



SOUTHWEST RESEARCH INSTITUTE®

6220 Culebra Road, P.O. Drawer 28510
Institute Quality Systems
Institute Calibration Laboratory
Phone: 210-522-5215 Fax 210-522-4834



Calibration Laboratory
Certificate #0972-01

Certificate of Calibration

Submitted By: DIV20

Address: B57

Contact: DON BANNON

Manufacturer / Model: KEITHLEY / 617

Description: ELECTROMETER

Serial No: 0579628

Asset No: 003400

Procedure: KEITHLEY 617 - 14 SEP 2006

Work Order: 303076644

Date Issued: Oct 3, 2007

Calibration Date: Oct 3, 2007

***Calibration Due:** Oct 3, 2008

Calibration Location: Bldg. 64

Environment: Temp. 72.0°F Hum. 45 %RH

****Data Type:** FOUND-LEFT

DivID/Location: N/A

This certificate documents traceability to the National Institute of Standards and Technology (NIST) and the International System of Units (SI). The Laboratory quality system conforms to ISO/IEC 17025, 2005, ANSI/NCSL Z540-1-1994 and relevant requirements of the ISO 9000-2000 standard. This certificate shall not be reproduced, except in full, without the written approval of the Southwest Research Institute Calibration Laboratory. This certificate shall not be used to claim product endorsement by Southwest Research Institute, American Association for Laboratory Accreditation (A2LA) or any agency of the U. S. Government. Results of this calibration relate only to the instrument described above at the time of calibration and does not imply any long term stability of the instrument.

*Determined by the customer, does not imply the instrument will remain within tolerance as any number of factors may cause an out-of-tolerance condition before this date. **Found/Left = adjustment and/or repair was not required, As Left = adjusted and/or repaired was required. The client has sole responsibility for determination of in-/out-of-tolerance or compliance/noncompliance. See Remarks or attached Measurement Report with the same Work Order number for data.

Reported uncertainty calculated in accordance with the ISO "Guide to the Expression of Uncertainty in Measurement" (GUM) and represents an expanded uncertainty with a coverage factor of k=2 to approximate a 95% confidence level.

Remarks: Limited Cal - Coulombs, 2 pA, 20 pA and 200 pA not calibrated.

Standards Used

Asset No.	Serial No.	Manufacturer	Model	Description	Cal Due
009779	S20908811050A	ESI	SR1050-1M	DECADE RESISTOR	Apr 12, 08
009829	A20602851959A	ESI	SR1050-10M	DECADE RESISTOR	Feb 15, 08
010747	20107901030D	ESI	SR1030 1 KOHM/S	STANDARD RESISTOR	Apr 10, 08
010748	20709891030E	ESI	SR1030 10 KOHM/	STANDARD RESISTOR	Apr 10, 08
010749	20709891030F	ESI	SR1030 100 KOHM	STANDARD RESISTOR	Apr 12, 08
012066	MY45040419	HEWLETT-PACKARD	3458A/OPT 002	MULTIMETER	Apr 20, 08
000101	86052	BIDDLE	72-6346-1	DECADE RESISTOR	Apr 20, 08
000182	5200003	FLUKE	5700A/EP	CALIBRATOR	Nov 17, 07

Scott Korte

Reviewed by: () wgh (x) srk () jrg () blt () pwc

Metrology Technician

Clint Rowe

Measurements by: Clint Rowe

Metrology Technician

Southwest Research Institute
Calibration Laboratory
Measurement Report

Work Order:	303076644	Mfr:	KEITHLEY	Technician:	CER
Asset No:	003400	Model:	617	Cal Date:	03-Oct-07
Serial No:	0579628	Type:	ELECTROMETER		
Remarks:					
Coulombs, 2 pA, 20 pA and 200 pA not calibrated.					

Function/Range	Test Point	TI Reading	Difference	+/-Test Limits	+/-Uncertainty	Found/Left
						Result
DC Amps	mAmps	mAmps	mAmps	mAmps	mAmps	
20 mA	19.000	19.004	0.004	0.030	0.0014	Pass
2 mA	1.9000	1.9007	0.0007	0.0033	0.00014	Pass
	uAmps	uAmps	uAmps	uAmps	uAmps	
200 uA	190.00	189.95	-0.05	0.30	0.029	Pass
20 uA	19.000	19.003	0.003	0.030	0.0019	Pass
2 uA	1.9000	1.9005	0.0005	0.0033	0.00022	Pass
	nAmps	nAmps	nAmps	nAmps	nAmps	
200 nA	190.00	189.94	-0.06	0.49	0.021	Pass
20 nA	19.000	18.996	-0.004	0.049	0.0017	Pass
2 nA	1.9000	1.9022	0.0022	0.0053	0.00017	Pass
DCV	mVolts	mVolts	mVolts	mVolts	mVolts	
200 mVolt	190.00	190.04	0.04	0.14	0.012	Pass
	Volts	Volts	Volts	Volts	Volts	
2 Volt	1.9000	1.9003	0.0003	0.0011	0.00012	Pass
20 Volt	19.000	19.002	0.002	0.011	0.0012	Pass
200 Volt	190.00	190.02	0.02	0.14	0.012	Pass
Resistance	GOhm	GOhm	GOhm	GOhm	GOhm	
20 GOhm	9.961	9.985	0.024	0.15	0.020	Pass
2 GOhm	0.9990	1.0018	0.0028	0.02	0.00025	Pass
	MOhm	MOhm	MOhm	MOhm	MOhm	
200 MOhm	100.00	100.01	0.01	0.31	0.10	Pass
20 MOhm	10.000	10.001	0.001	0.026	0.0012	Pass
2 MOhm	1.0000	1.0003	0.0003	0.0026	0.00012	Pass
	kOhm	kOhm	kOhm	kOhm	kOhm	
200 kOhm	100.00	100.03	0.03	0.26	0.012	Pass
20 kOhm	10.000	10.003	0.003	0.016	0.0017	Pass
2 kOhm	1.0000	1.0017	0.0017	0.00211	0.00010	Pass
Voltage Source	Volts	Volts	Volts	Volts	Volts	
	0.000	0.016	0.016	0.050	0.0012	Pass
	1.000	1.016	0.016	0.052	0.0012	Pass
	10.000	10.019	0.019	0.070	0.0012	Pass
	25.000	25.021	0.021	0.100	0.0015	Pass
	50.000	50.023	0.023	0.150	0.0015	Pass
	100.000	100.024	0.024	0.250	0.0012	Pass

END OF REPORT