



NABL

**National Accreditation Board for
Testing and Calibration Laboratories**

Department of Science & Technology, India

CERTIFICATE OF ACCREDITATION

FLUID CONTROL RESEARCH INSTITUTE

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

PALAKKAD, KERALA

in the field of

ELECTRO-TECHNICAL CALIBRATION

Certificate Number **C-0254**

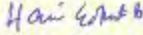
Issue Date **30/11/2009**

Valid Until **30/06/2011**

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


N. Venkateswaran
Convenor


Dr B. Hari Gopal
Director


Dr T. Ramasami
Chairman



रा.प्र.प्र.बो.

राष्ट्रीय परीक्षण और अंशशोधन
प्रयोगशाला प्रत्यायन बोर्ड
विज्ञान एवं प्रौद्योगिकी विभाग, भारत

प्रत्यायन प्रमाण-पत्र

फ्लूइड कंट्रोल रिसर्च इन्स्टीट्यूट

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”

पलक्काड, केरल

में स्थित इसकी सुविधाओं के लिए

विद्युत तकनीकी अंशशोधन

के क्षेत्र में किया गया।

प्रमाण-पत्र संख्या

अ-0254

जारी करने की तिथि

30/11/2009

वैधता की तिथि

30/06/2011

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

एन. वेंकटेश्वरन
एन. वेंकटेश्वरन

संयोजक

डा. हरि गोपाल
डा. वी. हरि गोपाल

निर्देशक

डा. टी. रामसामी
डा. टी. रामसामी

अध्यक्ष



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Quantity Measured / Instrument	Range / Frequency	*Calibration Measurement Capability (\pm)	Remarks
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AT LABORATORY

SOURCE

1. DC VOLTAGE	100 μ V to 1 mV	0.60% - 0.05%	MFC 4808		
	1 mV to 10 mV	0.05% - 0.007%			
	10 mV to 100 mV	0.007% - 0.001%			
	100 mV to 1000 V	0.001%			
2. DC CURRENT	100 μ A to 1 mA	0.014% to 0.006%	MFC 4808		
	1 mA to 100 mA	0.006%			
	100 mA to 10 A	0.006% to 0.024%			
	10 A to 100 A	0.15% to 0.5%		With Amplifier 1620 & 4808	
	100A to 900A	2.0%	9100 with coil		
3. RESISTANCE	1 Ω to 10 Ω	2.5% to 0.003%	MFC 4808		
	10 Ω to 100 Ω	0.003% to 0.001%			
	100 Ω to 100 k Ω	0.001%			
	1M Ω to 10 M Ω	0.003% to 0.006%			
	10 M Ω to 100 M Ω	0.006% to 0.01%			
		10 $\mu\Omega$		0.6%	Standard Resistors Discrete values (Guildline &Fluke)
		100 $\mu\Omega$		0.004%	
		1m Ω		0.0025%	
		10 m Ω		0.0014%	
		1 00 m Ω		0.0006%	
		1,10,25,100 Ω		0.0004%	
		1 ,10 k Ω		0.0007%	
		100 k Ω		0.0007%	
		1M Ω		0.001%	
		10 M Ω		0.002%	
		100 M Ω		0.007%	
	1G Ω	0.015%			
	10 G Ω	0.02%			

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4. AC VOLTAGE	50 Hz to 1kHz		
	1 mV to 10 mV	0.4% to 0.05%	MFC 4808
	10 mV to 100 mV	0.05% to 0.017%	
	100 mV to 1V	0.017% to 0.004%	
	1V to 100 V	0.004% to 0.009%	
	100 V to 1000 V	0.009% to 0.014%	
	1 kHz to 30 kHz		
	1mV to 10 mV	1.25% to 0.27%	
	10 mV to 100 mV	0.27% to 0.12%	
	100 mV to 1V	0.12% to 0.10%	
	1V to 10 V	0.10% to 0.14%	
	10 V to 100V	0.14% to 0.01%	
	30 kHz to 100 kHz		
	1mV to 10 mV	1.25% to 0.26%	
	10 mV to 100 mV	0.26% to 0.12%	
	100 mV to 1V	0.12% to 0.1%	
	1V to 10V	0.1% to 0.14%	
	10 V to 100 V	0.14% to 0.011%	
5. AC CURRENT	50 Hz to 5 kHz		
	100 μ A to 1 mA	0.04% to 0.02%	MFC 4808
	1 mA to 10 mA	0.02% to 0.03%	
	10 mA to 1A	0.03% to 0.04%	
	1A to 10A	0.04% to 0.06%	
	10 A to 100 A	0.06% to 0.3%	With Amplifier 1620 & 4808
	50Hz		
	100 A to 700 A	0.25% to 1.0%	9100 and CC

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Quantity Measured / Instrument	Range / Frequency	*Calibration Measurement Capability (\pm)	Remarks
6. FREQUENCY	1 Hz to 15 MHz	0.3% to 0.0025%	33128 Function Generator
7. AC POWER	50 Hz Single Phase 120, 240 V, 0.01 to 20A 1W to 4.8 kW(upf) 1W to 3.8 kW(0.8pf) 1W to 2.4 kW(0.5pf) 1W to 1.0 kW(0.2pf)	0.8% to 0.2% 3.3% to 0.36% 4.4% to 0.8% 5% to 2.5%	MFC 9100
8. CAPACITANCE	3 nF to 300 nF 300 nF to 3 uF 3 uF to 3 mF 3 mF to 30 mF	2.7% to 1.0% 1.0% to 1.2% 1.2% to 1.5% 1.5% to 3.8%	MFC 9100
9. TEMPERATURE INDICATOR (SIMULATION) THERMOCOUPLE B, C, E, J, K, N, R, S & T	-250 ^o C to 2320 ^o C	0.25 ^o C to 0.6 ^o C	MFC 9100
RTD	-200 ^o C to 850 ^o C	0.15 ^o C to 0.3 ^o C	MFC 4808
<u>MEASURE</u>			
10. DC VOLTAGE	0.1mV to 1mV 1 mV to 1000 V	0.12% to 0.013% 0.013% to 0.0012%	8 ½ DMM 1281
11. DC CURRENT	100 μ A to 100 mA 100 mA to 1A 1 A to 10 A	0.013% 0.013% to 0.026% 0.026% to 0.005%	8 ½ DMM1281 DMM 1281 & Shunt

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Quantity Measured / Instrument	Range / Frequency	*Calibration Measurement Capability (\pm)	Remarks
12. RESISTANCE	10 Ω to 100 k Ω	0.003% to 0.001%	8 ½ DMM 1281
	100 k Ω to 1 M Ω	0.001% to 0.002%	
	1 M Ω to 10 M Ω	0.002% to 0.005%	
	10 M Ω to 100 M Ω	0.005% to 0.05%	
	100 M Ω to 1G Ω	0.05% to 0.5%	
	100 $\mu\Omega$ to 10 k Ω	0.42% to 0.1%	Tinsly 5891 Microohmmeter
13. AC VOLTAGE	50 Hz to 10 kHz		8 ½ DMM 1281
	100 mV to 1V	0.04% to 0.003%	
	1V to 1000 V	0.03%	
	10 kHz to 60 kHz		
	100 mV to 1V	0.11% to 0.07%	
	1V to 100 V	0.07% to 0.09%	
14. AC CURRENT	50 Hz to 5 kHz		8 ½ DMM 1281
	100 μ A to 100 mA	0.06%	
	100 mA to 1 A	0.06% to 0.12%	
	50Hz		DMM1281 & Shunt
	1 A to 10 A	0.12% to 0.035%	
15. FREQUENCY	1 Hz to 600 MHz	1.0 μ Hz to 1.2 Hz	PM6681R & Frequency counter
16. TIME	1 s to 5400 s	0.2 μ s to 6.3 μ s	PM6681R
17. AC POWER SINGLE PHASE	50 Hz		Digital Power Meter (1030M)
	10 W to 13 KW		
	(upf)	0.85%	
	10 V to 650 V		
	1 A to 20 A		

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Quantity Measured / Instrument	Range / Frequency	*Calibration Measurement Capability (\pm)	Remarks
18. TEMPERATURE SIMULATOR (Simulation Method) For Calibration Of Process Calibrators			
THERMOCOUPLE B,C,E,J,K,N,R,S and T	-250°C to 2320°C	0.85°C	Digital Temperature Indicator ASLto150/ Tinsley 5885
RTD	-200°C to 850°C	0.24°C	
<u>AT SITE</u>			
<u>SOURCE</u>			
19. DC VOLTAGE	10 mV to 100 mV 100 mV to 1000 V	0.06% to 0.015% 0.015% to 0.01%	MFC 9100
20. DC CURRENT	100 μ A to 320 μ A 320 μ A to 320 mA 320 mA to 10 A 20 A to 900 A	0.035% to 0.018% 0.018% to 0.025% 0.025% to 0.4% 2.0%	MFC 9100 With 10 & 50 turn coil
21. AC CURRENT	50 Hz to 5 kHz 100 μ A to 320 μ A 320 μ A to 320 mA 320 mA to 20 A 50 Hz 20 A to 700 A	0.45% to 0.17% 0.17% 0.17% to 0.4% 1.0%	MFC 9100 With CC

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Quantity Measured / Instrument	Range / Frequency	*Calibration Measurement Capability (\pm)	Remarks
22. AC VOLTAGE	50 Hz to 1 kHz		
	10 mV to 320 mV	0.35% to 0.07%	MFC 9100
	320 mV to 100 V	0.07%	
	100 V to 750V	0.07%	
	1 kHz to 30 kHz		
	100 mV to 3.2 V	0.15% to 0.1%	
3.2 V to 100 V	0.1% to 0.15%		
30 kHz to 100 kHz			
	320 mV to 100 V	0.3% to 0.55%	
23. DC RESISTANCE	1 Ω to 40 Ω	2.4% to 0.1%	MFC 9100
	400 Ω to 40 k Ω	0.1% to 0.02%	
	400 k Ω to 4 M Ω	0.02% to 0.03%	
	40 M Ω to 300 M Ω	0.03% to 0.6%	
24.AC POWER SINGLE PHASE	120, 240 V, 0.01 to 20A		MFC 9100
	50 Hz		
	1W to 4.8 kW(upf)	0.8% to 0.2%	
	1W to 3.8 kW(0.8pf)	3.3% - 0.4%	
	1W to 2.4 kW(0.5pf)	4.4% to 0.8%	
	1W-1.0 kW(0.2pf)	5% to 2.5%	
25. CAPACITANCE	3 nF to 300 nF	2.7% to 1.0%	MFC 9100
	300 nF to 3uF	1.0% to 1.2%	
	3 uF to 3 mF	1.2% to 1.5%	
	3 mF to 30 mF	1.5% to 3.8%	
26. TEMPERATURE INDICATOR (SIMULATION)			
	Thermocouple B,C,E,J,K,N,R,S and T*	-250°C to 2320°C	0.25°C to 0.6°C
RTD	-200°C to 850°	0.15°C to 0.3°C	

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Quantity Measured / Instrument	Range / Frequency	*Calibration Measurement Capability (\pm)	Remarks
<u>MEASURE</u>			
27. DC VOLTAGE	0.1mV to 1mV 1 mV to 100 mV 100 mV to 1V 1V to 1000 V	4.5% to 0.5% 0.5% to 0.1% 0.1% to 0.007% 0.007%	DMM 34401A
28. AC VOLTAGE	50 Hz to 1kHz 10 mV to 1V 1V to 750 V	0.15% to 0.1% 0.1% to 0.15%	DMM 34401A
29. DC CURRENT	0.1 mA to 10 mA 10 mA to 100 mA 100 mA to 3A	2.5% to 0.07% 0.07% 0.07% to 0.17%	DMM 34401A
30. AC CURRENT	0.1 A to 1.0 A 0.2 1 A to 3 A	0.7% to 0.15% 0.15% to 0.25%	DMM 34401A
31. DC RESISTANCE	10 Ω to 100 Ω 100 Ω to 1M Ω 1 M Ω to 10 M Ω 10 M Ω to 100 M Ω 100 $\mu\Omega$ to 10 k Ω	0.06% to 0.015% 0.015% 0.015% to 0.051% 0.051% to 1.0% 0.45% to 0.1%	DMM 34401A/ Micro ohm meter 5891
32. TIME	1s to 5400 s	30 μ s to 50 ms	5334B/5316B
33. FREQUENCY	1 Hz to 15 MHz	70 μ Hz to 9 Hz	5334B/5316B
34. AC POWER	50 Hz 10W to 13KW (upf) 10 V to 650 V 1A to 20A	0.85%	Power meter WT1030M

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35. TEMPERATURE SIMULATOR (Simulation Method) Thermocouple B,C,E,J,K,N,R,S & T	-250 °C to 2320 °C	0.85°C	Digital Temperature Indicator ASLto150/ Tinsley 5885
RTD	-200 °C to 850 °C	0.24°C	

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

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