

REVIEWED & ACCEPTED
SIGN: *Rosmawati Purno*
DATE: 06/07/2020
REMARKS: EQ10 50645
BERNARD RAMPRONA (ff 06/07/2020)

Calibration Certificate

Report No:0810603:20200605135445

Manufacturer: Keithley Instruments
Model Number: 236
Serial Number: 0810603

Calibration Date: 05 June 2020
Temperature: 23.2 °C
Relative Humidity: 43.4 %
Procedure: QSIW-622 Rev.A
Condition as Returned: **IN TOLERANCE**

Customer Information: Flextronics Shah Alam Sdn Bhd

- Keithley Instruments, a Tektronix Company, certifies that the above instrument meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). This instrument has been calibrated using measurement standards traceable to the International System of Units (SI) through the National Institute of Standards and Technology (NIST), or other National Metrology Institutes (such as NPL, PTB, etc.), and meets the requirements of ANSI/NCSL Z540-1-1994.
- The quality system is registered to ISO 9001.
- This calibration is a direct comparison of the unit under test to the listed reference standards and did not involve any sampling plans to complete. No allowance has been made for the instability of the test device due to use, time, etc. Such allowances would be made by the customer as needed.
- Test accuracy ratios (TARs) are 4:1 or greater unless otherwise indicated.
- This calibration certificate shall not be reproduced except in full without the written approval of Keithley Instruments.

Calibration Facility
Keithley Instruments
28775 Aurora Road
Cleveland, Ohio 44139 USA
440-248-0400

Technician: 0320

Approved By: *Rick L. Krause*
Rick L. Krause
Service Manager
Certificate Issue Date: 08-Jun-2020

Measurement Report - As-Returned

Report Number:
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Standards Used

<u>Control Number</u>	<u>Description</u>	<u>Due Date</u>
10402	Keithley Instruments 6517A Electrometer	13-Oct-2020
7114	Keithley Instruments 263 Calibrator/Source	04-May-2021
7749	Agilent Technologies 3458A Multimeter	09-Jun-2020
9017	Fluke 5700A Multifunction Calibrator	15-Jun-2020

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Test Description	Expected Value	Measured Value	Lower Limit	Upper Limit	Test Status	TAR
263 Characterization						
0.900000 μ A	0.900000 μ A	0.89989 μ A	0.89955 μ A	0.90045 μ A	Pass	
-0.900000 μ A	-0.900000 μ A	-0.89983 μ A	-0.90045 μ A	-0.89955 μ A	Pass	
9.000000 μ A	9.000000 μ A	8.9993 μ A	8.9957 μ A	9.0043 μ A	Pass	
-9.000000 μ A	-9.000000 μ A	-8.9988 μ A	-9.0043 μ A	-8.9957 μ A	Pass	
90.0000 μ A	90.0000 μ A	89.989 μ A	89.955 μ A	90.045 μ A	Pass	
-90.0000 μ A	-90.0000 μ A	-89.985 μ A	-90.045 μ A	-89.955 μ A	Pass	
0.900000 mA	0.900000 mA	0.89992 mA	0.89957 mA	0.90043 mA	Pass	
-0.900000 mA	-0.900000 mA	-0.89992 mA	-0.90043 mA	-0.89957 mA	Pass	
9.000000 mA	9.000000 mA	8.9994 mA	8.9946 mA	9.0054 mA	Pass	
-9.000000 mA	-9.000000 mA	-8.9994 mA	-9.0054 mA	-8.9946 mA	Pass	
Keithley 263 Source Characterization.						
100 mA	1 μ A	1 μ A	1 μ A	1 μ A	Pass	0.13
-0.900000 μ A	-0.900000 μ A	-0.89984 μ A	-0.90045 μ A	-0.89955 μ A	Pass	
9.000000 μ A	9.000000 μ A	8.9991 μ A	8.9957 μ A	9.0043 μ A	Pass	
-9.000000 μ A	-9.000000 μ A	-8.9989 μ A	-9.0043 μ A	-8.9957 μ A	Pass	
90.0000 μ A	90.0000 μ A	89.988 μ A	89.955 μ A	90.045 μ A	Pass	
-90.0000 μ A	-90.0000 μ A	-89.986 μ A	-90.045 μ A	-89.955 μ A	Pass	
0.900000 mA	0.900000 mA	0.89992 mA	0.89957 mA	0.90043 mA	Pass	
-0.900000 mA	-0.900000 mA	-0.89992 mA	-0.90043 mA	-0.89957 mA	Pass	
9.000000 mA	9.000000 mA	8.9993 mA	8.9946 mA	9.0054 mA	Pass	
-9.000000 mA	-9.000000 mA	-8.9994 mA	-9.0054 mA	-8.9946 mA	Pass	
Common Mode verification						
Result of Operator Evaluation					Pass	
VOLTAGE SOURCE VERIFY						
100.00 V	100.00 V	100.002 V	99.943 V	100.057 V	Pass	
-100.00 V	-100.00 V	-99.994 V	-100.057 V	-99.943 V	Pass	
10.000 V	10.000 V	10.0003 V	9.9943 V	10.0057 V	Pass	
-10.000 V	-10.000 V	-9.9996 V	-10.0057 V	-9.9943 V	Pass	
1.0000 V	1.0000 V	1.00002 V	0.99902 V	1.00098 V	Pass	
-1.0000 V	-1.0000 V	-1.00001 V	-1.00098 V	-0.99902 V	Pass	
+/-0V source 1.1V Range						
0.000000 V	0.000000 V	0.00000 V	-0.00065 V	0.00065 V	Pass	
+/-0V @ 11V Range						
0.00000 V	0.00000 V	-0.0000 V	-0.0024 V	0.0024 V	Pass	
+/-0V @ 110V Range						
0.0000 V	0.0000 V	0.007 V	-0.024 V	0.024 V	Pass	
Voltage Measurement						
100.000 V	100.0000 V	99.998 V	99.965 V	100.035 V	Pass	
-100.000 V	-100.0000 V	-100.001 V	-100.035 V	-99.965 V	Pass	
10.0000 V	10.00000 V	10.0000 V	9.9965 V	10.0035 V	Pass	

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-10.0000 V	-10.00000 V	-10.0001 V	-10.0035 V	-9.9965 V	Pass	
1.00000 V	1.000000 V	0.99998 V	0.99942 V	1.00058 V	Pass	
-1.00000 V	-1.000000 V	-1.00001 V	-1.00058 V	-0.99942 V	Pass	
+/-0V @ 1.1V Range						
0.0000 V	0.00000 V	0.0000 V	-0.0003 V	0.0003 V	Pass	
+/-0V @ 11V Range						
0.000 V	0.0000 V	0.000 V	-0.001 V	0.001 V	Pass	
+/-0V @ 110V Range						
0.00 V	0.000 V	-0.00 V	-0.01 V	0.01 V	Pass	
Low Current 1nA to 10mA Measurement						
0.000000 nA	0.000000 nA	-0.00002 nA	-0.00010 nA	0.00010 nA	Pass	
0.00000 nA	0.00000 nA	0.0000 nA	-0.0010 nA	0.0010 nA	Pass	
0.0000 nA	0.0000 nA	0.000 nA	-0.006 nA	0.006 nA	Pass	
0.000000 µA	0.000000 µA	0.00000 µA	-0.00006 µA	0.00006 µA	Pass	
0.00000 µA	0.00000 µA	0.0000 µA	-0.0007 µA	0.0007 µA	Pass	
0.0000 µA	0.0000 µA	0.001 µA	-0.006 µA	0.006 µA	Pass	
0.000000 mA	0.000000 mA	0.00000 mA	-0.00006 mA	0.00006 mA	Pass	
0.00000 mA	0.00000 mA	-0.0001 mA	-0.0006 mA	0.0006 mA	Pass	
0.90000 nA	0.90000 nA	0.8997 nA	0.8972 nA	0.9028 nA	Pass	
-0.90000 nA	-0.90000 nA	-0.9000 nA	-0.9028 nA	-0.8972 nA	Pass	
9.00000 nA	9.00000 nA	9.0000 nA	8.9720 nA	9.0280 nA	Pass	
-9.00000 nA	-9.00000 nA	-8.9997 nA	-9.0280 nA	-8.9720 nA	Pass	
90.0000 nA	90.0000 nA	89.995 nA	89.805 nA	90.195 nA	Pass	
-90.0000 nA	-90.0000 nA	-89.999 nA	-90.195 nA	-89.805 nA	Pass	
0.900000 µA	0.900000 µA	0.90000 µA	0.89958 µA	0.90042 µA	Pass	
-0.900000 µA	-0.900000 µA	-0.90002 µA	-0.90042 µA	-0.89958 µA	Pass	
9.00000 µA	9.00000 µA	9.0001 µA	8.9962 µA	9.0038 µA	Pass	
-9.00000 µA	-9.00000 µA	-9.0002 µA	-9.0038 µA	-8.9962 µA	Pass	
90.0000 µA	90.0000 µA	89.999 µA	89.963 µA	90.037 µA	Pass	
-90.0000 µA	-90.0000 µA	-90.001 µA	-90.037 µA	-89.963 µA	Pass	
0.900000 mA	0.900000 mA	0.89999 mA	0.89963 mA	0.90038 mA	Pass	
-0.900000 mA	-0.900000 mA	-0.90001 mA	-0.90038 mA	-0.89963 mA	Pass	
9.00000 mA	9.00000 mA	9.0000 mA	8.9960 mA	9.0040 mA	Pass	
-9.00000 mA	-9.00000 mA	-9.0002 mA	-9.0040 mA	-8.9960 mA	Pass	
Low Current 1nA to 10mA Source						
0.0000 nA	0.00000 nA	-0.0000 nA	-0.0004 nA	0.0004 nA	Pass	
0.000 nA	0.0000 nA	0.001 nA	-0.002 nA	0.002 nA	Pass	
0.00 nA	0.000 nA	0.00 nA	-0.02 nA	0.02 nA	Pass	
0.0000 µA	0.00000 µA	0.0000 µA	-0.0002 µA	0.0002 µA	Pass	
0.000 µA	0.0000 µA	0.000 µA	-0.002 µA	0.002 µA	Pass	
0.00 µA	0.000 µA	0.00 µA	-0.02 µA	0.02 µA	Pass	

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0.0000 mA	0.00000 mA	-0.0000 mA	-0.0002 mA	0.0002 mA	Pass	
0.000 mA	0.0000 mA	-0.000 mA	-0.002 mA	0.002 mA	Pass	
0.90000 nA	0.90000 nA	0.900005 nA	0.896850 nA	0.903150 nA	Pass	
-0.90000 nA	-0.90000 nA	-0.899996 nA	-0.903150 nA	-0.896850 nA	Pass	
9.0000 nA	9.0000 nA	9.00000 nA	8.97100 nA	9.02900 nA	Pass	
-9.0000 nA	-9.0000 nA	-9.00000 nA	-9.02900 nA	-8.97100 nA	Pass	
90.000 nA	90.000 nA	90.0000 nA	89.7910 nA	90.2090 nA	Pass	
-90.000 nA	-90.000 nA	-90.0000 nA	-90.2090 nA	-89.7910 nA	Pass	
0.9000 µA	0.9000 µA	0.89998 µA	0.89935 µA	0.90065 µA	Pass	
-0.9000 µA	-0.9000 µA	-0.89999 µA	-0.90065 µA	-0.89935 µA	Pass	
9.0000 µA	9.0000 µA	8.99961 µA	8.99350 µA	9.00650 µA	Pass	
-9.0000 µA	-9.0000 µA	-8.99998 µA	-9.00650 µA	-8.99350 µA	Pass	
90.000 µA	90.000 µA	90.0003 µA	89.9350 µA	90.0650 µA	Pass	
-90.000 µA	-90.000 µA	-90.0000 µA	-90.0650 µA	-89.9350 µA	Pass	
0.9000 mA	0.9000 mA	0.89999 mA	0.89935 mA	0.90065 mA	Pass	
-0.9000 mA	-0.9000 mA	-0.90003 mA	-0.90065 mA	-0.89935 mA	Pass	
9.0000 mA	9.0000 mA	9.00005 mA	8.99350 mA	9.00650 mA	Pass	
-9.0000 mA	-9.0000 mA	-9.00012 mA	-9.00650 mA	-8.99350 mA	Pass	
Current 100mA Measurement						
0.000 mA	0.0000 mA	0.000 mA	-0.006 mA	0.006 mA	Pass	
-90.000 mA	90.0000 mA	89.997 mA	89.904 mA	90.096 mA	Pass	
90.000 mA	-90.0000 mA	-89.999 mA	-90.096 mA	-89.904 mA	Pass	
Current 100mA Source						
0.000 mA	0.0000 mA	0.003 mA	-0.020 mA	0.020 mA	Pass	
90.000 mA	90.0000 mA	89.998 mA	89.890 mA	90.110 mA	Pass	
-90.000 mA	-90.0000 mA	-90.005 mA	-90.110 mA	-89.890 mA	Pass	

Comments:

Before data was not possible due to condition of unit

***** End of Measurement Report *****