Laboratory	**Godrej & Boyce Mfg. Co. Ltd., Lawkim Motors Group, Calibration & Inspection, Plant 18 B, First Floor, Pirojshanagar, Vikhroli, Mumbai, Maharashtra**		
Accreditation Standard	**ISO/IEC 17025: 2005**		
Certificate Number	**CC-2634** ***(In lieu of C-0042, C-0050, C-0065, C-1196)***	**Page**	**1 of 43**
Validity	**28.03.2018 to 27.03.2020**	**Last Amended on**	**29.10.2018**

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
		ELECTRO-TECHNICAL CALIBRATION		
I.	**SOURCE**			
1.	DC Voltage[$]	0.1mV to 1mV 1mV to 10mV 10mV to 100mV 100mV to 100V 100V to 1000V	0.366% to 0.043% 0.043% to 0.004% 0.004% to 0.0014% 0.0014%to 0.0007% 0.0007% to 0.0009%	Using 5720A Calibrator with 8508A by Comparison method Using 5720A Calibrator by Direct Method
	DC Voltage[♣]	0.1mV to 1mV 1mV to 10mV 10mV to 100mV 100mV to 100V 100V to 1000V	0.75% to 0.075% 0.075% to 0.006% 0.006% to 0.0014% 0.0014% to 0.0007% 0.0007% to 0.0009%	Using 5720A Calibrator By Direct Method
2.	AC Voltage[$]	**10Hz to 1kHz** 1mV to 2mV 2mV to 20mV 20mV to 200mV 200mV to 20V 20V to 200V	 0.57% to 0.276% 0.276% to 0.03% 0.03% to 0.018% 0.018% to 0.007% 0.007% to 0.008%	Using 5720A Calibrator by Direct Method
		1kHz to 1MHz 1mV to 2mV 2mV to 20mV 20mV to 200mV 200mV to 10V	 0.57% to 2.3% 0.26% to 1.3% 0.03% to 1.3% 0.007% to 0.37%	Using 5720A Calibrator By Direct Method
		1kHz to 100kHz 10V to 100V	 0.005% to 0.02%	Using 5720A Calibrator By Direct Method

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
		1kHz to 20kHz 100V to 200V	0.01%	Using 5720A Calibrator By Direct Method
		50Hz to 1kHz 200V to 1000V	0.008% to 0.013%	Using 5720A Calibrator By Direct Method
		1KHz to 10KHz 200V to 1000V	0.06% to 0.18%	Using 9100 MFC By Direct Method
	AC Voltage♣	**10Hz to 1kHz** 1mV to 2mV 2mV to 20mV 20mV to 200mV 200mV to 20V 20V to 200V	 0.57% to 0.28% 0.28% to 0.03% 0.03% to 0.018% 0.018% to 0.007% 0.012% to 0.01%	Using 5720A Calibrator By Direct Method
		1kHz to 1MHz 1mV to 2mV 2mV to 20mV 20mV to 200mV 200mV to 10V	 0.57% to 1.5% 0.26% to 0.6% 0.03% to 0.6% 0.007% to 0.37%	
		1kHz to 100kHz 10V to 100V	0.009% to 0.02%	
		1kHz to 20kHz 100V to 200V	0.010%	
		50Hz to 1kHz 200V to 1000V	0.008% to 0.02%	
		1KHz to 10KHz 200V to 1000V	0.06% to 0.18%	Using 9100 MFC By Direct Method

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
3.	DC Current[$]	1µA to 10µA 10µA to 200µA 200µA to 20mA 20mA to 200mA 200mA to 2A	0.82% to 0.09% 0.09% to 0.008% 0.008% to 0.0044% 0.0044% to 0.006% 0.006% to 0.01%	Using 5720A Calibrator By Direct Method
		2A to 20A 20A to 100A	0.023% to 0.05% 0.05% to 0.08%	Using 5720A Calibrator With 52120A Amplifier By Direct Method
		100A to 1000A	0.802%	Using 9100 With Current Coil By Direct Method
	DC Current[♣]	1µA to 10µA 10µA to 200µA 200µA to 20mA 20mA to 200mA 200mA to 2A	0.82% to 0.09% 0.09% to 0.008% 0.008% to 0.0044% 0.0044% to 0.006% 0.006% to 0.01%	Using 5720A Calibrator By Direct Method
		2A to 20A 20A to 100A	0.023% to 0.05% 0.023% to 0.08%	Using 5720A Calibrator With 52120A Amplifier By Direct Method
		100A to 1000A	0.803%	Using 9100 MFC With Current Coil
4.	AC Current[$]	**10Hz to 1kHz** 10µA to 200mA	0.8% to 0.06%	Using 5720A Calibrator By Direct Method
		1kHz to 10kHz 20mA to 200mA	0.06% to 0.133%	
		40Hz to 10kHz 200mA to 2A	0.025% to 1.7%	

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
		50Hz to 1kHz 2A to 20A 20A to 100A	 0.5% to 0.11% 0.5% to 0.11%	Using 5720A Calibrator By Direct Method With 52120A Amplifier
		1kHz to 5kHz 2A to 20A	3.9% to 1.23%	Using 9100 MFC With Current Coil By Direct Method
		50Hz 20A to 1000A	0.703%	
	AC Current[♣]	**10Hz to 1kHz** 10µA to 200mA	0.8% to 0.06%	Using 5720A Calibrator By Direct Method
		1kHz to 10kHz 20mA to 200mA	0.06% to 0.133%	
		40Hz to 10kHz 200mA to 2A	0.025% to 1.7%	
		50Hz to 1kHz 2A to 20A	0.5% to 0.11%	Using 5720A Calibrator With 52120A Amplier
		20A to 100A 1kHz to 5kHz	0.5% to 0.11%	
		2A to 20A 50Hz	3.9% to 1.23%	
		20A to 1000A	0.703%	Using 9100 MFC With Current Coil
5.	Resistance[$]	1Ω 1.9Ω 10Ω	0.012% 0.011% 0.003%	Using 5720A Calibrator by Direct Method

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
		19Ω 100Ω 190Ω	0.003% 0.0012% 0.0012%	
		1kΩ 1.9kΩ 10kΩ 19kΩ 100kΩ 190kΩ 1MΩ 1.9MΩ 10MΩ 19MΩ 100MΩ	0.0012% 0.0013% 0.0012% 0.0012% 0.0012% 0.0013% 0.003% 0.003% 0.005% 0.006% 0.013%	Using 5720A Calibrator By Direct Method
		1GΩ	0.034%	Using Std Resistor By Direct Method
		1Ω to 30Ω 30Ω to 300Ω 300Ω to 1MΩ 1MΩ to 60MΩ 60MΩ to 300MΩ	1.22% to 0.07% 0.07% to 0.03% 0.03% to 0.07% 0.07% to 0.4% 0.55%	Using 9100 Calibrator By Direct Method
		0.001Ω to 0.01Ω 0.01Ω to 0.1 Ω 0.1Ω to 1Ω	2.6% 1.15% 1.15% to 0.8%	Using Decade Resistance Box
		300MΩ to 1GΩ 1GΩ to 1TΩ	1.17% 1.2% to 4.71%	Using Decade Mega Ohm Box

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
	Resistance♣	1Ω 1.9Ω 10Ω 19Ω 100Ω 190Ω 1kΩ 1.9kΩ	0.012% 0.011% 0.003% 0.003% 0.0012% 0.0012% 0.0012% 0.0013%	Using 5720A Calibrator By Direct Method
		10kΩ 19kΩ 100kΩ 190kΩ 1MΩ 1.9MΩ 10MΩ 19MΩ 100MΩ	0.0012% 0.0012% 0.0012% 0.0013% 0.003% 0.003% 0.005% 0.006% 0.013%	Using 5720A Calibrator By Direct Method
		1GΩ	0.034%	Using Std Resistor
		1Ω to 30Ω 30Ω to 300Ω 300Ω to 1MΩ 1MΩ to 60MΩ 60MΩ to 300MΩ	1.2% to 0.07% 0.07% to 0.03% 0.03% to 0.07% 0.07% to 0.4% 0.40%	Using 9100 MFC
		0.001Ω to 0.01Ω 0.01Ω to 0.1 Ω 0.1Ω to 1Ω	2.6% 1.13% 1.13% to 0.8%	Using Decade Resistance Box
		300MΩ to 1GΩ 1GΩ to 1TΩ	1.17% 1.2% to 4.71%	Using Decade Mega Ohm Box

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
6.	Temperature Simulation[$]			Using 5720A Calibrator By Direct Method
	J- Type	(-) 210 °C to 1200 °C (-)8.095 mV to 9.553 mV	0.029°C	
	K-Type	(-) 270 °C to 1372 °C (-)6.458 mV to 54.886 mV	0.036°C	
	T-Type	(-) 270 °C to 400°C (-) 6.258 mV to 20.872mV	0.031°C	
	E-Type	(-) 270 °C to 1000°C (-) 9.835 mV to 76.373mV	0.28°C	
	N-Type	(-) 270 °C to 1300°C (-) 4.345 mV to 47.513mV	0.047°C	
	R-Type	(-) 50 °C to 1768°C (-) 0.226 mV to 21.101mV	0.117°C	
	S-Type	(-) 50 °C to 1768°C (-) 0.236 mV to 18.693mV	0.12°C	
	B-Type	200 °C to 1820°C 0 to 13.820mV	0.217°C	
	C-Type	200 °C to 2320°C (3 mV to 37.066mV	0.037°C	
	U-Type	(-) 200 °C to 600°C (-) 5.7 mV to 34.31mV	0.026°C	
	L-Type	(-) 200 °C to 900°C (-) 8.15 mV to 53.14 mV	0.016°C	
	RTD	(-) 200 °C to 850°C	0.24 °C to 0.56 °C	Using MC2 Calibrator By Direct Method
	Temperature Indicators/ Recorders/ Controllers[♣]			
	J- Type K-Type T-Type E-Type N-Type R-Type S-Type B-Type	(-)200°C to 1200°C (-)200°C to 1372°C (-)200°C to 400°C (-)200°C to 1000°C (-)200°C to 1300°C 0°C to 1700°C 0°C to 1700°C 200°C to 1800°C	0.4°C 0.5°C 0.4°C 0.4°C 0.5°C 1.1°C 0.9°C 3.1°C	Using MFC MC2 (ITS90) By Direct Method

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
	C-Type U-Type L-Type RTD	200°C to 2300°C (-)200°C to 600°C (-)200°C to 900°C (-)200°C to 800°C	1.6°C 0.5°C 0.4°C 0.24°C to 0.56°C	
7.	Frequency[$]	4 Hz to 10 MHz	0.06% to 0.006%	Using 9100 MFC By Direct Method
	Frequency[♣]	10 Hz to 10 MHz	0.06% to 0.006%	Using 9100MFC By Direct Method
8.	Capacitance[$]	**1 kHz** 100pF to 900pF 1nF to 9nF 10nF to 900nF 1µF to 90µF	 7% to 1.8% 1.9% to 1.2% 1.2% to 1.8% 0.88% to 1.18%	Using DCB By Direct Method
		30µF to 3mF	0.81% to 0.7%	Using 9100 MFC By Direct Method
	Capacitance[♣]	**1kHz** 100pF to 900pF 1nF to 9nF 10nF to 900nF 1µF to 90µF 30µF to 3mF	 7% to 1.8% 1.9% to 1.2% 1.2% to 1.8% 0.88% to 1.18% 0.81% to 0.74%	Using DCB By Direct Method Using 9100MFC By Direct Method
9.	Inductance[$]	**1kHz** 1mH to 10H	 3.50%	Using Decade Inductance Box By Direct Method
	Inductance[♣]	**1kHz** 1mH to 10H	 3.5%	Using Decade Inductance Box By Direct Method

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
10.	Power[$] (1 Phase)	**50Hz at unity PF** **120V/240V** 0.01A to 20A	0.5% to 0.75%	Using 9100 MFC By Direct Method
		50Hz at 0.5 PF **120V/240V** 0.1A to 20A	1.17% to 1.2%	
		50Hz at 0.8 PF **120V/240V** 0.1A to 20A	0.83%	
		50Hz at 0.2 PF **120V/240V** 0.1A to 20A	2.5%	
		50Hz at 0.1 PF **120V/240V** 0.1A to 20A	5.0%	
	Power[$] (1 Phase)	**50Hz at unity PF** 120V/240V 0.01A to 20A	0.5% to 0.75%	Using 9100 MFC By Direct Method
		50Hz at 0.5 PF 120V/240V 0.1A to 20A	1.17% to 1.2%	
		50Hz at 0.8 PF 120V/240V 0.1A to 20A	0.83%	
		50Hz at 0.2 PF 120V/240V 0.1A to 20A	2.5%	
		50Hz at 0.1 PF 120V/240V 0.1A to 20A	5%	

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
11.	Power Factor[$]	0.25PF to 1PF	0.03PF	Using 9100 MFC By Direct Method
	Power Factor[♣]	0.25PF to 1 PF	0.03PF	
12.	Oscilloscope[$] Calibration Vertical Deflection (square wave @ 1kHz freq.& DC function) Horizontal Deflection (Time Base) Bandwidth	 10mV to 120V 10nS to 1S Up to 250 MHz	 0.4% 0.1% to 0.3% 6.3%	Using 9100 MFC By Direct Method
	Oscilloscope Calibration[♣] Vertical Deflection (square wave @ 1kHz freq.& DC function) Horizontal Deflection (Time Base) Bandwidth	 10mV to 120V 10nS to 1S Up to 250MHz	 0.4% 0.1% to 0.3% 6.3%	Using 9100 MFC By Direct Method
II.	**MEASURE**			
1.	DC Voltage[$]	0.1mV to 10mV 10mV to 100mV 100mV to 1000V	0.13% to 0.013% 0.013% to 0.0008% 0.0008%	Using 8508A DMM By Direct Method
	DC Voltage[♣]	0.1mV to 10mV 10mV to 100mV 100mV to 1000V	0.13% to 0.013% 0.013% to 0.0008% 0.0008%	Using 8508a DMM by Direct Method

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
2.	High Voltage[$]	1kV to 15kV	1.6 % to 2.1%	Using HV Divider By Direct Method
	High Voltage[♣]	1kV to 15kV	1.6 % to 2.1%	Using HV Divider
3.	DC Current[$]	1µA to 10µA 10µA to 10mA 10mA to 1A 1A to 20A	0.06% to 0.006% 0.006% to 0.0023% 0.0023% to 0.021% 0.021% to 0.065%	Using 8508A DMM By Direct Method
		20A to 30A	0.15%	Using Power Meter WT3000 By Direct Method
		30A to 100A	0.9%	Using DC Shunt And 8508A DMM By Direct Method
	DC Current[♣]	1µA to 10µA 10µA to 10mA 10mA to 1A 1A to 20A	0.06% to 0.006% 0.006% to 0.0023% 0.0023% to 0.021% 0.021% to 0.065%	Using 8508A DMM By Direct Method
		20A to 30A	0.15%	Using Power Meter WT3000
		30A to 100A	0.9%	Using DC Shunt And 8508A
4.	AC Voltage[$]	**10Hz to 1kHz** 1mV to 2mV	0.72%	Using 5790A AC Measurement Standard By Direct Method
		2mV to 20mV 20mV to 200mV 200mV to 20V 20V to 60V	0.72% to 0.013% 0.017% to 0.004% 0.008% to 0.003% 0.008% to 0.0035%	

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
		1kHz to 1MHz 1mV to 2mV 2mV to 20mV 20mV to 200mV 200mV to 20V	 0.13% to 1.3% 0.09% to 0.34% 0.013% to 0.25% 0.003% to 0.13%	
		1kHz to 300kHz 20V to 60V	0.003% to 0.02%	
		40Hz to 1kHz 60V to 1000V	0.008% to 0.004%	
		1kHz to 100kHz 60V to 600V	0.0035% to 0.06%	
		1kHz to 20kHz 600V to 1000V	0.0038% to 0.01%	
	AC Voltage*	**10Hz to 1kHz** 1mV to 2mV 2mV to 20mV 20mV to 200mV 200mV to 20V 20V to 60V	 0.72% 0.72% to 0.013% 0.017% to 0.004% 0.008% to 0.003% 0.008% to 0.0035%	Using 5790A AC Measurement Standard By Direct Method
		1kHz to 1MHz 1mV to 2mV 2mV to 20mV 20mV to 200mV 200mV to 20V	 0.13% to 1.3% 0.09% to 0.34% 0.013% to 0.25% 0.003% to 0.13%	
		1kHz to 300kHz 20V to 60V	0.003% to 0.02%	
		40Hz to 1kHz 60V to 1000V	0.008% to 0.004%	

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
		1kHz to 100kHz 60V to 600V	0.0035% to 0.06%	
		1kHz to 20kHz 600V to 1000V	0.0038% to 0.01%	
		50Hz 1kV to 100kV	1.8% to 2%	Using HV Divider With KV Meter
	AC High Voltage[$]	**50Hz** 1kV to 100kV	1.8% to 2%	Using HV Divider With KV Meter By Direct Method
5.	RF Power[$] (Without VSWR)	**1MHz to 1GHz** (-) 30dBm to 15dBm	0.25dBm to 1.3dBm	Using RF Milli Voltmeter URV55 By Direct Method
	RF Power[♣] (Without VSWR)	**1MHz to 1GHz** (-) 30 dBm to 15 dBm	0.25dBm to 1.3dBm	Using RF Millivoltmeter URV55 By Direct Method
6.	AC Current[$]	**10Hz to 1kHz** 10µA to 200mA 200mA to 2A 2A to 20A	0.3 % to 0.05 % 0.05 % to 0.07 % 0.07 % to 0.13 %	Using 8508A DMM By Direct Method
		10Hz to 400Hz 2mA to 20A	0.023 % to 0.06 %	Using 5790A AC Measurement Standard And A40/A40A Shunts By AC/DC Transfer Method
		400Hz to 10kHz 2 mA to 20 A	0.023 % to 0.06 %	
		50Hz 20A to 100A	0.3 % to 0.1 %	Using HC 3100 Precision Power Testing Instrument By Direct Method

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
	AC Current♣	**10Hz to 1kHz** 10µA to 200mA 200mA to 2A 2A to 20A	 0.3% to 0.05% 0.05% to 0.07% 0.07% to 0.13%	Using 8508A DMM By Direct Method
		10Hz to 10kHz 2mA to 20A	0.023% to 0.06%	Using 5790A AC Measurement Standard And A40/A40A Shunt By AC/DC Transfer Method
		50Hz 20A to 100A	0.3% to 0.1%	Using HC 3100 Precision Power Testing Instrument By Direct Method
7.	Resistance$	1mΩ to 1Ω 1Ω to 10Ω 10Ω to 10MΩ 10MΩ to 100MΩ 100MΩ to 10GΩ	0.61% to 0.006% 0.006% to 0.0013% 0.0013% to 0.0031% 0.0031% to 0.02% 0.02% to 0.23%	Using 8508A DMM By Direct Method
	Resistance♣	1mΩ to 1Ω 1Ω to 10Ω 10Ω to 10MΩ 10MΩ to 100MΩ 100MΩ to 10GΩ	0.61% to 0.006% 0.006% to 0.0012% 0.0012% to 0.003% 0.003% to 0.016% 0.016% to 0.17%	Using 8508A By Direct Method
8.	Inductance$	**1kHz** 100µH to 10H	 0.32% to 0.17%	Using LCR Meter 43100 by Direct Method
	Inductance♣	**1kHz** 100µH to 10H	 0.32% to 0.17%	Using LCR Meter 43100 By Direct Method

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
9.	Capacitance[$]	**1kHz** 1pF to 1mF **100Hz** 10µF to 1F	0.68% to 0.17% 0.12% to 0.5%	Using LCR Meter 43100 By Direct Method
	Capacitance[♣]	**1kHz** 1pF to 1mF	0.68% to 0.17%	Using LCR Meter 43100 By Direct Method
		100Hz 10µF to 1F	0.12% to 0.5%	
10.	Frequency[$]	1Hz to 3GHz	0.002% to 0.0008%	Using Timer/Counter CNT91CNT-91 By Direct Method
	Frequency[♣]	1Hz to 3GHz	0.002% to 0.0008%	Using Timer/Counter CNT91 By Direct Method
11.	Time[$] (Pulse Width)	1nS to 10S	0.06% to 0.0024%	Using Timer/Counter CNT91 By Direct Method
	Time[♣] (Pulse Width)	1nS to 10S	0.06% to 0.0024%	Using Timer/Counter CNT91 CNT-91 By Direct Method
12.	Temperature Simulation[$]			Using 8508A DMM By Direct Method
	J- Type	(-)210 °C to 1200°C (-)8.095 mV to 69.553 mV	0.012°C	
	K-Type	(-)210 °C to 1372°C (-)6.0346 mV to 54.886 mV	0.012 °C	

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
	T-Type	(-)200 °C to 400°C (-)5.602961 mV to 20.872 mV	0.01 °C	
	E-Type	(-)200 °C to 1000°C (-)9.835 mV to 76.373 mV	0.012 °C	
	N-Type	(-)200 °C to 1300 °C (-)4.345 mV to 47.513mV	0.014 °C	
	R-Type	(-)50 °C to 1768°C (-)0.226 mV to 21.101mV	0.054 °C	
	S-Type	(-)50 °C to 1768°C (-)0.236 mV to 18.693mV	0.031 °C	
	B-Type	200 °C to 1820°C 0.178 mV to 13.820mV	0.061°C	
	C-Type	200 to 2320°C 3 mV to 37.066mV	0.022°C	
	U-Type	(-)200 to 600°C (-)5.7 mV to 34.31mV	0.012 °C	
	L-Type	(-)200 to 900°C (-) 8.15 mV to 53.14mV	0.012 °C	
	RTD	(-)200 °C to 850 °C 18.52Ω to 390.48Ω	0.006°C to 0.01°C	
13.	AC Power[$]	**50Hz** **(120V,240V)** 1.2W to 7.2kW (UPF) 0.96W to 5.76kW (0.8 PF) 0.72W to 4.32kW (0.6 PF) 0.48W to 2.88kW (0.4 PF) 0.24W to 1.44kW (0.2 PF) 0.12W to 0.72kW (0.1 PF)	 2.92% to 0.08% 2.92% to 0.12% 2.92% to 0.13% 2.92% to 0.16% 2.92% to 0.24% 3.35% to 0.4%	Power Analyser WT3000 By Direct Method

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
	AC Power♣	**50Hz** **(120V,240V)** 1.2W to 7.2kW (UPF) 0.96W to 5.76kW (0.8 PF) 0.72W to 4.32kW (0.6 PF) 0.48W to 2.88kW (0.4 PF) 0.24W to 1.44kW (0.2 PF) 0.12W to 0.72kW (0.1 PF)	 2.92% to 0.08% 2.92% to 0.12% 2.92% to 0.13% 2.92% to 0.16% 2.92% to 0.24% 3.35% to 0.4%	Using Power Analyser WT3000 By Direct Method
14.	DC Power$	**(1V to 1000V)** **(100mA to 20A)** 0.5mW to 20kW **(50Hz)**	 3.8% to 0.3%	Using Power Analyser WT3000 By Direct Method
	DC Power♣	**(1V to 1000V)** **(100mA to 20A)** 0.1mW to 20kW	 3.8% to 0.3%	Using Power Analyser WT3000 By Direct Method
15.	Power Factor$	0.1 to UPF	0.03 PF	Using Power Analyser WT3000 By Direct Method
	Power Factor ♣	0.1 to UPF	0.03 PF	
16.	Phase Angle$	0 to 120° 120° to 360	1.11° to 0.61° 0.61° to 1.11°	Using Phase Angle Meter By Direct Method
	Phase Angle♣	0 to 120° 120° to 360	1.11° to 0.61° 0.61° to 1.11°	Using Phase Angle Meter By Direct Method

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
17.	Time[$]	200ms to 1s 1s to 60s 60s to 1hr 1hr to 5hr 5hr to 27hr	0.0252s 0.0252s to 0.03s 0.03s to 0.14s 0.14s to 6s 6s to 21s	Using Time Interval Meter By Direct Method
	Time[♣]	200ms to 1s 1s to 60s 60s to 1hr 1hr to 5hr 5hr to 27hr	0.0252s 0.0252s to 0.03s 0.03s to 0.14s 0.14s to 6s 6s to 21s	Using Time Interval Meter By Direct Method
18.	3 Phase Active Energy[$]	60V to 240V 0.1A to 5 A UPF @ 50Hz	0.1%	Using 3 Phase Power Testing Instrument By Direct Method
	3 Phase Energy[♣]	**50 Hz** 60V to 240V 0.1A to 5 A @ UPF	0.1%	Using 3 Phase Power Testing Instrument By Comparison
19.	Power[♣] (Single Phase)	50Hz , UPF 60V to 240V 1A to 100 A	0.1%	Using 3 Phase Power Testing Instrument By Comparison

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
		FLUID FLOW CALIBRATION		
1.	Fluid Flow[$]	5 sccm to 50 sccm 50 sccm to 100 sccm 100 sccm to 1slpm 1slm to 2 slpm 2 slm to 50 slpm 50 slpm to 100 slpm	0.40% Rdg 0.40% Rdg 0.42% Rdg 0.42% Rdg 0.41% Rdg 0.48% Rdg	Using Using Fluke Make Molbloc-L Laminar Element And Mass Flow Terminal By Comparison Method

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
	MECHANICAL CALIBRATION			
I.	**DIMENSION (BASIC MEASURING INSTRUMENT, GAUGE ETC.)**			
1.	External Micrometer[$] L.C.: 0.001 mm	Up to 100 mm 100 mm to 200 mm 200mm to 400 mm 400mm to 600 mm 600 mm to 800 mm 800 mm to 1000 mm	1.8 µm 2.6 µm 4.5µm 6.5µm 8.9µm 11.0µm	Using Slip Gauge Set Grade ' 0', Circular Steel Length Bar Optical Flat & Parallels
2.	Groove Micrometer[$] L.C.: 0.01 mm	Up to 100 mm	6.6µm	Using Slip Gauge Set Grade' 0
3.	V Anvil Micrometer[$] L.C.: 0.001mm	Up to 100 mm	8.8µm	Using Cylindrical Setting Master
4.	Master Rod/ Length Bar[$]	25 to 200 mm 200mm to 400 mm 400mm to 600 mm 600mm to 1000 mm	2.8µm 4.6µm 7.1µm 12.3µm	Using Slip Gauge Set Grade '0',Circular Steel, Length Bar, Electronic Comparator with Probe
5.	Inside Micrometer[$] Rang 50 to 1000 mm (Two Points) L.C.: 0.01 mm Extension Rod	 50mm to 100 mm 13mm to 500 mm 500mm to 1000 mm	 6.7µm 6.4µm 11.0µm	Using Slip Gauge Set Grade '0', Slip Gauge Accessories Circular Steel, Length Bar, Electronic Comparator with Probe
6.	Depth Micrometer[$] L.C.: 0.001 mm	Up to 300 mm	3.5µm	Using Slip Gauge Set Grade '0'

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
7.	Micrometer Head[$] L.C.: 0.001 mm	Up to 50 mm	3.0 µm	Using Electronic Comparator & Optical Flat
8.	Dial /Digimatic / Vernier Caliper[$] L.C.: 0.01 mm L.C.: 0.02 mm	Up to 300 mm 300 mm to 600 mm 600 mm to 1000 mm 1000 mm to 2000 mm	9.1 µm 10.4 µm 12.3 µm 15.5 µm	Using Caliper Checker Slip Gauge Set Circular Steel Length Bar Grade‘0’
9.	Dial / Digimatic / Vernier Height Gauge[#] L.C.: 0.0001 mm	Up to 300 mm 300 mm to 600 mm 600 mm to 1000 mm	3.4 µm 7.3 µm 8.3 µm	Using Caliper Checker Slip Gauge Set Circular Steel Length BarGrade‘0’
10.	Dial /Digimatic / Vernier Depth Gauge[$] L.C.: 0.01 mm	Up to 300 mm	8.0 µm	Using Slip Gauge Set Grade‘0’
11.	Dial Indicator[$] (Plunger) L.C.: 0.001 mm	Up to 25 mm 25 mm to 100 mm	2.3 µm 2.6 µm	Using Dial Calibration Tester & Electronic Comparator with Probe,
12.	Dial Indicator[$] (Lever) L.C.: 0.001mm	Up to 2 mm	1.3 µm	Using Calibration Tester & Electronic Comparator with Probe

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
13.	Dial Comparator / Mikrokator[$] L.C.: 0.0005 mm	(-)0.05mm to 0.05 mm	1.2 µm	Using Dial Calibration Tester & Electronic Comparator with Probe
14.	Dial Bore Gauge / Bore Gauge[$] (For Transmission)	Up to 2 mm	1.4 µm	Using Dial Calibration Tester & Electronic Comparator with Probe
15.	Dial Bore Gauge/ Bore Gauge[$] (Split/Circular Type) For Transmission	Up to 2 mm	3.0 µm	Using Slip Gauge Set Grade'0'& Slip Gauge Accessories Set
16.	Dial Thickness Gauge[$] L.C.: 0.001 mm	Up to 1 mm	1.3 µm	Using Slip Gauge Set Grade ' 0
17.	Inside Dial Caliper[$] L.C.: 0.001 mm Out Side Dial Caliper/ Pistol Caliper L.C.: 0.001 mm	5mm to 100 mm 0 to 100 mm	5.8 µm	Using Slip Gauge set
18.	Dial Calibration Tester[$] L.C.: 0.0001 mm	Up to 25 mm	1.3 µm	Using Electronic Comparator with Probe
19.	Plain Plug Gauge / Height Master Gauge/ Width Gauge[$]	1 mm to 100 mm 100 mm to 200 mm 200 mm to 300 mm	2.0 µm 2.5 µm 5.0 µm	Using Slip Gauge Set Grade ' 0', Electronic Comparator with Probe

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
20.	Pin Gauge/Thread Measuring Wire[$]	0.29 mm to 25 mm	1.4µm	Using Slip Gauge Set Grade ' 0', Electronic Comparator with Probe
21.	Cylindrical Setting Master/O.D. Gauge[$]	3mm to 200 mm	2.0µm	Using Slip Gauge Set Grade ' 0', Electronic Comparator with Probe
22.	Snap Gauge / Gap Gauge[$]	1 mm to 100 mm 100 mm to 200 mm 200 mm to 300 mm 300 mm to 400 mm	2.5 µm 3.2 µm 4.0 µm 8.3 µm	Using Slip Gauge Set Grade ' 0'
23.	Plain Ring Gauge[$]	3mm to 100 mm	1.2µm	Length Measuring Machine
24.	Thread Plug Gauge[$] (Parallel) (Metric, G,Bsp, Unified)	3mm to 100 mm 100 mm to 160 mm	4.0 µm 4.0 µm	Using Floating Carriage Diameter Measuring Machine, Thread Measuring Wire, Cylindrical Master
25.	Thread Plug Gauge[$] (Taper)	Up to 100 mm	3.6µm	Using Floating Carriage Diameter Measuring Machine, Thread Measuring Wire, Cylindrical Master
26.	Thread Ring Gauge[$] (Metric,G,Bsp, Unified)	4 mm to 100 mm	1.5µm	Using Length Measuring Machine with Master Setting Ring
27.	Bevel/Degree Protractor/ Clinometer[$] L.C.: 1 Sec.	Up to 360^{o}	4.0 Sec	Using Angle Gauge

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
28.	Combination Set[$] L.C.: 1°	0 to 180°	43.7min	Using Angle Gauge
29.	Engineer's Parallel/ Rectangular Block[$]	Length Up to 300mm	4.0 µm	Using Electronic Comparator with Probe
30.	'V' Block[$] Flatness/Parallelism/ Squareness/ Symmetry	Length Up to 300 mm	5.4µm	Using Electronic Comparator with Probe & Cylindrical Mandrel
31.	Coating Thickness Gauge[$] L.C.: 0.001 mm	Up to 6000 µm	3.0 µm	Using Master Foils
32.	Ultrasonic Thickness Gauge[$] L.C.: 0.1 mm	Up to 100 mm	71µm	Using Slip Gauge
33.	Foils[$]	0.005mm to 12 mm	1.3µm	Using Electronic Comparator with Probe
34.	Feeler Gauge[$]	0.01mm to 2 mm	1.8µm	Using Digimatic Micrometer
35.	Scale[$]	Up to 2000mm	$231x\sqrt{\frac{L}{1000}}$ µm L in mm	Using Scale & Tape Calibrator
36.	Tape / Pie Tape[$]	Up to 100meter	$232 x\sqrt{\frac{L}{1000}}$ µm L in mm	Using Scale & Tape Calibrator

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
37.	Surface Plate[#]	2500 X 2500	1.4 x $\sqrt{\frac{L+W}{100}}$ µm (L&W in mm)	Using Electronic Level
38.	Straight Edge[#]	Up to 600 mm 600 mm to1200 mm	12.1µm 17.7µm	Using Slip Gauge Set Grade ' 0' & Surface Plate
39.	L Square /Granite Square / Engineer Square[$]	Length : Up to 500 mm	8.0µm	Using Digital Height Gauge
40.	Electronic Blue Level/ Spirit Level[$] L.C.: 0.001 mm/m	Length Upto 300 mm	12.6µm/m	Using slip Gauge set &sine bar & Electronic Blue Level
41.	Sine Bar /Sine Center/Sine Table[$] Parallelism Angle	Angle 0 to 90°	7.7 µm	Using Slip Gauge Set Grade ' 0' Dial Indicator (L) Electronic Comparator with Probe and Angle Gauge
42.	Slip Gauge Carbide[$]	Up to 25 mm 25 mm to 50 mm 50 mm to 75 mm 75 mm to 100 mm	0.11µm 0.14µm 0.17µm 0.21µm	Using Slip Gauge Set Grade ' K' & Grade '0' Slip Gauge Calibrator
43.	Slip Gauge Steel[$]	Up to 25 mm 25 mm to 50 mm 50 mm to 75 mm 75 mm to 100 mm	0.15µm 0.22µm 0.27µm 0.39µm	Using Slip Gauge Set Grade ' K' & Slip Gauge Calibrator
44.	Slip Gauge Accessories[$]	Up to 300 mm	2.0 µm	Using Slip Gauge Set Grade '0' Dial Indicator (L)

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
45.	Electronic Comparator/ Indicator With Probe/ Lvdt[$] L.C.: 0.1 µm	Up to 25 mm	0.6 µm	Using Slip Gauge Set Grade ' K'
46.	Radius Gauge/ Radius Template/ Thread Pitch Gauge[$]	Up to 40 mm	11.7µm	Using Profile Projector
47.	Test Sieves/ Flakiness Sieves[$]	0.032 mm to 25 mm	10µm	Using Profile Projector
48.	Wire Gauge[$]	0.025mm to 10mm	8.0 µm	Using Profile Projector
49.	Hegman Gauge[$]	0 to 100µm	2.4µm	Using Electronic Comparator with Probe
50.	Glass Scale[$] L.C.: 0.1 mm	Up to 200 mm	9.0µm	Using Profile Projector
51.	Protractor/ Set Square[$] L.C.: 1deg	Up to 360°	3.4 min	Using Profile Projector
52.	Taper Scale[$] L.C.: 0.1 mm	0.4mm to 100mm	10.0µm	Using Profile Projector
53.	Weld Fillet Gauge[$]	Up to 50mm	49 µm	Using Profile Projector
54.	Comparator Stand For Flatness[$]	300 mm x 300 mm / Dia: 300 mm	3.4 µm	Using Electronic Comparator with Probe & Slip Gauge Set Grade ' 0'

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
55.	Weld Gauge Scale / Depth Angle[$]	Up to 50 mm Upto 60°	57.7 µm 6'20"	Using Slip Gauge Set Grade '0' Tape & Scale Calibrator; Profile Projector
56.	Profile Projector[#] Linear L.C.: 0.001 mm Angular L.C.: 1 Sec. Magnification	 Up to 200 mm 0 to 360^{o} 10X ,20X 50X,100X	 5.62 µm 2.35 ' 0.28%	Using Slip Gauge Set Grade ' 0',Linear Graticule,Glass Angular Graticule, Measuring Scale Glass
57.	Length Measuring Machine[#] L.C.: 0.0001 mm	Up to 100 mm	0.51µm	Using Slip Gauge K-Grade Set
58.	Tape & Scale Calibrator[#] L.C.: 0.005 mm	Up to 1000 mm	10.5µm	Using Slip Gauge Set
59.	Caliper Checker[$]	0 to 660 mm	3.70µm	Using Slip Gauge Set & Digital Height Gauge
60.	Slip Gauge Calibrator[#] L.C:0.01µm	0 to 100 mm	0.15µm	Using Bridge Slip Gauge Set K-Grade
61.	Centre Distance Gauge/ Centrimeter[$] L.C.: 0.01mm	Up to 600 mm	10.0 µm	Using Slip Gauge Set Grade'0' & Slip Gauge Accessories & Caliper Checker

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
62.	Angle Plate Flatness, Parallelism, Squareness[$]	Length: Up to 300 mm	8.3µm	Using Digital Height Gauge
II.	**ACCELERATION & SPEED**			
1.	Tachometer (Non Contact)/RPM Source/Centrifuge [#]	10 r/min to 100 r/min 100 r/min to 1000 r/min 1000 r/min to 5000 r/min 5000 r/min to 10000 r/min 10000 r/min to 60000 r/min 60000 r/min to 90000 r/min	0.63 r/min 1.52 r/min 1.97r/min 2.85r/min 3.71r/min 4.26r/min	Using Digital Tachometer
2.	Tachometer (Contact) [#]	10 r/min to 100 r/min 100 r/min to 1000 r/min 1000 r/min to 3000 r/min	1.9 r/min 2.3 r/min 2.9 r/min	Using Digital Tachometer & Tacho Calibrator
3.	Vibration [#] Acceleration Velocity Displacement	 Up to 190 m/s² (10 Hz to 5000 Hz) Up to 375 mm/s (15 Hz to 1000 Hz) Up to 1250 µm (15 Hz to 1000 Hz)	 5.5% 4.1% 4.4%	Using Vibration Calibrator
III.	**PRESSURE INDICATING DEVICES**			
1.	Pneumatic Pressure Indicating Devices, Pressure Transmitter [#]	0 to 150 mbar (g)	(0.0047+ 6.88E-5 xP) mbar	Using Low Pressure Controller By Comparison Method.(DKD-R-6-1)

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
		0.15 to 3.5 bar (g) 3.5 to 70 bar (g)	0.0081% rdg 0.011% rdg	Using Piston Gauge PC-7100/7600 By Comparison Method.(DKD-R-6-1)
2.	Hydraulic Pressure Indicating Devices, Pressure Transmitter #	2 to 70 bar (g) 70 to 2000 bar (g	0.011 % rdg 0.0092% rdg	Using Piston Gauge PC-7300 By Comparison Method (DKD-R-6-1)
3.	Absolute Pressure Pressure Indicating Devices, Pressure Transmitter #	0.08 to 3.5 bar (abs) 3.5 to 70 bar (abs)	0.02 % rdg 0.024% rdg	Using Piston Gauge PC-7100/7600 By Comparison Method (DKD-R-6-1)
4.	Vacuum Indicating Devices, Vacuum Transmitter #	0 to (-) 150 mbar (g) (-) 0.15 to (-) 0.95 bar(g)	(0.0047+ 6.97E-5 xP) mbar 0.04 % rdg	Using Low Pressure Controller By Comparison Method (DKD-R-6-1) Using DWT-P3025-I By Comparison Method (DKD-R-6-1)
5.	Pneumatic Dead Wt. Tester #	0.1 to 3.5 bar (g) 5 to 70 bar (g)	0.007%rdg 0.008%rdg	Using Piston gauge PC-7100/7600 By Cross Float Method.(Euramet cg-3)
6.	Hydraulic Dead Wt Tester $	3.5 to 70 bar (g) 70 to 1750 bar (g)	0.008% rdg 0.007% rdg	Using Piston gauge PC-7300 By Cross Float Method (Euramet cg-3)
7.	Pressure $	0 to 10 mbar (g)	0.021 mbar	Using Multifunctional Calibrator with Ext. Sensor

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
		10 to 200 mbar (g) 0.2 to 2 bar (g) 2 to 20 bar (g) 20 to 160 bar (g) 160 to 400 bar (g) 400 to 1000 bar (g	0.17 mbar 0.003 bar 0.02 bar 0.07 bar 0.37 bar 0.57 bar	Using Low Pressure Calibrator Using Multifunctional Calibrator with Int. & Ext. Sensor By Comparison Method (DKD-R-6-1)
8.	Vacuum[♣]	0 to (-) 200 mbar(g) (-) 0.2 to (-) 0.95 bar(g)	0.176 mbar 1 mbar	Using Low Pressure Calibrator Using Digital Vacuum Gauge By Comparison Method (DKD-R-6-1)
IV.	**WEIGHTS**			
1.	Mass[$]	1mg 2mg 5mg 10mg 20mg 50mg 100mg 200mg 500mg 1g 2g 5g 10g 20g 50g 100g 200g	0.01mg 0.01mg 0.01mg 0.01mg 0.01mg 0.02mg 0.02mg 0.02mg 0.02mg 0.04mg 0.03mg 0.03mg 0.03mg 0.04mg 0.04mg 0.10mg 0.33mg	Using Standard Weight of E_2 Class (1mg to 10kg), & Electronic Balance (Readability: 0.01/0.1mg.) F1 Class Weights (500g to 10kg)& M1 Class Weights (500g to 20kg) & Electronic Balance (Readability: 0.001/0.01g/0.1g.) By Substitution Method as per OIML R111-1:2004

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
		500g 1kg 2kg 5kg 10kg 20kg 50kg	1.00mg 2.69mg 0.01g 0.01g 0.10g 0.10g 24.4g	
V.	**WEIGHING SCALE AND BALANCE**			
1.	Electronic Weighing Balance [#] Readability : 0.01mg 0.10mg 1.00mg 10.00mg 0.1g 20.0g	 1mg to 100g 100g to 200g 200g to 500g 500g to 1000g 1kg to 5kg 5kg to 10kg 10kg to 30kg 30kg to 50kg 50kg to 100kg 100kg to 200kg 200kg to 300kg	 0.11mg 0.17mg 1.00mg 2.80mg 9.90mg 0.09g 0.24g 14.47g 14.74g 18.70g 28.25g	Using Standard Weight of E_2 Class (1mg to 10kg), F1 Class Weights (500g to 10kg) & M1 Class Weights (500g to 20kg) & Cl Weight above 200kg By comparison Method as per OIML R 76-1:2006
VI.	**VOLUME**			
1.	Piston-Operated Apparatus[$] (Micropipette)	10µl to 100µl 100 to 500µl 500µl to 1000µl 1ml to 2ml 2ml to 5ml 5ml to 10ml	0.05µl 0.04µl 0.11µl 0.19µl 0.47µl 0.46µl	Using Electronic Weighing Balance (Range : 0 to 100g Readability: 0.01mg) & distilled water By Gravimetric Method

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
	Dispenser[$]	10ml to 100ml	3.63µl	as per ISO8655-6:2002
2.	Burette[$]	0.1ml to 25ml 25ml to 50ml 50ml to 100ml	0.24µl 0.49µl 0.94µl	Using Electronic Weighing Balance (Readability: 0.01/0.1mg) & Distilled Water By Gravimetric Method as per ISO 4787:2010 &
3.	Pipette[$]	0.1ml to 5ml 5ml to 10ml 10ml to 25ml	0.19µl 0.17µl 0.29µl	
4.	Measuring Cylinder / Jar[$]	1ml to 10ml 10ml to 25ml 25ml to 100ml 100ml to 500ml 500ml to 1000ml 1000ml to 5000ml	0.17µl 0.29µl 0.02ml 0.253ml 0.266ml 0.508ml	
5.	Volumetric Flask[$]	1ml to 25ml 25ml to 100ml 100ml to 1000ml 1000ml to 5000ml	0.31µl 0.97µl 0.065ml 0.32ml	
VII.	**DENSITY AND VISCOSITY**			
1.	Density Hydrometer / Specific Gravity[$]	0.60 to 1.60g/ml	0.0012g/ml	Using Reference Density Hydrometer by Comparison method as per IS 3104 (Part I&II):1982
VIII.	**TORQUE GENERATING DEVICES**			
1.	Torque Wrench[$] Type I-Class B & C Type II-Class A & B	10 to 100 Nm 100 to 1000 Nm	1.16%rdg 1.25%rdg	Using Electronic Torque Wrench Tester Based on ISO 6789:2003

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
IX.	**HARDNESS TESTING MACHINES**			
1.	Rubber Hardness Tester By Spring Force Calibration♣	0 to 100 Shore (Shore A & D)	1.8 Shore A 1.8 Shore D	Using Rubber Hardness Tester Calibrator Based on ASTM D- 2240 Based on ASTM D-2240 / ISO 18898
2.	Rubber Hardness Tester By Indentation Depth Calibration♣	0 to 100 Shore (Shore A,D,AO,AM)	0.6 shore	Using Dial Calibration Tester & Holding Fixture Based on ASTM D-2240/ ISO 18898
X.	**MOBILE FORCE MEASURING SYSTEM**			
1.	Push Pull Gauge #	5 to 100 N 100 to 500 N	0.58 N 1.29 N	Using Newtonian Weights & Frame Fixture As per VDI/VDE 2624-2.1
2.	Verification of Uniaxial Testing Machine (Universal, Tensile, Compression Testing Machines) ♣	Compression 10 N to 100 kN Tension 10 N to 100 kN	 0.34% 0.34%	Using Load cell with Indicator (Class-1 & Better Accuracy) As per IS 1828 Part I: 2015 & ISO 7500-I:2004
XI.	**ACCOUSTIC**			
1.	Acoustic Pressure# (Sound)	94 dB & 114 dB	1.12 dB	Using Sound Calibrator

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
	MEDICAL DEVICES			
1.	Defibrillator♣ Heart Rate Output Energy Discharge Time Synchronization Test Pacer Output Pacer Rate	 10 bpm to 200 bpm 2 J to 400 J 0.1 sec to 100.0 sec 120 ms to 380 ms 10 mA to 100 mA 5 ppm to 800 ppm	 7.5 % to 1.2 % 2.9 % to 4.5 % 0.08 sec 1.26 msec 0.12 % to 1.16 % 1.20 %	Using Defibrillator Analyzer Impulse 7000 DP by Direct Method
2.	External Pacemaker♣ Pulse Rate Pulse Width Current	 30 ppm to 800 ppm 5.00 ms to 100.0 ms 1.00 to 100 mA	 0.17 % to 1.16 % 0.029 % 1.2 %	Using Defibrillator Analyzer Impulse 7000 DP by Direct Method
3.	Infusion / Syringe Pump Calibration♣ Flow rate Volume Occlusion	 0.1 to 1500 ml/hr 0.06 ml to 9999 ml 0 to 45 psi	 1.8 % 1.4 % 0.5 psi	Using Infusion Device Analyser IDA 5 by Direct Method
4.	Patient Monitor♣ Heart Rate Respiration Rate NIBP (Dynamic) IABP Spo2 Temperature NIBP leak test	 30 bpm to 300 bpm 10 bpm to 150 bpm 15 mmHg to 255 mmHg 0 to 300 mmHg 35 % to 100 % 30 °C to 42°C 0 to 15 mmHg	 2.3 % 5.9 % 5.5 % 1.2 % 4.0 % 1.34 °C 0.2 mmHg	Using Vital Sign Simulator Prosim 8 by Direct Method

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
5.	Ventilator Calibration♣ Respiration Rate Volume Pressure O2	 4 bpm to 100 bpm 0 to 60 L 0 to 6 bar 0 to 100 %	 0.6 bpm 3.55 % 1.77 % 2.4 %	Using Gas Flow Analyzer VT Plus HF by direct Method
6.	Diathermy♣ Output Power	 0 to 400 W	 0.8 W to 17 W	Using Electrosurgical Analyzer QA ES II by direct method
7.	BP Apparatus♣ NIBP Leak Test	 10 mmHg to 290 mmHg 0 to 200 mmHg/min	 1.35 mmHg to 2.11 mmHg 2.31 mmHg	Using Vital Sign Simulator Prosim 8 by direct Method
8.	ECG Machine♣ Heart Rate Amplitude	 10 bpm to 360 bpm 0.05 mV to 5.0 mV	 2.24 % 4.3 %	Using Vital Sign Simulator Prosim 8 by direct Method
9.	Pulse oxymeter♣ Heart Rate SpO2	 30 bpm to 300 bpm 30% to 100%	 2.7 % 3.99 %	Using Vital Sign Simulator Prosim 8 by direct Method
10.	Tourniquet♣ Pressure Time Interval	 10 mmHg to 390 mmHg 1min to 60 min	 4 % 0.64 min	Using Vital Sign Simulator Prosim 8 by direct Method
11.	Electronic / Mechanical Bed♣ Ground wire Resistance Chasis Leakage	 < 0.3Ω < 100µA NC, < 500µA SFC	 2.6 % 5 %	Using Electrical Safety Analyzer ESA 615 by Direct Method

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
	Patient Leakage	< 100µA AB&BF, < 10µA CF	5 %	
	Patient Lead Leakage Current (Mains On Patient Applied Part Isolation Test)	< 100µA BF, < 10µA CF	5 %	
	Insulation Test (Optional 500V)	< 2MΩ	2 %	
12.	Anesthesia Machine♣			Using Gas Flow Analyzer VT Plus HF by Direct Method
	Flow	4 lpm to 60 lpm	1.1 lpm	
	Volume	0 to 1000 ml	3.6 %	
	Pressure(PEP)	4 to 30cmH2O	1.2 cmH2O	
	O2	0 to 100%	2.4 %	
	Breadth Rate	4 bpm to 100bpm	1.3 bpm	
13.	Blood Gas Analyzer♣			Using Electrical Safety Analyzer ESA 615 by Direct Method
	Ground wire Resistance	< 0.3Ω	2.6 %	
	Chasis Leakage	< 100µA NC, < 500µA SFC	5 %	
	Patient Leakage	< 100µA AB&BF, < 10µA CF	5 %	
	Patient Lead Leakage Current (Mains On Patient Applied Part Isolation Test)	< 100µA BF, < 10µA CF	5 %	

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
	Insulation Test (Optional 500V)	< 2MΩ	2 %	
14.	Semi Auto Analyzer♣			Using Electrical Safety Analyzer ESA 615 by Direct Method
	Ground wire Resistance	< 0.3Ω	2.6 %	
	Chasis Leakage	< 100µA NC, < 500µA SFC	5 %	
	Patient Leakage	< 100µA AB&BF, < 10µA CF	5 %	
	Patient Lead Leakage Current (Mains On Patient Applied Part Isolation Test)	< 100µA BF, < 10µA CF	5 %	
	Insulation Test (Optional 500V)	< 2MΩ	2 %	
15.	ECG Machine♣			Using Electrical Safety Analyzer ESA 615 by Direct Method
	Ground wire Resistance	< 0.3Ω	2.6 %	
	Chasis Leakage	< 100µA NC, < 500µA SFC	5 %	
	Patient Leakage	< 100µA AB&BF, < 10µA CF	5 %	
	Patient Lead Leakage Current (Mains On Patient Applied Part Isolation Test)	< 100µA BF, < 10µA CF	5 %	

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
	Insulation Test (Optional 500V)	< 2MΩ	2 %	
16.	Hematology Analyzer♣			Using Electrical Safety Analyzer ESA 615 by Direct Method
	Ground wire Resistance	< 0.3Ω	2.6 %	
	Chasis Leakage	< 100µA NC, < 500µA SFC	5 %	
	Patient Leakage	< 100µA AB&BF, < 10µA CF	5 %	
	Patient Lead Leakage Current (Mains On Patient Applied Part Isolation Test)	< 100µA BF, < 10µA CF	5 %	
	Insulation Test (Optional 500V)	< 2MΩ	2 %	
17.	OT Table♣			Using Electrical Safety Analyzer ESA 615 by Direct Method
	Ground wire Resistance	< 0.3Ω	2.6 %	
	Chasis Leakage	< 100µA NC, < 500µA SFC	5 %	
	Patient Leakage	< 100µA AB&BF, < 10µA CF	5 %	
	Patient Lead Leakage Current (Mains On Patient Applied Part Isolation	< 100µA BF, < 10µA CF	5 %	

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
	Test) Insulation Test (Optional 500V)	< 2 MΩ	2 %	
18.	Nebulizer♣ Flow	0 to 10 lpm	2.6 %	Using Gas Flow Analyzer VT Plus HF by Direct Method
19.	Suction Apparatus♣ Vacuum (Pressure)	0 to (-) 1 bar	6.38 %	Using Pressure Gauge by direct Method as per ISO 10079-1
20.	Weighing Balance♣	300 kg	0.3 g	Using Standard Weights OIML-R-76-1, IS2489 by comparison method
21.	Electrical Safety (Common) ♣ Ground wire Resistance Chasis Leakage Patient Leakage Patient Lead Leakage Current (Mains On Patient Applied Part Isolation Test) Insulation Test (Optional 500V)	< 0.3 Ω < 100 µA NC, < 500 µA SFC < 100 µA AB&BF, < 10 µA CF < 100 µA BF, < 10 µA CF < 2 MΩ	2.6 % 5 % 5 % 5 % 2 %	Using Electrical Safety Analyzer ESA 615 by direct method

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
		THERMAL CALIBRATION		
I.	**TEMPERATURE**			
1.	SPRT'S,PRT'S, RTD' S & RTD Based Digital Thermometer, TC & TC Based Indicators[$]	(-)196.075 °C	8.4 m°C	Using Liquid Nitrogen, SPRT & Fluke Make Readout By Comparison Calibration
		0.01 °C	2.07 m°C	Using Maintenance Apparatus , TPW Cell & Readout By Fixed Point Calibration
		156.598 °C	3.52 m°C	Using Maintenance Apparatus, Indium Cell & Readout By Fixed Point Calibration
		231.928 °C	3.99 m°C	Using Maintenance Apparatus, Tin Cell & Readout By Fixed Point Calibration
		419.527 °C	5.24 m°C	Using Maintenance Apparatus, Zinc Cell & Readout By Fixed Point Calibration
		660.323 °C	8.06 m°C	Using Maintenance Apparatus, Aluminum Cell & Readout By Fixed Point Calibration

Laboratory	**Godrej & Boyce Mfg. Co. Ltd., Lawkim Motors Group, Calibration & Inspection, Plant 18 B, First Floor, Pirojshanagar, Vikhroli, Mumbai, Maharashtra**		
Accreditation Standard	**ISO/IEC 17025: 2005**		
Certificate Number	**CC-2634** ***(In lieu of C-0042, C-0050, C-0065, C-1196)***	**Page**	**41 of 43**
Validity	**28.03.2018 to 27.03.2020**	**Last Amended on**	**29.10.2018**

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
2.	RTD/Thermocouple Temperature Sensor with and without Indicators, Temperature Gauges[$]	(-)80°C to(-)40°C (-)40°C to 50°C 50°C to 250°C 250° to 650°C	0.10°C 0.007°C 0.10°C 0.35°C	Using SPRT/PRT & Readout, Multimeter, Low Temperature Bath & Oil Bath By Comparison Calibration
3.	RTD/Thermocouple Temperature Sensor with and without Indicators, Temperature Gauges[$]	650°C to 900°C 900°C to 1200°C	1.98°C 2.3°C	Using Standard R type TC with Indicator & Dry Well Bath By Comparison Calibration
4.	Glass Type Thermometers[$]	(-)80°C to (-)40°C (-)40°C to 50°C 50°C to 250°C	0.10° C 0.06°C 0.16°C	Using SPRT & Readout, Low Temperature Bath & Oil Bath By Comparison Calibration
5.	Infrared /Non-Contact Thermometer[$]	50°C to 500°C 500°C to 1200°C	1.91°C 3.10°C	Using 4 Wire RTD with Indicator & Black Body Furnace Using Non Contact Pyrometer With Black Body Furnace
6.	Controller/Indicator with Sensor of Liquid Baths, Dry Well Blocks, Incubators (for Non-Medical Applications), Oven[$]	(-)80°C to (-)40°C (-)40°C to 50°C 50°C to 250°C 250° to 650°C	0.10°C 0.008°C 0.10°C 0.35°C	Using SPRT & Fluke Make Readout By Single Point Calibration
7.	Controller / Indicator of Dry Well Blocks, Muffle Furnace[$]	650°C to 900°C 900°C to 1200°C	1.86°C 2.3°C	Using R type TC with Indicator By Single point calibration

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Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
8.	Humidity & Temperature Indicator, Thermohygrometer[$]	25%RH to 90%RH (5°C to 50°C)	1.04%RH (0.3°C)	Using Humidity Chamber with Digital Temp & Humidity indicator with Sensors By Comparison Calibration
9.	Dew Point Meter[$]	(-)20 °C to 50°C	1°C	Using Humidity Chamber with Digital Temp & Humidity indicator with Sensors By Comparison Calibration
10.	RTD/Thermocouple Temperature Sensor with and without Indicators, Temperature Gauges[♣]	(-)25°C to 50°C 50°C to 250°C 250°C to 650°C	0.10°C 0.10°C 0.40°C	Using Standard PRT with Milky Indicator, Low Temperature Bath, Oil Bath & Dry Well Bath By Comparison Calibration
11.	RTD/Thermocouple Temperature Sensor with and without Indicators, Temperature Gauges [♣]	650°C to 900°C 900°C to 1200°C	1.98°C 2.6°C	Using S Type TC with MILIK Indicator & Dry well Bath By Comparison Calibration
12.	Glass Type Thermometers[♣]	(-)25°C to 50°C 50°C to 250°C	0.12°C 0.16°C	Using Standard PRT with Milky Indicator, Low Temperature Bath & Oil Bath

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Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
13.	Calibration Of Refrigerators, Incubators (for Non-Medical Applications), Ovens, Furnace♣	(-)80°C to 300°C 300°C to 1200°C	1.17°C 3.2°C	Using Standard RTD & Standard N Type T/C with Multi Channel Data Logger By 9 Point Calibration & Mapping Method
14.	Controller / Indicator of Refrigerators, Incubators (for Non-Medical Applications), Ovens, Furnace, Dry Well Blocks, Liquid Bath♣	(-)35°C to 50°C 50°C to 250°C 250°C to 650°C	0.10°C 0.10°C 0.40°C	Using Standard PRT with Milky Indicator By Single Position Calibration (at Measuring Location in DUC)
15.	Controller/Indicator of Dry Well Blocks, Muffle Furnace♣	650°C to 900°C 900°C to 1200°C	1.86°C 2.6°C	Using Standard S type TC with Milky Indicator & Dry Well Bath By Single Position Calibration (at Measuring Location in DUC)
16.	Humidity Chamber♣	30% to 90% RH@25°C	2%RH	Using Humidity and Temp Data Logger Multipoint Calibration

*** 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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