



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)2010 E&S 56

11 3 SEP 2010

TITLE: TESTING OF PL-250 (MOVING COIL , DC OPERATED ,ANALOG PANEL METER)

1.1 Service Request No. and Date: 20100406 dated: 26-MAR-10

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/SHRIKANT DINGORE
Customer Service Cell





GOVERNMENT OF INDIA
ELECTRONICS REGIONAL TEST LABORATORY (WEST)
MINISTRY OF COMMUNICATIONS & INFORMATION TECHNOLOGY
DEPT. OF INFORMATION TECHNOLOGY, STQC DTE.

REPORT NO. : ERTL (W)/ 2010 E&S 56

PAGE 1 OF 10

TEST REPORT

TITLE: TYPE TESTING OF ANALOG DC VOLTMETER

DATE OF ISSUE
September 8, 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 VOLTMETER	
		Make :	RISHABH INSTRUMENTS PVT. LTD.	
		Model/Type :	PL 96 *	
		Sl. No. :	UB Q 2517 #	
		Quantity:	01	
1.4	Item(s) condition on receipt: OK	Received Date: 26/03/2009	Test Completed Date : 06/09/2010	
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	$\pm 0.05\%$	2009S&C1413	04-02-2011
2	Programmable Humidity Chamber	$\pm 2^\circ \text{C}$	2010TNP511	15-05-2011
3	High Voltage Tester	$\pm 2\%$	20109S&C774	25-06-2011
4	Insulation Tester	$\pm 2\%$	2010S&C773	16-06-2011
5	DC Power supply	-----	Spot check	-----
6	Programmable Humidity Chamber	$\pm 0.6^\circ \text{C/RH} \pm 1.7\%$	2010TNP511	15-06-2011
7	Vibration Chamber	$\pm 4.41\%$	2010ENV218	09-07-2011
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.





GOVERNMENT OF INDIA
ELECTRONICS REGIONAL TEST LABORATORY (WEST)
 MINISTRY OF COMMUNICATIONS & INFORMATION TECHNOLOGY
 DEPT. OF INFORMATION TECHNOLOGY, STQC DTE.

REPORT NO. : ERTL (W)/ 2010 E&S 56

PAGE 2 OF 10

TEST REPORT

TITLE: TYPE TESTING OF ANALOG DC VOLTMETER

DATE OF ISSUE
September 8, 2010

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 50 VDC 100 VDC 150 VDC 200 VDC 250 VDC	Error shall not exceed 1.5%	-0.4 %	-0.3 %	Complied
				-0.1 %	-0.1 %	
				0.1 %	0.1 %	
				-0.1 %	-0.1 %	
				-1.0 %	-1.0 %	
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. 50 VDC 100 VDC 150 VDC 200 VDC 250 VDC	Permissible variation shall be 100% of class index	-0.2 % -0.2 % 0.04% 0.5% -0.2%		Complied



RELEASED BY



GOVERNMENT OF INDIA
ELECTRONICS REGIONAL TEST LABORATORY (WEST)
 MINISTRY OF COMMUNICATIONS & INFORMATION TECHNOLOGY
 DEPT. OF INFORMATION TECHNOLOGY, STQC DTE.

REPORT NO. : ERTL (W)/ 2010 E&S 56

PAGE 3 OF 10

TEST REPORT

TITLE: TYPE TESTING OF ANALOG DC VOLTMETER

DATE OF ISSUE
September 8, 2010

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 % Upper R.H. 80% At following equidistant points. 50 VDC 100 VDC 150 VDC 200 VDC 250 VDC	Permissible variation shall be 100% of class index	0.1 % -0.04 % 0.04 % -0.04 % 0.04 %	Complied
2.2.3	Variation due to position	5 deg. tilt in forward, backward, left and right direction. At following equidistant points. 50 VDC 100 VDC 150 VDC 200 VDC 250 VDC	Permissible variation shall be 100% of class index	0.04 % -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. 50 VDC 100 VDC 150 VDC 200 VDC 250 VDC	6 % of fiducial value	0.03 % 0.01 % 0.01 % -0.01 % -0.03 %	Complied



TEST REPORT

TITLE: TYPE TESTING OF ANALOG DC VOLTMETER

DATE OF ISSUE
September 8, 2010

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
2.2.5	Variation due to ferromagnetic supports	Mounting UUT on ferrous and non ferrous panels & measurements at following points: 50 VDC 100 VDC 150 VDC 200 VDC 250 VDC	Shall remain within the limit of the intrinsic error when mounted on a panel of any nature and thickness.	0.7 % 0.7 % -0.01 % -0.04 % 0.1 %	Complied
2.2.6	Variation due to conductive support	Accuracy test carried out by mounting UUT on conductive support following points 50 VDC 100 VDC 150 VDC 200 VDC 250 VDC	Shall meet the requirement of intrinsic error	Increasing -0.1 % -0.1 % -0.2 % -0.2 % -1.0 % Decreasing -0.1 % -0.1 % -0.1 % -0.1 % -1.0 %	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



RELEASED BY



GOVERNMENT OF INDIA
ELECTRONICS REGIONAL TEST LABORATORY (WEST)
MINISTRY OF COMMUNICATIONS & INFORMATION TECHNOLOGY
DEPT. OF INFORMATION TECHNOLOGY, STQC DTE.

REPORT NO. : ERTL (W)/ 2010 E&S 56

PAGE 5 OF 10

TEST REPORT

TITLE: TYPE TESTING OF ANALOG DC VOLTMETER

DATE OF ISSUE
September 8, 2010

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
2.5	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 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.	0.0 %	Complied





GOVERNMENT OF INDIA
ELECTRONICS REGIONAL TEST LABORATORY (WEST)
 MINISTRY OF COMMUNICATIONS & INFORMATION TECHNOLOGY
 DEPT. OF INFORMATION TECHNOLOGY, STQC DTE.

REPORT NO. : ERTL (W)/ 2010 E&S 56

PAGE 6 OF 10

TEST REPORT

TITLE: TYPE TESTING OF ANALOG DC VOLTMETER

DATE OF ISSUE
September 8, 2010

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
2.7	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. 50 VDC 100 VDC 150 VDC 200 VDC 250 VDC	a) Residual deflection shall not exceed 1% of scale length b) Shall comply with the accuracy requirement.	No residual deflection observed. Increasing -0.5 % -0.5 % -0.6 % -1.0 % -1.4 % Decreasing -0.4 % -0.2 % -0.6 % -1.0 % -1.5 %	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 50 VDC 100 VDC 150 VDC 200 VDC 250 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 -0.5 % -0.5 % -0.6 % -0.9 % -1.4 % Decreasing -0.4 % -0.2 % -0.6 % -1.0 % -1.5 %	Complied





GOVERNMENT OF INDIA
ELECTRONICS REGIONAL TEST LABORATORY (WEST)
 MINISTRY OF COMMUNICATIONS & INFORMATION TECHNOLOGY
 DEPT. OF INFORMATION TECHNOLOGY, STQC DTE.

REPORT NO. : ERTL (W)/ 2010 E&S 56

PAGE 7 OF 10

TEST REPORT

TITLE: TYPE TESTING OF ANALOG DC VOLTMETER

DATE OF ISSUE
September 8, 2010

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												
2.8	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 : 50 VDC 100 VDC 150 VDC 200 VDC 250 VDC	Error shall be within class index (1.5%)	<table border="1" style="width: 100%;"> <thead> <tr> <th>Increasing</th> <th>Decreasing</th> </tr> </thead> <tbody> <tr> <td>-0.4 %</td> <td>-0.4 %</td> </tr> <tr> <td>-0.1 %</td> <td>-0.2 %</td> </tr> <tr> <td>-0.8 %</td> <td>-0.8 %</td> </tr> <tr> <td>-1.4 %</td> <td>-1.5 %</td> </tr> <tr> <td>-1.2 %</td> <td>-1.2 %</td> </tr> </tbody> </table>	Increasing	Decreasing	-0.4 %	-0.4 %	-0.1 %	-0.2 %	-0.8 %	-0.8 %	-1.4 %	-1.5 %	-1.2 %	-1.2 %	Complied
Increasing	Decreasing																
-0.4 %	-0.4 %																
-0.1 %	-0.2 %																
-0.8 %	-0.8 %																
-1.4 %	-1.5 %																
-1.2 %	-1.2 %																



RECEIVED (E)



GOVERNMENT OF INDIA
ELECTRONICS REGIONAL TEST LABORATORY (WEST)
 MINISTRY OF COMMUNICATIONS & INFORMATION TECHNOLOGY
 DEPT. OF INFORMATION TECHNOLOGY, STQC DTE.

REPORT NO. : ERTL (W)/2010 E&S 56

PAGE 8 OF 10

TEST REPORT

TITLE: TYPE TESTING OF ANALOG DC VOLTMETER

DATE OF ISSUE
September 8, 2010

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
2.9	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 IEC 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 IEC 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.	---



RELEASED



GOVERNMENT OF INDIA
ELECTRONICS REGIONAL TEST LABORATORY (WEST)
 MINISTRY OF COMMUNICATIONS & INFORMATION TECHNOLOGY
 DEPT. OF INFORMATION TECHNOLOGY, STQC DTE.

REPORT NO. : ERTL (W)/ 2010 E&S 56

PAGE 9 OF 10

TEST REPORT

TITLE: TYPE TESTING OF ANALOG DC VOLTMETER

DATE OF ISSUE
September 8, 2010

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
				Increasing	Decreasing	
2.10.3	Deviation of error due to vibration and shock	At the following points: 50 VDC 100 VDC 150 VDC 200 VDC 250 VDC	Error shall not deviate more than 100 % of class index	-0.4 % -0.3 % -0.5 % -0.4 % 0.6 %	-0.7 % -0.6 % -0.4 % -0.3 % 0.6 %	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 not 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





GOVERNMENT OF INDIA
ELECTRONICS REGIONAL TEST LABORATORY (WEST)
MINISTRY OF COMMUNICATIONS & INFORMATION TECHNOLOGY
DEPT. OF INFORMATION TECHNOLOGY, STQC DTE.

REPORT NO. : ERTL (W)/ 2010 E&S 56

PAGE 10 OF 10

TEST REPORT

TITLE: TYPE TESTING OF ANALOG DC VOLTMETER

DATE OF ISSUE
September 8, 2010

3.0 General Remarks: -NIL-

REPORT APPROVED BY

K.MURARI
HEAD, TEST OPERATIONS



SHRIKANT DINGORE/W.V.CHAVAN
OIC/HEAD, CUSTOMER SERVICE CELL