



GOVERNMENT OF INDIA
Electronics Regional Test Laboratory (west)
MINISTRY OF COMMUNICATIONS & INFORMATION TECHNOLOGY,
DEPT. OF INFORMATION TECHNOLOGY, STQC DTE.

COVER SHEET

TEST REPORT

REPORT No.:ERTL(W)2009 E&S 276

TITLE: TESTING OF ANALOG MOVING COIL FREQUENCY METER

21 JUL 2010

1.1 Service Request No. and Date: 20091515 dated: 10-NOV-09

1.2 Service Requested By:

(Name & Address)

M/s. **RISHABH INSTRUMENTS PVT. LTD.**

F-31,
MIDC
SATPUR,
NASIK-422007

Report Released By:

N.V.CHAVAN/JAYANT KATHE

Customer Service Cell





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DATE OF ISSUE
July 20, 2010

1.0 Scope

1.1	Service request no and Date	As per cover sheet
1.2	Name and address of Customer :	As per cover sheet

1.3	Description & Identification of Test item(s)	Nomenclature :	ANALOG FREQUENCY METER	
		Make :	ZIEGLER INSTRUMENTS	
		Model/Type :	FM-72 *	
		Sl. No. :	TJ Q 5916 #	
		Quantity:	01	
1.4	Item(s) condition on receipt: OK/Not OK	Received Date: 10/11/2009	Test Completed Date : 30/04/2010	
1.5	Testing performed at :	ERTL(W)		
1.6	Test Specification / Test Procedure used	Type testing as per IEC 60051		

1.7	Major Equipments used and Traceability Details:			
Sl. No.	Equipment Used	Uncertainty (Best Case)	Calibration Report Ref.	Valid up to
1	3 ph Power Energy System	$\pm 0.02\%$	ERTL(N)/90(4)-2008A	29-10-2010
2	AC voltage calibrator	$\pm 0.01\%$	2010 S&C475	01-04-2011
3	Programmable Humidity Chamber	$\pm 2^\circ \text{C}$	2010 TNP 511	15-05-2011
4	High Voltage Tester	$\pm 2\%$	2009S&C747	10-06-2010
5	Insulation Tester	$\pm 2\%$	2009S&C748	09-06-2010
6	Variable supply	-----	Spot check	-----
7	Programmable Humidity Chamber	$\pm 1.5^\circ \text{C/RH} \pm 2\%$	2009TNP703	19-08-2010
8	Vibration Chamber	$\pm 4.41 \%$	2009ENV208	23-07-2010
9	Climatic Test Chamber	$\pm 0.25^\circ \text{C/RH} \pm 2\%$	2010TNP420	08-04-2011

* :As specified by customer,not marked on Panel Meter.
#: Serial number found on paper sticker.





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TEST REPORT

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2.0 TEST RESULTS:

LABORATORY AMBIENT : Temperature: As prevalent at site Humidity: As prevalent at site

2.0 Test Results:

SR NO	TEST PARAMETER	TEST CONDITION	TEST REQUIREMENT	OBSERVATIONS		REMARK
				Increasing	Decreasing	
2.1	Intrinsic Error	At following equidistant point Observation 45 Hz 50 Hz 55 Hz 60 Hz 65 Hz	Error shall not exceed 1.5%	-0.23 % -0.23 % -0.234 % 0.03 % 0.23 %	-0.12 % -0.07 % -0.06 % 00.6 % 0.09 %	Complied
2.2	Variation due to influential quantities					
2.2.1	Variation due to ambient temp.	Lower temp. 11 deg. C, Upper temp. 35 deg.C, At following quidistant points. 45 Hz 50 Hz 55 Hz 60 Hz 65 Hz	Permissible variation shall be 100% of class index	0.0 % -0.15 % 0.15% 0.0 % 0.77 %		Complied





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2.0 TEST RESULTS:

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2.0 Test results (Contd...)

Sr.No.	Test/Parameter	Test Condition	Requirement	Observation	Remark
2.2.2	Variation due to humidity	Lower R.H. 25 % Upper R.H. 80% At following equidistant points. 45 Hz 50 Hz 55 Hz 60 Hz 65 Hz	Permissible variation shall be 100% of class index	-0.02 % -0.08 % -0.02 % 0.03 % -0.03 %	Complied
2.2.3	Variation due to distortion of AC measured quantity	Superimpose 15 % of third harmonics up on the fundamental wave form. At mid-scale of measuring range.	Permissible variation shall be 100% of class index	0.0 %	Complied
2.2.4	Variation due to voltage component of AC measured quantity	Lower voltage 194 V, Upper voltage 267 V At following equidistant points. 45 Hz 50 Hz 55 Hz 60 Hz 65 Hz	Permissible variation shall be 100% of class index	0.0 % 0.0 % -0.15 % 0.0 % 0.15 %	Complied





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2.0 Test results (Contd...)

Sr.No.	Test/Parameter	Test Condition	Requirement	Observation	Remark
2.2.5	Variation due to position	5 deg. tilt in forward, backward, left and right direction. At following equidistant points 45 Hz 50 Hz 55 Hz 60 Hz 65 Hz	Permissible variation shall be 100% of class index	0.0 % 0.15 % 0.0 % 0.0 % 0.0 %	Complied
2.2.6	Variation due to magnetic field of external origin	Subject the meter to a magnetic field of external origin of 0.4kA/m. Maximum deviation to be observed. 45 Hz 50 Hz 55 Hz 60 Hz 65 Hz	6 % of fiducial value	0.0 % 0.0 % 0.0 % 0.0 % 0.0 %	Complied
2.2.7	Variation due to ferromagnetic supports	Mounting UUT on ferrous and non ferrous panels & measurements at following points: 45 Hz 50 Hz 55 Hz 60 Hz 65 Hz	Shall remain within the limit of the intrinsic error when mounted on a panel of any nature and thickness.	0.0 % 0.0 % 0.0 % -0.2 % -0.2 %	Complied





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LABORATORY AMBIENT : Temperature: As prevalent at site Humidity: As prevalent at site

2.0 Test results (Contd...)

Sr.No	Test/Parameter	Test Condition	Requirement	Observation		Remark
				Increasing	Decreasing	
2.2.8	Variation due to conductive support	Accuracy test carried out by mounting UUT on conductive support following points 45 Hz 50 Hz 55 Hz 60 Hz 65 Hz	Shall meet the requirement of intrinsic error	-0.31% -0.15% -0.15% 0.0% 0.15%	-0.15% -0.15% -0.15% 0.0% 0.31%	Complied
2.3	High Voltage Test	AT 2 kV AC rms for 1 min. between terminals shorted together and foil wrapped on body.	There shall not be any breakdown/flashover.	There shall no break down/ flash over .		Complied
2.4	Insulation Resistance	At 500 V DC for 1 min. between terminals shorted together and body.	-----	> 2 G Ω		Complied





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2.0 Test results (Contd...)

Sr.No	Test/Parameter	Test Condition	Requirement	Observation	Remark
2.5	Damping				
2.5.1	Mechanical overshoot	By suddenly applying excitation to produce deflection $2/3^{\text{rd}}$ of scale length & note down the % overshoot.	Shall not exceed 20% of scale length	No over shoot observed	Complied
2.5.2	Response time	By suddenly applying excitation to produce deflection $2/3^{\text{rd}}$ of scale length & note down time (sec) required for index to come to apparent rest while remaining in a band of on either side of its final rest position of length equal to 1.5 % of scale length.	---	Approximately $> 1s$ & $< 3s$	Complied
2.6	Self Heating	By applying 90% of upper limit of measuring range for 30 to 35 min.	Variation shall not exceed 100% of class index.	0.15 %	Complied





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2.0 TEST RESULTS:

2.0 Test results (Contd...)

Sr.No.	Test/Parameter	Test Condition	Requirement	Observation	Remark
2.7	Permissible overloads				
2.7.1	Continuous overload	a)Apply 120% of rated voltage for 2h b)Accuracy test at following equidistant points after 2 h. 45 Hz 50 Hz 55 Hz 60 Hz 65Hz	a) Residual deflection shall not exceed 1% of scale length b) Shall comply with the accuracy requirement.	No residual deflection observed. Increasing -0.15% -0.31 % -0.31 % 0.0% 0.15 % Decreasing -0.31 % -0.15% -0.15 % 0.0 % 0.15 %	Complied





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2.0 Test results (Contd...)

Sr.No.	Test/Parameter	Test Condition	Requirement	Observation	Remark												
2.7.2	Overloads of short duration	a)Apply 200 % of upper limit of electrical input quantity for 0.5s nine times at an interval of 60s and once for 5s. b)Accuracy test at following equidistant points after 2 h. 45 Hz 50 Hz 55 Hz 60 Hz 65 Hz	a)Deviation of index from zero scale mark shall not exceed 1.5%(class index)of scale length. b)Shall comply with the accuracy requirement	Deviation of index from zero scale mark Found Within 1.5 % of scale length.	Complied												
				<table border="1"> <thead> <tr> <th>Increasing</th> <th>Decreasing</th> </tr> </thead> <tbody> <tr> <td>-0.15 %</td> <td>-0.15 %</td> </tr> <tr> <td>-0.31 %</td> <td>-0.15 %</td> </tr> <tr> <td>-0.15 %</td> <td>-0.15 %</td> </tr> <tr> <td>0.15 %</td> <td>0.15 %</td> </tr> <tr> <td>0.15 %</td> <td>0.15 %</td> </tr> </tbody> </table>	Increasing	Decreasing	-0.15 %	-0.15 %	-0.31 %	-0.15 %	-0.15 %	-0.15 %	0.15 %	0.15 %	0.15 %	0.15 %	
Increasing	Decreasing																
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2.0 Test results (Contd...)

Sr.No.	Test/Parameter	Test Condition	Requirement	Observation	Remark										
2.8	Limiting values of temperature	40 deg.C for 16h & -25 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 and return to zero. Similarly after 8h and while at lower temp. slowly increase & decrease the excitation until index reaches the upper limit of measuring range and return to zero.	Please See observation at Sr. No. 2.8.1	To be conditioned. Index was following the excitation changes at 40 °C & at -25 °C.	Complied										
2.8.1	Post Measurement Intrinsic error	At the following equidistant points 45 Hz 50 Hz 55 Hz 60 Hz 65 Hz	Error shall be within class index (1.5%)	<table border="1"> <thead> <tr> <th>Increasing</th> <th>Decreasing</th> </tr> </thead> <tbody> <tr> <td>0.31 %</td> <td>-0.15 %</td> </tr> <tr> <td>-0.15 %</td> <td>-0.15 %</td> </tr> <tr> <td>-0.15 %</td> <td>0.0 %</td> </tr> <tr> <td>0.0 %</td> <td>0.15 %</td> </tr> </tbody> </table>	Increasing	Decreasing	0.31 %	-0.15 %	-0.15 %	-0.15 %	-0.15 %	0.0 %	0.0 %	0.15 %	Complied
Increasing	Decreasing														
0.31 %	-0.15 %														
-0.15 %	-0.15 %														
-0.15 %	0.0 %														
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2.0 Test results (Contd...)

Sr.No.	Test/Parameter	Test Condition	Requirement	Observation	Remark
2.9	Deviation from zero	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.	Deviation expressed as percentage of scale length shall not exceed 50% of class index.	Deviation observed within 50 % of Class index.	Complied
2.10	Effect of vibration and shock				
2.10.1	Vibration Test	As per IS 60068-2-6 Sweep range: 10-55-10 Hz Displacement amplitude: 0.15 mm. Sweep Rate: 1 octave/min., Direction of vibration: vertical. No. of sweep cycles: 5 Instrument is fastened in its normal position of use.	Please See observation at Sr. No. 2.10.3	Conditioned No physical damage observed.	---
2.10.2	Shock Test	As per IS 60068-2-27 Peak Acceleration: 15g, Pulse shape: half sine, Duration: 11 ms, 3 shocks in both directions of 3 mutually perpendicular axes (total 18 shocks)	Please See observation at Sr. No. 2.10.3	Conditioned No physical damage observed.	---





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2.0 Test results (Contd...)

Sr.No.	Test/Parameter	Test Condition	Requirement	Observation		Remark
				Increasing	Decreasing	
2.10.3	Deviation of error due to vibration and shock	At the following points: 45 Hz 50 Hz 55 Hz 60 Hz 65 Hz	Error shall not deviate more than 100 % of class index	0.0 % 0.0 % 0.0 % 0.0 % 0.15 %	0.0 % 0.0 % 0.0 % 0.0 % 0.0 %	Complied
2.11	Range of mechanical zero adjustment	Record the values of the greatest deflection of index downscale & upscale. Set the index to the zero or mid-scale mark . Reset the index above below the reference	Not less than 2 % of scale length or 2° whichever is less.	The total range of adjustment was less than 2 % of scale length.		Complied
2.12	Markings and symbols for terminals	As per clause No. 9 of IEC 60051-1 and clause No. 9.4.3 of IEC 51-2.	Marking shall remain legible and indelible and of a colour which contrasts with the background or shall be moulded.	No markings of measuring circuit terminals are required.		Complied





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3.0 General Remarks: -NIL-

REPORT APPROVED BY


K.MURARI
HEAD, TEST OPERATIONS

