STQC	GOVERNMET 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 254
TITLE: TESTING OF ANALOG MOVING COIL DC VOLTMETER DS-72 28 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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REPORT NO. : ERTL (W)/ 2009 E&S 254

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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 VOLTMETER	
		Make :	RISHABH INSRUMENTS PVT. LTD.	
		Model/Type :	DS-72 *	
		Sl. No. :	TJ Q 2545 #	
		Quantity:	01	
1.4	Item(s) condition on receipt: 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 Voltage Calibrator	± 0.01%	2009S&C544	26-08-2010
2	Programmable Humidity Chamber	± 2° C	2010TNP511	15-05-2011
3	High Voltage Tester	± 2%	20109S&C774	25-06-2011
4	Insulation Tester	± 2%	2010S&C773	16-06-2011
5	DC Power supply	------	Spot check	------
6	Programmable Humidity Chamber	± 1.5° C/RH ±2%	2009TNP703	19-08-2010
7	Vibration Chamber	± 4.41 %	2010ENV218	09-07-2011
8	Climatic Test Chamber	± 0.25° C/RH ±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: 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
2.1	Intrinsic Error	At following equidistant point Observation 2 VDC 4 VDC 6 VDC 8 VDC 10 VDC	Error shall not exceed 1.5%	Increasing -0.4 % -0.5 % -0.6 % -0.4 % 0.5 %	Decreasing -0.4 % -0.5 % -0.6 % -0.2 % 0.5 %	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. 2 VDC 4 VDC 6 VDC 8 VDC 10 VDC	Permissible variation shall be 100% of class index	-0.1 % 0.3 % -0.3% 0.2% 0.2%		Complied

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2.0 TEST RESULTS: 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
2.2.2	Variation due to humidity	Lower R.H. 25 % UpperR.H.80% At following equidistant points. 2 VDC 4 VDC 6 VDC 8 VDC 10 VDC	Permissible variation shall be 100% of class index	 0.22 % -0.04 % 0.02 % 0.04 % 0.02 %	Complied
2.2.3	Variation due to position	5 deg. tilt in forward, backward, left and right direction. At following equidistant points. 2 VDC 4 VDC 6 VDC 8 VDC 10 VDC	Permissible variation shall be 100% of class index	 -0.06 % -0.08 % 0.1 % 0.06 % -0.1 %	Complied
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. 2 VDC 4 VDC 6 VDC 8 VDC 10 VDC	6 % of fiducial value	 0.03% 0.01 % 0.01 % -0.01 % -0.03 %	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 ferromagnetic supports	Mounting UUT on ferrous and non ferrous panels & measurements at following points: 2 VDC 4 VDC 6 VDC 8 VDC 10 VDC	Shall remain within the limit of the intrinsic error when mounted on a panel of any nature and thickness.	-0.01 % -0.01 % 0.02 % -0.06 % 0.0 %		Complied
2.2.6	Variation due to conductive support	Accuracy test carried out by mounting UUT on conductive support following points 2 VDC 4 VDC 6 VDC 8 VDC 10 VDC	Shall meet the requirement of intrinsic error	Increasing -0.5 % -0.5 % -0.6 % -0.3 % 0.3 %	Decreasing -0.4 % -0.5 % -0. 6 % -0.3 % 0.3 %	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.	No break down/flash over observed.		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 2/3rd 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 2/3rd 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 & < 2s	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.	0.03 %	Complied

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2.0 Test results (Contd...)

Sr.No.	Test/Parameter	Test Condition	Requirement	Observation	Remark
2.7	Permssible 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. 2 VDC 4 VDC 6 VDC 8 VDC 10 VDC	a) Residual deflection shall not exceed 1% of scale length b) Shall comply with the accuracy requirement.	No residual deflection observed. Increasing: -0.4 %, -0.5 %, -0.6 %, -0.2 %, 0.3 % Decreasing: -0.4 %, -0.5 %, -0.5 %, -0.1 %, 0.4 %	Complied
2.7.2	Overloads of short duration	a) Apply 200 % of upper limit for 0.5s nine times at an interval of 60s and once for 5s. b) Accuracy test at the following equidistant points 2 VDC 4 VDC 6 VDC 8 VDC 10 VDC	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. Increasing: -0.4 %, -0.6 %, -0.7 %, -0.4 %, 0.3 % Decreasing: -0.4 %, -0.6 %, -0.6 %, -0.3 %, 0.4 %	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. 3cycles 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 :	Error shall be within class index (1.5%)	Increasing	Decreasing	Complied
		2 VDC		-0.4 %	-0.4 %	
		4 VDC		-0.5 %	-0.5 %	
		6 VDC		-0.6 %	-0.5 %	
		8 VDC		-0.3 %	-0.3 %	
		10 VDC		0.3 %	0.3 %	

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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: 2 VDC 4 VDC 6 VDC 8 VDC 10 VDC	Error shall not deviate more than 100 % of class index	 -0.4 % -0.5 % -0.5 % -0.3 % 0.22 %	 -0.4 % -0.4 % -0.5 % -0.2 % 0.3 %	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.	For single range DC voltmeters,the positive terminal is marked with symbol +.		Complied

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3.0 **General Remarks:** -NIL-

REPORT APPROVED BY	REPORT RELEASED BY
K.MURARI HEAD, TEST OPERATIONS	JAYANT KATE/N.V.CHAVAN OIC/HEAD, CUSTOMER SERVICE CELL