مركز الإمارات العالمي للاعتماد
Emirates International Accreditation Centre

ACCREDITATION CERTIFICATE

003-LB-CAL

Emirates International Accreditation Centre

has accredited

METROMAC CALIBRATION SERVICES

WS-104, Dubai Maritime City- DMC

Dubai - United Arab Emirates

In accordance with the requirements of

ISO/IEC 17025:2017

General requirements for the competence of testing and calibration laboratories

to undertake the calibration in the attached accreditation scope

This Accreditation is invalid without the attached accreditation scope and shall remain in force within the validity period printed below, subject to continuing compliance with the requirements of the accreditation criteria.

Validity: 13/02/2020 to 30/12/2022

Initial Accreditation Date: 31/12/2007

ilac-MRA

eiac مركز الإمارات العالمي للاعتماد Emirates International Accreditation Centre

CHIEF EXECUTIVE OFFICER
APPROVAL

Accreditation Scope

Balance and Mass Calibration

003-LB-CAL

Metromac Calibration Services

WS-104, Dubai Maritime City- DMC

Dubai - United Arab Emirates

Issue no.: 09 **Date: 13-02-2020** **Valid to: 30-12-2022**

Calibration Field/ Measuring Quality	Calibration Method	Range and Specification	Calibration Measurement Capability (CMC)*	Location
Weighing Balance				
Weighing Scale	METROMAC calibration procedure MQS 03 C 75	Upto 600 g	1.4 mg	Customer Premises
		> 600 g to 3000 g	14 mg	
		> 3 kg to 60 kg	0.14 g	
		>60 kg to 100 kg	1.2 g	
		>100 kg to 300 kg	12 g	
		> 300 kg to 500 kg	0.12 Kg	
Mass				
OIML Masses Class F1 and Lower	Using E2 class masss by comparison method	1 mg	0.01 mg	Metromac Premises
		2 mg	0.01 mg	
		5 mg	0.01 mg	
		10 mg	0.01 mg	
		20 mg	0.01 mg	
		50 mg	0.01 mg	
		100 mg	0.01 mg	
		200 mg	0.01 mg	
		500 mg	0.01 mg	
		1 g	0.01 mg	
		2 g	0.01 mg	
		5 g	0.02 mg	
		10 g	0.02 mg	

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Mass				
OIML Masses Class F1 and Lower	Using E2 class masss by comparison method	20 g	0.03 mg	Metromac Premises
		50 g	0.03 mg	
		100 g	0.05 mg	
		200 g	0.10 mg	
		200 g	0.10 mg	
		500 g	0.85 mg	
		1 kg	1.2 mg	

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Accreditation Scope

Dimensional Calibration

003-LB-CAL

Metromac Calibration Services

WS-104, Dubai Maritime City- DMC

Dubai - United Arab Emirates

Issue no.: 10 **Date: 13-02-2020** **Valid to: 30-12-2022**

Calibration Field/ Measuring Quality	Calibration Method	Range and Specification	Calibration Measurement Capability (CMC)*	Location
Calipers Dial & Analogue & Digital	MQS 03 C 54 For determining error of indicated size Comparison with gauge blocks or calliper checker	Up to 300 mm	26 µm	Metromac Premises
		Up to 600 mm	30 µm	
		Up to 1000 mm	40 µm	
Tape & Scale Calibrator	MQS 03 C 113 For determining error of indicated displacement, Comparison with reference measuring tape	Up to 1 m	0.4 mm	Metromac Premises
Ruler (Engineer or machinst scale)	MQS 03 C 112 Measurement of line spacing using length measuring machine equipped with optical magnification unit.	Up to 1 m	0.82 mm	Metromac Premises

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Calibration Field/ Measuring Quality	Calibration Method	Range and Specification	Calibration Measurement Capability (CMC)*	Location
Measuring Tape	MQS 03 C 112 Measurement of line spacing using length measuring machine equipped with optical magnification unit. Stitching is carried out after length of 1 m.	Up to 50 m	(0.7 mm +0.12 x L) mm , L : m	Metromac Premises
Dial Gauges (Digital & Analogue)	MQS 03 C 111 For determining error of indicated size Comparison with dial gauge calibrator	Up to 5 mm	4 µm	Metromac Premises
		Up to 15 mm	12 µm	
		Up to 25 mm	18 µm	
External Micrometer (Digital & Analogue)	MQS 03 C 109 For determining error of indicated size Comparison with reference gauge blocks	Up to 25 mm	2.5 µm	Metromac Premises
Internal two point (bore) micrometer	MQS 03 C 110 For determining error of indicated size Comparison with reference gauge blocks	Up to 300 mm	10 µm	Metromac Premises

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Calibration Field/ Measuring Quality	Calibration Method	Range and Specification	Calibration Measurement Capability (CMC)*	Location
External Micrometer (Digital & Analogue)	MQS 03 C 109 For determining error of indicated size Comparison with reference gauge blocks	25 to 50 mm	3 µm	Metromac Premises
		50 to 75 mm	3.5 µm	
		75 to 100 mm	4 µm	

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Accreditation Scope

Volume Calibration

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Calibration Field/ Measuring Quality	Calibration Method	Range and Specification	Calibration Measurement Capability (CMC)*	Location
Volume Measurement				
Macro Pipette,	Gravimetric Method	0.5 µl up to 50 µl	0.04 µl	Metromac Premises
Micro Pipette,	Euramet cg 19	> 50 µl up to 100 µl	0.11 µl	
		> 100 µl up to 1 ml	0.39 µl	
Dispenser	ISO 8655	> 1 ml up to 10 ml	1.20 µl	

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Accreditation Scope

Speed Calibration

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Issue no.: 02 **Date: 13-02-2020** **Valid to: 30-12-2022**

Calibration Field/ Measuring Quality	Calibration Method	Range and Specification	Calibration Measurement Capability (CMC)*	Location
Speed (Centrifuge / Variable Rotation Speed) eg. : Centrifuges, Mixers, Orbit & Plate shakers, MST Apparatus, Auoclaves	SOP - MQS 03 C - 97	Up to 1000 rpm	1.0 rpm	Metromac Premises & Customer Premises
		1001 up to 6500 rpm	1.7 rpm	
Timer (Centrifuge / Variable Rotation Speed) eg. : Centrifuges, Mixers, Orbit & Plate shakers, MST Apparatus, Auoclaves	SOP - MQS 03 C - 97	Up to 30 min	0.81 s	
TACHOMETER Non-Contact	SOP - MQS 03 C-123	Upto 99.99 rpm	0.01 rpm	Metromac Premises
		100 to 999.9 rpm	0.08 rpm	
		1000 to 99999 rpm	1 rpm	

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Accreditation Scope

Electrical Calibration

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Calibration Field/ Measuring Quality	Calibration Method	Range and Specification	Calibration Measurement Capability (CMC)*	Location
Measuring Mode: Calibration of Measuring Instruments				
AC Voltage	MetroMac Calibration Procedure MQS 03 C 60 (U=Measured Voltage Value)	**1.0 mV to 32.999 mV**		Metromac Premises
		10 Hz to 45 Hz	$0.55 \times 10^{-3}\ U + 6.5\ \mu V$	
		>45 Hz to 10 kHz	$0.28 \times 10^{-3}\ U + 4.8\ \mu V$	
		>10 kHz to 20 kHz	$0.29 \times 10^{-3}\ U + 4.3\ \mu V$	
		>20 kHz to 50 kHz	$0.65 \times 10^{-3}\ U + 4.3\ \mu V$	
		>50 kHz to 100 kHz	$1.9 \times 10^{-3}\ U + 7.4\ \mu V$	
		>100 kHz to 500 kHz	$4.4 \times 10^{-3}\ U + 28\ \mu V$	
		33 mV to 329.999 mV		
		10 Hz to 45 Hz	$0.27 \times 10^{-3}\ U + 12\ \mu V$	
		>45 Hz to 10 kHz	$90 \times 10^{-6}\ U + 7.1\ \mu V$	
		>10 kHz to 20 kHz	$99 \times 10^{-6}\ U + 7.1\ \mu V$	
		>20 kHz to 50 kHz	$0.21 \times 10^{-3}\ U + 6.8\ \mu V$	
		>50 kHz to 100 kHz	$0.48 \times 10^{-3}\ U + 19\ \mu V$	
		>100 kHz to 500 kHz	$1.2 \times 10^{-3}\ U + 43\ \mu V$	
		0.33 V to 3.29999 V		
		10 Hz to 45 Hz	$0.16 \times 10^{-3}\ U + 73\ \mu V$	
		>45 Hz to 10 kHz	$73 \times 10^{-6}\ U + 35\ \mu V$	
		>10 kHz to 20 kHz	$0.11 \times 10^{-3}\ U + 42\ \mu V$	

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Measuring Mode: Calibration of Measuring Instruments				
AC Voltage	MetroMac Calibration Procedure MQS 03 C 60 (U=Measured Voltage Value)	**0.33 V to 3.29999 V**		Metromac Premises
		>20 kHz to 50 kHz	$0.17 \times 10^{-3}\ U + 45\ \mu V$	
		>50 kHz to 100 kHz	$0.40 \times 10^{-3}\ U + 84\ \mu V$	
		>100 kHz to 500 kHz	$1.3 \times 10^{-3}\ U + 0.34\ mV$	
		3.3 V to 32.9999 V		
		10Hz to 45Hz	$0.16 \times 10^{-3}\ U + 0.78\ mV$	
		>45 Hz to 10 kHz	$87 \times 10^{-6}\ U + 0.32\ mV$	
		>10 kHz to 20 kHz	$0.14 \times 10^{-3}\ U + 0.46\ mV$	
		>20 kHz to 50 kHz	$0.22 \times 10^{-3}\ U + 0.61\ mV$	
		>50 kHz to 100 kHz	$0.57 \times 10^{-3}\ U + 1.3\ mV$	
		33 V to 329.999 V		
		45 Hz to 1 kHz	$0.11 \times 10^{-3}\ U + 3.5\ mV$	
		>1 kHz to 10 kHz	$0.11 \times 10^{-3}\ U + 4.6\ mV$	
		>10 kHz to 20 kHz	$0.14 \times 10^{-3}\ U + 4.5\ mV$	
		>20 kHz to 50 kHz	$0.44 \times 10^{-3}\ U + 11\ mV$	
		>50 kHz to 100 kHz	$1.1 \times 10^{-3}\ U + 28\ mV$	

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Measuring Mode: Calibration of Measuring Instruments				
AC Voltage	MetroMac Calibration Procedure MQS 03 C 60 (U=Measured Voltage Value)	**330 V to 1000 V**		Metromac Premises
		45 Hz to 1 kHz	$0.16 \times 10^{-3}\ U + 49$ mV	
		>1 kHz to 5 kHz	$0.14 \times 10^{-3}\ U + 46$ mV	
		>5 kHz to 10 kHz	$0.17 \times 10^{-3}\ U + 44$ mV	
DC VOLTAGE	MetroMac Calibration Procedure / MQS 03 C 60 *(U=Measured Voltage Value)*	3 mV to 329.9999 mV	$14 \times 10^{-6}\ U + 1.9$ µV	Metromac Premises
		0.33 V to 3.299999 V	$7.2 \times 10^{-6}\ U + 2.7$ µV	
		3.3 V to 32.99999 V	$8.0 \times 10^{-6}\ U + 16$ µV	
		33 V to 329.9999 V	$12 \times 10^{-6}\ U + 0.16$ mV	
		330 V to 1000 V	$12 \times 10^{-6}\ U + 1.2$ mV	
Resistance	MetroMac Calibration Procedure MQS 03 C 60 *(R=Measured Resistance Value)*	0 to 10.9999 Ω	$33 \times 10^{-6}\ R + 5.6$ mΩ	Metromac Premises
		11 Ω to 32.9999 Ω	$18 \times 10^{-6}\ R + 8.2$ mΩ	
		33 Ω to 109.9999 Ω	$17 \times 10^{-6}\ R + 8.2$ mΩ	
		110 Ω to 329.9999 Ω	$17 \times 10^{-6}\ R + 11$ mΩ	
		330 Ω to 1.099999 kΩ	$16 \times 10^{-6}\ R + 11$ mΩ	
		1.1 kΩ to 3.299999 kΩ	$16 \times 10^{-6}\ R + 0.11$ Ω	
		3.3 kΩ to 10.99999 kΩ	$16 \times 10^{-6}\ R + 77$ mΩ	
		11 kΩ to 32.99999 kΩ	$16 \times 10^{-6}\ R + 0.55$ Ω	
		33 kΩ to 109.9999 kΩ	$16 \times 10^{-6}\ R + 0.58$ Ω	
		110 kΩ to 329.9999 kΩ	$20 \times 10^{-6}\ R + 6.5$ Ω	
		330 kΩ to 1.099999 MΩ	$20 \times 10^{-6}\ R + 16.6$ Ω	
		1.1 MΩ to 3.299999 MΩ	$36 \times 10^{-6}\ R + 0.14$ kΩ	

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Measuring Mode: Calibration of Measuring Instruments				
Resistance	MetroMac Calibration Procedure MQS 03 C 60 *(R=Measured Resistance Value)*	3.3 MΩ to 10.99999 MΩ	74 x 10^{-6} R + 0.25 kΩ	Metromac Premises
		11 MΩ to 32.99999 MΩ	0.14 x 10^{-3} R + 1.5 kΩ	
		33 MΩ to 109.9999 MΩ	0.29 x 10^{-3} R + 2.9 kΩ	
		110 MΩ to 329.999 MΩ	1.7 x 10^{-3} R + 56 kΩ	
		330 MΩ to 1100 MΩ	8.2 x 10^{-3} R + 0.31 MΩ	
DC Current	MetroMac Calibration Procedure / MQS 03 C 60 (I=Measured Current Value)	3 µA to 329.999 µA	86 x 10^{-6} / + 12 nA	Metromac Premises
		330 µA to 3.29999 mA	57 x 10^{-6} / + 18 nA	
		3.3 mA to 32.9999 mA	57 x 10^{-6} / + 0.12 µA	
		33 mA to 329.999 mA	57 x 10^{-6} / + 1.2 µA	
		330 mA to 2.99999 A	0.12 x 10^{-3} / + 22 µA	
		3 A to 10.9999 A	0.28 x 10^{-3} / + 0.22 mA	
		11 A to 20.5 A	0.56 x 10^{-3} / +0.52 mA	
	MetroMac Calibration Procedure MQS 03 C 60 Clamp Meter - Using 50 Turn Coil *(I=Measured Current Value)*	16.5 A to 149.95 A	2.0 x 10^{-3} / + 12 mA	
		150 A to 549.5 A	2.1 x 10^{-3} / + 40 mA	
		550 A to 1025 A	2.1 x10^{-3} / + 39 mA	

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Measuring Mode: Calibration of Measuring Instruments				
AC Current	MetroMac Calibration Procedure MQS03 C60 *(I=Measured Current Value)*	**29.00 µA to 329.99 µA**		Metromac Premises
		10 Hz to 20 Hz	1.2×10^{-3} / + 77 nA	
		>20 Hz to 45 Hz	0.88×10^{-3} / + 77 nA	
		>45 Hz to 1 kHz	0.77×10^{-3} / + 65 nA	
		>1 kHz to 5 kHz	1.8×10^{-3} / + 89 nA	
		>5 kHz to 10 kHz	4.5×10^{-3} / +0.12 µA	
		>10 kHz to 30 kHz	11×10^{-3} / +0.23 µA	
		0.33 mA to 3.2999 mA		
		10 Hz to 20 Hz	1.2×10^{-3} / +0.48 µA	
		>20 Hz to 45 Hz	0.69×10^{-3} / +0.50 µA	
		>45 Hz to 1 kHz	0.60×10^{-3} / +0.26 µA	
		>1 kHz to 5 kHz	1.1×10^{-3} / +0.24 µA	
		>5 kHz to 10 kHz	2.8×10^{-3} / +0.30 µA	
		>10 kHz to 30 kHz	7.8×10^{-3} / +0.85 µA	
		3.3 mA to 32.999 mA		
		10 Hz to 20 Hz	1.0×10^{-3} / + 2.9 µA	
		>20 Hz to 45 Hz	0.52×10^{-3} / + 2.7 µA	
		>45 Hz to 1 kHz	0.25×10^{-3} / + 2.3 µA	
		>1 kHz to 5 kHz	0.52×10^{-3} / + 1.7 µA	
		>5 kHz to 10 kHz	1.3×10^{-3} / + 3.0 µA	
		>10 kHz to 30 kHz	3.0×10^{-3} / + 6.3 µA	

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Measuring Mode: Calibration of Measuring Instruments				
AC Current	MetroMac Calibration Procedure MQS03 C60 (I=Measured Current Value)	**33 mA to 329.99 mA**		Metromac Premises
		10 Hz to 20 Hz	1.0×10^{-3} / + 29 µA	
		>20 Hz to 45 Hz	0.52×10^{-3} / + 27 µA	
		>45 Hz to 1 kHz	0.30×10^{-3} / + 23 µA	
		>1 kHz to 5 kHz	0.61×10^{-3} / + 34 µA	
		>5 kHz to 10 kHz	1.3×10^{-3} / + 61 µA	
		>10 kHz to 30 kHz	3.5×10^{-3} / + 0.12 mA	
		0.33 A to 2.99999A		
		10 Hz to 45 Hz	0.97×10^{-3} / + 0.25 mA	
		>45 Hz to 1 kHz	0.38×10^{-3} / + 0.20 mA	
		>1 kHz to 5 kHz	3.2×10^{-3} / + 0.57 mA	
		>5 kHz to 10 kHz	14×10^{-3} / + 2.7 mA	
		3 A to 10.9999 A		
		45 Hz to 100 Hz	0.43×10^{-3} I + 3.3 mA	
		>100 Hz to 1 kHz	0.59×10^{-3} I + 3.0 mA	
		>1 kHz to 5 kHz	14×10^{-3} I + 1.3 mA	
		11 A to 20.5 A		
		45 Hz to 100 Hz	0.72×10^{-3} I + 6.9 mA	
		>100 Hz to 1 kHz	0.86×10^{-3} I +6.6 mA	
		>1 kHz to 5 kHz	14×10^{-3} I + 3.3 mA	

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Measuring Mode: Calibration of Measuring Instruments				
AC Current	MetroMac Calibration Procedure MQS 03 C 60 Clamp Meter - Using 50 Turn Coil *(I=Measured Current Value)*	**16.5 A to 149.9995 A**		Metromac Premises
		10 Hz to 100 Hz	2.4×10^{-3} / + 20 mA	
		>100 Hz to 440 kHz	6.6×10^{-3} / + 21 mA	
		150 A to 1025 A		
		10 Hz to 100 Hz	2.4×10^{-3} / + 71 mA	
		>100 Hz to 440 kHz	8.5×10^{-3} / + 65 mA	
Capacitance	MetroMac Calibration Procedure MQS 03 C 60 *(C=Measured Capacitance Value)*	0.19 to 0.3999 nF	2.7×10^{-3} C + 5.5 pF	Metromac Premises
		0.4 to 1.0999 nF	2.8×10^{-3} C + 5.5 pF	
		1.1 to 3.2999 nF	3×10^{-3} C + 5.5 pF	
		3.3 to 10.9999 nF	1.2×10^{-3} C + 9.0 pF	
		11 to 32.9999 nF	1.4×10^{-3} C + 55 pF	
		33 to 109.999 nF	1.2×10^{-3} C + 90 pF	
		110 to 329.999 nF	1.4×10^{-3} C + 0.18 nF	
		0.33 to 1.09999 µF	1.2×10^{-3} C + 0.89 nF	
		1.1 to 3.29999 µF	1.4×10^{-3} C + 1.8 nF	
		3.3 to 10.9999 µF	1.3×10^{-3} C + 9 nF	
		11 to 32.9999 µF	2.3×10^{-3} C + 18 nF	
		33 to 109.999 µF	2.5×10^{-3} C + 85 nF	
		110 to 329.999 µF	2.6×10^{-3} C + 0.2 µF	
		0.33 to 1.09999 mF	2.5×10^{-3} C + 0.86 µF	

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Accreditation Scope

Electrical Calibration

003-LB-CAL

Metromac Calibration Services

WS-104, Dubai Maritime City- DMC

Dubai - United Arab Emirates

Issue no.: 09 **Date: 13-02-2020** **Valid to: 30-12-2022**

Calibration Field/ Measuring Quality	Calibration Method	Range and Specification	Calibration Measurement Capability (CMC)*	Location
Measuring Mode: Calibration of Measuring Instruments				
Capacitance	MetroMac Calibration Procedure MQS 03 C 60 *(C=Measured Capacitance Value)*	1.1 to 3.2999 mF	$2.6 \times 10^{-3}\ C + 1.9$ µF	Metromac Premises
		3.3 to 10.9999 mF	$2.3 \times 10^{-3}\ C + 8.3$ µF	
		11 to 32.9999 mF	$4.2 \times 10^{-3}\ C + 18$ µF	
		33 to 110 mF	$6.0 \times 10^{-3}\ C + 76$ µF	
Frequency	MetroMac Calibration Procedure MQS 03 C 60 *(f=Measured Frequency Value)*	0.01 to 119.99 Hz	$0.94 \times 10^{-6}\ f + 89$ µHz	Metromac Premises
		120 to 1199.9 Hz	$1.1 \times 10^{-6}\ f + 0.71$ mHz	
		1.20 to 11.999 kHz	$1.1 \times 10^{-6}\ f + 7.1$ mHz	
		12 to 119.99 kHz	$1.1 \times 10^{-6}\ f + 71$ mHz	
		120 to 1199.9 kHz	$1.1 \times 10^{-6}\ f + 0.71$ Hz	
		1.2 to 2 MHz	$1.4 \times 10^{-6}\ f + 0.67$ Hz	
RTD	MetroMac Calibration Procedure MQS 03 C 60	-200°C to 0 °C	0.055 °C	Metromac Premises
		> 0°C to 300 °C	0.070 °C	
		> 300°C to 500 °C	0.10 °C	
		> 500°C to 800 °C	0.18 °C	
Thermocouple	MetroMac Calibration Procedure MQS 03 C 60	**J-Type**		Metromac Premises
		-210 °C to -100 °C	0.25 °C	
		> -100 °C to -30°C	0.18 °C	
		> -30 °C to 150 °C	0.16 °C	
		> 150 °C to 760 °C	0.17 °C	
		> 760 °C to 1200 °C	0.21 °C	

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Accreditation Scope

Electrical Calibration

003-LB-CAL

Metromac Calibration Services

WS-104, Dubai Maritime City- DMC

Dubai - United Arab Emirates

Issue no.: 09 **Date: 13-02-2020** **Valid to: 30-12-2022**

Calibration Field/ Measuring Quality	Calibration Method	Range and Specification	Calibration Measurement Capability (CMC)*	Location
Measuring Mode: Calibration of Measuring Instruments				
Thermocouple	MetroMac Calibration Procedure MQS 03 C 60	**K-Type**		Metromac Premises
		-200 °C to -100 °C	0.33 °C	
		> -100 °C to -25°C	0.20 °C	
		> -25 °C to 120 °C	0.17 °C	
		> 120 °C to 1000 °C	0.24 °C	
		> 1000 °C to 1370 °C	0.34 °C	
RTD	MetroMac Calibration Procedure MQS 03 C 60	-190 °C to 780 °C	0.38 °C	Customer Premises
Thermocouple	MetroMac Calibration Procedure MQS 03 C 60	**J-Type**		Customer Premises
		-200 °C to 0 °C	1.2 °C	
		> 0°C to 1200 °C	0.85 °C	
		K-Type		
		-200 °C to 0 °C	1.4 °C	
		> 0 °C to 600 °C	0.94 °C	
		> 600 °C to 1250 °C	0.96 °C	
Sourcing Mode: Calibration of Sources				
AC Voltage	MetroMac Calibration Procedur MQS 03 C 124 *(U= Source Voltage Value)*	**10 mV to 100 mV**		Metromac Premises
		>10 Hz to 20 kHz	$0.34 \times 10^{-3}\ U + 22\ \mu V$	
		>20 kHz to 50 kHz	$0.68 \times 10^{-3}\ U + 27\ \mu V$	
		>50 kHz to 100 kHz	$3.3 \times 10^{-3}\ U + 44\ \mu V$	
		>100 kHz to 300 kHz	$22 \times 10^{-3}\ U + 0.27\ mV$	

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Accreditation Scope

Electrical Calibration

003-LB-CAL

Metromac Calibration Services

WS-104, Dubai Maritime City- DMC

Dubai - United Arab Emirates

Issue no.: 09 **Date: 13-02-2020** **Valid to: 30-12-2022**

Calibration Field/ Measuring Quality	Calibration Method	Range and Specification	Calibration Measurement Capability (CMC)*	Location
Sourcing Mode: Calibration of Sources				
AC Voltage	MetroMac Calibration Procedur MQS 03 C 124 *(U= Source Voltage Value)*	**>100 mV to 1 V**		Metromac Premises
		>10 Hz to 20 kHz	$0.33 \times 10^{-3}\ U + 0.16$ mV	
		>20 kHz to 50 kHz	$0.66 \times 10^{-3}\ U + 0.27$ mV	
		>50 kHz to 100 kHz	$3.3 \times 10^{-3}\ U + 0.44$ mV	
		>100 kHz to 300 kHz	$22 \times 10^{-3}\ U + 2.7$ mV	
		> 1 V to 10 V		
		>10 Hz to 20 kHz	$0.29 \times 10^{-3}\ U + 2.5$ mV	
		>20 kHz to 50 kHz	$0.63 \times 10^{-3}\ U + 3.3$ mV	
		>50 kHz to 100 kHz	$3.3 \times 10^{-3}\ U + 4.7$ mV	
		>100 kHz to 300 kHz	$22 \times 10^{-3}\ U + 27$ mV	
		>10 V to 100 V		
		>10 Hz to 20 kHz	$0.33 \times 10^{-3}\ U + 17$ mV	
		>20 kHz to 50 kHz	$0.66 \times 10^{-3}\ U + 28$ mV	
		>50 kHz to 100 kHz	$3.3 \times 10^{-3}\ U + 44$ mV	

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Accreditation Scope

Electrical Calibration

003-LB-CAL

Metromac Calibration Services

WS-104, Dubai Maritime City- DMC

Dubai - United Arab Emirates

Issue no.: 09 **Date: 13-02-2020** **Valid to: 30-12-2022**

Calibration Field/ Measuring Quality	Calibration Method	Range and Specification	Calibration Measurement Capability (CMC)*	Location
Sourcing Mode: Calibration of Sources				
AC Voltage	MetroMac Calibration Procedur MQS 03 C 124 *(U= Source Voltage Value)*	**>100 V to 1000 V**		Metromac Premises
		>10 Hz to 20 kHz	$0.34 \times 10^{-3}\ U + 0.17$ V	
		>20 kHz to 50 kHz	$0.66 \times 10^{-3}\ U + 0.29$ V	
		>50 kHz to 100 kHz	$3.2 \times 10^{-3}\ U + 0.44$ V	
DC Voltage	MetroMac Calibration Procedure MQS 03 C 124 *(U= Source Voltage Value)*	0 mV to 100 mV	$20 \times 10^{-6}\ U + 2.2$ µV	Metromac Premises
		> 100 mV to 1 V	$14 \times 10^{-6}\ U + 4.3$ µV	
		> 1 V to 10 V	$13 \times 10^{-6}\ U + 29$ µV	
		> 10 V to 100 V	$21 \times 10^{-6}\ U + 0.34$ mV	
		> 100 V to 1000 V	$23 \times 10^{-6}\ U + 5.6$ mV	
Resistance	MetroMac Calibration Procedure MQS 03 C 124 *(R= Source Resistance Value)*	0 Ω to 10 Ω	$56 \times 10^{-6}\ R + 1.6$ mΩ	Metromac Premises
		> 10 Ω to 100 Ω	$55 \times 10^{-6}\ R + 2.2$ mΩ	
		> 100 Ω to 1 kΩ	$55 \times 10^{-6}\ R + 5.7$ mΩ	
		> 1 kΩ to10 kΩ	$55 \times 10^{-6}\ R + 55$ mΩ	
		> 10 kΩ to100 kΩ	$55 \times 10^{-6}\ R + 0.55$ Ω	
		> 100 kΩ to1 MΩ	$56 \times 10^{-6}\ R + 5.5$ Ω	
		> 1 MΩ to10 MΩ	$0.22 \times 10^{-3}\ R + 56$ Ω	
		> 10 MΩ to100 MΩ	$4.4 \times 10^{-3}\ R + 5.5$ kΩ	
		> 100 MΩ to1 GΩ	$11 \times 10^{-3}\ R + 55$ kΩ	

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Accreditation Scope

Electrical Calibration

003-LB-CAL

Metromac Calibration Services

WS-104, Dubai Maritime City- DMC

Dubai - United Arab Emirates

Issue no.: 09 **Date: 13-02-2020** **Valid to: 30-12-2022**

Calibration Field/ Measuring Quality	Calibration Method	Range and Specification	Calibration Measurement Capability (CMC)*	Location
Sourcing Mode: Calibration of Sources				
DC Current	MetroMac Calibration Procedure MQS 03 C 124 *(I= Source Current Value)*	10 µA to 100 µA	0.28×10^{-3} / + 14 nA	Metromac Premises
		> 100 µA to 1 mA	0.27×10^{-3} / + 28 nA	
		> 1 mA to 10 mA	0.27×10^{-3} / + 1.1 µA	
		> 10 mA to 100 mA	0.28×10^{-3} / + 2.8 µA	
		> 100 mA to 1 A	0.28×10^{-3} / + 0.11 mA	
		> 1A to 3 A	0.62×10^{-3} / + 0.31 mA	
		> 3 A to 10 A	0.85×10^{-3} / +0.57 mA	
AC Current	MetroMac Calibration Procedure MQS 03 C 124 *(I = Source Current Value)*	**Upto 100 µA**		Metromac Premises
		10 Hz to 5 kHz	0.55×10^{-3} / + 26 nA	
		>5 kHz to 10 kHz	1.6×10^{-3} / + 0.14 µA	
		> 100 µA to 1 mA		
		10 Hz to 5 kHz	0.55×10^{-3} / +0.24 µA	
		>5 kHz to 10 kHz	1.4×10^{-3} / +1.4 µA	
		> 1 mA to 10 mA		
		10 Hz to 5 kHz	0.55×10^{-3} / + 2.4 µA	
		>5 kHz to 10 kHz	1.4×10^{-3} / + 14 µA	
		> 10 mA to 100 mA		
		10 Hz to 5 kHz	0.55×10^{-3} / + 24 µA	
		>5 kHz to 10 kHz	1.2×10^{-3} / + 0.14 µA	

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Accreditation Scope

Electrical Calibration

003-LB-CAL

Metromac Calibration Services

WS-104, Dubai Maritime City- DMC

Dubai - United Arab Emirates

Issue no.: 09 **Date: 13-02-2020** **Valid to: 30-12-2022**

Calibration Field/ Measuring Quality	Calibration Method	Range and Specification	Calibration Measurement Capability (CMC)*	Location
Sourcing Mode: Calibration of Sources				
AC Current	MetroMac Calibration Procedure MQS 03 C 124 *(I = Source Current Value)*	**> 100 mA to 1 A**		Metromac Premises
		10 Hz to 5 kHz	0.58×10^{-3} / +0.22 mA	
		>5 kHz to 10 kHz	3.6×10^{-3} / + 3.7 mA	
		> 1 A to 3 A		
		10 Hz to 5 kHz	0.84×10^{-3} / + 1.0 mA	
		>5 kHz to 10 kHz	3.9×10^{-3} / + 10 mA	
		> 3 A to 10 A		
		10 Hz to 5 kHz	0.85×10^{-3} / + 4.1 mA	
		>5 kHz to 10 kHz	2.4×10^{-3} / + 38 mA	
Capacitance	MetroMac Calibration Procedure MQS 03 C 124 *(C= Source Capacitance Value)*	0 nF to 1 nF	15×10^{-3} *C* + 14 pF	Metromac Premises
		> 1 nF to 10 nF	7.3×10^{-3} *C* + 30 pF	
		> 10 nF to 100 nF	6.4×10^{-3} *C* + 0.28 nF	
		> 100 nF to 1 µF	6.8×10^{-3} *C* + 2.8 nF	
		> 1 µF to 10 µF	7.2×10^{-3} *C* + 27 nF	
		> 10 µF to 100 µF	7.2×10^{-3} *C* + 0.27 µF	
		> 100 µF to 1 mF	7.2×10^{-3} *C* + 2.8 µF	
		> 1 mF to 10 mF	12×10^{-3} *C* + 26 µF	
		> 10 mF to 40 mF	22×10^{-3} *C* + 0.16 mF	

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Accreditation Scope

Electrical Calibration

003-LB-CAL

Metromac Calibration Services

WS-104, Dubai Maritime City- DMC

Dubai - United Arab Emirates

Issue no.: 09 **Date: 13-02-2020** **Valid to: 30-12-2022**

Calibration Field/ Measuring Quality	Calibration Method	Range and Specification	Calibration Measurement Capability (CMC)*	Location
Sourcing Mode: Calibration of Sources				
Frequency	MetroMac Calibration Procedure MQS 03 C 124 *(f =Source Frequency Value)*	5 Hz to10 Hz	0.26×10^{-3} f + 0.21 mHz	Metromac Premises
		>10 Hz to 40 Hz	0.16×10^{-3} f + 41 µHz	
		>40 Hz to 300 kHz	58×10^{-6} f + 6.5 mHz	
		>300 kHz to 1000 kHz	56×10^{-6} f + 2.7 Hz	
RTD Source Pt 100 (-200 to 600)°C	MetroMac Calibration Procedure MQS 03 C 124	-200 °C to 0 °C	0.10 °C	Metromac Premises
		> 0 °C to 100 °C	0.10 °C	
		> 100 °C to 600 °C	0.16 °C	
Thermocouple - Simulation method	MetroMac Calibration Procedure MQS 03 C 124	**J type**		Metromac Premises
		-210 °C to -100 °C	0.24 °C	
		> -100 °C to -30 °C	0.16 °C	
		> -30 °C to 150 °C	0.15 °C	
		> 150 °C to 760 °C	0.16 °C	
		> 760 °C to 1200 °C	0.20 °C	
		K type		
		-200 °C to -100 °C	0.30 °C	
		> -100 °C to -25 °C	0.18 °C	
		> -25 °C to 120 °C	0.16 °C	
		> 120 °C to 1000 °C	0.24 °C	
		> 1000 °C to 1370 °C	0.34°C	

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Accreditation Scope

Electrical Calibration

003-LB-CAL

Metromac Calibration Services

WS-104, Dubai Maritime City- DMC

Dubai - United Arab Emirates

Issue no.: 09 **Date: 13-02-2020** **Valid to: 30-12-2022**

Calibration Field/ Measuring Quality	Calibration Method	Range and Specification	Calibration Measurement Capability (CMC)*	Location
Insulation Tester:				
Resistance	MetroMac Calibration Procedure MQS 03 C 73	10 MΩ to 10 GΩ	0.65 % rdg	Metromac Premises
Voltage		50 V to 1 kV	0.1 % rdg	
		>1 kV to 5 kV	2.2 % rdg	
Installation & Appliance Testers:				
Continuity- Resistance	MetroMac Calibration Procedure MQS 03 C 74	100 mΩ to 10 kΩ	1.2 % rdg	Metromac Premises
Insulation- Resistance	MetroMac Calibration Procedure MQS 03 C 74	50 kΩ to 2 GΩ	1.2 % rdg	Metromac Premises
Insulation- Voltage	MetroMac Calibration Procedure MQS 03 C 74	50 V to 1000 V	1.2 % rdg	Metromac Premises
RCD Current	MetroMac Calibration Procedure MQS 03 C 74	6 m A to 30 m A	0.62 % rdg	Metromac Premises
		>30 m A to 2.0 A	0.60 % rdg	
		>2.0 A to 2.5 A	1.2 % rdg	
RCD Trip Time	MetroMac Calibration Procedure MQS 03 C 74	10 ms to 2000 ms	0.59 ms	Metromac Premises

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Accreditation Scope

Electrical Calibration

003-LB-CAL

Metromac Calibration Services

WS-104, Dubai Maritime City- DMC

Dubai - United Arab Emirates

Issue no.: 09 **Date: 13-02-2020** **Valid to: 30-12-2022**

Calibration Field/ Measuring Quality	Calibration Method	Range and Specification	Calibration Measurement Capability (CMC)*	Location
Loop Impedance	MetroMac Calibration Procedure MQS 03 C 74	Upto 0.300 Ω	0.84 % rdg + 36mΩ	Metromac Premises
		> 0.3Ω to 18 Ω	0.62 % rdg + 36mΩ	
		>18 Ω to 1800 Ω	0.59 % rdg + 36mΩ	

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Accreditation Scope

Temperature Calibration

003-LB-CAL

Metromac Calibration Services

WS-104, Dubai Maritime City- DMC

Dubai - United Arab Emirates

Issue no.: 09 **Date: 13-02-2020** **Valid to: 30-12-2022**

Calibration Field/ Measuring Quality	Calibration Method	Range and Specification	Calibration Measurement Capability (CMC)*	Location
Temperature & Relative Humidity	METROMAC calibration procedure MQS 03 C 122	10 up to 50 °C @ 20 to 95 % RH	0.6 °C	Metromac Premises
		20 up to 95 % @ 10 to 50 °C	1.5 % RH	
Liquid in Glass Thermometer	METROMAC calibration procedure MQS 03 C 55	- 40 °C up to 130 °C	0.05 °C (if scale graduation of UUT is appropriate)	Metromac Premises
		130 °C up to 270 °C	0.15 °C (if scale graduation of UUT is appropriate)	
Digital Thermometer	METROMAC calibration procedure MQS 03 C 59	- 40 °C up to 130 °C	± 0.05 °C	Metromac Premises
		130 °C up to 270 °C	± 0.10 °C	
		270 °C up to 400 °C	± 0.20 °C	
Infrared Thermometer	METROMAC calibration procedure MQS 03 C 107	- 15 °C up to 120 °C	± 1.4 °C	Metromac Premises
Temperature Dry Block Calibrator	METROMAC calibration procedure MQS 03 C 24	- 30 °C up to 133 °C	± 0.20 °C	Metromac Premises
		> 133 °C up to 600 °C	1.5 mK*t/ °C	
Liquid Bath	METROMAC calibration procedure MQS 03 C 76 (5 points)	- 30 °C up up to 130 °C	± 0.60 °C	Customer Premises
		> 130 °C up to 400 °C	± 1.0 °C	

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Accreditation Scope

Temperature Calibration

003-LB-CAL

Metromac Calibration Services

WS-104, Dubai Maritime City- DMC

Dubai - United Arab Emirates

Issue no.: 09 **Date: 13-02-2020** **Valid to: 30-12-2022**

Calibration Field/ Measuring Quality	Calibration Method	Range and Specification	Calibration Measurement Capability (CMC)*	Location
Incubator	METROMAC calibration procedure MQS 03 C 65 (5 points)	20 °C up to 100 °C	± 0.55 °C	Customer Premises
Refrigerators/Freezers	METROMAC calibration procedure MQS 03 C 77 (9 points)	- 30 °C up to 20 °C	± 0.55 °C	Customer Premises
Ovens	METROMAC calibration procedure MQS 03 C 40 (9 points)	25 °C up to 100 °C	± 0.75 °C	Customer Premises
		> 100 °C up to 200 °C	± 1.0 °C	
		> 200 °C up to 250 °C	± 1.5 °C	
Muffle Furnace	METROMAC calibration procedure MQS 03 C 90	500 °C up to 900 °C	± 3.0 °C	Customer Premises
		> 900 °C up to 1100 °C	± 4.5 °C	
Autoclave	METROMAC calibration procedure MQS 03 C 96	up to 150°C	± 0.8 °C	Customer Premises

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Accreditation Scope

Pressure Calibration

003-LB-CAL

Metromac Calibration Services

WS-104, Dubai Maritime City- DMC

Dubai - United Arab Emirates

Issue no.: 09 **Date: 13-02-2020** **Valid to: 30-12-2022**

Calibration Field/ Measuring Quality	Calibration Method	Range and Specification	Calibration Measurement Capability (CMC)*	Location
Gas Pressure Pneumatic Pressure vacuum gauges, transducers, transmitters and switches	Comparison with pressure transducer using W.I. MQS 03 C 61 & MQS 03 C 117 Based on: DKD R 6-1 : 2014 & cg17: 2017.	- 90 kPa up to 0 kPa	5 Pa + 0.02 % of reading	Metromac Premises and Customer
		0 kPa up to 350 kPa	10 Pa + 0.02 % of reading	Laboratory and Customer Premises
		0 MPa up to 10 Mpa	300 Pa + 0.02 % of reading	Metromac Premises and Customer
Liquid Pressure Hydraulic Pressure gauges, transducers, transmitters and switches	Comparison with DWT using W.I:MQS 03 C 56 & MQS 03 C 117 Based on DKD R 6 - 1: 2014 & cg 17: 2017	0.6 MPa up to 6 Mpa	0.025 % of reading	Metromac Premises
		6 MPa up to 120 Mpa	0.02 % of reading	Metromac Premises

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Accreditation Scope

Torque Calibration

003-LB-CAL

Metromac Calibration Services

WS-104, Dubai Maritime City- DMC

Dubai - United Arab Emirates

Issue no.: 02 **Date: 13-02-2020** **Valid to: 30-12-2022**

Calibration Field/ Measuring Quality	Calibration Method	Range and Specification	Calibration Measurement Capability (CMC)*	Location
Torque				
Hand Torque Tools	Direct comparison with reference torque transducer using Work Instruction METROMAC calibration procedure MQS 03 C 115 Based on: ISO 6789-1:2017 and ISO 6789-2:2017	0.04 N•m to 2 N•m Torque Transducer No:124712	1.5 % of reading	Metromac Premises
		>2 N•m to 25 N•m Torque Transducer No:91057	1.0 % of reading	
		>25 N•m to 150 N•m Torque Transducer No:87123	1.0 % of reading	
		>150 N•m to 1500 N•m Torque Transducer No:87794	1.0 % of reading	

* Calibration and Measurement Capability (CMC) is the smallest uncertainty of measurement that a laboratory can achieve within its scope of accreditation when performing more or less routine calibrations of nearly ideal measurement standards or nearly ideal measuring equipment. Calibration and Measurement Capabilities represent expanded uncertainties expressed at approximately the 95 % level of confidence, usually using a coverage factor of k = 2. The actual measurement uncertainty of a specific calibration performed by the laboratory may be greater than the CMC due to the behavior of the customer's device and to influences from the circumstances of the specific calibration.

Accreditation Scope

014-LB-CAL

Metromac Calibration Services

WS-104, Dubai Maritime City- DMC

Dubai - United Arab Emirates

Date: 27-05-2019 **Valid to: 30-12-2019**

Accreditation History			
Scope	**Issue No.**	**Details**	**Date**
Balance & Mass	09	Renewal accreditation and comply with ISO 17025:2017	13/02/2020
Volume	10		
Electrical	09		
Temperature	09		
Torque	02		
Pressure	09		
Speed	02	Renewal accreditation, Extension in scope and comply with ISO 17025:2017	
Dimensional	10		
Frequency	01	Granted accreditation from EIAC and comply with ISO 17025:2017	
Electrical	08	Extension in scope	27/05/2019
Temperature	08		
Pressure	08	Modify the CMC Values	
Torque	01	Granted accreditation from EIAC	
Balance & Mass	08	First issuance under the name of EIAC (Which was formerly known as DAC)	25/12/2018
Dimensional	09		
Volume	09		
Electrical	07		
Temperature	07		
Pressure	07		
Speed	01	Granted accreditation from EIAC (Which was formerly known as DAC)	