



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 28, 2020

Cert No. 551220083588304

**Customer:**

WATERS PACIFIC PTE LTD

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

Work Order #: SG-11014134

MPC Control #: 63103A005457  
Asset ID: 93178  
Gage Type: DC ELECTRONIC LOAD  
Manufacturer: CHROMA  
Model Number: 63103A  
Size: 80V/60A  
Temp/RH: 22°C / 52 %  
Location: Calibration performed at MPC facility

Serial Number: 63103A005457  
Department: N/A  
Performed By: SENGTHYE CHEW  
Received Condition: IN TOLERANCE  
Returned Condition: IN TOLERANCE  
Cal. Date: April 28, 2020  
Cal. Interval: 12 MONTHS  
Cal. Due Date: April 28, 2021

**Calibration Notes:**

Unit is calibrated with Mainframe 6314A S/N: 6314A0002902  
Performance test passed. See attached data (1 Page).

Calibration performed for PT Surya Teknologi.

**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 guard banded 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.

**PASS<sup>2</sup>**- Term used when compliance statement is given, and the measurement result is conditional passed or PASS<sup>2</sup>.

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

**FAIL<sup>2</sup>**- Term used when compliance statement is given, and the measurement result is conditional failed or FAIL<sup>2</sup>.

**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: 63103A005457  
Asset Number: 93178

Order Number: SG-11014134  
Serial Number: 63103A005457  
Calibration Date: April 28, 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   | 15.0010 V | 15.0010 V | 15.0155 V   | PASS   | 0.000065 V        |
| 80 V  | 20.0000 V     | 19.9500 V   | 20.0010 V | 20.0010 V | 20.0500 V   | PASS   | 0.000085 V        |
| 80 V  | 30.0000 V     | 29.9450 V   | 30.0020 V | 30.0020 V | 30.0550 V   | PASS   | 0.00012 V         |
| 80 V  | 40.0000 V     | 39.9400 V   | 40.0010 V | 40.0010 V | 40.0600 V   | PASS   | 0.00016 V         |
| 80 V  | 50.0000 V     | 49.9350 V   | 50.0020 V | 50.0020 V | 50.0650 V   | PASS   | 0.00020 V         |
| 80 V  | 60.0000 V     | 59.9300 V   | 60.0020 V | 60.0020 V | 60.0700 V   | PASS   | 0.00024 V         |
| 80 V  | 75.0000 V     | 74.9225 V   | 75.0040 V | 75.0040 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    | 30.065 A | 30.065 A | 30.090 A    | PASS   | 0.026 A           |
| 60 A  | 40.000 A      | 39.899 A    | 40.088 A | 40.088 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     | 52.12 Ω  | 52.12 Ω  | 60.10 Ω     | PASS   | 0.00050 Ω         |
| 5 kΩ  | 1000.0 Ω      | 899.0 Ω     | 1003.5 Ω | 1003.5 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         |