NABL

National Accreditation Board for Testing and Calibration Laboratories

(An Autonomous Body under Department of Science & Technology, Govt. of India)

CERTIFICATE OF ACCREDITATION

AUTOCAL SOLUTIONS PVT. LTD.

has been assessed and accredited in accordance with the standard

ISO/IEC 17025:2005

"General Requirements for the Competence of Testing & Calibration Laboratories"

for its facilities at

Plot No. BG - 74, Gala No. 1 & 2, Jai Tulja Bhavani Indl. Premises, Telco Road, MIDC - Bhosari, Pune, Maharashtra

in the discipline of

ELECTRO-TECHNICAL CALIBRATION

(To see the scope of accreditation of this laboratory, you may also visit NABL website www.nabl-india.org)

Certificate Number C-1268

Issue Date 11/09/2015

Valid Until 10/09/2017

This certificate remains valid for the Scope of Accreditation as specified in the annexure subject to continued satisfactory compliance to the above standard & the additional requirements of NABL.

Signed for and on behalf of NABL

Avijit Das	Anil Relia	Prof. S. K. Joshi
Program Manager	Director	Chairman

रा.प्र.प्र.बो.

राष्ट्रीय परीक्षण और अंशशोधन प्रयोगशाला प्रत्यायन बोर्ड

(विज्ञान एवं प्रौद्योगिकी विभाग, भारत सरकार के अधीन स्वायत्तशासी निकाय)

प्रत्यायन प्रमाण-पत्र

ऑटोकैल सोल्यूशन्स प्राइवेट लिमिटेड

का मूल्यांकन और प्रत्यायन निम्न मानक के अनुसार

आई.एस.ओ./आई.ई.सी. 17025:2005

"परीक्षण एवं अंशशोधन प्रयोगशालाओं की सक्षमता की सामान्य अपेक्षाएँ"

पुणे, महाराष्ट्र

में स्थित इसकी सुविधाओं के लिए

विद्युत तकनीकी अंशशोधन

के विषय क्षेत्र में किया गया।

(इस प्रयोगशाला के प्रत्यायन के विषय क्षेत्र की जानकारी एन ए बी एल वेबसाइट www.nabl-india.org से भी प्राप्त कर सकते हैं)

प्रमाण-पत्र संख्या अ-1268

जारी करने की तिथि 11/09/2015

वैधता की तिथि 10/09/2017

यह प्रमाण-पत्र उपर्युक्त मानक तथा राष्ट्रीय परीक्षण और अंशशोधन प्रयोगशाला प्रत्यायन बोर्ड की अतिरिक्त अपेक्षाओं का निरंतर संतोषप्रद अनुपालन किए जाने पर अनुबंध में निर्दिष्टानुसार प्रत्यायन के क्षेत्र के लिए वैध रहेगा।

रा.प्र.प्र.बो. की ओर से हस्ताक्षरित

अ. दास

अविजित दास
कार्यक्रम प्रबन्धक

अनिल रेलिया

अनिल रेलिया
निदेशक

श्रीकृष्ण जोशी

प्रो. श्रीकृष्ण जोशी
अध्यक्ष

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SCOPE OF ACCREDITATION

Laboratory	**Autocal Solutions Pvt. Ltd., Plot No. BH – 74, Gala No. 1 & 2, Jai Talja Bhavani Indl. Premises, Telco Road, MIDC – Bhosari, Pune, Maharashtra**		
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Certificate Number	**C-1268**	**Valid Until**	**10.09.2017**
Last Amended on	**-**	**Page**	**1 of 8**

	Quantity Measured/ Instrument	Range / Frequency	*Calibration Measurement Capability (±)	Remarks
	SOURCE			
1.	**DC VOLTAGE#**	0.1mV to 1 mV	3.58% to 0.36%	Using Multifunction Calibrator, Fluke-5500E by Direct Method
		1mV to 10 mV	0.36% to 0.042%	
		10 mV to 100 mV	0.042% to 0.010%	
		100 mV to 1 V	0.010 % to 0.0017 %	
		1 V to 100 V	0.0017% to 0.0024%	Using Multifunction Calibrator, Fluke-5520A by Direct Method
		100 V to 1000 V	0.0024% to 0.0025%	
2.	**DC CURRENT#**	10 µA to 100 mA	0.26%to 0.016%	Using Multifunction Calibrator, Fluke-5520A by Direct Method
		100 mA to 1 A	0.016% to 0.029%	
		1A to 10 A	0.029% to 0.064%	
		10 A to 20 A	0.064% to 0.12%	
		20 A to 1000 A	0.73% to 0.3%	Using Multifunction Calibrator, Fluke-5520A + 50Turn Current Coil, by Direct Method
3.	**AC VOLTAGE#**	**45 Hz to 10 kHz**		
		2 mV to 10 mV	2.53% to 0.41%	Using Multifunction Calibrator, Fluke-5500E by Direct Method
		10 mV to 100 mV	0.41% to 0.082%	
		100 mV to 1 V	0.082% to 0.03%	
		45 Hz to 1 kHz		
		1 V to 10 V	0.03% to 0.026%	Using Multifunction Calibrator, Fluke-5520A by Direct Method
		10 V to 1000 V	0.026% to 0.037%	
		10 kHz to 100 kHz		
		1 V to 100 V	0.1% to 0.29%	

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Convenor

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Certificate Number	C-1268	Valid Until	10.09.2017
Last Amended on	-	Page	2 of 8

	Quantity Measured/ Instrument	Range / Frequency	*Calibration Measurement Capability (±)	Remarks
4.	AC CURRENT#	**45 Hz to 1 kHz**		
		30 µA to 3 A	0.62% to 0.08%	Using Multifunction Calibrator, Fluke-5520A by Direct Method
		3 A to 10 A	0.08% to 0.14%	
		10 A to 20 A	0.14% to 0.20%	
		50 Hz		Using Multifunction Calibrator, Fluke-5520A + 50Turn Current Coil, by Direct Method
		20 A to 1000 A	0.67% to 0.30%	
5.	DC RESISTANCE#	100 mΩ to 100 kΩ	1.31% to 0.0036%	Using Multifunction Calibrator, Fluke-5520A by Direct Method
		100 kΩ to 1MΩ	0.0036% to 0.0043%	
		1MΩ to 10 MΩ	0.0043% to 0.016%	
		10 MΩ to 100 MΩ	0.016% to 0.063%	
		100 MΩ to 1GΩ	0.063% to 1.8%	
6.	HIGH RESISTANCE#	0.1 Ω to 100 MΩ	2.31%	Using Standard Megohm Decade Box & Discrete High Resistance by Direct Method
		50 MΩ	2.32%	
		200 MΩ	2.32%	
		300 MΩ	2.32%	
		400 MΩ	2.32%	
		1 GΩ to 100 GΩ	2.33%	
7.	CAPACITANCE#	**1kHz**		Using Multifunction Calibrator, Fluke-5520A by Direct Method
		1 nF to 10 µF	1.73 % to 0.41 %	
		10 µF to 100 µF	0.41 % to 0.64 %	
		100 µF to 1 mF	0.64 % to 0.84 %	
8.	INDUCTANCE#	**1kHz**		Using Standard Discrete Inductance by Direct Method
		0.1 mH	1.67%	
		1 mH	1.16%	
		10 mH	1.16%	
		100 mH	1.16%	
		1000 mH	1.16%	

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Accreditation Standard	ISO/IEC 17025: 2005		
Discipline	Electro-Technical Calibration	Issue Date	11.09.2015
Certificate Number	C-1268	Valid Until	10.09.2017
Last Amended on	-	Page	3 of 8

	Quantity Measured/ Instrument	Range / Frequency	*Calibration Measurement Capability (±)	Remarks
9.	**TEMPERATURE INDICATOR /CONTROLLER BY SIMULATION METHOD#**			
	RTD (PT-100)	-200 °C to 800 °C	0.05 °C	Using Multifunction Calibrator, Fluke-5520A Conversion by using ITS-90 Scale for Ω to °C and mV to °C
	Thermocouple (K, J, N, E, T, R, S, B, C, L, U)	-200 °C to 1370 °C	0.12 °C	
10.	**POWER FACTOR#**	**50Hz** 0.1 PF to UPF Lead/ Lag	0.008 PF	Using Multifunction Calibrator, Fluke-5520A by Direct Method
11.	**AC POWER# (1 phase)**	**50Hz**		
	@ UPF	120 V to 240 V 0.01 A to 20 A 1.2 W to 4.8 kW	0.65% to 0.18%	Using Multifunction Calibrator, Fluke-5520A + 50Turn Current Coil, by Direct Method
	@ 0.8PF (Lag/ Lead)	120 V to 240 V 0.1 A to 20 A 9.6 W to 3.8 kW	0.99% to 0.25%	
	@ 0.5PF (Lag/ Lead)	120 V to 240 V 0.1 A to 20 A 6 W to 2.4 kW	1.20% to 0.39%	
	@ 0.2PF (Lag/ Lead)	120 V to 240 V 0.1 A to 20 A 2.4 W to 960 W	3.09% to 1.16%	

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SCOPE OF ACCREDITATION

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Accreditation Standard	ISO/IEC 17025: 2005		
Discipline	Electro-Technical Calibration	Issue Date	11.09.2015
Certificate Number	C-1268	Valid Until	10.09.2017
Last Amended on	-	Page	4 of 8

	Quantity Measured/ Instrument	Range / Frequency	*Calibration Measurement Capability (±)	Remarks
12.	**FREQUENCY**#	10 Hz to 250 MHz	0.58% to 0.023%	Using Multifunction Calibrator, Fluke-5520A by Direct Method
13.	**PERIOD**#	0.1 s to 4 ns	0.577% to 0.023%	Using Multifunction Calibrator, Fluke-5520A by Direct Method
14.	**OSCILLOSCOPE**#			
	DC AMPLITUDE	**50Ω output**		
		5 mV to 2.2 V	1.91% to 0.46%	Using Multifunction Calibrator, Fluke-5520A by Direct Method
		1MΩ output		
		5 mV to 33 V	0.53% to 0.23%	
		33 V to 100 V	1.75% to 0.78%	
	AC AMPLITUDE	**1MΩ output @ 1kHz (V p-p)**		
		5 mV p-p to 50 V p-p	1.81% to 0.2%	
		50 V p-p to 100 V p-p	0.2 % to 0.74%	
	TIME BASE	**50Ω output**		
		5 mV p-p to 2 V p-p	1.81% to 0.60%	
	BANDWIDTH	2 ns to 10 ms	0.32% to 0.64%	
		10 ms to 5 s	0.64% to 0.60%	
		50 kHz to 250 MHz	3.47% to 6%	

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Certificate Number	**C-1268**	**Valid Until**	**10.09.2017**
Last Amended on	**-**	**Page**	**5 of 8**

Quantity Measured/ Instrument	Range / Frequency	*Calibration Measurement Capability (±)	Remarks
MEASURE			
1. **DC VOLTAGE#**	100 µV to 1000 V	0.62% to 0.0012%	Using 81/2 Agilent 3458A DMM by Direct Method
	1 kV to 10 kV	5.09% to 2.39%	Using 80k-40 HV Probe with DMM by Direct Method
	10 kV to 90 kV	3.55% to 3.67%	Using HV Divider SEV & kV Meter by Direct Method
2. **DC CURRENT#**	10 µA to 10 mA	0.021% to 0.009%	Using 81/2 Agilent 3458A DMM by Direct Method
	10 mA to 1 A	0.009% to 0.014%	
	1 A to 20 A	0.36% to 0.35%	Using 81/2 Agilent 3458A DMM with Agilent shunt by Direct / Comparison Method
3. **AC VOLTAGE#**	**45 Hz to 1 kHz**		
	1 mV to 100 mV	0.91% to 0.03%	Using 81/2 Agilent 3458A DMM by Direct Method
	100 mV to 700 V	0.03% to 0.06%	
	45 Hz to 1 kHz		
	700 V to 1000 V	0.12% to 0.11%	Using 61/2 Fluke 8846A DMM by Direct Method
	1 kHz to 10 kHz		
	1 mV to 10 V	0.24% to 0.035%	Using 81/2 Agilent 3458A DMM by Direct Method
	10 V to 700 V	0.035% to 0.080%	
	50 Hz		
	1 kV to 10 kV	7.21% to 6.29%	Using 80k-40 HV Probe with DMM by Direct Method

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Certificate Number	**C-1268**	**Valid Until**	**10.09.2017**
Last Amended on	**-**	**Page**	**6 of 8**

	Quantity Measured/ Instrument	Range / Frequency	*Calibration Measurement Capability (±)	Remarks
		10 kV to 80 kV	4.27% to 3.64%	Using HV Divider SEV & kV Meter by Direct Method
4.	**AC CURRENT#**	**45 Hz to 1 kHz**		
		30 µA to 100 mA	0.16% to 0.10%	Using 81/2 Agilent 3458A DMM by Direct Method
		100 mA to 1A	0.10% to 0.14%	
		1 A to 20 A	0.41% to 0.36%	Using 81/2 Agilent 3458A DMM with Agilent shunt By Direct / Comparison Method
5.	**DC RESISTANCE#**	10 mΩ to 10 Ω	0.82% to 0.0028%	Using 81/2 Agilent 3458A DMM by Direct Method
		10 Ω to 10 MΩ	0.0028% to 0.007%	
		10 MΩ to 100 MΩ	0.007% to 0.065%	
		100 MΩ to 1 GΩ	0.065% to 0.58%	
6.	**AC RESISTANC#**	**1kHz**		
		1 Ω to 100 kΩ	0.14% to 0.13%	Using RLC Meter PM6304 By Direct Method
7.	**FREQUENCY#**	1 Hz to 250 MHz	0.024% to 0.0058%	Using Frequency Counter, Agilent 53220A Direct / Comparison Method
8.	**PERIOD#**	5 ns to 2 s	0.06% to 0.03%	Using Frequency Counter, Agilent 53220A Direct / Comparison Method
9.	**CAPACITANCE#**	**1kHz**		
		10 pF to 10 µF	1.16% to 0.23 %	Using RLC Meter PM6304 By Direct Method
		10 µF to 100 µF	0.23%	

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Certificate Number	C-1268	Valid Until	10.09.2017
Last Amended on	-	Page	7 of 8

	Quantity Measured/ Instrument	Range / Frequency	*Calibration Measurement Capability (±)	Remarks
10.	INDUCTANCE#	1kHz 100 µH to 1 H	1.29% to 0.12%	Using RLC Meter PM6304 by Direct Method
11.	TIME#	6 s to 30 min 30 min to 24 Hrs	0.1s to 1.2 s 1.2 s to 4.0 s	Using Digital Timer by Direct Method
12.	PROCESS CALIBRATOR BY SIMULATION METHOD#			
	RTD (PT-100)	-200 °C to 800 °C	0.008 °C to 0.024 °C	Using Multifunction Calibrator, Fluke-5520A
	Thermocouple (K, J, N, E, T, R, S, B, C, L, U)	-200 °C to 1370 °C	0.035°C to 0.032°C	Conversion by using ITS-90 Scale for Ω to °C and mV to °C
13.	CURRENT TRANSFORMER RATIO ERROR / PHASE ERROR$	5 A to 3200 A/ 5 A 2000 A to 6000 A/ 5 A	0.013 % 1.46 min 0.084 % 2.64 min	Using ELTEL Class 0.005 CT and ELTEL AITTS 98 Bridge
14.	CURRENT TRANSFORMER RATIO ERROR/ PHASE ERROR*	5 A to 2000 A/ 5 A 2000 A to 6000 A/ 5 A	0.066 % 3.15 min 0.084 % 2.64 min	Using ELTEL Class 0.05 CT and ELTEL AITTS 98 Bridge
15.	POTENTIAL TRANSFORMER RATIO ERROR/ PHASE ERROR#	6.6 11 22 33 kV/ 110 V	0.10 % 5.15 min	Using Standard PT and ELTEL AITTS 98 Bridge
16.	CT BURDENS#	1.25 VA to 30 VA	1.75 %	Using ELTEL AITTS 98 Bridge

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Certificate Number	C-1268	Valid Until	10.09.2017
Last Amended on	-	Page	8 of 8

	Quantity Measured/ Instrument	Range / Frequency	*Calibration Measurement Capability (±)	Remarks
17.	PT BURDENS#	2.5 VA to 50 VA	2.0 %	Using ELTEL AITTS – 98 Bridge

* Measurement Capability is expressed as an uncertainty (±) 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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