



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 253

TITLE: TESTING OF ANALOG MOVING COIL DC AMMETER DS-72

21 JUL 2010

1.1 Service Request No. and Date: 20091386 dated: 09-OCT-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 DC AMMETER	
		Make :	RISHABH INSTRUMENTS PVT. LTD.	
		Model/Type :	DS-72 *	
		Sl. No. :	TJ Q 2545 #	
		Quantity:	01	
1.4	Item(s) condition on receipt: OK/Not OK	Received Date: 15/10/2009	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	DC Current Source	$\pm 0.05 \%$	2009 S&C 543	29-06-2010
2	Programmable Humidity Chamber	$\pm 2^\circ \text{C}$	2010 TNP 511	15-05-2011
3	High Voltage Tester	$\pm 2\%$	2010S&C774	25-06-2011
4	Insulation Tester	$\pm 2\%$	2010S&C773	16-06-2011
5	DC Power Supply	-----	Spotcheck	-----
6	Programmable Humidity Chamber	$\pm 1.5^\circ \text{C/RH} \pm 2\%$	2009TNP703	19-08-2010
7	Vibration Chamber	$\pm 4.41 \%$	2009ENV208	23-07-2010
8	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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2.0 Test Results

Sr.No.	Test/Parameter	Test Condition	Requirement	Observation		Remark
				Increasing	Decreasing	
2.1	Intrinsic Error	At following equidistant point Observation 4mADC 8mADC 12mADC 16m ADC 20 mADC	Error shall not exceed 1.5%	0.41 % 0.61 % 0.38 % 0.25 % 0.005 %	0.43 % 0.85 % 0.50 % 0.73 % 0.075 %	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 equidistant points. 4mADC 8mADC 12mADC 16m ADC 20 mADC	Permissible variation shall be 100% of class index		-0.1 % 0.23 % 0.22 % 0.35 % 0.2 %	Complied



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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. 4mADC 8mADC 12mADC 16 mADC 20 mADC	Permissible variation shall be 100% of class index	0.005 % -0.5 % -0.08 % -0.1 % -0.2 %	Complied
2.2.3	Variation due to position	5 deg. tilt in forward, backward, left and right direction. At following equidistant points. 4 mADC 8 mADC 12mADC 16mADC 20mADC	Permissible variation shall be 50% of class index	-0.03 % 0.06 % 0.05 % -0.06 % 0.04 %	Complied



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2.0 Test results (Contd...)

Sr.No.	Test/Parameter	Test Condition	Requirement	Observation	Remark
2.2.4	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. 4 mADC 8 mADC 12mADC 16mADC 20mADC	6 % of fiducial value	0.04 % -0.05 % 0.02% -0.02% 0.03%	Complied
2.2.5	Variation due to ferromagnetic supports	Mounting UUT on ferrous & non-ferrous panels & measurements at following equidistant points 4 mADC 8 mADC 12mADC 16mADC 20mADC	Shall remain within the limit of the intrinsic error when mounted on a panel of any nature and thickness.	- 0.03 % 0.01 % 0.02 % - 0.01 % - 0.02 %	Complied



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2.0 Test results (Contd...)

Sr.No.	Test/Parameter	Test Condition	Requirement	Observation		Remark
				Increasing	Decreasing	
2.2.6	Variation due to conductive support	Accuracy test carried out by mounting UUT on conductive support following equidistant points 4 mADC 8mADC 12mADC 16mADC 20mADC	Shall meet the requirement of intrinsic error (1.5 %)	0.6 % 0.9% 0.6% 0.8 % 0.2 %	0.6 % 0.8 % 0.5 % 0.8 % 0.1 %	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 was no breakdown /flashover.		Complied
2.4	Insulation Resistance	At 500 V DC for 1 min. between terminals shorted together and body.	----	> 2 GΩ		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 < 1 s	Complied
2.6	Self Heating	By applying 90% of upper limit of measuring range for 30 to 35 min. & note down the deviation (%) 1 min. - 3 min. 30 min. - 35 min.	Variation shall not exceed 100% of class index.		-0.015 %	Complied



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2.0 Test results (Contd...)

Sr.No.	Test/Parameter	Test Condition	Requirement	Observation	Remark
2.7	Permissible overloads				
2.7.1	Continuous overload	a) By applying 120% of upper limit for 2h b) Accuracy test at following equidistant points after 2 h. 4 mADC 8 mADC 12mADC 16m ADC 20 mADC	a) Residual deflection shall not exceed 1% of scale length b) Shall comply with the accuracy requirement.	No residual deflection observed. Increasing decreasing 0.6 % 1.0 % 0.6 % 0.7 % 0.2 %	Complied



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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 & 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.	Please See observation at Sr.No. 2.8.1	To be conditioned. Index was following the excitation changes at 40 °C and at -25 °C.	-----												
2.8.1	Post Measurement Intrinsic error After 2 h recovery.	Accuracy test at the following equidistant points 4mADC 8mADC 12mADC 16mADC 20mADC	Error shall be within class index (1.5%)	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; text-align: center;">Increasing</td> <td style="width: 50%; text-align: center;">Decreasing</td> </tr> <tr> <td style="text-align: center;">1.0 %</td> <td style="text-align: center;">1.1 %</td> </tr> <tr> <td style="text-align: center;">0.9 %</td> <td style="text-align: center;">1.0 %</td> </tr> <tr> <td style="text-align: center;">0.6 %</td> <td style="text-align: center;">0.9 %</td> </tr> <tr> <td style="text-align: center;">1.0 %</td> <td style="text-align: center;">1.0 %</td> </tr> <tr> <td style="text-align: center;">0.5 %</td> <td style="text-align: center;">0.5 %</td> </tr> </table>	Increasing	Decreasing	1.0 %	1.1 %	0.9 %	1.0 %	0.6 %	0.9 %	1.0 %	1.0 %	0.5 %	0.5 %	Completed
Increasing	Decreasing																
1.0 %	1.1 %																
0.9 %	1.0 %																
0.6 %	0.9 %																
1.0 %	1.0 %																
0.5 %	0.5 %																



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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 1.5s after the excitation has been reduced to zero.	Deviation expressed as percentage of scale length shall not exceed more than 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 following equidistant points 4mADC 8mADC 12mADC 16mADC 20 mADC	Error shall not deviate more than 100% of class index	0.01 % -0.01 % 0.03 % 0.1 % 0.025 %	-0.01 % 0.01 % 0.06 % -0.06 % 0.05 %	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 mark.	Not less than 2 % of scale length or 2° whichever is less.	Not applicable.		Graduation Starts from 4 mA.
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 be and remain legible and indelible and of a colour which contrasts with the background or shall be molded.	For single range DC ammeters, positive terminal is marked using symbol +.		Complied



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3.0 General Remarks: Nil.

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HEAD, TEST OPERATIONS

JAYANT KATHE / N V CHAVAN
OIC/HEAD, CUSTOMER SERVICE CELL