



Certificate No. : CC-2640

ELECTRICAL RESEARCH AND DEVELOPMENT ASSOCIATION

(Accredited by the National Accreditation Board for Testing and Calibration Laboratories, Govt. of India)

R-336, TTC Industrial Area, Thane - Belapur Road, MIDC, Rabale, Navi Mumbai - 400 701.

EPABX : + 91 (022) 27606212 / 13 / 14

E-mail : erdarab@erda.org

Web : http://www.erda.org



URL-CC264019000012424F

CALIBRATION CERTIFICATE OF DIGITAL MULTIMETER

CERTIFICATE NO. : RP-1920-001957

DATE : 15.04.2019

SHEET NO. : 1 OF 7

CALIBRATED ON : 15.04.2019

RECOMMENDED RECALIBRATION DATE: 14.04.2020

1.0 NAME & ADDRESS OF CUSTOMER

: M/s. Hatco Industries
"Hazari House",
197/201, Dr. Cawasji Hormusji Street,
Dhobi Talao, Parsi Dairy Signal,
Mumbai - 400 002,
Maharashtra

2.0 CUSTOMER'S REFERENCE NO.

: E-Mail Dated 28.03.2019

3.0 SAMPLE RECEIVED ON

: 03.04.2019

4.0 DESCRIPTION & IDENTIFICATION OF ITEM

NAME : DIGITAL MULTIMETER
MAKE : HTC INSTRUMENTS
MODEL : DM98
RANGE: RESISTANCE : 0 - 600/6k/60k/600k/6M/60M OHM
DC VOLTAGE : 0 - 600m/6/60/600/1000V
AC VOLTAGE : 0 - 600m/6/60/600/750V
DC CURRENT : 0 - 600μ/6000μ/60m/600m/10A
AC CURRENT : 0 - 600μ/6000μ/60m/600m/10A
CAPACITANCE : 0 - 10n/100n/1000n/10μ/100μ/1000μ/10m/100mF
FREQUENCY : 0 - 10/100/1000/10k/100k/1000k/10MHz
TEMPERATURE : -20°C TO 1000°C (K-TYPE THERMOCOUPLE)

ACCURACY : --

SR.NO. : 20190505

RESOLUTION : Please refer U.U.C. Readings

ERDA SAMPLE CODE.: ERDA-00310026

5.0 AMBIENT TEMPERATURE

: (25 ± 2.0)°C

RELATIVE HUMIDITY

: (45% - 75%)RH

6.0 MAJOR EQUIPMENTS USED FOR CALIBRATION :

SR. NO.	NAME	RANGE	ERDA SR. NO.	Uncertainty at 95% Confidence Level
1	UNIVERSAL CALIBRATION SYSTEM	10mV - 1000V DC	R0006	±0.001% to ±0.006%
		20mV - 1000V AC		±0.008% to ±0.410%
		10μA - 20A DC		±0.003% to ±0.013%
		100μA - 20A AC		±0.020% to ±0.036%
		1 OHM - 100M OHM		±0.002% to ±0.205%
		10Hz - 10M Hz		±0.001% to ±0.006%
2	UNIVERSAL CALIBRATION SYSTEM	1nF - 1mF	R0030	±0.04% to ±1.2%

7.0 PROCEDURE

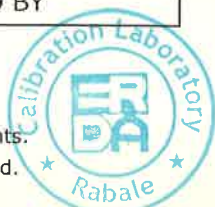
: RAB/CAL/002 & 003

CHECKED BY

NITIN DOSHI
APPROVED BY

NOTE

- 1.0 This certificate relates only to the particular item(s) received for calibration in good condition at ERDA.
- 2.0 This certificate shall not be reproduced, except in full, without permission of the Director, ERDA.
- 3.0 The calibration results reported in the certificate are valid at the time of and under stated conditions of measurements.
- 4.0 In case of any dispute, Vadodara will be the exclusive jurisdiction & shall be construed as where the cause has arisen.



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8.0 RESULTS:**RANGE : 0 - 600 OHM**

U.U.C. Reading	Standard Meter Rdg.	% Error Of Rdg.	Expanded Uncertainty At 95% Confidence Level \pm (%)
(OHM)	(OHM)		
59.9	60.0	-0.167	0.14
300.0	300.0	0.000	0.04
540.2	540.0	0.037	0.03

RANGE : 0 - 6 k OHM

U.U.C. Reading	Standard Meter Rdg.	% Error Of Rdg.	Expanded Uncertainty At 95% Confidence Level \pm (%)
(k OHM)	(k OHM)		
0.600	0.600	0.000	0.12
3.000	3.000	0.000	0.06
5.400	5.400	0.000	0.03

RANGE : 0 - 60 k OHM

U.U.C. Reading	Standard Meter Rdg.	% Error Of Rdg.	Expanded Uncertainty At 95% Confidence Level \pm (%)
(k OHM)	(k OHM)		
6.00	6.00	0.000	0.10
29.99	30.00	-0.033	0.03
54.00	54.00	0.000	0.03

RANGE : 0 - 600 k OHM

U.U.C. Reading	Standard Meter Rdg.	% Error Of Rdg.	Expanded Uncertainty At 95% Confidence Level \pm (%)
(k OHM)	(k OHM)		
59.9	60.0	-0.167	0.14
299.9	300.0	-0.033	0.03
539.8	540.0	-0.037	0.08

RANGE : 0 - 6 MOHM

U.U.C. Reading	Standard Meter Rdg.	% Error Of Rdg.	Expanded Uncertainty At 95% Confidence Level \pm (%)
(M OHM)	(M OHM)		
0.601	0.600	0.167	0.12
2.996	3.000	-0.133	0.07
5.360	5.400	-0.741	0.03

RANGE : 0 - 60 MOHM

U.U.C. Reading	Standard Meter Rdg.	% Error Of Rdg.	Expanded Uncertainty At 95% Confidence Level \pm (%)
(M OHM)	(M OHM)		
5.98	6.00	-0.333	0.10
29.89	30.00	-0.367	0.28
53.29	54.00	-1.315	0.51

RANGE : 0 - 600 mV DC

U.U.C. Reading	Standard Meter Rdg.	% Error Of Rdg.	Expanded Uncertainty At 95% Confidence Level \pm (%)
(mV)	(mV)		
59.8	60.0	-0.333	0.10
299.9	300.0	-0.033	0.03
540.1	540.0	0.019	0.03

RANGE : 0 - 6V DC

U.U.C. Reading	Standard Meter Rdg.	% Error Of Rdg.	Expanded Uncertainty At 95% Confidence Level \pm (%)
(V)	(V)		
0.599	0.600	-0.167	0.10
2.999	3.000	-0.033	0.03
5.400	5.400	0.000	0.03


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RANGE : 0 - 60 V DC

U.U.C. Reading	Standard Meter Rdg.	% Error Of Rdg.	Expanded Uncertainty At 95% Confidence Level \pm (%)
(V)	(V)		
6.00	6.00	0.000	0.10
30.00	30.00	0.000	0.03
54.00	54.00	0.000	0.03

RANGE : 0 - 600 V DC

U.U.C. Reading	Standard Meter Rdg.	% Error Of Rdg.	Expanded Uncertainty At 95% Confidence Level \pm (%)
(V)	(V)		
59.9	60.0	-0.167	0.10
299.8	300.0	-0.067	0.03
539.8	540.0	-0.037	0.03

RANGE : 0 - 1000 V DC

U.U.C. Reading	Standard Meter Rdg.	% Error Of Rdg.	Expanded Uncertainty At 95% Confidence Level \pm (%)
(V)	(V)		
99.9	100.0	-0.100	0.06
499.8	500.0	-0.040	0.03
899	900	-0.111	0.07

RANGE : 0 - 600mV AC, 50Hz

U.U.C. Reading	Standard Meter Rdg.	% Error Of Rdg.	Expanded Uncertainty At 95% Confidence Level \pm (%)
(mV)	(mV)		
59.7	60.0	-0.500	0.13
299.5	300.0	-0.167	0.05
540.1	540.0	0.019	0.03

RANGE : 0 - 6 V AC, 50Hz

U.U.C. Reading	Standard Meter Rdg.	% Error Of Rdg.	Expanded Uncertainty At 95% Confidence Level \pm (%)
(V)	(V)		
0.599	0.600	-0.167	0.10
2.998	3.000	-0.067	0.03
5.398	5.400	-0.037	0.04

RANGE : 0 - 60 V AC, 50Hz

U.U.C. Reading	Standard Meter Rdg.	% Error Of Rdg.	Expanded Uncertainty At 95% Confidence Level \pm (%)
(V)	(V)		
5.97	6.00	-0.500	0.10
29.99	30.00	-0.033	0.04
54.00	54.00	0.000	0.07

RANGE : 0 - 600 V AC, 50Hz

U.U.C. Reading	Standard Meter Rdg.	% Error Of Rdg.	Expanded Uncertainty At 95% Confidence Level \pm (%)
(V)	(V)		
59.9	60.0	-0.167	0.12
299.8	300.0	-0.067	0.04
539.7	540.0	-0.056	0.02

RANGE : 0 - 750 V AC, 50Hz

U.U.C. Reading	Standard Meter Rdg.	% Error Of Rdg.	Expanded Uncertainty At 95% Confidence Level \pm (%)
(V)	(V)		
74.9	75.0	-0.133	0.10
374.8	375.0	-0.053	0.03
674	675	-0.148	0.09

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RANGE : 0 - 600 μ A DC			
U.U.C. Reading	Standard Meter Rdg.	% Error Of Rdg.	Expanded Uncertainty At 95% Confidence Level \pm (%)
(μ A)	(μ A)		
60.0	60.0	0.000	0.10
300.1	300.0	0.033	0.05
540.2	540.0	0.037	0.04

RANGE : 0 - 6000 μ A DC			
U.U.C. Reading	Standard Meter Rdg.	% Error Of Rdg.	Expanded Uncertainty At 95% Confidence Level \pm (%)
(μ A)	(μ A)		
600.1	600.0	0.017	0.04
3001	3000	0.033	0.05
5401	5400	0.019	0.04

RANGE : 0 - 60mA DC			
U.U.C. Reading	Standard Meter Rdg.	% Error Of Rdg.	Expanded Uncertainty At 95% Confidence Level \pm (%)
(mA)	(mA)		
5.98	6.00	-0.333	0.11
29.94	30.00	-0.200	0.03
53.91	54.00	-0.167	0.03

RANGE : 0 - 600mA DC			
U.U.C. Reading	Standard Meter Rdg.	% Error Of Rdg.	Expanded Uncertainty At 95% Confidence Level \pm (%)
(mA)	(mA)		
59.8	60.0	-0.333	0.10
299.6	300.0	-0.133	0.03
540.1	540.0	0.019	0.03

RANGE : 0 - 10A DC			
U.U.C. Reading	Standard Meter Rdg.	% Error Of Rdg.	Expanded Uncertainty At 95% Confidence Level \pm (%)
(A)	(A)		
0.996	1.000	-0.400	0.06
5.004	5.000	0.080	0.03
9.06	9.00	0.667	0.07

RANGE : 0 - 600 μ A AC, 50Hz			
U.U.C. Reading	Standard Meter Rdg.	% Error Of Rdg.	Expanded Uncertainty At 95% Confidence Level \pm (%)
(μ A)	(μ A)		
99.9	100.0	-0.100	0.69
299.9	300.0	-0.033	0.48
540.1	540.0	0.019	0.48

RANGE : 0 - 6000 μ A AC, 50Hz			
U.U.C. Reading	Standard Meter Rdg.	% Error Of Rdg.	Expanded Uncertainty At 95% Confidence Level \pm (%)
(μ A)	(μ A)		
600.0	600.0	0.000	0.48
3000	3000	0.000	0.48
5401	5400	0.019	0.48

RANGE : 0 - 60mA AC, 50Hz			
U.U.C. Reading	Standard Meter Rdg.	% Error Of Rdg.	Expanded Uncertainty At 95% Confidence Level \pm (%)
(mA)	(mA)		
5.98	6.00	-0.333	0.10
29.94	30.00	-0.200	0.04
53.91	54.00	-0.167	0.04

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RANGE : 0 - 600mA AC, 50Hz			
U.U.C. Reading	Standard Meter Rdg.	% Error Of Rdg.	Expanded Uncertainty At 95% Confidence Level \pm (%)
(mA)	(mA)		
59.8	60.0	-0.333	0.10
299.6	300.0	-0.133	0.04
539.9	540.0	-0.019	0.04

RANGE : 0 - 10A AC, 50Hz			
U.U.C. Reading	Standard Meter Rdg.	% Error Of Rdg.	Expanded Uncertainty At 95% Confidence Level \pm (%)
(A)	(A)		
0.995	1.000	-0.500	0.07
5.014	5.000	0.280	0.04
9.12	9.00	1.333	0.07

RANGE : 0 - 10nF			
U.U.C. Reading	Standard Meter Rdg.	% Error Of Rdg.	Expanded Uncertainty At 95% Confidence Level \pm (%)
(nF)	(nF)		
1.010	1.000	1.000	2.08
5.024	5.000	0.480	2.08
9.032	9.000	0.356	2.08

RANGE : 0 - 100nF			
U.U.C. Reading	Standard Meter Rdg.	% Error Of Rdg.	Expanded Uncertainty At 95% Confidence Level \pm (%)
(nF)	(nF)		
10.04	10.00	0.400	2.08
50.03	50.00	0.060	2.08
90.03	90.00	0.033	2.08


RANGE : 0 - 1000nF			
U.U.C. Reading	Standard Meter Rdg.	% Error Of Rdg.	Expanded Uncertainty At 95% Confidence Level \pm (%)
(nF)	(nF)		
100.0	100.0	0.000	2.08
501.0	500.0	0.200	2.08
901.9	900.0	0.211	2.08

RANGE : 0 - 10 μ F			
U.U.C. Reading	Standard Meter Rdg.	% Error Of Rdg.	Expanded Uncertainty At 95% Confidence Level \pm (%)
(μ F)	(μ F)		
0.997	1.000	-0.300	2.08
4.994	5.000	-0.120	0.77
8.989	9.000	-0.122	0.77

RANGE : 0 - 100 μ F			
U.U.C. Reading	Standard Meter Rdg.	% Error Of Rdg.	Expanded Uncertainty At 95% Confidence Level \pm (%)
(μ F)	(μ F)		
9.99	10.00	-0.100	0.77
49.78	50.00	-0.440	0.77
89.57	90.00	-0.478	0.77

RANGE : 0 - 1000 μ F			
U.U.C. Reading	Standard Meter Rdg.	% Error Of Rdg.	Expanded Uncertainty At 95% Confidence Level \pm (%)
(μ F)	(μ F)		
99.52	100.00	-0.480	0.77
497.8	500.0	-0.440	1.40
895.4	900.0	-0.511	1.40

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RANGE : 0 - 10mF			
U.U.C. Reading	Standard Meter Rdg.	% Error Of Rdg.	Expanded Uncertainty At 95% Confidence Level \pm (%)
(mF)	(mF)		
1.011	1.000	1.100	1.79

RANGE : 0 - 100Hz			
U.U.C. Reading	Standard Meter Rdg.	% Error Of Rdg.	Expanded Uncertainty At 95% Confidence Level \pm (%)
(Hz)	(Hz)		
10.00	10.00	-0.010	0.06
49.99	50.00	-0.020	0.01
89.99	90.00	-0.011	0.01

RANGE : 0 - 1000Hz			
U.U.C. Reading	Standard Meter Rdg.	% Error Of Rdg.	Expanded Uncertainty At 95% Confidence Level \pm (%)
(Hz)	(Hz)		
99.99	100.0	-0.010	0.01
499.9	500.0	-0.020	0.01
899.9	900.0	-0.011	0.01

RANGE : 0 - 10kHz			
U.U.C. Reading	Standard Meter Rdg.	% Error Of Rdg.	Expanded Uncertainty At 95% Confidence Level \pm (%)
(Hz)	(kHz)		
999.9	1.000	-0.010	0.01
4.999k	5.000	-0.020	0.01
8.999k	9.000	-0.011	0.01

RANGE : 0 - 100kHz			
U.U.C. Reading	Standard Meter Rdg.	% Error Of Rdg.	Expanded Uncertainty At 95% Confidence Level \pm (%)
(kHz)	(kHz)		
9.999	10.000	-0.010	0.01
49.99	50.00	-0.020	0.01
89.99	90.00	-0.011	0.01

RANGE : 0 - 1000kHz			
U.U.C. Reading	Standard Meter Rdg.	% Error Of Rdg.	Expanded Uncertainty At 95% Confidence Level \pm (%)
(kHz)	(kHz)		
100.0	100.0	0.000	0.01
499.9	500.0	-0.010	0.01
899.9	900.0	-0.020	0.01

RANGE : 0 - 10MHz			
U.U.C. Reading	Standard Meter Rdg.	% Error Of Rdg.	Expanded Uncertainty At 95% Confidence Level \pm (%)
(Hz)	(MHz)		
999.9 k	1.000	-0.010	0.01


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- NOTE:**
- Standard used for calibration was calibrated with reference standard traceable to NPL, New Delhi vide report no. CALCERT-3879 Dated 26.07.2018 & CC/ECL/0971/18-19 Dated 23.08.2018 valid for one year.
 - The reported expanded uncertainty in measurement is stated as the standard uncertainty in measurement multiplied by the coverage factor $k=2$, which for a normal distribution corresponds to a coverage probability of approximately 95%.
 - Accuracy class of the U.U.C. was not specified by customer.
 - U.U.C.: Unit Under Calibration.
 - Calibration was carried out as requested by customer.
 - Frequency range 0-10Hz not calibrated due to limitation of standard.
 - AC Current range calibrated from $100\mu A$, Capacitance range calibrated upto 1mF & Frequency range calibrated upto 1MHz due to limitation of standard.
 - A sticker indicating "CALIBRATION STATUS" as given below has been fixed on the U.U.C.

Mfg. Spec.	<input checked="" type="checkbox"/>	User Spec.	<input type="checkbox"/>	Full Cal.	<input type="checkbox"/>
Partial Cali.	<input checked="" type="checkbox"/>	Within Cal.	<input type="checkbox"/>	Out of Spec.	<input type="checkbox"/>
Use Cal. Value	<input checked="" type="checkbox"/>				


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