

TEST REPORT

24 JAN 2017



Field: Electrical Testing
Work Order No. : WO/ETL/157/16-17
Date : 23.12.2016

Test Report No. : TR/ETL/229/16-17
Date of Testing : 27.12.2016 to 17.01.2017
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Test Item : AC Digital Tong Tester / Clamp on True RMS Power Meter

Tested for : M/s. Meco Meters Pvt. Ltd.

Plot No. EL-60, MIDC Electronic Zone, TTC Industrial Area, Mahape, Navi Mumbai - 400 710,
Maharashtra, India

Tested at : IDEMI MUMBAI

Specification of Equipment Under Test	Specification of Standards/ Equipments Used
Manufacturer : M/s. Meco Meters Pvt. Ltd. Condition of Item on receipt : Good Range /Rating / Size : 0-600V AC/DC, 0-1000A AC Model No.: 3510PHW Sr. No: 151100076, 151100077, 151100078	Refer page 2 for std. equipment used. Traceability: Standard use are traceable to National / International Standards

Ambient Conditions :

Temperature : 15°C to 35°C

Relative Humidity : < 75%

Remarks : Please refer page 2 to 33 for Test Results.

- 1) Procedure of Test : The above mentioned item is tested for **type testing as per IS 13875 (Part 1) 1993 & customer's requirements.**

C.M.PATIL
ASS. DIRECTOR
AUTHORISED SIGNATORY

(Note : This report refers only to the particular item(s) submitted for testing. The report should not be reproduced except in full without the prior permission from the Principal Director IDEMI, Mumbai - 400 022)

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Standards/Equipment used:

Equipment	Sr. No.	Model	Calibration Validity
Multifunction Calibrator	1154010	5520A	Dec 2017
6 ½ True RMS Multimeter	MY53004547	34401A	March 2017
LXI Data acquisition/ Switch Unit	MY49027748	34972A	July 2017
Safety Analyzer	10112754	Guardian 6100+	Dec 2017
Environmental Chamber	10772	ETC 1000	May 2017
External Magnetic Field Coil	001	IDEMI-MC-01	Dec 2017
Wooden wedge	--	--	June 2017
Vibration Test System Digital Vibration Controller With PCB Charge Accelerometer	SEV 360, SPARK USB	10652 28580	March 2018


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Summary of Tests

Tests	Standard	Result
Insulation Resistance Test	IS 13875 (Part 1) 1993	Complied
High Voltage Test	IS 13875 (Part 1) 1993	Complied
Intrinsic Error Test	IS 13875 (Part 1) 1993	Complied
Variation due to ambient temperature	IS 13875 (Part 1) 1993	Complied
Variation due to humidity	IS 13875 (Part 1) 1993	Complied
Variation due to distortion of AC measured quantity	-	Complied
Variation due to magnetic field of external origin	IS 13875 (Part 1) 1993	Complied
Variation due to position	IS 13875 (Part 1) 1993	Complied
Self Heating Test	IS 13875 (Part 1) 1993	Complied
Temperature Cycling Test	-	Complied
Vibration Test	IS 13875 (Part 1) 1993	Complied
Shock Test	IS 13875 (Part 1) 1993	Complied
& tested as per customer requirements.		

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1. INSULATION RESISTANCE TEST

a. Test condition:

A test voltage of 500V DC is applied between following point for 1 minute.
- All terminals shorted together & body.

b. Requirement :

Insulation resistance > 5 MΩ

c. Observation:

Sr. No.	Measured Insulation Resistance
151100076	> 50 GΩ
151100077	> 50 GΩ
151100078	> 50 GΩ

Measurement before Insulation Resistance Test:

Sr. No.	Standard Meter Reading	Span		EUT		
		Min.	Max	151100076	151100077	151100078
1	5.00A	4.70	5.30	4.93 A	5.05 A	4.94 A
	400.0A	390	410.0	399.6 A	401.2 A	400.1 A
	975.0A	953.5	996.5	975.4 A	978.6 A	977.0 A
2	20.00V AC	19.6	20.40	20.00 V AC	20.06 V AC	19.99 V AC
	600.0V AC	592.0	608.0	598.2 V AC	598.9 V AC	599.0 V AC
	20.00V DC	19.6	20.40	20.03 V DC	20.10 V DC	20.03 V DC
	600.0V DC	592.0	608.0	599.5 V DC	599.9 V DC	599.8 V DC
3	2.0KW(200V,10A UPF)	1.96	2.04	1.99 KW	2.00 kW	1.98 kW
	480.0KW (480V, 1000A UPF)	470.4	489.6	479.9 kW	480.9 kW	480.1 kW
	585.0KW (600V, 975.0A UPF)	573.3	596.7	584.2 kW	586.2 kW	584.8 kW
	2.68HP (200V,10A UPF)	2.63	2.73	2.66 HP	2.69 HP	2.65 HP
	643.4 HP (480V, 1000A UPF)	630.5	656.3	643.5 HP	645.0 HP	643.5 HP
	784.1HP(600V, 975.0A UPF)	768.4	799.8	783.7 HP	786.1 HP	784.2 HP


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Sr. No.	Standard Meter Reading	Span		EUT		
		Min.	Max	151100076	151100077	151100078
4	500 Ohms	495.0	505.0	500.0 Ω	500.1 Ω	500.0 Ω
	500 KOhms	494.0	506.0	500.0 K Ω	499.8 K Ω	500.2 K Ω
	1.0MOhms	0.98	1.02	0.997 M Ω	0.998 M Ω	0.997 M Ω
5	0.5 Lag (100V,50A)	0.454	0.545	0.510	0.513	0.515
	UNITY(100V,50A)	0.999	0.999	0.999	0.999	0.999
	0.5 Lead (100V,50A)	0.454	0.545	0.478	0.489	0.483

Measurement after Insulation Resistance Test:

Sr. No.	Standard Meter Reading	Span		EUT		
		Min.	Max	151100076	151100077	151100078
1	5.00A	4.70	5.30	4.99 A	5.03 A	4.94 A
	400.0A	390	410.0	399.8 A	401.0 A	399.9 A
	975.0A	953.5	996.5	975.4 A	978.6 A	975.4 A
2	20.00V AC	19.6	20.40	20.00 V AC	20.06 V AC	19.99 V AC
	600.0V AC	592.0	608.0	598.1 V AC	598.9 V AC	599.0 V AC
	20.00V DC	19.6	20.40	20.03 V DC	20.10 V DC	20.03 V DC
	600.0V DC	592.0	608.0	599.4 V DC	599.9 V DC	599.7 V DC
3	2.0KW(200V,10A UPF)	1.96	2.04	1.99 kW	2.00 kW	1.98 kW
	480.0KW (480V, 1000A UPF)	470.4	489.6	478.6 kW	480.2 kW	479.1 kW
	585.0KW (600V, 975.0A UPF)	573.3	596.7	583.2 kW	585.6 kW	583.5 kW
	2.68HP (200V,10A UPF)	2.63	2.73	2.66 HP	2.68 HP	2.65 HP
	643.4 HP (480V, 1000A UPF)	630.5	656.3	641.8 HP	643.9 HP	642.4 HP
	784.1HP(600V, 975.0A UPF)	768.4	799.8	781.9 HP	785.1 HP	782.4 HP
4	500 Ohms	495.0	505.0	500.0 Ω	500.1 Ω	500.0 Ω
	500 KOhms	494.0	506.0	500.0 K Ω	499.8 K Ω	500.1 K Ω
	1.0MOhms	0.98	1.02	0.997 M Ω	0.984 M Ω	0.997 M Ω
5	0.5 Lag (100V,50A)	0.454	0.545	0.513	0.515	0.513
	UNITY(100V,50A)	0.999	0.999	0.999	0.999	0.999
	0.5 Lead (100V,50A)	0.454	0.545	0.490	0.480	0.483

d. Result: Complied

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2. HIGH VOLTAGE TEST:

a. Test Condition

AC 2.5 kV, 50 Hz RMS applied for 1 min. between following groups

- All terminals shorted together and foil wrapped on body/enclosure of EUT.

b. Requirement:

During dielectric test, no breakdown or flashover shall occur.

c. Observation:

Sr. No.	Observation
151100076	No flashover or breakdown was observed during & after the Test.
151100077	
151100078	

Measurement before High Voltage Test:

Sr. No.	Standard Meter Reading	Span		EUT		
		Min.	Max	151100076	151100077	151100078
1	5.00A	4.70	5.30	4.98 A	5.03 A	4.95 A
	400.0A	390	410.0	399.8 A	401.0 A	399.9 A
	975.0A	953.5	996.5	975.4 A	978.6 A	975.4 A
2	20.00V AC	19.6	20.40	20.00 V AC	20.06 V AC	19.99 V AC
	600.0V AC	592.0	608.0	598.1 V AC	598.9 V AC	599.0 V AC
	20.00V DC	19.6	20.40	20.03 V DC	20.10 V DC	20.03 V DC
	600.0V DC	592.0	608.0	599.4 V DC	599.9 V DC	599.7 V DC
3	2.0KW(200V,10A UPF)	1.96	2.04	1.99 kW	2.00 kW	1.98 kW
	480.0KW (480V, 1000A UPF)	470.4	489.6	478.6 kW	480.2 kW	479.1 kW
	585.0KW (600V, 975.0A UPF)	573.3	596.7	583.2 kW	585.6 kW	583.5 kW
	2.68HP (200V,10A UPF)	2.63	2.73	2.66 HP	2.68 HP	2.65 HP
	643.4 HP (480V, 1000A UPF)	630.5	656.3	641.8 HP	643.9 HP	642.4 HP
	784.1HP(600V, 975.0A UPF)	768.4	799.8	781.9 HP	785.1 HP	782.4 HP

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Sr. No.	Standard Meter Reading	Span		EUT		
		Min.	Max	151100076	151100077	151100078
4	500 Ohms	495.0	505.0	500.0 Ω	500.1 Ω	500.0 Ω
	500 KOhms	494.0	506.0	500.0 k Ω	499.8 Ω	500.1 Ω
	1.0MOhms	0.98	1.02	0.997 M Ω	0.984 M Ω	0.997 M Ω
5	0.5 Lag (100V,50A)	0.454	0.545	0.513	0.515	0.513
	UNITY(100V,50A)	0.999	0.999	0.999	0.999	0.999
	0.5 Lead (100V,50A)	0.454	0.545	0.490	0.480	0.483

Measurement after High Voltage Test:

Sr. No.	Standard Meter Reading	Span		EUT		
		Min.	Max	151100076	151100077	151100078
1	5.00A	4.70	5.30	4.98 A	5.03 A	4.96 A
	400.0A	390	410.0	399.8 A	401.6 A	399.7 A
	975.0A	953.5	996.5	975.2 A	976.1 A	977.2 A
2	20.00V AC	19.6	20.40	20.01 V AC	20.06 V AC	19.99 V AC
	600.0V AC	592.0	608.0	598.1 V AC	598.9 V AC	598.9 V AC
	20.00V DC	19.6	20.40	20.04 V DC	20.10 V DC	20.03 V DC
	600.0V DC	592.0	608.0	599.5 DC	600.0 V DC	599.8 V DC
3	2.0KW(200V,10A UPF)	1.96	2.04	1.98 KW	2.00 KW	1.98 KW
	480.0KW (480V, 1000A UPF)	470.4	489.6	476.4 KW	481.2 KW	479.5 KW
	585.0KW (600V, 975.0A UPF)	573.3	596.7	580.5KW	584.2 KW	584.1KW
	2.68HP (200V,10A UPF)	2.63	2.73	2.65 HP	2.68 HP	2.65 HP
	643.4 HP (480V, 1000A UPF)	630.5	656.3	639.0 HP	645.3 HP	642.7 HP
	784.1HP(600V, 975.0A UPF)	768.4	799.8	778.5 HP	783.5 HP	783.1 HP
4	500 Ohms	495.0	505.0	500.0 Ω	500.1 Ω	500.0 Ω
	500 KOhms	494.0	506.0	500.3 k Ω	500.0 k Ω	500.3 k Ω
	1.0MOhms	0.98	1.02	0.997 M Ω	0.998 M Ω	0.997 M Ω
5	0.5 Lag (100V,50A)	0.454	0.545	0.518	0.518	0.519
	UNITY(100V,50A)	0.999	0.999	0.999	0.999	0.999
	0.5 Lead (100V,50A)	0.454	0.545	0.477	0.477	0.477

d. Result: Complied.

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3. INTRINSIC ERROR

Sr. No.	Parameters	Accuracy	Standard Meter Reading	EUT		
				151100076	151100077	151100078
1.	Voltage range (0-600V AC)	$\pm (1.0\% \text{ rgd} + 20\text{dgt})$	540 V	538.5 V	539.2 V	539.3 V
			480 V	478.9 V	479.5 V	479.4 V
			420 V	419.2 V	419.8 V	419.6 V
			360 V	359.4 V	360.0 V	359.8 V
			300 V	299.6 V	300.2 V	299.8 V
			240 V	239.9 V	240.3 V	239.9 V
			180 V	179.9 V	180.3 V	179.9 V
			120 V	119.9 V	120.3 V	119.8 V
			60 V	59.88 V	60.02 V	59.93 V
2.	Voltage range (0-600V DC)	$\pm (1.0\% \text{ rgd} + 20\text{dgt})$	540 V	539.6 V	540.0 V	539.9 V
			480 V	479.7 V	480.2 V	480.0 V
			420 V	419.8 V	420.3 V	420.1 V
			360 V	360.0 V	360.4 V	360.2 V
			300 V	300.0 V	300.5 V	300.2 V
			240 V	240.0 V	240.5 V	240.1 V
			180 V	180.1 V	180.6 V	180.1 V
			120 V	120.0 V	120.5 V	120.0 V
			60 V	60 V	60.14 V	60.03 V
3.	Current range (0-1000A AC)	$\pm (2\% \text{ rgd} + 20\text{dgt})$	900 A	899.8 A	903.8 A	900.7 A
			600 A	599.5 A	602.0 A	600.4 A
			300 A	299.0 A	300.9 A	299.3 A
			100 A	99.30 A	100.3 A	99.20 A
			80 A	79.83 A	80.02 A	80.03 A
			60 A	59.94 A	60.28 A	59.93 A
			40 A	39.97 A	40.19 A	39.99 A
			20 A	20.02 A	20.13 A	20.03 A
			10 A	9.98 A	10.06 A	9.97 A
			5 A	4.96 A	5.05 A	4.94 A

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Sr. No.	Parameters	Accuracy	Standard Meter Reading	EUT		
				151100076	151100077	151100078
4.	Active power (10W to 600.0kW)	±2% rdg	540 kW	537.3 KW	539.9 KW	538.8 KW
			480 kW	477.5 KW	480.6 KW	478.8 KW
			420 kW	418.0 KW	420.4 KW	419.1 KW
			360 kW	358.5 KW	360.3 KW	359.5 KW
			300 kW	298.4 KW	300.3 KW	299.2 KW
			240 kW	238.6 KW	240.0 KW	239.0 KW
			180 kW	178.7 KW	179.7 KW	179.1 KW
			120 kW	119.1 KW	119.7 KW	119.4 KW
			60 W	59.6 W	60.3 W	59.8 W
5.	Active power (10HP to 800.0HP)	±2% rdg	724.15 HP	720.2 HP	724.0 HP	722.5 HP
			643.69 HP	640.3 HP	644.5 HP	642.0 HP
			563.23 HP	560.5 HP	563.7 HP	562.0 HP
			482.77 HP	480.7 HP	483.1 HP	482.1 HP
			402.77 HP	400.1 HP	402.7 HP	401.2 HP
			321.84 HP	319.7 HP	321.8 HP	320.5 HP
			241.38 HP	239.6 HP	240.9 HP	240.1 HP
			160.92 HP	159.7 HP	160.5 HP	159.9 HP
			80.46 HP	79.9 HP	80.8 HP	80.1 HP
6.	Reactive power (10kVA to 600.0kVA)	±3% rdg	540 kVA	537.3	540.2	539.0
			480 kVA	477.5	480.7	478.8
			420 kVA	418.0	420.7	419.5
			360 kVA	358.6	360.4	359.6
			300 kVA	298.5	300.4	299.2
			240 kVA	238.5	240.0	239.1
			180 kVA	178.8	179.8	179.2
			120 kVA	119.2	119.8	119.4
			60 KVA	59.7	60.4	59.9
7.	Power Factor	--	0.5 Lead	0.490	0.481	0.483
			0.8 Lead	0.860	0.854	0.860
			Unity	0.999	0.999	0.999
			0.8 Lag	0.874	0.854	0.860
			0.5 Lag	0.515	0.513	0.513

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Sr. No.	Parameters	Accuracy	Standard Meter Reading	EUT		
				151100076	151100077	151100078
8.	Resistance (400Ω to 999.9Ω)	± (1.0% rgd + 10dgt)	500 kΩ	500.0	499.8	500.1
			100 kΩ	99.9	99.9	100.0
			10 kΩ	9.99	10.01	10.00
			5 kΩ	5.001	5.002	5.000
			1 kΩ	1.000Ω	1.000	1.000
			500 Ω	500.0 Ω	500.1 Ω	500.0 Ω
9.	Resistance (9.999MΩ to 99.99MΩ)	± (1.0% rgd + 20dgt)	10MΩ	9.88 MΩ	9.98 MΩ	9.98 MΩ
			5MΩ	4.926 MΩ	4.994 MΩ	4.992 MΩ
			1MΩ	0.984 MΩ	0.998 MΩ	0.997 MΩ
10.	Micro Amps range (100 μA to 1000 μA)	± (1.0% rgd + 20dgt)	900 μA	898.5 μA	897.2 μA	900.3 μA
			800 μA	798.8 μA	798.0 μA	800.7 μA
			700 μA	699.8 μA	699.0 μA	701.0 μA
			600 μA	600.2 μA	599.5 μA	601.3 μA
			500 μA	500.5 μA	500.0 μA	501.3 μA
			400 μA	400.6 μA	400.2 μA	401.3 μA
			300 μA	300.6 μA	300.3 μA	301.0 μA
			200 μA	200.1 μA	199.9 μA	200.5 μA
			100 μA	100.2 μA	100.3 μA	100.7 μA

Requirement:

Intrinsic error should be within limits mentioned above.

Result:

Complied

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ELECTRICAL TESTING LABORATORY

Sr. No: 151100076, 151100077, 151100078
Date of Testing : 27.12.2016 to 17.01.2017

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4. VARIATION DUE TO AMBIENT TEMPERATURE

a. Test condition

- Take the error value (B_R) at 90 % of the full scale value.
- Subject the EUT at 37 °C for 2 hrs & check the error (B_{x1}) at 90% of the full scale value.
- Subject the EUT at 17 °C for 2 hrs & check the error (B_{x2}) at 90 % of the full scale value.
- Calculate the difference between B_x and B_R .

b. Requirement

Variation shall not exceed specified limits.

c. Observation

Measurement before Test (B_R):

Sr. No.	Standard Meter Reading	Span		EUT		
		Min.	Max	151100076	151100077	151100078
1	5.00A	4.70	5.30	4.97 A	5.05 A	4.96 A
	400.0A	390	410.0	399.7 A	401.3 A	399.6 A
	975.0A	953.5	996.5	975.6 A	976.2 A	977.4 A
2	20.00V AC	19.6	20.40	20.05 V AC	20.07 V AC	19.98 V AC
	600.0V AC	592.0	608.0	598.3 V AC	598.8 V AC	598.7 V AC
	20.00V DC	19.6	20.40	20.06 V DC	20.12 V DC	20.05 V DC
	600.0V DC	592.0	608.0	599.7 DC	600.0 V DC	599.6 V DC
3	2.0KW(200V,10A UPF)	1.96	2.04	1.97 KW	2.00 KW	1.98 KW
	480.0KW (480V, 1000A UPF)	470.4	489.6	476.2 KW	481.4 KW	479.7 KW
	585.0KW (600V, 975.0A UPF)	573.3	596.7	580.6KW	584.3 KW	584.4KW
	2.68HP (200V,10A UPF)	2.63	2.73	2.62 HP	2.65 HP	2.69 HP
	643.4 HP (480V, 1000A UPF)	630.5	656.3	639.0 HP	645.4 HP	642.8 HP
	784.1HP(600V, 975.0A UPF)	768.4	799.8	778.5 HP	783.5 HP	783.1 HP

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Sr. No.	Standard Meter Reading	Span		EUT		
		Min.	Max	151100076	151100077	151100078
4	500 Ohms	495.0	505.0	500.2 Ω	500.1 Ω	500.0 Ω
	500 KOhms	494.0	506.0	500.4 K Ω	500.0 K Ω	500.2 K Ω
	1.0MOhms	0.98	1.02	0.998 M Ω	0.999 M Ω	0.999 M Ω
5	0.5 Lag (100V,50A)	0.454	0.545	0.518	0.518	0.519
	UNITY(100V,50A)	0.999	0.999	0.999	0.999	0.999
	0.5 Lead (100V,50A)	0.454	0.545	0.476	0.477	0.476

Measurement after 37°C @ 2 hours (B_{x1}):

Sr. No.	Standard Meter Reading	Span		EUT		
		Min.	Max	151100076	151100077	151100078
1	5.00A	4.70	5.30	4.96 A	5.05 A	4.94 A
	400.0A	390	410.0	399.8 A	402.0 A	399.5 A
	975.0A	953.5	996.5	973.2 A	977.2 A	975.6 A
2	20.00V AC	19.6	20.40	20.00 V AC	20.06 V AC	19.98 V AC
	600.0V AC	592.0	608.0	597.8 V AC	598.6 V AC	598.4 V AC
	20.00V DC	19.6	20.40	20.04 V DC	20.10 V DC	20.02 V DC
	600.0V DC	592.0	608.0	599.1 V DC	599.7 V DC	599.3 V DC
3	2.0KW(200V,10A UPF)	1.96	2.04	1.98 KW	2.00 KW	1.98 KW
	480.0KW (480V, 1000A UPF)	470.4	489.6	477.1 KW	479.6 KW	478.6 KW
	585.0KW (600V, 975.0A UPF)	573.3	596.7	581.6 KW	585.4 KW	583.7 KW
	2.68HP (200V,10A UPF)	2.63	2.73	2.65 HP	2.68 HP	2.65 HP
	643.4 HP (480V, 1000A UPF)	630.5	656.3	639.9 HP	643.1 HP	641.9 HP
	784.1HP(600V, 975.0A UPF)	768.4	799.8	779.9 HP	785.0 HP	782.7 HP
4	500 Ohms	495.0	505.0	500.0 Ω	500.2 Ω	500.0 Ω
	500 KOhms	494.0	506.0	499.8 K Ω	499.8 K Ω	500.1 K Ω
	1.0MOhms	0.98	1.02	0.997 M Ω	0.999 M Ω	0.998 M Ω
5	0.5 Lag (100V,50A)	0.454	0.545	0.475	0.492	0.47
	UNITY(100V,50A)	0.999	0.999	0.999	0.999	0.999
	0.5 Lead (100V,50A)	0.454	0.545	0.475	0.492	0.478

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ELECTRICAL TESTING LABORATORY

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Measurement after 17°C @ 2 hours (B_{x2}):

Sr. No.	Standard Meter Reading	Span		EUT		
		Min.	Max	151100076	151100077	151100078
1	5.00A	4.70	5.30	4.98A	5.05 A	4.94 A
	400.0A	390	410.0	400.2 A	400.4 A	399.5 A
	975.0A	953.5	996.5	975.2 A	979.2 A	976.8 A
2	20.00V AC	19.6	20.40	20.01 V AC	20.06 V AC	19.99 V AC
	600.0V AC	592.0	608.0	598.3 V AC	598.9 V AC	598.9 V AC
	20.00V DC	19.6	20.40	20.03 V DC	20.10 V DC	20.03 V DC
	600.0V DC	592.0	608.0	599.5 V DC	600.0 V DC	599.9 V DC
3	2.0KW(200V,10A UPF)	1.96	2.04	1.99 KW	2.00 KW	1.98 KW
	480.0KW (480V, 1000A UPF)	470.4	489.6	479.1 KW	480.2 KW	480.2 KW
	585.0KW (600V, 975.0A UPF)	573.3	596.7	583.7 KW	584.6 KW	584.2 KW
	2.68HP (200V,10A UPF)	2.63	2.73	2.66 HP	2.68 HP	2.65 HP
	643.4 HP (480V, 1000A UPF)	630.5	656.3	642.2 HP	643.9 HP	643.8 HP
	784.1HP(600V, 975.0A UPF)	768.4	799.8	782.6 HP	783.9 HP	783.1 HP
4	500 Ohms	495.0	505.0	500.0 Ω	500.0 Ω	500 Ω
	500 KOhms	494.0	506.0	500.0 K Ω	499.8 K Ω	500.2 K Ω
	1.0MOhms	0.98	1.02	0.997 M Ω	0.999 M Ω	0.997 M Ω
5	0.5 Lag (100V,50A)	0.454	0.545	0.516	0.516	0.513
	UNITY(100V,50A)	0.999	0.999	0.999	0.999	0.999
	0.5 Lead (100V,50A)	0.454	0.545	0.481	0.481	0.486

The above measured difference between B_{x1} and B_R , B_{x2} and B_R was calculated & found within limits.

d. **Result:** Complied.


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5. VARIATION DUE TO HUMIDITY

a. Test condition

- Take the error value (B_R) at 90 % of the full scale value.
- Subject the EUT at 25% RH for 2 hrs & check the error (B_{x1}) at 90% of the full scale value.
- Subject the EUT at 80% RH for 2 hrs & check the error (B_{x2}) at 90 % of the full scale value.
- Calculate the difference between B_x and B_R .

b. Requirement

Variation shall not exceed specified limits.

c. Observation

Measurement before Test (B_R):

Sr. No.	Standard Meter Reading	Span		EUT		
		Min.	Max	151100076	151100077	151100078
1	5.00A	4.70	5.30	4.98A	5.05 A	4.94 A
	400.0A	390	410.0	400.2 A	400.4 A	399.5 A
	975.0A	953.5	996.5	975.2 A	979.2 A	976.8 A
2	20.00V AC	19.6	20.40	20.01 V AC	20.06 V AC	19.99 V AC
	600.0V AC	592.0	608.0	598.4 V AC	598.7 V AC	598.9 V AC
	20.00V DC	19.6	20.40	20.03 V DC	20.10 V DC	20.03 V DC
	600.0V DC	592.0	608.0	599.5 V DC	600.0 V DC	599.9 V DC
3	2.0KW (200V, 10A UPF)	1.96	2.04	1.99 KW	2.00 KW	1.98 KW
	480.0KW (480V, 1000A UPF)	470.4	489.6	479.1 KW	480.2 KW	480.2 KW
	585.0KW (600V, 975.0A UPF)	573.3	596.7	583.7 KW	584.6 KW	584.2 KW
	2.68HP (200V, 10A UPF)	2.63	2.73	2.66 HP	2.68 HP	2.65 HP
	643.4 HP (480V, 1000A UPF)	630.5	656.3	642.5 HP	643.7 HP	643.8 HP
	784.1HP (600V, 975.0A UPF)	768.4	799.8	778.6 HP	783.4 HP	783.3 HP

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Sr. No.	Standard Meter Reading	Span		EUT		
		Min.	Max	151100076	151100077	151100078
4	500 Ohms	495.0	505.0	500.1 Ω	500.1 Ω	500.0 Ω
	500 KOhms	494.0	506.0	500.3 K Ω	500.0 K Ω	500.2 K Ω
	1.0MOhms	0.98	1.02	0.998 M Ω	0.998 M Ω	0.997 M Ω
5	0.5 Lag (100V,50A)	0.454	0.545	0.518	0.517	0.519
	UNITY(100V,50A)	0.999	0.999	0.999	0.999	0.999
	0.5 Lead (100V,50A)	0.454	0.545	0.477	0.477	0.477

Measurement after 25% RH @ 2 hours (B_{x1}):

Sr. No.	Standard Meter Reading	Span		EUT		
		Min.	Max	151100076	151100077	151100078
1	5.00A	4.70	5.30	4.97 A	5.04 A	4.96 A
	400.0A	390	410.0	400.2 A	400.4 A	399.5 A
	975.0A	953.5	996.5	975.4 A	979.3 A	976.7 A
2	20.00V AC	19.6	20.40	20.02 V AC	20.05 V AC	19.98 V AC
	600.0V AC	592.0	608.0	598.2 V AC	598.5 V AC	598.8 V AC
	20.00V DC	19.6	20.40	20.03 V DC	20.10 V DC	20.03 V DC
	600.0V DC	592.0	608.0	599.5 V DC	600.0 V DC	599.9 V DC
3	2.0KW(200V,10A UPF)	1.96	2.04	1.97 KW	2.00 KW	1.98 KW
	480.0KW (480V, 1000A UPF)	470.4	489.6	479.2 KW	480.4 KW	480.2 KW
	585.0KW (600V, 975.0A UPF)	573.3	596.7	583.7 KW	584.6 KW	584.2 KW
	2.68HP (200V,10A UPF)	2.63	2.73	2.66 HP	2.68 HP	2.64 HP
	643.4 HP (480V, 1000A UPF)	630.5	656.3	642.5 HP	643.6 HP	643.9 HP
	784.1HP(600V, 975.0A UPF)	768.4	799.8	778.6 HP	783.5 HP	783.7 HP
4	500 Ohms	495.0	505.0	500.2 Ω	500.1 Ω	500.0 Ω
	500 KOhms	494.0	506.0	500.3 K Ω	500.0 K Ω	500.2 K Ω
	1.0MOhms	0.98	1.02	0.997 M Ω	0.999 M Ω	0.998 M Ω
5	0.5 Lag (100V,50A)	0.454	0.545	0.518	0.516	0.519
	UNITY(100V,50A)	0.999	0.999	0.999	0.999	0.999
	0.5 Lead (100V,50A)	0.454	0.545	0.478	0.477	0.477

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Measurement after 80% RH @ 2 hours (B_{x2}):

Sr. No.	Standard Meter Reading	Span		EUT		
		Min.	Max	151100076	151100077	151100078
1	5.00A	4.70	5.30	4.98 A	5.03 A	4.96 A
	400.0A	390	410.0	399.8 A	401.6 A	399.6 A
	975.0A	953.5	996.5	975.3 A	976.1 A	977.2 A
2	20.00V AC	19.6	20.40	20.01 V AC	20.06 V AC	19.98 V AC
	600.0V AC	592.0	608.0	598.1 V AC	598.9 V AC	598.9 V AC
	20.00V DC	19.6	20.40	20.05 V DC	20.10 V DC	20.03 V DC
	600.0V DC	592.0	608.0	599.5 DC	600.0 V DC	599.8 V DC
3	2.0KW(200V,10A UPF)	1.96	2.04	1.98 KW	2.00 KW	1.98 KW
	480.0KW (480V, 1000A UPF)	470.4	489.6	476.4 KW	481.3 KW	479.5 KW
	585.0KW (600V, 975.0A UPF)	573.3	596.7	580.6 KW	584.2 KW	583.6KW
	2.68HP (200V,10A UPF)	2.63	2.73	2.66 HP	2.68 HP	2.65 HP
	643.4 HP (480V, 1000A UPF)	630.5	656.3	639.0 HP	645.5 HP	642.8 HP
	784.1HP(600V, 975.0A UPF)	768.4	799.8	778.5 HP	783.5 HP	783.1 HP
4	500 Ohms	495.0	505.0	500.2 Ω	500.1 Ω	500.0 Ω
	500 KOhms	494.0	506.0	500.2 K Ω	499.8 K Ω	500.3 K Ω
	1.0MOhms	0.98	1.02	0.997 M Ω	0.998 M Ω	0.997 M Ω
5	0.5 Lag (100V,50A)	0.454	0.545	0.518	0.518	0.519
	UNITY(100V,50A)	0.999	0.999	0.999	0.999	0.999
	0.5 Lead (100V,50A)	0.454	0.545	0.477	0.477	0.477

The above measured difference between B_{x1} and B_R , B_{x2} and B_R was calculated & found within limits.

d. **Result:** Complied.

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6. VARIATION DUE TO DISTORTION OF AC MEASURED QUANTITY

a. Test condition

- Take the error value (B_R) at 90 % of the full scale value.
- Ac excitation to 80% of range was applied to EUT.
- Superimpose 20% of 3rd harmonic upon the fundamental waveform and adjust the amplitude of distorted waveform to produce the same RMS value on the reference instrument. Check the error (B_x) at 90 % of the full scale value.
- Calculate the difference between B_x and B_R .

b. Requirement

Variation shall not exceed specified limits.

c. Observation

Measurement before Test (B_R):

Sr. No.	Standard Meter Reading	Span		EUT		
		Min.	Max	151100076	151100077	151100078
1	5.00A	4.70	5.30	4.98 A	5.05 A	4.94 A
	400.0A	390	410.0	400.2 A	401.6 A	399.5 A
	975.0A	953.5	996.5	975.2 A	976.2 A	977.8 A
2	20.00V AC	19.6	20.40	20.01 V AC	20.06 V AC	19.98 V AC
	600.0V AC	592.0	608.0	598.1 V AC	598.9 V AC	598.9 V AC
	20.00V DC	19.6	20.40	20.05 V DC	20.10 V DC	20.03 V DC
	600.0V DC	592.0	608.0	599.5 DC	600.0 V DC	599.8 V DC
3	2.0KW(200V,10A UPF)	1.96	2.04	1.98 KW	2.00 KW	1.98 KW
	480.0KW (480V, 1000A UPF)	470.4	489.6	476.4 KW	481.3 KW	479.5 KW
	585.0KW (600V, 975.0A UPF)	573.3	596.7	580.6 KW	584.2 KW	583.6KW
	2.68HP (200V,10A UPF)	2.63	2.73	2.66 HP	2.68 HP	2.65 HP
	643.4 HP (480V, 1000A UPF)	630.5	656.3	639.0 HP	645.5 HP	642.8 HP
	784.1HP(600V, 975.0A UPF)	768.4	799.8	778.5 HP	783.5 HP	783.1 HP

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Sr. No.	Standard Meter Reading	Span		EUT		
		Min.	Max	151100076	151100077	151100078
4	500 Ohms	495.0	505.0	500.2 Ω	500.2 Ω	500.0 Ω
	500 KOhms	494.0	506.0	500.2 K Ω	499.9 K Ω	500.3 K Ω
	1.0MOhms	0.98	1.02	0.998 M Ω	0.999 M Ω	0.997 M Ω
5	0.5 Lag (100V,50A)	0.454	0.545	0.518	0.518	0.519
	UNITY(100V,50A)	0.999	0.999	0.999	0.999	0.999
	0.5 Lead (100V,50A)	0.454	0.545	0.479	0.478	0.483

Measurement during test (B_x):

Sr. No.	Standard Meter Reading	Span		EUT		
		Min.	Max	151100076	151100077	151100078
1	5.00A	4.70	5.30	4.95 A	5.04 A	4.98 A
	400.0A	390	410.0	400.2 A	400.1 A	399.6 A
	975.0A	953.5	996.5	975.7 A	979.5 A	976.4 A
2	20.00V AC	19.6	20.40	20.05 V AC	20.09 V AC	20.03 V AC
	600.0V AC	592.0	608.0	598.4 V AC	598.9 V AC	598.7 V AC
	20.00V DC	19.6	20.40	19.03 V DC	20.10 V DC	20.03 V DC
	600.0V DC	592.0	608.0	599.7 V DC	600.0 V DC	599.6 V DC
3	2.0KW(200V,10A UPF)	1.96	2.04	1.97 KW	2.00 KW	1.99 KW
	480.0KW (480V, 1000A UPF)	470.4	489.6	476.4 KW	481.5 KW	479.4 KW
	585.0KW (600V, 975.0A UPF)	573.3	596.7	580.5KW	584.3 KW	584.1KW
	2.68HP (200V,10A UPF)	2.63	2.73	2.65 HP	2.67 HP	2.65 HP
	643.4 HP (480V, 1000A UPF)	630.5	656.3	639.0 HP	645.3 HP	642.8 HP
	784.1HP(600V, 975.0A UPF)	768.4	799.8	778.4 HP	783.5 HP	783.1 HP
4	500 Ohms	495.0	505.0	500.0 Ω	500.2 Ω	500.0 Ω
	500 KOhms	494.0	506.0	502.2 K Ω	497.1 K Ω	497.1 K Ω
	1.0MOhms	0.98	1.02	1.002 M Ω	1.003 M Ω	1.002 M Ω
5	0.5 Lag (100V,50A)	0.454	0.545	0.513	0.515	0.513
	UNITY(100V,50A)	0.999	0.999	0.999	0.999	0.999
	0.5 Lead (100V,50A)	0.454	0.545	0.490	0.482	0.484

The above measured difference between B_x and B_R was calculated & found within limits

d. **Result:** Complied.

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INSTITUTE FOR DESIGN OF ELECTRICAL
MEASURING INSTRUMENTS, MUMBAI - 400 022.



ELECTRICAL TESTING LABORATORY

Sr. No: 151100076, 151100077, 151100078
Date of Testing : 27.12.2016 to 17.01.2017

Test Report No: TR/ETL/229/16-17
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7. VARIATION DUE TO MAGNETIC FIELD OF EXTERNAL ORIGIN

a. Test condition

- Take the error value (B_R) at 90 % of the full scale value.
- Subject the EUT at 0.4kA/m external magnetic field & check the error (B_x) at 90 % of the full scale value.
- Calculate the difference between B_x and B_R .

b. Requirement

Variation shall not exceed specified limits.

c. Observation

Measurement before Test (B_R):

Sr. No.	Standard Meter Reading	Span		EUT		
		Min.	Max	151100076	151100077	151100078
1	5.00A	4.70	5.30	4.97 A	5.04 A	4.95 A
	400.0A	390	410.0	400.3 A	400.2 A	399.6 A
	975.0A	953.5	996.5	975.7 A	979.5 A	976.4 A
2	20.00V AC	19.6	20.40	20.05 V AC	20.09 V AC	20.03 V AC
	600.0V AC	592.0	608.0	598.4 V AC	598.9 V AC	598.7 V AC
	20.00V DC	19.6	20.40	19.03 V DC	20.10 V DC	20.03 V DC
	600.0V DC	592.0	608.0	599.7 V DC	600.0 V DC	599.6 V DC
3	2.0KW(200V,10A UPF)	1.96	2.04	1.97 KW	2.00 KW	1.99 KW
	480.0KW (480V, 1000A UPF)	470.4	489.6	476.4 KW	481.5 KW	479.4 KW
	585.0KW (600V, 975.0A UPF)	573.3	596.7	580.5KW	584.3 KW	584.1KW
	2.68HP (200V,10A UPF)	2.63	2.73	2.65 HP	2.67 HP	2.65 HP
	643.4 HP (480V, 1000A UPF)	630.5	656.3	639.0 HP	645.3 HP	642.8 HP
	784.1HP(600V, 975.0A UPF)	768.4	799.8	778.4 HP	783.5 HP	783.1 HP

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Sr. No.	Standard Meter Reading	Span		EUT		
		Min.	Max	151100076	151100077	151100078
4	500 Ohms	495.0	505.0	500.0 Ω	500.2 Ω	500.0 Ω
	500 KOhms	494.0	506.0	502.2 K Ω	497.1 K Ω	497.1 K Ω
	1.0MOhms	0.98	1.02	1.002 M Ω	1.003 M Ω	1.002 M Ω
5	0.5 Lag (100V,50A)	0.454	0.545	0.513	0.515	0.513
	UNITY(100V,50A)	0.999	0.999	0.999	0.999	0.999
	0.5 Lead (100V,50A)	0.454	0.545	0.490	0.482	0.484

Measurement at 0.4kA/m external magnetic field (B_x):

Sr. No.	Standard Meter Reading	Span		EUT		
		Min.	Max	151100076	151100077	151100078
1	5.00A	4.70	5.30	4.98 A	5.05 A	4.97 A
	400.0A	390	410.0	400.2 A	400.5 A	399.5 A
	975.0A	953.5	996.5	975.6 A	979.5 A	976.6 A
2	20.00V AC	19.6	20.40	20.05 V AC	20.09 V AC	20.03 V AC
	600.0V AC	592.0	608.0	598.4 V AC	598.9 V AC	598.7 V AC
	20.00V DC	19.6	20.40	19.03 V DC	20.10 V DC	20.03 V DC
	600.0V DC	592.0	608.0	599.7 V DC	600.0 V DC	599.6 V DC
3	2.0KW(200V,10A UPF)	1.96	2.04	1.97 KW	2.00 KW	1.99 KW
	480.0KW (480V, 1000A UPF)	470.4	489.6	476.4 KW	481.5 KW	479.4 KW
	585.0KW (600V, 975.0A UPF)	573.3	596.7	580.5KW	584.3 KW	584.1KW
	2.68HP (200V,10A UPF)	2.63	2.73	2.65 HP	2.67 HP	2.65 HP
	643.4 HP (480V, 1000A UPF)	630.5	656.3	639.0 HP	645.3 HP	642.8 HP
	784.1HP(600V, 975.0A UPF)	768.4	799.8	778.4 HP	783.5 HP	783.1 HP
4	500 Ohms	495.0	505.0	500.0 Ω	500.1 Ω	500.0 Ω
	500 KOhms	494.0	506.0	502.0 K Ω	497.1 K Ω	497.1 K Ω
	1.0MOhms	0.98	1.02	1.001 M Ω	1.002 M Ω	1.002 M Ω
5	0.5 Lag (100V,50A)	0.454	0.545	0.513	0.515	0.513
	UNITY(100V,50A)	0.999	0.999	0.999	0.999	0.999
	0.5 Lead (100V,50A)	0.454	0.545	0.490	0.482	0.484

The above measured difference between B_x and B_R was calculated & found within limits

d. Result: Complied.

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वैद्युतिक मापन उपयंत्र अभिकल्प संस्थान, मुंबई - ४०० ०२२.

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8. VARIATION DUE TO POSITION

a. Test condition

- Take the error value (B_R) at 90 % of the full scale value.
- Tilt the EUT at $\pm 10^\circ$ & check the error (B_x) at 90% of the full scale value.
- Calculate the difference between B_x and B_R .

b. Requirement

Variation shall not exceed specified limits.

c. Observation

Measurement before Test (B_R):

Sr. No.	Standard Meter Reading	Span		EUT		
		Min.	Max	151100076	151100077	151100078
1	5.00A	4.70	5.30	4.96 A	5.05 A	4.98 A
	400.0A	390	410.0	400.2 A	400.5 A	399.5 A
	975.0A	953.5	996.5	975.7 A	979.8 A	976.6 A
2	20.00V AC	19.6	20.40	20.05 V AC	20.09 V AC	20.03 V AC
	600.0V AC	592.0	608.0	598.4 V AC	598.9 V AC	598.7 V AC
	20.00V DC	19.6	20.40	19.03 V DC	20.10 V DC	20.03 V DC
	600.0V DC	592.0	608.0	599.7 V DC	600.0 V DC	599.6 V DC
3	2.0KW(200V,10A UPF)	1.96	2.04	1.98 KW	2.00 KW	1.99 KW
	480.0KW (480V, 1000A UPF)	470.4	489.6	476.6 KW	481.5 KW	479.5 KW
	585.0KW (600V, 975.0A UPF)	573.3	596.7	580.5KW	584.3 KW	584.2KW
	2.68HP (200V,10A UPF)	2.63	2.73	2.65 HP	2.67 HP	2.65 HP
	643.4 HP (480V, 1000A UPF)	630.5	656.3	639.0 HP	645.3 HP	642.8 HP
	784.1HP(600V, 975.0A UPF)	768.4	799.8	778.4 HP	783.5 HP	783.1 HP-

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Sr. No.	Standard Meter Reading	Span		EUT		
		Min.	Max	151100076	151100077	151100078
4	500 Ohms	495.0	505.0	500.0 Ω	500.1 Ω	500.0 Ω
	500 KOhms	494.0	506.0	502.0 K Ω	499.8 K Ω	499.1 K Ω
	1.0MOhms	0.98	1.02	1.001 M Ω	1.002 M Ω	1.002 M Ω
5	0.5 Lag (100V,50A)	0.454	0.545	0.513	0.515	0.513
	UNITY(100V,50A)	0.999	0.999	0.999	0.999	0.999
	0.5 Lead (100V,50A)	0.454	0.545	0.490	0.481	0.486

Measurement at $\pm 10^\circ$ position (Bx):

Sr. No.	Standard Meter Reading	Span		EUT		
		Min.	Max	151100076	151100077	151100078
1	5.00A	4.70	5.30	4.95 A	5.02 A	4.98 A
	400.0A	390	410.0	401.5 A	402.0 A	398.9 A
	975.0A	953.5	996.5	977.2 A	977.5 A	974.8 A
2	20.00V AC	19.6	20.40	20.00 V AC	20.06 V AC	19.99 V AC
	600.0V AC	592.0	608.0	597.8 V AC	598.6 V AC	597.4 V AC
	20.00V DC	19.6	20.40	20.03 V DC	20.10 V DC	20.03 V DC
	600.0V DC	592.0	608.0	599.4 V DC	599.9 V DC	599.7 V DC
3	2.0KW(200V,10A UPF)	1.96	2.04	1.99 KW	2.01 KW	1.98 KW
	480.0KW (480V, 1000A UPF)	470.4	489.6	478.9 KW	480.7 KW	479.2 KW
	585.0KW (600V, 975.0A UPF)	573.3	596.7	582.3 KW	586.0 KW	583.6 KW
	2.68HP (200V,10A UPF)	2.63	2.73	2.66 HP	2.69 HP	2.65 HP
	643.4 HP (480V, 1000A UPF)	630.5	656.3	642.3 HP	644.5 HP	642.4 HP
	784.1HP(600V, 975.0A UPF)	768.4	799.8	781.0 HP	785.9 HP	782.6 HP
4	500 Ohms	495.0	505.0	500.2 Ω	500.3 Ω	500.0 Ω
	500 KOhms	494.0	506.0	500.2 K Ω	499.7 K Ω	500.5 K Ω
	1.0MOhms	0.98	1.02	0.997 M Ω	0.984 M Ω	0.997 M Ω
5	0.5 Lag (100V,50A)	0.454	0.545	0.515	0.515	0.513
	UNITY(100V,50A)	0.999	0.999	0.999	0.999	0.999
	0.5 Lead (100V,50A)	0.454	0.545	0.480	0.480	0.492

The above measured difference between B_x and B_R was calculated & found within limits

d. Result: Complied.

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ELECTRICAL TESTING LABORATORY

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9. VARIATION DUE TO SELF HEATING

a. Test condition

- Keep the EUT in a switched-on condition for at least two hours at reference temperature, but without a measured quantity applied Till the EUT at $\pm 10^\circ$ & check the error (B_x) at 90% of the full scale value.
- Apply measuring quantity with approximately 90 % of the full scale value.
- Note down the displayed value after the elapse of one minute (B_R).
- Keep the EUT for 30 minutes with input quantity applied.
- Note down the displayed value after the elapse of 30 minutes.
- Calculate the self heating influence error $B_x - B_R$

b. Requirement

Variation shall not exceed specified limits.

c. Observation

Measurement before Test (B_R):

Sr. No.	Standard Meter Reading	Span		EUT		
		Min.	Max	151100076	151100077	151100078
1	5.00A	4.70	5.30	4.98 A	5.03 A	4.94 A
	400.0A	390	410.0	399.8 A	401.6 A	399.7 A
	975.0A	953.5	996.5	975.2 A	976.1 A	977.6 A
2	20.00V AC	19.6	20.40	20.01 V AC	20.06 V AC	19.99 V AC
	600.0V AC	592.0	608.0	598.2 V AC	598.6 V AC	598.8 V AC
	20.00V DC	19.6	20.40	20.04 V DC	20.12 V DC	20.03 V DC
	600.0V DC	592.0	608.0	599.5 V DC	600.0 V DC	599.7 V DC
3	2.0KW(200V,10A UPF)	1.96	2.04	1.97 KW	2.08 KW	1.98 KW
	480.0KW (480V, 1000A UPF)	470.4	489.6	476.6 KW	481.5 KW	479.5 KW
	585.0KW (600V, 975.0A UPF)	573.3	596.7	580.5KW	584.3 KW	584.2KW
	2.68HP (200V,10A UPF)	2.63	2.73	2.65 HP	2.67 HP	2.65 HP
	643.4 HP (480V, 1000A UPF)	630.5	656.3	639.0 HP	645.3 HP	642.8 HP
	784.1HP(600V, 975.0A UPF)	768.4	799.8	778.4 HP	783.5 HP	783.1 HP

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Sr. No.	Standard Meter Reading	Span		EUT		
		Min.	Max	151100076	151100077	151100078
4	500 Ohms	495.0	505.0	500.4 Ω	500.1 Ω	500.3 Ω
	500 KOhms	494.0	506.0	500.2 K Ω	499.8 K Ω	500.4 K Ω
	1.0MOhms	0.98	1.02	0.997 M Ω	0.984 M Ω	0.997 M Ω
5	0.5 Lag (100V,50A)	0.454	0.545	0.516	0.515	0.512
	UNITY(100V,50A)	0.999	0.999	0.999	0.999	0.999
	0.5 Lead (100V,50A)	0.454	0.545	0.480	0.480	0.492

Measurement after 30 minutes (B_x):

Sr. No.	Standard Meter Reading	Span		EUT		
		Min.	Max	151100076	151100077	151100078
1	5.00A	4.70	5.30	4.96 A	5.05 A	4.94 A
	400.0A	390	410.0	400.4 A	401.4 A	399.5 A
	975.0A	953.5	996.5	976.1 A	979.2 A	978.7 A
2	20.00V AC	19.6	20.40	20.01 V AC	20.07 V AC	19.99 V AC
	600.0V AC	592.0	608.0	598.2 V AC	599.0 V AC	598.9 V AC
	20.00V DC	19.6	20.40	20.03 V DC	20.10 V DC	20.03 V DC
	600.0V DC	592.0	608.0	599.5 V DC	600.0 V DC	599.7 V DC
3	2.0KW(200V,10A UPF)	1.96	2.04	1.99 KW	2.01 KW	1.98 KW
	480.0KW (480V, 1000A UPF)	470.4	489.6	479.7 KW	480.8 KW	479.8 KW
	585.0KW (600V, 975.0A UPF)	573.3	596.7	584.0 KW	586.3 KW	584.7 KW
	2.68HP (200V,10A UPF)	2.63	2.73	2.65 HP	2.69 HP	2.65 HP
	643.4 HP (480V, 1000A UPF)	630.5	656.3	643.2 HP	645.5 HP	643.4 HP
	784.1HP(600V, 975.0A UPF)	768.4	799.8	783.4 HP	783.8 HP	784.1 HP
4	500 Ohms	495.0	505.0	500.1 Ω	500.2 Ω	500.2 Ω
	500 KOhms	494.0	506.0	500.0 K Ω	499.7 K Ω	500.0 K Ω
	1.0MOhms	0.98	1.02	0.998 M Ω	0.995 M Ω	0.996 M Ω
5	0.5 Lag (100V,50A)	0.454	0.545	0.515	0.513	0.515
	UNITY(100V,50A)	0.999	0.999	0.999	0.999	0.999
	0.5 Lead (100V,50A)	0.454	0.545	0.483	0.489	0.483

The above measured difference between B_x and B_R was calculated & found within limits.

d. Result: Complied.

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10. TEMPERATURE CYCLING TEST

a. Test condition

- Take the error value (B_R) at 90 % of the full scale value.
- Subject the EUT at 40°C for 16 hours.
- Subject the EUT at 0°C for 8 hours & check the error (B_x) at 90 % of the full scale value.
- Calculate the difference between B_x and B_R .

b. Requirement

Variation shall not exceed specified limits.

c. Observation

Measurement before Test (B_R):

Sr. No.	Standard Meter Reading	Span		EUT		
		Min.	Max	151100076	151100077	151100078
1	5.00A	4.70	5.30	4.96 A	5.05 A	4.95 A
	400.0A	390	410.0	400.2 A	401.8 A	399.2 A
	975.0A	953.5	996.5	976.1 A	979.2 A	978.7 A
2	20.00V AC	19.6	20.40	20.01 V AC	20.07 V AC	19.99 V AC
	600.0V AC	592.0	608.0	598.2 V AC	599.0 V AC	598.9 V AC
	20.00V DC	19.6	20.40	20.03 V DC	20.10 V DC	20.03 V DC
	600.0V DC	592.0	608.0	599.6 V DC	600.0 V DC	599.8 V DC
3	2.0KW(200V,10A UPF)	1.96	2.04	1.98 KW	2.01 KW	1.99 KW
	480.0KW (480V, 1000A UPF)	470.4	489.6	479.7 KW	480.8 KW	479.8 KW
	585.0KW (600V, 975.0A UPF)	573.3	596.7	584.0 KW	586.2 KW	584.7 KW
	2.68HP (200V,10A UPF)	2.63	2.73	2.64 HP	2.67 HP	2.65 HP
	643.4 HP (480V, 1000A UPF)	630.5	656.3	643.0 HP	645.4 HP	643.5 HP
	784.1HP(600V, 975.0A UPF)	768.4	799.8	783.5 HP	783.9 HP	784.3 HP

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Sr. No.	Standard Meter Reading	Span		EUT		
		Min.	Max	151100076	151100077	151100078
4	500 Ohms	495.0	505.0	500. Ω	500.1 Ω	500.1 Ω
	500 KOhms	494.0	506.0	500.0 K Ω	499.7 K Ω	500.0 K Ω
	1.0MOhms	0.98	1.02	0.998 M Ω	0.996 M Ω	0.999 M Ω
5	0.5 Lag (100V,50A)	0.454	0.545	0.516	0.576	0.513
	UNITY(100V,50A)	0.999	0.999	0.999	0.999	0.999
	0.5 Lead (100V,50A)	0.454	0.545	0.475	0.497	0.478

Measurement after test (B_x):

Sr. No.	Standard Meter Reading	Span		EUT		
		Min.	Max	151100076	151100077	151100078
1	5.00A	4.70	5.30	4.94 A	5.03 A	4.96 A
	400.0A	390	410.0	399.8 A	401.0 A	399.9 A
	975.0A	953.5	996.5	975.4 A	978.6 A	975.4 A
2	20.00V AC	19.6	20.40	20.00 V AC	20.06 V AC	19.99 V AC
	600.0V AC	592.0	608.0	598.1 V AC	598.9 V AC	599.0 V AC
	20.00V DC	19.6	20.40	20.03 V DC	20.10 V DC	20.03 V DC
	600.0V DC	592.0	608.0	599.4 V DC	599.9 V DC	599.7 V DC
3	2.0KW(200V,10A UPF)	1.96	2.04	1.99 kW	2.00 kW	1.98 kW
	480.0KW (480V, 1000A UPF)	470.4	489.6	478.6 kW	480.2 kW	479.1 kW
	585.0KW (600V, 975.0A UPF)	573.3	596.7	583.2 kW	585.6 kW	583.5 kW
	2.68HP (200V,10A UPF)	2.63	2.73	2.66 HP	2.68 HP	2.65 HP
	643.4 HP (480V, 1000A UPF)	630.5	656.3	641.8 HP	643.9 HP	642.4 HP
	784.1HP(600V, 975.0A UPF)	768.4	799.8	781.9 HP	785.1 HP	782.4 HP
4	500 Ohms	495.0	505.0	500.0 Ω	500.1 Ω	500.0 Ω
	500 KOhms	494.0	506.0	500.0 K Ω	499.8 K Ω	500.1 K Ω
	1.0MOhms	0.98	1.02	0.997 M Ω	0.984 M Ω	0.997 M Ω
5	0.5 Lag (100V,50A)	0.454	0.545	0.513	0.515	0.513
	UNITY(100V,50A)	0.999	0.999	0.999	0.999	0.999
	0.5 Lead (100V,50A)	0.454	0.545	0.490	0.480	0.483

The above measured difference between B_x and B_R was calculated & found within limits.

d. Result: Complied.

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11. VIBRATION TEST**a. Test condition**

- Take the error value (B_R) at 90 % of the full scale value.
- Subject the EUT for vibration test as per IS 9000 (Part 8) 1981.
- After the test verify for any damage. Check the error (B_x) at 90 % of the full scale value
- Calculate the difference between B_x and B_R .

b. Test Specifications

Test method	: IS 9000 (Part 8) : 1981
Amplitude	: ± 0.15 mm
Frequency	: 10Hz -55Hz-10Hz
Sweep	: 1 octave per minute
No of cycle	: 2 cycles per axis
Direction	: X, Y, Z axis

c. Requirement

No damage shall occur to the measuring instrument during tests. After the test the error shall be within limits

d. Observation

No mechanical damage was observed during & after test. The error was found to be within limit after the test.


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MSME - TECHNOLOGY DEVELOPMENT CENTRE,
MUMBAI

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INSTITUTE FOR DESIGN OF ELECTRICAL
MEASURING INSTRUMENTS, MUMBAI - 400 022.



ELECTRICAL TESTING LABORATORY

Sr. No: 151100076, 151100077, 151100078

Date of Testing : 27.12.2016 to 17.01.2017

Test Report No: TR/ETL/229/16-17

Page No. : 28 of 33

Measurement before Test (B_R):

Sr. No.	Standard Meter Reading	Span		EUT		
		Min.	Max	151100076	151100077	151100078
1	5.00A	4.70	5.30	4.98 A	5.03 A	4.94 A
	400.0A	390	410.0	399.8 A	401.0 A	399.9 A
	975.0A	953.5	996.5	975.4 A	978.6 A	975.4 A
2	20.00V AC	19.6	20.40	20.00 V AC	20.06 V AC	19.99 V AC
	600.0V AC	592.0	608.0	598.1 V AC	598.9 V AC	599.0 V AC
	20.00V DC	19.6	20.40	20.03 V DC	20.10 V DC	20.03 V DC
	600.0V DC	592.0	608.0	599.4 V DC	599.9 V DC	599.7 V DC
3	2.0KW(200V,10A UPF)	1.96	2.04	1.99 kW	2.00 kW	1.98 kW
	480.0KW (480V, 1000A UPF)	470.4	489.6	478.6 kW	480.2 kW	479.1 kW
	585.0KW (600V, 975.0A UPF)	573.3	596.7	583.2 kW	585.6 kW	583.5 kW
	2.68HP (200V,10A UPF)	2.63	2.73	2.66 HP	2.68 HP	2.65 HP
	643.4 HP (480V, 1000A UPF)	630.5	656.3	641.8 HP	643.9 HP	642.4 HP
	784.1HP(600V, 975.0A UPF)	768.4	799.8	781.9 HP	785.1 HP	782.4 HP
4	500 Ohms	495.0	505.0	500.0 Ω	500.1 Ω	500.0 Ω
	500 KOhms	494.0	506.0	500.0 KΩ	499.8 KΩ	500.1 KΩ
	1.0MOhms	0.98	1.02	0.997 MΩ	0.984 MΩ	0.997 MΩ
5	0.5 Lag (100V,50A)	0.454	0.545	0.513	0.515	0.513
	UNITY(100V,50A)	0.999	0.999	0.999	0.999	0.999
	0.5 Lead (100V,50A)	0.454	0.545	0.490	0.480	0.483

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ELECTRICAL TESTING LABORATORY

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Test Report No: TR/ETL/229/16-17
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Measurement after test (Bx):

Sr. No.	Standard Meter Reading	Span		EUT		
		Min.	Max	151100076	151100077	151100078
1	5.00A	4.70	5.30	4.98 A	5.03 A	4.94 A
	400.0A	390	410.0	399.8 A	401.0 A	399.9 A
	975.0A	953.5	996.5	975.4 A	978.6 A	975.4 A
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	600.0V AC	592.0	608.0	598.1 V AC	598.9 V AC	599.0 V AC
	20.00V DC	19.6	20.40	20.03 V DC	20.10 V DC	20.03 V DC
	600.0V DC	592.0	608.0	599.4 V DC	599.9 V DC	599.7 V DC
3	2.0KW(200V,10A UPF)	1.96	2.04	1.99 kW	2.00 kW	1.98 kW
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	784.1HP(600V, 975.0A UPF)	768.4	799.8	781.9 HP	785.1 HP	782.4 HP
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	500 KOhms	494.0	506.0	500.0 K Ω	499.8 K Ω	500.1 K Ω
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	UNITY(100V,50A)	0.999	0.999	0.999	0.999	0.999
	0.5 Lead (100V,50A)	0.454	0.545	0.490	0.480	0.483

The above measured difference between B_x and B_R was calculated & found within limits

e. Result: Complied.

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ELECTRICAL TESTING LABORATORY

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Date of Testing : 27.12.2016 to 17.01.2017

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12. SHOCK TEST

a. Test condition

- Take the error value (B_R) at 90 % of the full scale value.
- Subject the EUT to shocks according to IS 9000 (Part 7/Sec 1)
- After the test verify for any damage & check the error (B_x) at 90 % of the full scale value.
- Calculate the difference between B_x and B_R .

b. Test Specifications

Test method	: IS 9000 (Part 7/Sec 1) : 1979
Waveform	: Half Sine
Acceleration	: 15g
Pulse Width	: 11 ms
No of Shock	: 3 per Axis
Direction	: X, Y, Z axis

c. Requirement

No damage shall occur to the measuring instrument during tests. After the test the error shall be within limits

d. Observation

No mechanical damage was observed during & after test. The error was found to be within limit after the test.

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Test Report No: TR/ETL/229/16-17
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The above measured difference between B_x and B_R was calculated & found within limits.

e. Result: Complied.


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ELECTRICAL TESTING LABORATORY**Sr. No:** 151100076, 151100077, 151100078**Date of Testing :** 27.12.2016 to 17.01.2017**Test Report No:** TR/ETL/229/16-17**Page No. :** 33 of 33**EUT Photographs****Front view****Rear view******* END OF TEST REPORT*****
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