	60

**e) Observations**

Measurements with peak detector were carried.  
Pl. see Graph at page 10 of 10

**f) Results**

Complied



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### 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 :

Set-up As per BS EN 55022 : 1995  
 Frequency Range 30 MHz – 1000MHz  
**EUT in normal operating condition with output loaded with full resistive load.**

#### b) Receiver:

Bandwidth 120 KHz  
 Detectors QP  
 Antenna Bi-Conical (For 30 – 200 MHz)  
 Log-Periodic (For 200 – 1000 MHz)  
 Configuration Conforming to CISPR 16-1.

#### c) Test procedure

- 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 Ambient 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)
30-230	QP
230-1000	50
	57

#### e) Observations

Emission peaks found below required limits.

#### f) Results

Complied.



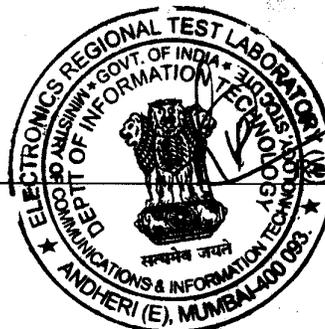
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### 3.3 Conducted susceptibility

#### Test Rationale:

To check immunity characteristics of the EUT against Conducted RF Susceptibility levels.

- a) **Test Condition:**
- Set-up** As per BS EN 61000 – 4 –6 : 1996
  - Mode of simulation:** Injected on power mains
  - Test Voltage:** 3 V r.m.s
- Simulation** Using coupling/ decoupling Network  
**EUT in normal operating condition as per Sr. No. 2.2**
- c) **Test procedure:**
- Conducted RF level was injected to power mains by coupling/ decoupling network along the subject frequency range & EUT performance was monitored before and after the test as per Sr. No. 2.2.
- d) **Requirement:**  
Performance Criterion 'A', Normal Operation of the EUT with specified performance as per Sr. No. 2.2
- e) **Observations**  
Operation of the EUT was found normal before and after the test as per Sr. No. 2.2.
- f) **Results**  
Complied



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### 3.5 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 : 1995  
**Mode of simulation:** Contact Discharge on conductive surfaces &  
Air Discharge on non- conductive surfaces  
**Test level** 2  
**Test Voltage:** **Contact Discharge:** 4kV  
**Air Discharge:** 8kV  
**No. of Discharges** 10  
**Polarity** Positive and Negative  
**Points of Discharge** **Contact Discharge**  
Maintenance screws, conducting metal surfaces  
**Air Discharge :**  
> Insulating surfaces

**Simulation** Using ESD Gun  
**EUT in normal operating condition as per Sr. No. 2.2**

#### 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 :

Performance Criterion B ,temporary degradation or loss of function is allowed during the test.  
After the test EUT shall function normal as per Sr. No. 2.2.

#### e Observations

Operation of the EUT was found to be normal during and after the test as per Sr. No. 2.2.

#### f Results

Complied



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### 3.6 ELECTRICAL FAST TRANSIENTS (EFT)

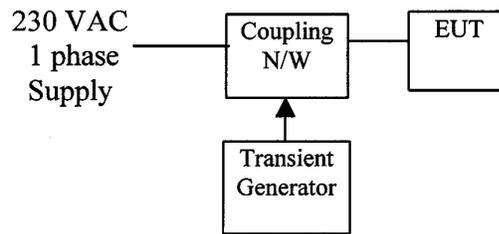
#### Test Rationale :

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 : 1995
Pulse	5/50 ns
Modes	Common and Differential
Test Level	3
Pulse Amplitude	2kV
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 as per Sr. No. 2.2.	

#### c Test procedure :



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

#### d Requirements :

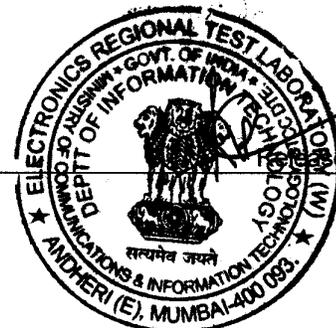
Performance Criterion B ,temporary degradation or loss of function is allowed during the test. After the test EUT shall function normal as per Sr. No. 2.2.

#### e Observations

Operation of the EUT was found to be normal during and after the test as per Sr. No. 2.2.

#### f Results

Complied



By

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4.0 General Remarks: Nil

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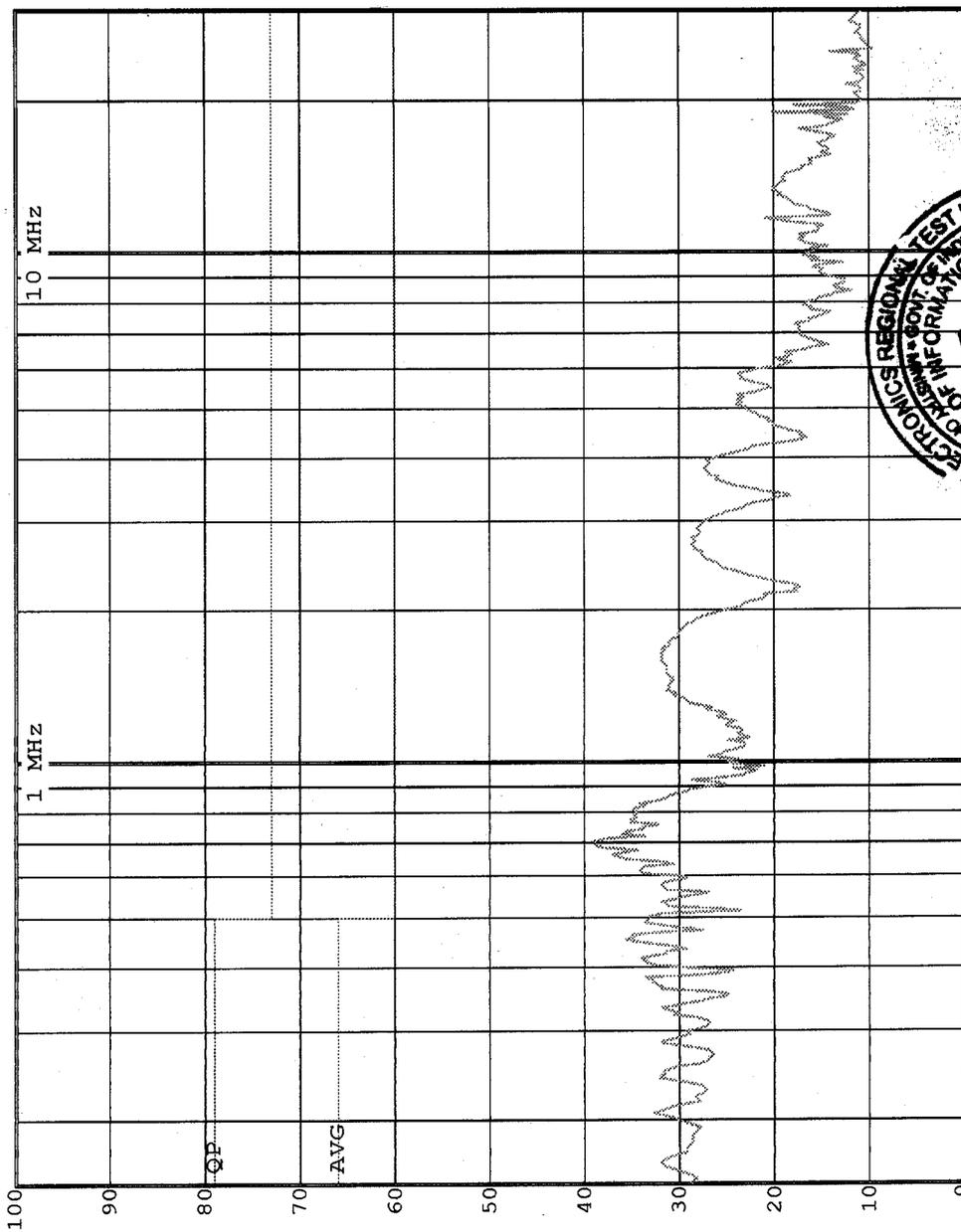
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*F VK Ramesh*  
*6/1/2004*  
HEAD (EMI/PCT)



6 JAN 2004

Att 10 dB    INPUT 2    Marker 1 [T1]    14.62 dBuV    Det    AV Trd  
 100    80    70    60    50    40    30    20    10    0    150 kHz    30 MHz  
 1 MHz    10 MHz    9 kHz    100 ms Unit    dBuV  
 Meas T    8.18200000 MHz    ResBW    9 kHz    Meas T    100 ms Unit    dBuV



Date: 24.DEC.2003 17:20:08

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