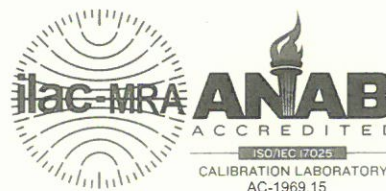




MICRO PRECISION CALIBRATION PTE LTD
BLOCK 5008 ANG MO KIO AVENUE 5 #07-02/03
TECHPLACE II SINGAPORE 569874
65 67484384



Certificate of Calibration

Date: May 7, 2020

Cert No. 551220083598107

Customer:

WATERS PACIFIC PTE LTD

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

Work Order #: SG-11014064

MPC Control #: US38010248

Asset ID: PWAT-16GC0039

Gage Type: 6 1/2 DIGIT MULTIMETER

Manufacturer: RACAL-DANA INSTRUMENTS

Model Number: 4152A

Size: N/A

Temp/RH: 22.0°C / 50.0%

Location: Calibration performed at Customer's facility

Serial Number: US38010248

Department: N/A

Performed By: DIVIEERNRAJ CHANDRAN

Received Condition: IN TOLERANCE

Returned Condition: IN TOLERANCE

Cal. Date: April 30, 2020

Cal. Interval: 12 MONTHS

Cal. Due Date: April 30, 2021

Calibration Notes:

Please refer to the attached calibration data. (2 pages)
Calibration performed at GES SINGAPORE PTE LTD.

Standards Used to Calibrate Equipment

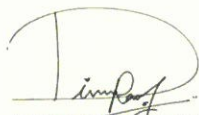
I.D.	Description.	Model	Serial	Manufacturer	Cal. Due Date	Traceability #
DH3876	MULTI-FUNCTION CALIBRATOR	5700A/NAF	6020913	FLUKE	Apr 9, 2021	551220083583661

Procedures Used in this Event

Procedure Name
RACAL 4152A

Description
6.5 Digit Digital Multimeter, Racal 4152A

Calibrating Technician:


DIVIEERNRAJ CHANDRAN

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.

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.



Calibration Report of Racial Dana Instruments 4152A 6 1/2 Digit Multimeter

MPC Control #:	US38010248	Serial Number:	US38010248
Asset ID:	PWAT-16GC0039	Calibration Date:	April 30, 2020

DC Voltage Accuracy

Standard Input Value	Nominal	Lower Limit	As Found	As Left	Error	Upper Limit	Result	Uncertainty (±)
100 mV	100.0000 mV	99.9958 mV	100.0022 mV	100.0022 mV	0.002200 %	100.0042 mV	PASS	0.0015 mV
100 mV	-100.0000 mV	-100.0042 mV	-100.0007 mV	-100.0007 mV	0.000700 %	-99.9958 mV	PASS	0.0015 mV
1 V	1.000000 V	0.999974 V	1.000008 V	1.000008 V	0.000750 %	1.000026 V	PASS	0.000068 V
1 V	-1.000000 V	-1.000026 V	-1.000013 V	-1.000013 V	0.001300 %	-0.999974 V	PASS	0.000068 V
10 V	10.00000 V	9.99976 V	10.00011 V	10.00011 V	0.001090 %	10.00024 V	PASS	0.000043 V
10 V	-10.00000 V	-10.00024 V	-10.00011 V	-10.00011 V	0.001100 %	-9.99976 V	PASS	0.000043 V
100 V	100.0000 V	99.9964 V	99.9990 V	99.9990 V	0.000980 %	100.0036 V	PASS	0.00040 V
100 V	-100.0000 V	-100.0036 V	-99.9973 V	-99.9973 V	0.002660 %	-99.9964 V	PASS	0.00040 V
199 V	199.0000 V	198.9932 V	198.9982 V	198.9982 V	0.000925 %	199.0068 V	PASS	0.0010 V
199 V	-199.0000 V	-199.0068 V	-198.9993 V	-198.9993 V	0.000372 %	-198.9932 V	PASS	0.0010 V

AC Voltage Accuracy

Standard Input Value	Nominal	Lower Limit	As Found	As Left	Error	Upper Limit	Result	Uncertainty (±)
100 mV @ 1 kHz	100.000 mV	99.925 mV	99.992 mV	99.992 mV	0.008000 %	100.075 mV	PASS	0.019 mV
100 mV @ 30 kHz	100.000 mV	99.860 mV	100.022 mV	100.022 mV	0.022430 %	100.140 mV	PASS	0.040 mV
1 V @ 1 kHz	1.000000 V	0.999450 V	0.999666 V	0.999666 V	0.033400 %	1.000550 V	PASS	0.00017 V
1 V @ 30 kHz	1.000000 V	0.998600 V	1.000238 V	1.000238 V	0.023810 %	1.001400 V	PASS	0.00014 V
10 V @ 1 kHz	10.0000 V	9.9945 V	9.9986 V	9.9986 V	0.014000 %	10.0055 V	PASS	0.0024 V
10 V @ 30 kHz	10.0000 V	9.9860 V	10.0049 V	10.0049 V	0.048540 %	10.0140 V	PASS	0.0057 V
100 V @ 1 kHz	100.0000 V	99.9450 V	99.9981 V	99.9981 V	0.001900 %	100.0550 V	PASS	0.017 V
100 V @ 30 kHz	100.0000 V	99.8600 V	99.9854 V	99.9854 V	0.014590 %	100.1400 V	PASS	0.026 V
199 V @ 1 kHz	199.0000 V	198.9010 V	198.9850 V	198.9850 V	0.007538 %	199.0990 V	PASS	0.033 V
199 V @ 30 kHz	199.0000 V	198.7410 V	198.8734 V	198.8734 V	0.063618 %	199.2590 V	PASS	0.047 V

Resistance Accuracy

Standard Input Value	Nominal	Lower Limit	As Found	As Left	Error	Upper Limit	Result	Uncertainty (±)
100 Ω	100.0000 Ω	99.9953 Ω	100.0000 Ω	100.0000 Ω	0.000000 %	100.0047 Ω	PASS	0.0010 Ω
1 kΩ	1.000000 kΩ	0.999964 kΩ	1.000010 kΩ	1.000010 kΩ	0.001000 %	1.000036 kΩ	PASS	0.000085 kΩ
10 kΩ	10.00000 kΩ	9.99964 kΩ	10.00015 kΩ	10.00015 kΩ	0.001500 %	10.00036 kΩ	PASS	0.000085 kΩ
100 kΩ	100.0000 kΩ	99.9954 kΩ	100.0020 kΩ	100.0020 kΩ	0.002000 %	100.0046 kΩ	PASS	0.0010 kΩ
1 MΩ	1.000000 MΩ	0.999912 MΩ	1.000015 MΩ	1.000015 MΩ	0.001500 %	1.000088 MΩ	PASS	0.000018 MΩ
10 MΩ	10.00000 MΩ	9.99792 MΩ	10.00073 MΩ	10.00073 MΩ	0.007270 %	10.00208 MΩ	PASS	0.00037 MΩ

DC Current Accuracy

Standard Input Value	Nominal	Lower Limit	As Found	As Left	Error	Upper Limit	Result	Uncertainty (±)
1 A	1.000000 A	0.999780 A	1.000000 A	1.000000 A	0.000000 %	1.000220 A	PASS	0.000095 A
1 A	-1.000000 A	-1.000220 A	-1.000027 A	-1.000027 A	0.002700 %	-0.999780 A	PASS	0.000095 A

15/05/20

Calibration Report of Racal Dana Instruments 4152A 6 1/2 Digit Multimeter

MPC Control #:	US38010248	Serial Number:	US38010248
Asset ID:	PWAT-16GC0039	Calibration Date:	April 30, 2020

AC Current Accuracy

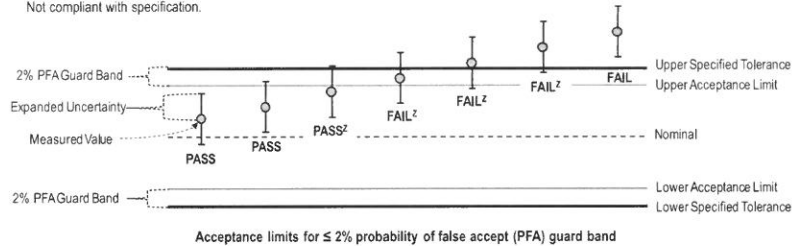
Standard Input Value	Nominal	Lower Limit	As Found	As Left	Error	Upper Limit	Result	Uncertainty ($\pm$)
1 A @ 1 kHz	1.000000 A	0.998600 A	0.999623 A	0.999623 A	0.037724 %	1.001400 A	PASS	0.00074 A

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/NCSL Z540.3-2006

The status of compliance with the acceptance criteria is reported as:

- PASS** — Compliant with specification.
- PASS^z** — The measured value is within acceptance limits.
However, a portion of the expanded uncertainty of measurement at 95% exceeds the specified tolerance.
- FAIL^z** — The measured value is not within the acceptance limits.
However, a portion of the expanded uncertainty of measurement at 95% is within the specified tolerance.
- FAIL** — Not compliant with specification.



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/NCSL Z540.3-2006, Method 6 — Guard Bands Based on Test Uncertainty Ratio.

- End of Calibration Report -

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