



TEST / CALIBRATION REPORT

Type Test Report for MECO Frequency Transducer

Testing as per IEC 60688 (Edition 2.2)



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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2. The report shall not be regarded in any way diminishing the normal contractual responsibilities / obligations between the customer and **ERTL (W)**.
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		REPORT NO. ERTL (W)/2003 E&S27	
SUBJECT: TESTING OF FREQUENCY TRANSDUCER		DATE 9 MAY 2003	PAGE 1 OF 7

1. SCOPE

1.1 Service Request No : ERTL(W)/20030563 DATED 21st March 2003

1.1.1 Service Request finalised on : 21st March 2003

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

1.3	<u>Description</u>	<u>Qty</u>	<u>Manufacturer</u>	<u>Type No.</u>	<u>Serial Nos.</u>
	FREQUENCY TRANSDUCER, INPUT : 45 - 55 Hz OUTPUT : 0 - 10 mA & 4 - 20 mA Accuracy: 0.2 %	01 No.	MECO	FT	030946

1.4 Test specifications : Testing as per IEC 60688 (Edition 2.2)

1.5 Lab Ambient : Temperature: $(25 \pm 2)^\circ \text{C}$
RH : $(55 \pm 5) \%$

1.6 Test Equipment used :

1) Calibration System	S&C/138
2) Energy Meter Calibrator	E&S/126
3) System DMM	EM!/006
4) Vibration Machine	ENV/008
5) Shock Test Machine	ENV/018
6) Over Voltage Test Generator	EMI/002
7) HF Test Generator	EMI/019
8) Coupling Network	EMI/021
8) Programmable Humidity Chamber	ENV/042



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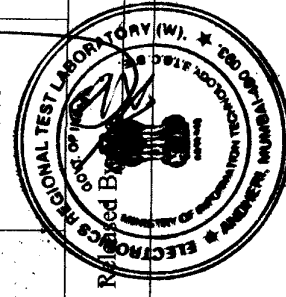
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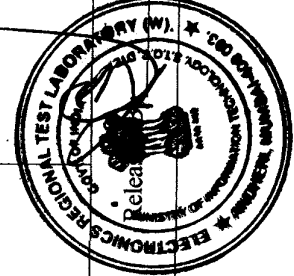
2.0 Test Results

Sr.No	Reference Clause No.	Test/Parameter	Test Condition	Requirement	Observation		Remark
					O/p 1	O/p 2	
2.1	4.2	Intrinsic error	Auxiliary power supply : 48 V DC. Input voltage = 110 V AC a) Input frequency = 45 Hz b) Input frequency = 50 Hz c) Input frequency = 55 Hz	Class index (0.2 %)	0.05 % 0.05 % 0.01 %	0.01 % 0.05 % 0.01 %	Complied
2.2	6.2	Variation due to auxiliary supply voltage	Input voltage = 110 V AC Aux. Voltage varied from 38.4 V to 57.6 V	50 % of class index	0.06 %	0.03 %	Complied
2.3	6.4	Variation due to ambient temp.	Auxiliary power supply : 48 V DC Input voltage = 110 V AC Temp. varied from 0 deg. C to 45 deg. C	100 % of class index	0.09 %	0.03 %	Complied
2.3	6.6	Variation due to the input voltage.	Auxiliary power supply : 48 V DC Input voltage varied from 88 V to 132 V at 45 Hz and 55 Hz.	50 % of class index	0.09 %	0.03 %	Complied
2.4	6.9	Variation due to output load	Auxiliary power supply : 48 V DC Input voltage = 110 V AC Output 1 Output load resistance varied from 0 ohm to 1000 ohm. Output2 Output load resistance varied from 0 ohm to 500 ohm.	50 % of class index	0.01 %	0.01 %	Complied



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Sr.No	Reference Clause No.	Test/Parameter	Test Condition	Requirement	Observation		Remark
					O/p 1	O/p 2	
2.5	6.10	Variation due to distortion of input quantities	Auxiliary power supply : 48 V DC Input voltage = 110 V AC I/p with 20 % 3 rd harmonics	200 % of Class index	0.02 %	0.02 %	Complied
2.6	6.11	Variation due to magnetic field of external origin	Auxiliary power supply : 48 V DC Input voltage = 110 V AC Magnetic field of 0.4 kA/m	Class index	0.01 %	0.01 %	Complied
2.7	6.14	Variation due to self heating	Auxiliary power supply : 48 V DC Input voltage = 110 V AC Test duration: 35 min.	Class index	0.03 %	0.04 %	Complied
2.8	6.15	Variation due to continuous operation	Auxiliary power supply : 48 V DC Input voltage = 110 V AC Test duration: 6 h	Continue to comply the accuracy class	0.01 %	0.04 %	Complied
2.9	6.16	Variation due to common mode interference	Auxiliary power supply : 48 V DC Input voltage = 110 V AC With 100 Vrms at 45 Hz to 65 Hz applied between either output terminal and earth.	Class index	0.0 %	0.01 %	Complied



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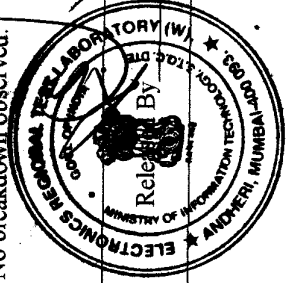
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Sr.No.	Reference Clause No.	Test/Parameter	Test Condition	Requirement	Observation		Remark
					O/p 1	O/p 2	
2.10	6.17	Variation due to series mode interference	Auxiliary power supply : 48 V DC Input voltage = 110 V AC With 1 V rms at 45 Hz to 65 Hz applied in series with output signal	Class index	0.01 %	0.01 %	Complied
2.11	6.18	Permissive excessive inputs					
2.11.1	6.18.1	Continuous excessive inputs	Auxiliary power supply : 48 V DC Apply 120 % of nominal upper value on aux. Supply, voltage inputs and current inputs.	Continue to comply the accuracy class after test	Complied	Complied	Complied
2.11.2	6.18.2	Excessive inputs of short duration	a) For voltage inputs: 200 % of the nominal value of the measured voltage applied for 1 s and repeated 10 times at 10 s interval. b) For current inputs: 20 times the nominal value of the measured current applied for 1 s and repeated 5 times at 300 s interval	Continue to comply the accuracy class after test	Complied	Complied	Complied
2.12	6.20	Voltage test,	At 3 kV AC for 1 min. between a) Input & output b) Aux. & output c) Aux. & input	No breakdown	No breakdown observed.		Complied



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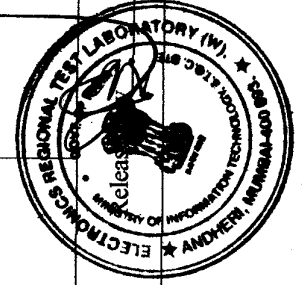
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Sr.No.	Reference Clause No.	Test/Parameter	Test Condition	Requirement	Observation		Remark
					Output 1	Output 2	
2.13	6.20	Impulse voltage tests	At peak test voltage of 5 kV in both positive and negative senses having the standardized impulse waveform of 1.2/50 us, applied between terminals of each circuit in turn and all other circuit connected together.	After completion of the test the DUT shall comply with the requirement appropriate to its class index.			Complied
2.13.1	4.2	Intrinsic error	Auxiliary power supply : 48 V DC a) Input freq. = 45 Hz b) Input freq = 50 Hz c) Input freq. = 55 Hz	Class index (0.2 %)	0.03 % 0.04 % 0.03 %	-0.05 % 0.16 % 0.11 %	Complied
2.14	6.21	High frequency disturbance test	2.5 kV peak between independent circuits. 1kV peak between terminals of the same circuit.	The variation due to the effect of disturbance shall not be twice of class index.	Complied	Complied	Complied
2.14.1	4.2	Intrinsic error	Auxiliary power supply : 48 V DC a) Input freq. = 45 Hz b) Input freq = 50 Hz c) Input freq. = 55 Hz	Class index (0.2 %)	-0.03 % 0.06 % 0.03 %	-0.03 % 0.05 % 0.16 %	Complied
2.15	6.22	Test for temp. rise	Current circuit loaded at 110 % for 2 h Voltage circuit loaded at 120 % for 2 h	For input circuits: 60 k For exterior surface: 25 k	Not discernible	Not discernible	Complied



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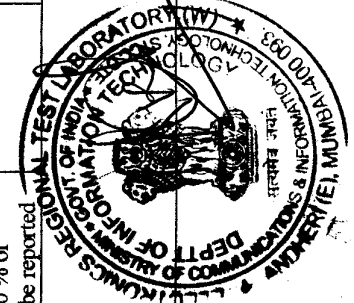
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Sr.No.	Reference Clause No.	Test/Parameter	Test Condition	Requirement	Observation		Remark
					Output 1	Output 2	
2.16	6.23	Vibration Test	Freq. : 10 - 55 - 10 Hz. Amplitude: 0.15 mm. 5 cycles, 1 octave/min. Axis: Vertical		Conditioned		---
2.16.1	4.2	Intrinsic error	a) Input freq. = 45 Hz b) Input freq. = 50 Hz c) Input freq. = 55 Hz	Class index (0.2 %)	-0.03 % 0.07 % 0.06 %	-0.03 % 0.03 % 0.02 %	Complied
2.17	6.23	Shock Test	15g, ½ sine, 11 ms, 3 shocks on each sense. Total 18 shocks.		Conditioned		---
2.17.1	4.2	Intrinsic error	a) Input freq. = 45 Hz b) Input freq. = 50 Hz c) Input freq. = 55 Hz	Class index (0.2 %)	-0.04 % -0.03 % 0.03 %	-0.02 % 0.02 % 0.06 %	Complied
2.18	6.23	Drop & topple Test.	Drop height: 25 mm, one drop about each of four bottom edges. One topple about each of four bottom edges.		Conditioned		---
2.18.1	4.2	Intrinsic error	Auxiliary power supply : 48 V DC a) Input freq. = 45 Hz b) Input freq. = 50 Hz c) Input freq. = 55 Hz	Class index (0.2 %)	-0.03 % -0.03 % 0.03 %	-0.01 % 0.01 % 0.05 %	Complied
2.19	5.2.3	Open circuit voltage	Auxiliary power supply : 48 V DC Input freq. = 55 Hz		14.71 V	14.92 V	---
2.20	5.4	Ripple	Auxiliary power supply : 48 V DC Input freq. = 55 Hz	Not exceed twice of class index	0.37 %	0.24 %	Complied
2.21	5.5	Response time	Auxiliary power supply : 48 V DC Input voltage = 110 V AC Input frequency switched from 45 to 55 Hz	Time required for output signal to reach 99 % from 0 % of fiducial value shall be reported	132 ms	147 ms	---

Addendum Approved by

[Signature]
(Head, E&S)

(OIC, CSC)



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3.0 General Remarks : Nil.

REPORT APPROVED BY

REPORT RELEASED BY

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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.