

from
WATERS PTE LTD



MICRO PRECISION CALIBRATION PTE LTD
BLOCK 5008 ANG MO KIO AVENUE 5 #07-02/03
TECHPLACE II SINGAPORE 569874
65 67484384



Certificate of Calibration

Date: April 22, 2020

Cert No. 551220083578963

Customer:

WATERS PACIFIC PTE LTD

1 SCIENCE PARK ROAD, #02-08 THE CAPRICORN
SINGAPORE SCIENCE PARK II
SINGAPORE 117528

Work Order #: SG-11014090

MPC Control #: 631030017042
Asset ID: 95192
Gage Type: DC ELECTRONIC LOAD
Manufacturer: CHROMA
Model Number: 63103
Size: 80V/60A
Temp/RH: 22°C / 52 %
Location: Calibration performed at MPC facility

Serial Number: 631030017042
Department: N/A
Performed By: SENGTHYE CHEW
Received Condition: IN TOLERANCE
Returned Condition: IN TOLERANCE
Cal. Date: April 22, 2020
Cal. Interval: 12 MONTHS
Cal. Due Date: April 22, 2021

Calibration Notes:

Performance test passed. See attached data (1 Page).

Calibration performed for PT Surya Teknologi.

Unit is calibrated with Mainframe 6314 S/N: 63140009193.

Standards Used to Calibrate Equipment

I.D.	Description.	Model	Serial	Manufacturer	Cal. Due Date	Traceability #
CA8094	MULTIMETER	3458A	2823A25888	HEWLETT PACKARD	Jan 10, 2021	1-12015829011-1
CV0251	SYSTEM DC POWER SUPPLY	6031A	MY41000451	AGILENT	Nov 15, 2020	551220083344238
DB8884	CALIBRATOR	5500A	7520009	FLUKE	Sep 13, 2020	551220083209610
CH2324	CURRENT SHUNT	34330A	0804	AGILENT	Sep 7, 2020	551220083200927

Procedures Used in this Event

Procedure Name	Description
33K1-4-3058-1	DC Electronic Load, Chroma 6310 Series, Feb-28-2014

Calibrating Technician:

SENGTHYE CHEW

QC Approval:

JUN CALIMAG

STATEMENTS OF PASS OR FAIL CONFORMANCE: The uncertainty of measurement has been taken into account when determining compliance with specification, as per ILAC-G8:03/2009. All measurements and test results have been rounded to ensure the probability of false-accept does not exceed 2% in compliance with ANSI/NCCL Z540.3-2006 and in case without guard banded the probability of false-accept depending on test uncertainty ratio.

THE CALIBRATION REPORT STATUS:

PASS- Term used when compliance statement is given, and the measurement result is PASS.

PASS²- Term used when compliance statement is given, and the measurement result is conditional passed or PASS².

FAIL- Term used when compliance statement is given, and the measurement result is FAIL.

FAIL²- Term used when compliance statement is given, and the measurement result is conditional failed or FAIL².

REPORT OF VALUE - Term used when reported measurement is not requiring compliance statement in report.

ADJUSTED- When adjustments are made to an instrument which changes the value of measurement from what was measured as found to new value as left.

LIMITED - When an instrument fails calibration but is still functional in a limited manner.

The expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%, unless otherwise stated. This calibration report complies with ISO/IEC 17025:2017 and ANSI/NCCL Z540.3. Calibration cycles and resulting due dates were submitted/approved by the customer. Any number of factors may cause an instrument to drift out of tolerance before the next scheduled calibration. Recalibration cycles should be based on frequency of use, environmental conditions and customer's established systematic accuracy. All standards are traceable to SI through the National Institute of Standards and Technology (NIST) and/or recognized national or international standards laboratories. Services rendered include proper manufacturer's service instruction and are warranted for no less than thirty (30) days. The information on this report pertains only to the instrument identified, this may not be reproduced in part or in a whole without the prior written approval of the issuing MP Calibration Laboratory.



Chroma 63103 DC Electronic Load

Procedure: **33K1-4-3058-1**
ID Number: **631030017042**
Asset Number: **95192**

Order Number: **SG-11014090**
Serial Number: **631030017042**
Calibration Date: **April 22, 2020**

Voltage Readback Accuracy

Range	Nominal Value	Lower Limit	As Found	As Left	Upper Limit	Result	Uncertainty (±)
16 V	15.0000 V	14.9845 V	15.0045 V	15.0045 V	15.0155 V	PASS	0.000065 V
80 V	20.0000 V	19.9500 V	20.0310 V	20.0310 V	20.0500 V	PASS	0.000085 V
80 V	30.0000 V	29.9450 V	30.0330 V	30.0330 V	30.0550 V	PASS	0.00012 V
80 V	40.0000 V	39.9400 V	40.0430 V	40.0430 V	40.0600 V	PASS	0.00016 V
80 V	50.0000 V	49.9350 V	50.0450 V	50.0450 V	50.0650 V	PASS	0.00020 V
80 V	60.0000 V	59.9300 V	60.0520 V	60.0520 V	60.0700 V	PASS	0.00024 V
80 V	75.0000 V	74.9225 V	75.0580 V	75.0580 V	75.0775 V	PASS	0.00030 V

Current Readback Accuracy

Range	Nominal Value	Lower Limit	As Found	As Left	Upper Limit	Result	Uncertainty (±)
6 A	5.0000 A	4.9891 A	5.0075 A	5.0075 A	5.0109 A	PASS	0.00085 A
60 A	30.000 A	29.910 A	30.008 A	30.008 A	30.090 A	PASS	0.026 A
60 A	40.000 A	39.899 A	40.005 A	40.005 A	40.101 A	PASS	0.034 A

Constant Current Accuracy

Range	Nominal Value	Lower Limit	As Found	As Left	Upper Limit	Result	Uncertainty (±)
6 A	5.0000 A	4.9890 A	5.0000 A	5.0000 A	5.0110 A	PASS	0.00070 A
60 A	50.000 A	49.830 A	50.000 A	50.000 A	50.170 A	PASS	0.030 A

Constant Resistance Accuracy

Range	Nominal Value	Lower Limit	As Found	As Left	Upper Limit	Result	Uncertainty (±)
100 Ω	50.00 Ω	39.90 Ω	51.89 Ω	51.89 Ω	60.10 Ω	PASS	0.00050 Ω
5 kΩ	1000.0 Ω	899.0 Ω	1002.2 Ω	1002.2 Ω	1101.0 Ω	PASS	0.0085 Ω

Constant Voltage Accuracy

Range	Nominal Value	Lower Limit	As Found	As Left	Upper Limit	Result	Uncertainty (±)
80 V	75.000 V	74.880 V	75.000 V	75.000 V	75.120 V	PASS	0.00058 V