

TEST / CALIBRATION REPORT

Type Test Report

for

MECO Analog Frequency Meter

Testing as per IS 1248 : 1993 (Category II)



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

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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- 3. The result reported in this report are valid only at the time of and under the stated conditions of the measurements.

ELECTRONICS REGIONAL TEST LABORATORY (WEST)			
DEPARTMENT OF INFORMATION TECHNOLOGY (STQC Dte.)	REPORT NO. ERTL(W)	/2002E&S	\$293
SUBJECT: TYPE TESTING OF ANALOG FREQUENCY	DATE	PAGE	OF
METER	2 JUL 2003	1	9

1. SCOPE

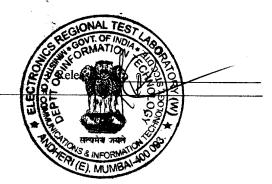
- 1.1 Service Request No : ERTL(W) / 20022611 dated 31-Dec.-2002
 1.1.1 Service Request finalised on : 31-Dec.-2002
 1.2 Requested by (Name and address of organisation) : MECO INSTRUMENTS PVT LTD., 301, BHARAT INDUSTRIAL EASTATE,
- 1.3 Description Qty Manufacturer Model Serial Nos. ANALOG FREQUENCY 03 MECO F 96 1067/3 - SAMPLE 1 (S1) METER, 45 – 55 Hz. Nos. 1068/3 - SAMPLE 2 (S2) CLASS - 0.5 1069/3 - SAMPLE 3 (S3)
- 1.4 Test specifications
- 1.5 Lab Ambient
- 1.6 Test Equipment used :

TYPE TEST AS PER IS 1248 : 1993 CATEGORY II

T.J. ROAD, SEWREE (W), MUMBAI – 400 015.

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

1.	Calibration System	S&C/138
2.	D.M.M	E&S/120
3.	Digital Insulation Tester	E&S/121
4.	Energy Meter Calibrator	E&S/125
5.	W/I Auto Tester	E&S/066
6.	Environmental Chamber	ENV/042
7.	Environmental Chamber	WK 1000-2
8.	Vibration Machine	ENV/008
9.	Shock Test Machine.	ENV/018



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A By ER 36 COMMITEST Complied Complied Complied Complied Remark 9 OF -0.04 % -0.04 % -0.04 % REPORT NO. ERTL(W) / 2002E&S293 -0.04 % -0.04 % $\begin{array}{c} 0.04 \ \% \\ 0.02 \ \% \\ 0.04 \ \% \\ 0.04 \ \% \end{array}$ -0.06 % % 0PAGE ŝ Observation -0.04 % -0.04 % -0.04 % 0.06 % 0.06 % 0.06 % 0.06 % 0.06 % 0.02 % 0.02 % 0.04 % -0.04 % 0.02 % -0.04 % 2003 -0.04 % -0.04 % -0.04 % 0.06 % 0.06 % 0.02 % 0.02 % -0.04 % -0.06 % -0.04 % -0.04 % -0.04 % -0.02 % shall be 100% of class shall be 100% of class shall be 100% of class Permissible variation Permissible variation Permissible variation shall be 50% of class Permissible variation Requirement index index index index 195.5 V AC 230 V AC 264.5 V AC 50 Hz 52 Hz 55 Hz 48 Hz 48 Hz 50 Hz 52 Hz 55 Hz 45 Hz 45 Hz Intrinsic error to be measured at reference plane and humidity 80% Intrinsic error checked at following Lower Relative humidity 25%, Upper Relative Voltage varied from 195.5 V to 264.5 VAC. Superimpose 15 % of third harmonics up on backward, left & right direction. Maximum then at 5 deg. Inclination plane in forward, 1 deviation at following equidistant points Test Condition MINISTRY OF INFORMATION TECHNOLOGY (STQC Dtc.) SUBJECT : TYPE TESTING ANALOG FREQUENCY METER the fundamental wave form. ELECTRONICS REGIONAL TEST LABORATORY (WEST) equidistant points to distortion of Test/Parameter Variation due Variation due Variation due Variation due AC measured to voltage of AC measured to position to humidity quantity quantity 2.4.4 Sr.No. 2.4.4 2.4.3 2.4.2

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Complied		Complied							Complied								Complied	V	Complet	18/20/
S-3	0 %0			-0.09 %	%0	-0.02 %	-0.04 %	-0.18 %			-0.11%	-0.02 %	-0.07 %	-0.02 %	-0.11%		7%		on of rest	er den er er den er en er
S-2	%0			-0.07 %	-0.06 %	~ 60.0-	- 0.09 %	-0.11 %		-	-0.24 %	-0.16%	-0.16 %	-0.16%	-0.20 %		7 %		Indices reached the position of rest	eacn case
 S-1	%0			-0.02 %	0.02 %	0.04 %	-0.02 %	-0.06 %			-0.06 %	-0.06 %	%0	-0.16%	-0.27 %		7%		Indices reac	WITHIN 48 IN CACH CASE
6 % of fiducial value		Within the limit of intrinsic	error						Shall meet the requirement of intrinsic error								Shall not exceed 20% of scale	length	Within 1.5% scale length after	4 S.
AC excitation of upper limit under an external	magnetic field of 0.4kA/m. Maximum deviation to be observed.	Accuracy test carried out by mounting UUT	on Non Ferrous Panel (PVC) & Ferrous Panel at following equidistant points	45 Hz	48 Hz	50 Hz	52 Hz	55 Hz	Accuracy test carried out by mounting UUT on conductive support at following equidistant	points	45 Hz	48 Hz	50 Hz	52 Hz	55 Hz		By suddenly applying 2/3 rd of measuring	range & note down the % overshoot.	By suddenly applying 2/3 rd of measuring	range & note down time (sec).
Variation due to	magnetic field of external origin	Variation due to	ferromagnetic supports						Variation due to conductive	supports				-		Damping	Mechanical	overshoot	Response time	
2.4.5		2.4.6							2.4.7							2.5	2.5.1		2.5.2	

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ы Чо REPORT NO. ERTL(W) / 2002E&S293 PAGE 5 JUL 2003 MINISTRY OF INFORMATION TECHNOLOGY (STQC Dte.) SUBJECT : TYPE TESTING ANALOG FREQUENCY METER ELECTRONICS REGIONAL TEST LABORATORY (WEST)

Remark	Complied	<u>, , , , , , , , , , , , , , , , , , , </u>	Complied								Complied								ONAL TEOL	CONT. OF INC.		2 日本 1 日本
	S-3	0.04 %	srved	C 0	<u>.</u>	0.07 %	-0.11%	-0.06 %	-0.07 %	-0.07 %	any of the			S-3	-0.18%	-0.13 %	-0.16 %	-0.15 %	2.00.0-	CE A COVT. OF	AL.	000
Observation	S-2	0 %	No residual deflection observed	()	7-0	0.04 %	-0.02 %	-0.04 %	-0.04 %	0%	No deviation observed on any of the three samples.			S-2	0.04 %	-0.02 %	-0.13 %	-0.09 %	% 0		Rele	
	S-1	0.06%	No residual c	C 1	1-2	-0.02 %	% 0	-0.02 %	0.02 %	-0.04 %	No deviation three samples.	1		S-1	% 0	-0.04 %	-0.11%	0.04 %	-0.06 %			
Requirement	Shall comply with the	requirements of class index.	a) Residual deflection shall not exceed 1% of scale		b) Shall comply with the accuracy requirement	anterio vintes (an man					a) Deviation of index from zero scale mark shall not	exceed 0.5% of scale length	b) Shall comply with accuracy	requirements.	1							
Test Condition	By applying 90% of upper limit of measuring	range for 30 to 35 min. & note down the deviation (%)	ng 120% voltage of upper limit		b) Accuracy test at following equidistant	45 Hz	48 Hz	50 Hz	52 Hz	55 Hz	a) Apply 200 % voltage for 0.5s nine times at an interval of 60s and once for 5s.		b) Accuracy test at the following equidistant	points :	- 45 Hz	48 Hz	50 Hz	52 Hz	55 Hz			
Test/Parameter	Self Heating		Continuous overload								Overloads of short duration			_								
Sr.No.	2.6		2.7								2.8	_										

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ORY (WEST)	Y (STQC Dte.) REPORT NO. ERTL(W) / 2002E&S293	JENCY METER PAGE OF 0F	Test Condition Requirement Observation Remark		55 degC for 16h & -10 deg.C for 8h. 3To be conditionedConditionedcycles while at 80% of the upper limit of excitation. During the last cycle at the end of 16h and while at high temp. slowly increase & decrease the excitation untilConditioned
ELECTRONICS REGIONAL TEST LABORATORY (WEST)	MINISTRY OF INFORMATION TECHNOLOGY (STQC D(c.)	SUBJECT : TYPE TESTING ANALOG FREQUENCY METER	Sr.No. Test/Parameter	2.9 Environmental Tests	2.9.1 Temp. cycling 55 deg.C for 16h & cycles while at 80% (cycles while at 80% (excitation. During the of 16h and while at increase & decrease

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Remark		Complied		Complied	AEGIONAL TE	CONVERSION OR MATTON	ELON ELON ELON ELON ELON ELON ELON ELON
	g to	S-3 -0.06 % -0.22 % 0.04 %		S-3	-0.18%	-0.27 % -0.06 %	
Observation	Conditioned Indices were responding to excitation change.	S-2 -0.24 % -0.16 % -0.20 % -0.20 %	Conditioned	S-2	-0.33 % -0.40 %	-0.38 % -0.42 % -0.44 %	Released By
	Conditioned Indices were resp excitation change.	S-1 0.22 % 0.24 % 0.24 % 0.20 % 0.11 %		S-1	0.15% 0.18%	0.22 % 0.13 % 0.13 %	
Requirement	To be conditioned	Error shall be within class index (0.5%)	To be conditioned	Class index (0.5%)			
Test Condition	55 deg.C for 16h & -10 deg.C for 8h. 3 cycles while at 80% of the upper limit of excitation. During the last cycle at the end of 16h and while at high temp. slowly increase & decrease the excitation until index reaches the upper limit of measuring range & return to zero. Similarly after 8h at lower temp. slowly increase & decrease the excitation until index reaches the upper limit of measuring range & return to zero.	At the following equidistant points : 45 Hz 48 Hz 50 Hz 52 Hz 55 Hz	As per IS 9000. Part 5 Sec. 1 (16+8) h cycle. 2 cycles. Recovery 24 h.	ant points :	45 Hz 48 Hz	50 Hz 52 Hz 55 Hz	
Test/Parameter Environmental Tests	Temp. cycling	Post Measurement Intrinsic error	Damp Heat Cyclic Test	Post	Measurement Intrinsic error		
Sr.No. 2.9	2.9.1	2.9.2	2.9.3	2.9.4			

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REPORT NO. ERTL(W) / 2002E&S293	PAGE OF 7 9	Observation	No deviation observed in any of Complied the three samples.	No visual damage observed	A THE PART OF THE
REPORT NO.	L-2 JUL 2	Ō	· · · · · · · · · · · · · · · · · · ·	Co visual	
		Requirement	Deviation expressed as percentage of scale length shall not exceed more than 50% of class index.	To be conditioned	
ELECTRONICS REGIONAL TEST LABORATORY (WEST) MINISTRY OF INFORMATION TECHNOLOGY (STQC Dte.)	SUBJECT : TYPE TESTING ANALOG FREQUENCY METER	Test Condition	Energise the samples for 30s at upper limit of measuring range. Quickly reduce the excitation to zero. Deviation from zero shall be measured 15s after the excitation has been reduced to zero.	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.	
VICS REGIONAL T OF INFORMATIO	TYPE TESTING A	Test/Parameter	Deviation from zero	Vibration test	

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		9 9	Remark	Complied	L			2		Complied	•					robit			Complied	6.5.		<u>^</u>	1100 00 00 00 00 00 00 00 00 00 00 00 00	100 H	C ALLE	
REPORT NO. ERTL(W) / 2002E&S293		PAGE 8		S-3	0.07%	0.06%	_	-		S-3	0.2%	0.02 %	0.13 %	0.11 %	0.09 %				S-3	0.0 %	-0.18%	-0.16%	-0.20%	-0.36 %	ed By	
ERTL(W)/			Observation	S-2	0.42 % 0.31 %	0.13 %	0.13 /0	Conditioned		S-2	0 24 %	0.18%	0.18%	0.07 %	0 %	Conditioned			S-2	0.16%	0.24 %	% 60 [.] 0-	-0.18%	-0.27%	Released By	
REPORT NO		JUL 2003		S-1	0.06 % 0.06 %	% /0.0 % 60.0	0/ 11.0			S-1	0 13 %	0.02 %	0.06 %	0.15 %	0.09 %				S-1	0.47 %	0.49 %	0.45 %	0.38 %	0.45 %		
		2	Requirement	Error shall not deviate more than	50% of class index		- 	To be conditioned		Error after test shall not deviate	hv more than 100% of class	index from the original values	measured before shock test.			To be conditioned			Error shall be within class index	(0.5 %)						
ELECTRONICS REGIONAL TEST LABORATORY (WEST)	V TECHNOLOGY (STQC Dte.)	SUBJECT : TYPE TESTING ANALOG FREQUENCY METER	Test Condition	At the following equidistant points :		52 Hz		celerat on: 11	3 shocks in both directions of 3 mutually perpendicular axes (total 18 shocks)	At the following equidistant points :	45 Hz	48 Hz	50 Hz	52 Hz	55 Hz	1	of such amplitude that the pointer reaches max value of the scale without impinging on	the end stop. ON for 1 sec OFF for 4 sec during one cvcle.	At the following equidistant points :		48 Hz	50 Hz	52 Hz	70 66		
NICS REGIONAL TI	MINISTRY OF INFORMATION TECHNOLOGY	: TYPE TESTING AI	Test/Parameter	Accuracy Test	(Post Vibration)			Shock Test		Accuracy Test	(Doet Shork)	(FUSI DILUCK)				Life Test			Accuracy Test	(Post Life Test)	-					
ELECTRO	MINISTRY	SUBJECT	Sr.No.	2.12				2.13		2 14						2.15			2.16							

ELECTRONICS REGIONAL TEST LABORATORY (WEST)	REPORT NO. ERTL()	V)/2002E&	8202
MINISTRY OF INFORMATION TECHNOLOGY (STQC Dte.)	NEI OKT NO. EKTE(<i>v)</i> /2002E&	3293
SUBJECT: TYPE TESTING OF ANALOG FREQUENCY METER	_2 JUL 2003	PAGE 9	OF 9

3.0 General Remarks : Nil.

REPORT APPROVED BY REPOR enak HEAD (E&S) MADA

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.