

TEST / CALIBRATION REPORT

Calibration Report for MECO Current Transducer

Testing as per IEC 60688



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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- 3. The results 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))/2003E&S	117
SUBJECT: TESTING OF CURRENT TRANSDUCER	2 3 JAN 2004	PAGE 1	OF 7

1. **SCOPE**

1.1	Service Request No		: ERTL(W)/20031	587DATED 22	nd AUG 2003				
1.1.1	Service Request finalised on		: 22 nd AUG 2003						
1.2	Requested by (Name and address of organisation)	on)	: MECO INSTRUMENTS PVT LTD., 301, BHARAT INDUSTRIAL EASTATE, T.J. ROAD, SEWREE (W), MUMBAI – 400 015.						
1.3	Description	Qty	Manufacturer	<u>Type No.</u>	<u>Serial Nos.</u>				
	CURRENT TRANSDUCER, INPUT : $0 - 5$ AAC, OUTPUT : $4 - 20$ mA Accuracy: 0.5 %	01 No.	MECO	СМТ	030620				
1.4	Test specifications		Testing as per IEC	60688	•				
1.5	Lab Ambient		Temperature: (25 – RH : (55	±2) ° C ± 5) %					
1.6	Test Equipment used :		 Calibration Sys Energy Meter O System DMM Vibration Macl Shock Test Ma Over Voltage T HF Test Genera Coupling Netw Programmable Chamber 	Calibrator hine chine 'est Generator ator ork	S&C/138 E&S/126 EM!/006 ENV/008 ENV/018 EMI/002 EMI/019 EMI/021 ENV/042				
				TEST					



	0F 7		Remark	Complied	Complied	Complied	Complied	Complied	Complied	Complied	SULDAY (W) + 300 SULDAY (SOTONE 300 SULDAY SOTONE 300 SULDAY SOTONE 300 SULDAY SOTONE 300 SULDAY SULDAY SULDAY
REPORT NO. ERTL (W)/2003 E&S 117	PAGE 2		Observation	14.094 V	0.67 %	96.1 ms	Complied	0.07 % 0.09 % 0.01 %	0.02 %	0.006 %	
ERTL (W)	DATE AN 2004		ð				0			0	Rele
REPORT NO.	2 3 JAN		Requirement	lax)	Not exceed twice of class index.	Time required for output signal to reach 99% from 0% of fiducial value shall be less than 400ms.	After returning to reference conditions the DUT shall meet the requirements of the specification.		ss index	ss index	
			Re	15V DC (max)	Not exceed index.	Time require signal to rea of fiducial vi than 400ms.	After returni conditions th meet the requision specification	Class index (0.5 %)	50 % of class index	50 % of class index	
FORY (WEST) DLOGY	DUCER		Test Condition	Auxiliary power supply : 230 VAC Input Current =5A AC	Auxiliary power supply : 230 VAC Input Current =5A AC	Auxiliary power supply : 230 VAC Input Current switched from 0 to 5A AC.	Temp : -20 deg.C. Temp : +70 deg.C.	Auxiliary power supply: 230 VAC. a) Input current = 0A AC b) Input current = 2.5A AC c) Input current = 5A AC	Input current = 5A AC. Aux. Voltage varied from 184 V to 276 V.	Input current = 5A AC. Aux. frequency varied from 45 Hz to 55 Hz	
ELECTRONICS REGIONAL TEST LABORATORY (WEST) DEPARTMENT OF INFORMATION TECHNOLOGY	SUBJECT: TESTING OF CURRENT TRANSDUCER		Test/Parameter	Open Circuit Voltage	Ripple	Response Time	Limiting conditions for storage and transport.	Intrinsic error	Variation due to auxiliary supply voltage	Variation due to auxiliary supply frequency	
ONICS REGI MENT OF IN	I: TESTING (Results	Reference Clause No.	5.2.3	5.4	5.5.2	5.10	4.2	6.2	6.3	
ELECTR	SUBJEC	2.0 Test Results	Sr. No.	2.1	2.2	2.3	2.4	2.5	2.6	2.7	

Z 3 JAN 2004 3 Test Condition Requirement Observation R If power supply: 230 VAC 100 % of class index 0.1 % Contract of the class index If power supply: 230 VAC 100 % of class index 0.1 % Contract of class index If power supply: 230 VAC 100 % of class index 0.1 % Contract of class index 0.1 % If power supply: 230 VAC 100 % of class index 0.037 % Contract of class index 0.037 % Contract of class index 0.037 % If power supply: 230 VAC 50 % of class index 0.002 % 0.002 % Contract of class index 0.002 % Contract of class index 0.002 % Contract of class index 0.066 % Contract of class index 0.066 % Contract of class index 0.066 % Contract of class index 0.010 % Contract of class index 0.010 % Contract of class index 0.066 % Contract of class index 0.066 % Contract of class index 0.010 % Contract of class index Contract of cla	rence se No.	SUBJECT: TESTING OF CURRENT TRANSDUCER	DUCER		DATE	PAGF	OF
Test/Parameter Test Condition Requirement Observation Variation due to Auxiliary power supply: 230 VAC 100 % of class index 0.1 % Variation due to Input current = 5A AC. 100 % of class index 0.1 % Auxiliary power supply: 230 VAC 100 % of class index 0.1 % Arraition due to the Auxiliary power supply: 230 VAC 100 % of class index 0.1 % Imput current = 5A AC. Variation due to Auxiliary power supply: 230 VAC 50 % of class index 0.1 % Variation due to Auxiliary power supply: 230 VAC 50 % of class index 0.037 % 0.037 % Variation due to Auxiliary power supply: 230 VAC 50 % of class index 0.02 % 0.02 % Variation due to Auxiliary power supply: 230 VAC 200 % of Class index 0.02 % 0.06 % Variation due to Auxiliary power supply: 230 VAC 200 % of Class index 0.02 % 0.05 % Variation due to Auxiliary power supply: 230 VAC 200 % of Class index 0.02 % 0.06 % Variation due to Auxiliary power supply: 230 VAC 200 % of Class index 0.01 %	rence se No.				-	3	7
Variation due toAuxiliary power supply: 230 VAC100 % of class index0.1 %ambient temp.Input current = 5 AACTemp. varied from 0 deg. C to45 deg. C0.1 %Variation due to theAuxiliary power supply: 230 VAC100 % of class index0.1 %Variation due to theAuxiliary power supply: 230 VAC100 % of class index0.1 %Variation due toAuxiliary power supply: 230 VAC50 % of class index0.037 %Variation due toAuxiliary power supply: 230 VAC50 % of class index0.037 %Variation due toAuxiliary power supply: 230 VAC50 % of class index0.002 %Variation due toInput current = 5AAC0.007 % of Class index0.002 %Variation due toAuxiliary power supply: 230 VAC200 % of Class index0.002 %Variation due toAuxiliary power supply: 230 VAC200 % of Class index0.002 %Variation due toAuxiliary power supply: 230 VAC200 % of Class index0.002 %Variation due toAuxiliary power supply: 230 VAC200 % of Class index0.002 %Variation due toAuxiliary power supply: 230 VAC200 % of Class index0.066 %Variation due toInput current = 5AACAuxiliary power supply: 230 VAC200 % of Class index0.056 %Variation due toInput current = 5AACVariation due toInput current = 5AAC0.01 %Variation due to selfAuxiliary power supply: 230 VACClass index0.01 %Variation due to selfInput current = 5AAC0.01 %0.01 % </th <th></th> <th>Test/Parameter</th> <th>Test Condition</th> <th>Require</th> <th></th> <th>ervation</th> <th>Remark</th>		Test/Parameter	Test Condition	Require		ervation	Remark
Variation due to the frequency of input quantitiesAuxiliary power supply: 230 VAC Input current = 5 A AC.100 % of class index0.1 %Variation due to quantitiesInput current = 5 A AC. 45 Hz and 55 Hz.100 % of class index0.1 %Variation due to output loadAuxiliary power supply: 230 VAC 	6.4	Variation due to ambient temp.	Auxiliary power supply : 230 VAC Input current = 5A AC. Temp. varied from 0 deg. C to 45 deg. C	100 % of class i		.1%	Complied
Variation due toAuxiliary power supply: 230 VAC50 % of class index0.037 %output loadInput current = 5A AC.Output load resistance varied from0.037 %0.037 %Variation due toNum to 500 ohm.Nariation due to0.010 % of Class index0.02 %Variation due toAuxiliary power supply: 230 VAC200 % of Class index0.02 %Variation due toAuxiliary power supply: 230 VAC200 % of Class index0.02 %variation due toAuxiliary power supply: 230 VAC200 % of Class index0.05 %Variation due toAuxiliary power supply: 230 VACClass index0.06 %Variation due toAuxiliary power supply: 230 VACClass index0.06 %Variation due toInput current = 5A AC.Auxiliary power supply: 230 VACClass index0.06 %Variation due toInput current = 5A AC.Auxiliary power supply: 230 VACClass index0.01 %Variation due toInput current = 5A AC.Auxiliary power supply: 230 VACClass index0.01 %Variation due toInput current = 5A AC.Auxiliary power supply: 230 VACClass index0.01 %Variation due to selfAuxiliary power supply: 230 VACClass index0.01 %Variation due to selfAuxiliary power supply: 230 VACClass index0.01 %Variation due to selfInput current = 5A AC.Feat duration: 35 min.0.01 %	6.5	Variation due to the frequency of input quantities	Auxiliary power supply : 230 VAC Input current = 5A AC. Input current frequency varied from 45 Hz and 55 Hz.	100 % of class i		.1%	Complied
Variation due to Auxiliary power supply : 230 VAC 200 % of Class index 0.02 % distortion of input Input current = 5A AC. 200 % of Class index 0.02 % quantities I/p with 20 % 3 rd harmonics Nariation 0.06 % Variation due to Auxiliary power supply : 230 VAC Class index 0.66 % magnetic field of Input current = 5A AC. External origin 0.66 % variation due to Magnetic field of 0.4 kA/m 0.66 % 1.66 % Variation due to self Auxiliary power supply : 230 VAC Class index 0.01 % Variation due to self Auxiliary power supply : 230 VAC Class index 0.01 % Input current = 5A AC. Test duration: 35 min. 0.01 % 1.66 %	6.9	Variation due to output load	Auxiliary power supply : 230 VAC Input current = 5A AC. Output load resistance varied from 0 ohm to 500 ohm.	50 % of class inc		037 %	Complied
Variation due to magnetic field of external origin Auxiliary power supply : 230 VAC Class index 0.66 % magnetic field of external origin Input current = 5A AC. 0.66 % 0.06 % Variation due to self Magnetic field of 0.4 kA/m 0.01 % 0.01 % Variation due to self Auxiliary power supply : 230 VAC Class index 0.01 % Input current = 5A AC. Test duration: 35 min. Test duration: 35 min. 0.01 %	6.10	Variation due to distortion of input quantities	Auxiliary power supply : 230 VAC Input current = $5A$ AC. I/p with 20% 3^{rd} harmonics	200 % of Class i		02 %	Complied
Variation due to selfAuxiliary power supply : 230 VACClass index0.01 %heatingInput current = 5A AC.Test duration: 35 min.	6.11	Variation due to magnetic field of external origin	Auxiliary power supply : 230 VAC Input current = 5A AC. Magnetic field of 0.4 kA/m	Class index	0	66%	Complied
	6.14	Variation due to self heating	Auxiliary power supply : 230 VAC Input current = 5A AC. Test duration: 35 min.	Class index	ō		Complied

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	OF	7	Remark	Complied	Complied	Complied		Complied	Complied	Complied	
03 E&S 117	PAGE	4	Observation	0.019 %	0.018 %	0.012 %		Complied	Complied	-0.067 % 0.067 % -0.004 %	WORLD'S S
ERTL (W)/20	TE	N 2004	Obser	0.0	0.0	0.0		Com	Com	0.0- 00.0-	Released By
REPORT NO. ERTL (W)/2003 E&S 117	DATE	2 3 JAN	ement	aply the				nply the fter test	uply the fter test		
H			Requirement	Continue to comply the accuracy class	Class index	Class index		Continue to comply the accuracy class after test	Continue to comply the accuracy class after test	Class index (0.5 %)	
TORY (WEST) OLOGY	DUCER		Test Condition	Auxiliary power supply : 230 VAC Input current = 5A AC. Test duration: 6 h	1: 230 VAC Hz to 65 Hz output	Auxiliary power supply : 230 VAC Input current = 5A AC. With 1 V rms at 45 Hz to 65 Hz applied in series with output signal	puts	q	For current inputs: 20 times the nominal value of the measured current applied for 1 s and repeated 5 times at 300 s interval	Auxiliary power supply : 230 VAC a) Input current = 0A AC b) Input current = 2.5A AC c) Input current = 5A AC	
ELECTRONICS REGIONAL TEST LABORATORY (WEST) DEPARTMENT OF INFORMATION TECHNOLOGY	SUBJECT: TESTING OF CURRENT TRANSDUCER		Test/Parameter	Variation due to continuous operation	Variation due to common mode interference	Variation due to series mode interference	Permissive excessive inputs	Continuous excessive inputs	Excessive inputs of short duration	Intrinsic error	
ONICS REGI	I: TESTING (Reference Clause No.	6.15	6.16	6.17	6.18	6.18.1	6.18.2	4.2	
ELECTR DEPART	SUBJEC		Sr. No.	2.14	2.15	2.16	2.17	2.17.1	2.17.2	2.17.3	

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Remark	Complied	Complied	Complied	Complied	Complied	Complication
Observation	No breakdown observed.	Complied	-0.077 % 0.066 % -0.001 %	0.64 %	-0.07 % 0.076 % -0.004 %	2.7 deg. C
Requirement	No breakdown	After completion of the test the DUT shall comply with the requirement appropriate to its class index.	Class index (0.5 %)	The variation due to the effect of disturbance shall not be twice of class index.	Class index (0.5 %)	For input circuits: 60 k For exterior surface: 25 k
Test Condition	At 2 kV AC for 1 min. between a) Input & output b) Aux. & output c) Aux. & input	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.	Auxiliary power supply : 230 VAC a) Input current = 0A AC b) Input current = 2.5A AC c) Input current = 5A AC	2.5 kV peak between independent circuits.1kV peak between terminals of the same circuit.	Auxiliary power supply : 230 VAC a) Input current = 0A AC b) Input current = 2.5A AC c) Input current = 5A AC	Current circuit loaded at 110 % for 2 h Voltage circuit loaded at 120 % for 2 h
Test/Parameter	Voltage test	Impulse voltage tests		st	Intrinsic error	Test for temperature rise.
Reference Clause No.	6.19	6.20	4.2	6.21	4.2	6.22
Sr. No.	2.18	2.19	2.19.1	2.20	2.20.1	2.21



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Remark		Complied		Complied	1	Complied
Observation		-0.07 % 0.1 % 0.15 %	0/ 01.0	-0.082 % 0.072 % -0.03 %	A	-0.086 % 0.07 % -0.03 %
Requirement		Class index (0.5 %)		Class index (0.5 %)		Class index (0.5 %)
Test Condition	Freq. : 10 - 55 - 10 Hz. Amplitude: 0.15 mm. 5 cycles, 1 octave/min. Axis: Vertical	Auxiliary power supply : 230 VAC a) Input current = 0A AC b) Input current = 2.5A AC c) Input current = 5A AC	15g. ½ sine, 11 ms, 3 shocks on each sense. Total 18 shocks.	Auxiliary power supply : 230 VAC a) Input current = 0A AC b) Input current = 2.5A AC c) Input current = 5A AC	Drop height: 25 mm, one drop about each of four bottom edges. One topple about each of four bottom edges.	Auxiliary power supply : 230 VAC a) Input current = 0A AC b) Input current = 2.5A AC c) Input current = 5A AC
Test/Parameter	Vibration Test	Intrinsic error	Shock Test	Intrinsic error	Drop & topple Test.	Intrinsic error
Reference Clause No.	6.23	4.2	6.23	4.2	6.23	4.2
Sr. No.	2.22	2.22.1	2.23	2.23.1	2.24	2.24.1



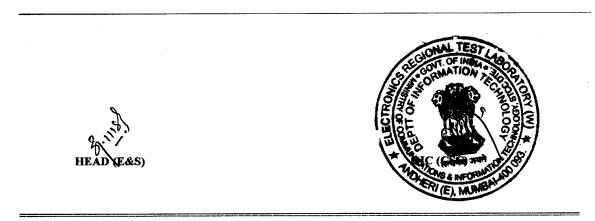
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3.0 General Remarks : Nil.



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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 Iaboratories (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.