

Laboratory **Electronics Test & Development Centre, B-108, Phase-VIII, Industrial Area, (SAS Nagar), Mohali, Punjab**

Accreditation Standard **ISO/IEC 17025:2005**

Discipline **Electro-Technical Calibration** **Issue Date** **20.02.2015**

Certificate Number **C-0029** **Valid Until** **19.02.2017**

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Quantity Measured / Instrument	Range/ Frequency	* Calibration Measurement Capability (\pm)	Remarks
4. AC VOLTAGE^{\$}	10 Hz to 1 kHz		Using DMM 3458A, Agilent 3 Phase Power Analyser, Voltech by Direct method
	10 mV to 100 mV	0.4 % to 0.06 %	
	100 mV to 100 V	0.06 %	
	100 V to 1000 V	0.06 % to 0.15 %	
	1 kHz to 1MHz		
	10 mV to 10 V	1.6 %	
	10 kHz to 100 kHz		
	10 mV to 10 V	4.2 %	
AC HIGH VOLTAGE[#]	50 Hz		Using ESV meter, ESH-28CTX, SR By Direct method
	1 kV to 15 kV	2.1 %	
5. AC CURRENT^{\$}	50 Hz to 5 kHz		Using DMM 3458A, Agilent 3 Ph. Power Analyser, Voltech AC shunt by Direct method
	10 uA to 100 uA	0.7 %	
	100 uA to 100 mA	0.8 %	
	100 mA to 1 A	0.8 %	
	1 A to 20 A	0.8 % to 0.05 %	
	50 Hz		
	20 A to 1000 A	2%	
6 FREQUENCY^{\$}	10 Hz to 1 MHz	2.5 ppm	Using Counter PM 6680B Fluke by Direct method
	1 MHz to 2 GHz	1 ppm	
7. TIME INTERVAL^{\$}	10 us to 100 ms	1.5 ppm	Using Counter PM 6680B Fluke by Direct method
8. LF POWER^{\$} (Active/Reactive/Apparent) 1 Phase	50 Hz		Using 3 Phase Power analyser, 3000A, Voltech 3 Phase Power Energy reference standard with source, Zera by Direct method
	200 mV to 640 V	0.5 %	
	50 mA to 20 A		
	PF 0.2 to 1		
3 Phase	50 Hz		
	110 V to 240 V	0.1 %	
	0.1A to 100 A		
	PF 0.5 to 1		

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Program Manager

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9. LF ACTIVE ENERGY[§] (3 PHASE/ 1 PHASE)	50 Hz 110 V to 240 V 0.1 to 100 A PF 0.5 to 1	0.05% to 0.2%	Using 3 Ph.Power Energy Ref. Std. with source, Zera by Direct method
10. POWER FACTOR[§]	0 to 1 (Lag/Lead)	1.0 %	Using 3 Ph. Power analyser, 3000A, Voltech By Direct method
11. MODULATION[§] AM (Depth)	10 % to 90 % CW:100 MHz to 2 GHz (MF: 1 kHz)	5 %	Using Modulation Analyser, Boonton by (In House) Direct method
FM (Deviation)	10MHz to 500 kHz 30 Hz to 500 kHz CW: 100 kHz to 2 GHz (MF: 1 kHz)	4 %	
12. AC RESISTANCE[§]	1 kHz 1 Ω to 400 k Ω	0.1 %	Using RCL Meter, by Direct method
13. INDUCTANCE[§]	1 kHz 100 uH to 10 H	0.25 %	Using RCL Meter, by Direct method
14. CAPACITANCE[§]	1 kHz 1 pF to 1 uF	0.2 %	Using RCL Meter, by Direct Method
15. RF LEVEL[§]	10 MHz to 2.5 GHz (-) 1 dBm to 13 dBm	1 dB	Using Modulation Analyser, By Direct Method
	10 MHz to 2.5 GHz (-) 40 dBm to 13 dBm	1 dB	Using Level Meter, URV35, R&S byDirect method
16. THERMOCOUPLE[§] (B, C, E, J, K, L, N, R, S, T and U Type)	(-) 200 °C to 1750 °C (-) 100 mV to 100 mV	0.01 %	Using DMM, 3458A, process calibrator by Simulation method

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17. RTD ^{\$}	(-) 200 °C to 850 °C (0 to 4.0 k Ω)	0.01 %	Using DMM 3458A, Agilent by Simulation method
18. CURRENT & VOLTAGE HARMONICS ^{\$} 1. SQUARE WAVE a) VOLTAGE: 60 V P-P/ 50 Hz b) CURRENT 1 A P-P/ 50 Hz 2. SINE WAVE 240 V, 1A, 50 Hz	Harmonics order: 3 % to 39th 2 % to 33 %	0.7 % 0.7 %	Using 3 Ph. Power analyser, 3000A, Voltech by Direct method
19. DC VOLTAGE*	10 mV to 100 mV 100 mV to 1 V 1 V to 1000 V	0.07 % to 0.01 % 0.01 % to 0.008 % 0.008 %	Using DMM, 34401A, Agilent HV Probe H289 by
20. DC CURRENT*	1 mA to 100 mA 100 mA to 1 A 1 A to 20 A	2.0 % to 0.07 % 0.08 % to 0.15 % 0.5	Using DMM, 34401A, Agilent, shunt By Direct Method
21. DC RESISTANCE*	1 Ω to 100 Ω 100 Ω to 100 M Ω 100 M Ω to 20 G Ω	0.15% to 0.02 % 0.02 % to 1.0 % 1.0 %	Using DMM, 34401A, Agilent Tera ohm meter TM 100A, Motwane by Direct Method
22. AC VOLTAGE*	50 Hz 10 mV to 100 mV 100 mV to 750 V	0.15 % to 0.1 % 0.1 %	Using DMM 34401A, Agilent Power analyser, PM3000A, Voltech HV Probe H289, ESV by Direct Method
23. AC CURRENT*	50 Hz 100 mA to 3 A 3A to 20 A	1.5% to 0.2% 0.5%	Using 6½ DMM 34401A Fluke with Shunt by Direct Method
24. FREQUENCY*	10 Hz to 30 kHz	0.05 % to 0.01 %	Using 6½ DMM 34401A Fluke by Direct Method

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25. LF POWER* (Active/Reactive/Apparent) 1PHASE	50 Hz 100 mW to 20 kW (100 mV to 1000 V) (50 mA to 20 A)	0.5 %	Using Power analyser PM3000A, Voltech by Direct Method
26. MODULATION* AM (10 MHz to 1GHz) FM (10 MHz to 1GHz)	10 % to 90 % 10 kHz to 300 kHz	5 % 5 %	Using Modulation Analyser 8201 Booton by Direct Method
27. INDUCTANCE*	1kHz 100 μ H to 10 H	0.25 %	Using LCR Meter by Direct Method
28. CAPACITANCE*	1kHz 1 pF to 1 μ F	0.2 %	Using LCR Meter by Direct Method
29. THERMOCOUPLE* (B, C, E, J, K, L, N, R, S, T and U Type)	190 °C to 1750 °C (-) 10 mV to (-) 100 mV (-) 10 mV to 10 mV 10 mV to 100 mV	0.01 %	Using DMM, 34401A, Agilent Process calibrator, By Direct Method

* Measurement Capability is expressed as an uncertainty (\pm) at a confidence probability of 95%

\$ Only in Permanent Laboratory

* Only for Site Calibration

The laboratory is also capable for site calibration however, the uncertainty at site depends on the prevailing actual environmental conditions and master equipment used.

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