

SOUTHWEST RESEARCH INSTITUTE

6220 CULEBRA ROAD • POST OFFICE DRAWER 28510 • SAN ANTONIO, TEXAS, USA 78228-0510 • (512) 684-5111 • TELEX 244846

Division 05 - Instrument Repair and Calibration Laboratory

CERTIFICATE OF CALIBRATION

ISSUED TO: DIV 20 Center For Nuclear Waste Regulatory Analysis
MFGR/MODEL ABB 5E120 RECORDER
ITEM DESCRIPTION RECORDER
S/N 0515265 SWRI NO. NONE
PLUG-INS, ETC. NONE
TOLERANCE SEE MFG SPECS

STANDARDS

Standard No.	MFGR Model	Description	S/N	Cal. Due	Cal. Rec. No.
		<u>JUNN FLUKE 335A DC STANDARD</u>	<u>175024</u>	<u>9 MAR 92</u>	<u>08247</u>

ENVIRONMENT: Temperature 70°F Humidity 34%
Location Room A11 BLDG 68 SWRI

PROCEDURE

Essentially as outlined in MFGRS Service Manual

CONCLUSION

Item within tolerance
 Item out of tolerance
 Item ADJ/repared to tolerance

Calibration was in accord with requirements of MIL-STD-45662A. Measurements are traceable to the National Institute of Standards and Technology. Inspection and test data are on file and available for inspection.

SIGNED Anthony P. [Signature]
DATE 2 DEC 91

RECORD NUMBER: 0008029 NEXT CALIBRATION DUE: 2 June 92

S O U T H W E S T R E S E A R C H I N S T I T U T E

Department of Quality Assurance
Calibration Laboratory

CERTIFICATE OF CALIBRATION

Issued to: DIV20 B57 NARASI SRIDHAR

Device No: 2292

Manufacturer: ABB

Model: SE 120

Nomenclature: PLOTTER

Serial Number: 0515265

SwRI No: NONE

Remarks

Accuracy: MFGR

Procedure: MFGR

ENVIRONMENT

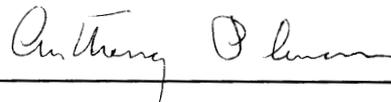
Temperature: 72 Humidity: 39 Location: ROOM A11 B68 SWRI

CONCLUSION

Tolerance/Remarks: Received into the system, introduced or reactivated

Calibration was in accord with requirements of MIL-STD-45662A. Measurements are traceable to the National Institute of Standards and Technology. Inspection and test data are on file and available for inspection.

Signed



Calibration Date: 04/05/93

Record Number: 00010991

Next Calibration Due: 04/05/94

S O U T H W E S T R E S E A R C H I N S T I T U T E

Department of Quality Assurance
Calibration Laboratory

Device Serial No: 0515265

Calibration Date: 04/05/93

STANDARDS

Standard No: 132 Manufacturer: JOHN FLUKE

Model: 5100B

Nomenclature: CALIBRATOR

Serial No: 2730017

Cal.Due: 04/08/93

Cal.Rec.No: 00009975

S O U T H W E S T R E S E A R C H I N S T I T U T E

Department of Quality Assurance
Calibration Laboratory

CERTIFICATE OF CALIBRATION

Issued to: DIV20 B57 NARASI SRIDHAR

Device No: 2292

Manufacturer: ABB

Model: SE 120

Nomenclature: PLOTTER

Serial Number: 0515265

SwRI No: NONE

Cal interval 12 Mo.

Remarks

*Accuracy: .5% of input.

Accuracy: *

Procedure: MFGR

ENVIRONMENT

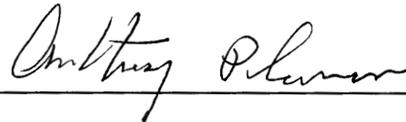
Temperature: 74 Humidity: 45 Location: ROOM A11 B68 SWRI

CONCLUSION

Tolerance/Remarks: Received in tolerance, no adjustments made

Calibration was in accord with requirements of MIL-STD-45662A. Measurements are traceable to the National Institute of Standards and Technology. Inspection and test data are on file and available for inspection.

Signed



Calibration Date: 04/05/94

Cal interval: 12 Months

Record Number: 00013771

Next Calibration Due: 04/05/95

S O U T H W E S T R E S E A R C H I N S T I T U T E

Department of Quality Assurance
Calibration Laboratory

Device Serial No: 0515265

Calibration Date: 04/05/94

STANDARDS

Standard No: 168 Manufacturer: JOHN FLUKE Model: 335A
Nomenclature: DC VOLTAGE STANDARD/DIFFERENTIAL VOLTMETER/NULL DET.
Serial No: 775024 Cal.Due: 04/19/94 Cal.Rec.No: 00012453

SOUTHWEST RESEARCH INSTITUTE
Department of Quality Assurance
Calibration Laboratory

OUT OF TOLERANCE NOTICE

05/02/95

The following asset was found to be out of tolerance when submitted for calibration. Please be aware measurements made with this may be inaccurate.

INSTRUMENT INFORMATION

Issued to: DARRELL DUNN DIV20 B57 Asset Number: 002292
Manufacturer: ABB Model Number: SE 120
Nomenclature: PLOTTER
Serial Number: 0515265 SwRI Capital Number:
Accuracy: MFGR SPECS Calibration Interval: 12 months

DEVIATION

Out of Tolerance Date: 05/02/95 Last Valid Calibration Date: 04/05/94

REMARKS

LOWER PEN

Range	Tol.	As Found	Error	Released
50.0 mV	0.5% of Range	50.29 mV	0.55 %	50.11 mV
2.0 V	0.5% of Range	2.011 V	0.55 %	2.005 V

Suppression

-1 x 100 %	0.20 % of Setting	10.050 mV	0.50 %	10.005 mV
-2 x 100 %	0.20 % of setting	20.015 mV	0.75 %	20.040 mV

Adjusted span and suppression pots to read within mfg spec's.
All other specifications were within tolerance.

Signed

Anthony Placencia

Checked by

Walt Sullivan

OUT OF TOLERANCE

SOUTHWEST RESEARCH INSTITUTE
Department of Quality Assurance
Calibration Laboratory

Page 2 of 3

OUT OF TOLERANCE NOTICE

05/02/95

The following asset was found to be out of tolerance when submitted for calibration. Please be aware measurements made with this may be inaccurate.

INSTRUMENT INFORMATION

Issued to: DARRELL DUNN DIV20 B57 Asset Number: 002292
Manufacturer: ABB Model Number: SE 120
Nomenclature: PLOTTER
Serial Number: 0515265 SWRI Capital Number:
Accuracy: MFGR SPECS Calibration Interval: 12 months

DEVIATION

Out of Tolerance Date: 05/02/95 Last Valid Calibration Date: 04/05/94

REMARKS

LOWER PEN

Range	Tol.	As Found	Error	Released
50.0 mV	0.5% of Range	50.29 mV	0.55 %	50.11 mV
2.0 V	0.5% of Range	2.011 V	0.55 %	2.005 V

Suppression

-1 x 100 %	0.20 % of Setting	10.050 mV	0.50 %	10.005 mV
-2 x 100 %	0.20 % of setting	20.015 mV	0.75 %	20.040 mV

Adjusted span and suppression pots to read within mfg spec's.
All other specifications were within tolerance.

Signed

Arthy Plowman

Checked by

Walt Lill

OUT OF TOLERANCE

MEMORANDUM

Date: 5/12/95

To: N. Sridhar

From: Darrell S. Duna 

Subject: Nonconformance report # 95-02

Subject Chart recorder is not used to make measurements but is used to record the out put of another calibrated instrument such as an Orion pH meter model # 940 or an electrometer output such as a Keithley model 617 which are calibrated. The model and serial # of the instrument used is recorded in the laboratory notebook. The recorders are never used as a stand alone device to make measurements and only serve as a convenient way to record the analog output of the measuring instrument.

The accuracy needed by the recorders depends of course on the type of measurement being conducted. For open circuit measurements the 0.55% error on a 1.0 V scale translates to less than 3 mV. For pH measurements conducted with the recorder on the 1.0 V scale would translate to an error of 0.05 pH. Typically, the pH recorded by the strip chart recorder is "read" from the chart in 0.1 pH increments. Likewise, for open circuit measurements the minimum increment "read" from the chart is 5 mV. No tests have been conducted with these recorders serving as the data acquisition system where the data collected was required to have an accuracy of better than 1 mV.

On the basis of the required accuracy for the measurements conducted in which this chart recorder serves as the data acquisition system, I suggest that we continue to use a calibrated instrument continuously so that we can have a real time check of the measurements as they are recorded. It does not seem prudent at this time to increase the frequency of calibration in light of our rather limited use of this instrument, and its previous performance.


5/16/95

CENTER FOR NUCLEAR WASTE REGULATORY ANALYSES

NONCONFORMANCE REPORT

Project No. 20-5704-041

NCR No. 95-02

PART 1: DESCRIPTION OF NONCONFORMANCE

The ABB Plotter Model SE 120, s/n 0515265, was found out of tolerance when calibrated on 5/2/95. The lower pen error (voltage) was 0.55%, with a tolerance of 0.5%, and the Suppression error was 0.50% to 0.75%, with a tolerance of 0.20% of setting.

Initiated by: R. Brient *RB*

Date: 5/10/95

PART 2: PROPOSED DISPOSITION AND CORRECTIVE ACTION

Disposition:

Continue using the strip chart recorder in conjunction with other calibrated instruments (see memo attached). The ~~subsequent~~ data acquired thus far are not affected by the out of tolerance finding.

Basis of Disposition:

See memo attached

Action to correct nonconformance:

None needed.

Target date for completion: _____

Proposed by: *N. Friedrich*

Date: *5/16/95*

PART 3: APPROVAL

Element Manager: *N. Friedrich* Date: *5/14/95*

Director of QA: *Dunn Malachuk* Date: *5/16/95*

Comments/Instructions:

PART 4: CLOSE OUT

Comments:

No other action required. Maintain as a 3-page QA record to document position.

Verified by: *Dunn Malachuk*

Date: *5/16/95*



Southwest Research Institute
6220 Culebra Road
San Antonio, TX 78238
Department of Quality Assurance
Calibration Laboratory

Certificate of Calibration

23 May 1996

Issued to: DARRELL DUNN DIV20 B57
Manufacturer/Model: ABB SE 120
Description: PLOTTER
Serial Number: 0515265
Asset Number: 002292

Environmental Conditions

Temperature: 76.0 Humidity: 42%

Calibration Information

Calibration was in accordance with requirements of MIL-STD-45662A and ANSI/NCSL Z540-1-1994. Measurements are traceable to the National Institute of Standards and Technology (NIST). This report may not be reproduced except in full without written approval of the originator. Inspection and test data are on file and available for inspection.

Calibration Date: 23 May 96 Calibration Procedure: 330006703
Interval: 12 months Accuracy: MFGR SPECS
Next Calibration Due: 23 May 97 Received: In Tolerance

Remarks:

Certificate # 21221

Signed: *Anthony Plummer*

LAST PAGE OF REPORT
Total Pages Printed: 1



Southwest Research Institute
6220 Culebra Road
San Antonio, TX 78238
Department of Quality Assurance
Calibration Laboratory

Certificate of Calibration

2 June 1997

Issued to: DARRELL DUNN DIV20 B57
Manufacturer/Model: ABB SE 120
Description: PLOTTER
Serial Number: 0515265
Asset Number: 002292

Environmental Conditions

Temperature: 77.0 Deg. F Humidity: 49%

Calibration Information

Calibration was in accordance with requirements of MIL-STD-45662A and ANSI/NC SL Z540-1-1994. Measurements are traceable to the National Institute of Standards and Technology (NIST). This report may not be reproduced except in full without written approval of the originator. Inspection and test data are on file and available for inspection.

Calibration Date: 2 Jun 97 Calibration Procedure: 300.0067.03
Interval: 12 months Accuracy: MFG SPECS
Next Calibration Due: 2 Jun 98 Received: In Tolerance

Remarks:

Standards Used

Asset	MFR	Model	Description	Serial No.	Due Cal
000168	FLUKE	335A	DC VOLTAGE STANDARD/D	775024	4 Aug 97

Certificate # 25531

Signed: 

LAST PAGE OF REPORT
Total Pages Printed: 1



Southwest Research Institute
6220 Culebra Road
San Antonio, TX 78238
Department of Quality Assurance
Calibration Laboratory



Certificate of Calibration

8 June 1998

Issued to: DARRELL DUNN DIV20 B57
Manufacturer/Model: ABB SE 120
Description: PLOTTER
Serial Number: 0515265
Asset Number: 002292

Environmental Conditions

Temperature: 71.00 Deg. F Humidity: 51 % RH

Calibration Information

Calibration was in accordance with requirements of MIL-STD-45662A and ANSI/NCSL Z540-1-1994. Measurements are traceable to the National Institute of Standards and Technology (NIST). This report may not be reproduced except in full without written approval of the originator. Inspection and test data are on file and available for inspection.

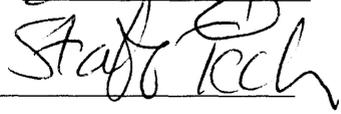
The uncertainty of the calibration was sufficient to determine that the instrument met the manufacturer's specifications.

Calibration Date: 8 Jun 98 Calibration Procedure: MFGR MANUAL
Interval: 12 months
Next Calibration Due: 8 Jun 99 Received: In Tolerance
Remarks:

Standards Used

Asset	MFR	Model	Description	Serial No.	Due Cal
000106	FLUKE	8506A	THERMAL RMS DIGITAL MULTIM	4180021	13 Feb 99

Signed: 

Title: 

LAST PAGE OF REPORT
Total Pages Printed: 1

Certificate # 29976



Southwest Research Institute
6220 Culebra Road
San Antonio, TX 78238
(210) 522-5215
Department of Quality Assurance
Calibration Laboratory



Certificate #
0972-01

Certificate of Calibration

15 June 1999

Issued to: DARRELL DUNN DIV20 B57
Manufacturer/Model: ABBEON SE 120
Description: PLOTTER
Serial Number: 0515265
Asset Number: 002292

This certifies the above item was calibrated in compliance with MIL-STD-45662A and ANSI/NCSL Z540-1-1994. Standards used in this calibration, described in the referenced calibration procedure with associated uncertainties or tolerances, are traceable to the National Institute of Standards and Technology (NIST). Supporting documentation relative to traceability is on file and is available for examination upon request. This certificate is not to be reproduced, except in full, without the written approval of the Southwest Research Institute Department of Quality Assurance Calibration Laboratory.

This laboratory is accredited by the American Association for Laboratory Accreditation (A2LA) and the results of this calibration certificate were determined in accordance with the terms of accreditation unless stated otherwise below.

The uncertainty of the calibration was sufficient to determine that the item met the manufacturer's published specifications unless stated otherwise below.

Ambient Conditions: Temperature: 75.0 Degrees Fahrenheit Humidity: 42 % RH

Calibration Date: 15 Jun 99

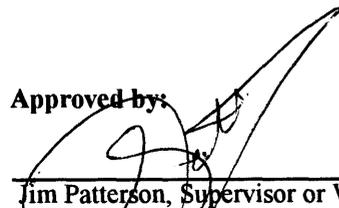
Calibration Procedure: CL-75, JUNE 99

Condition as Received: IN TOLERANCE

Condition as Released: IN TOLERANCE

Remarks:

Approved by:

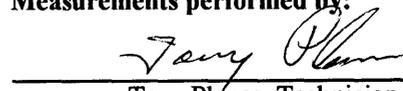


Jim Patterson, Supervisor or Walt Hill, Metrologist

Certificate # 34808

m:\a2la.rpt Rev date 10 Mar 99

Measurements performed by:



Tony Planas, Technician

Page 1 of 1



SOUTHWEST RESEARCH INSTITUTE™

6220 Culebra Road, P.O. Drawer 28510
Institute Quality Systems
Institute Calibration Laboratory
Phone: 210-522-5215 Fax 210-522-3692

Certificate of Calibration

Submitted By: DIV20

Address: B57

Contact: DARRELL DUNN

Manufacturer Model: ABBEON SE 120

Description: STRIP CHART RECORDER

Serial No: 0515265

Asset No: 002292

Procedure: CL-75 6/99

Work Order: 444050123

Date Issued: Sep 6, 2002

Calibration Date: Sep 6, 2002

****Calibration Due:** Sep 6, 2003

Calibration Location: N/A

Environment: Temp. 72.0°F Hum. 40 %RH

***As Found:** IN TOLERANCE

***As Left:** IN TOLERANCE

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, 1999 and ANSI/NCSL Z540-1-1994 which are equivalent to relevant requirements of the ISO 9000-1994 series of standards. This certificate may not be reproduced, except in full, without the written approval of the Southwest Research Institute Calibration Laboratory. The results of this calibration relate only to the individual instrument described above. This certificate shall not be used to claim product endorsement by the American Association for Laboratory Accreditation (A2LA) or any agency of the U. S. Government.

Uncertainty evaluation includes the item under test and is calculated in accordance with the ISO "Guide to the Expression of Uncertainty in Measurement" (GUM). The uncertainty represents an expanded uncertainty using a coverage factor of k=2 to approximate a 95% confidence level. The calibration process provides a Test Uncertainty Ratio (TUR) of less than or equal to 25% (4:1) of the test limit unless otherwise stated in remarks or an attachment.

*The client has sole responsibility for determination of in/out of tolerance or compliance/noncompliance. An in/out of tolerance opinion is provided for your convenience based only on the Test Instrument (TI) reading(s) and limits as reported. The reported uncertainty relates only to the results at the time of calibration and does not imply any short or long term stability of the TI.

**Calibration interval is determined by the client and does not assure the instrument will remain within tolerance until this date. Any number of factors may cause the instrument to be out of tolerance before the next calibration date.

Remarks: None

Standards Used

Asset	Manufacturer	Model	Description	Cal Due
004164	FLUKE	5500A/SC300	CALIBRATOR	Jul 25, 03

Approved by: Walt Hill
Metrology Group Leader
m:\Nona21a1.rpt Rev date 15, August 02

Measurements by: Tony Planas
Metrology Technician

Southwest Research Institute
Calibration laboratory
Calibration Sheet.

Work Order:	444050124	Mfr. Abb	Technician Tplanas
Asset No.	2292	Model SE120	Procedure CL-75 06/99
Serial No.	0515265	Type. Chart Recorder	Cal Date. 6 Sept. 02
Remarks:			

Function/Range	Test Point	TI Reading	Difference	Test Limits+/-	Uncertainty	Found/Left
DCV Ch 1	mVolts	mVolts	mVolts	mVolts	mVolts	Results
1 mV	1.000	1.003	0.003	0.010	2.7:1	Pass
2 mV	2.000	2.006	0.006	0.010	2.7:1	Pass
5 mV	5.000	5.010	0.010	0.025	2.5:1	Pass
10 mV	10.00	10.02	0.02	0.05	>4:1	Pass
20 mV	20.00	20.03	0.03	0.10	>4:1	Pass
50 mV	50.00	50.08	0.08	0.25	>4:1	Pass
100 mV	100.0	100.3	0.3	0.5	>4:1	Pass
	50.0	50.0	0.0	0.3	>4:1	Pass
	25.00	24.93	-0.07	0.13	>4:1	Pass
DCV	Volts	Volts	Volts	Volts	Volts	Results
1 V	1.000	1.004	0.004	0.005	>4:1	Pass
2 V	2.000	2.005	0.005	0.010	>4:1	Pass
5 V	5.000	5.013	0.013	0.025	>4:1	Pass
10 V	10.00	10.02	0.02	0.05	>4:1	Pass
20 V	20.00	20.05	0.05	0.10	>4:1	Pass
50 V	50.00	50.16	0.16	0.25	>4:1	Pass
100 V	100.00	100.24	0.24	0.50	>4:1	Pass
200 V	200.0	200.6	0.6	1.0	>4:1	Pass

Function/Range	Test Point	TI Reading	Difference	Test Limits+/-	Uncertainty	Results
DCV Ch 2	mVolts	mVolts	mVolts	mVolts	mVolts	Results
1 mV	1.000	0.998	-0.002	0.010	2.7:1	Pass
2 mV	2.000	1.998	-0.002	0.010	2.7:1	Pass
5 mV	5.000	4.990	-0.010	0.025	2.5:1	Pass
10 mV	10.00	9.99	-0.01	0.05	>4:1	Pass
20 mV	20.00	19.97	-0.03	0.10	>4:1	Pass
50 mV	50.00	49.94	-0.06	0.25	>4:1	Pass
100 mV	100.0	99.8	-0.2	0.5	>4:1	Pass
	50.0	50.0	0.0	0.3	>4:1	Pass
	25.00	24.99	-0.01	0.13	>4:1	Pass
DCV	Volts	Volts	Volts	Volts	Volts	Results
1 V	1.000	0.999	-0.001	0.005	>4:1	Pass
2 V	2.000	1.998	-0.002	0.010	>4:1	Pass
5 V	5.000	4.990	-0.010	0.025	>4:1	Pass
10 V	10.00	9.98	-0.02	0.05	>4:1	Pass
20 V	20.00	19.99	-0.01	0.10	>4:1	Pass
50 V	50.00	50.00	0.00	0.25	>4:1	Pass
100 V	100.00	100.00	0.00	0.50	>4:1	Pass
200 V	200.0	199.8	-0.2	1.0	>4:1	Pass



SOUTHWEST RESEARCH INSTITUTE™

6220 Culebra Road, P.O. Drawer 28510
Institute Quality Systems
Institute Calibration Laboratory
Phone: 210-522-5215 Fax 210-522-3692

Certificate of Calibration

Submitted By: DIV20
Address: B57
Contact: DARRELL DUNN
Manufacturer Model: ABBEON SE 120
Description: STRIP CHART RECORDER
Serial No: 0515265
Asset No: 002292
Procedure: CL-75, Jun/99

Work Order: 444055346
Date Issued: Sep 17, 2003
Calibration Date: Sep 16, 2003
****Calibration Due:** Sep 16, 2004
Calibration Location: Bldg. 64
Environment: Temp. 72.0°F Hum. 38 %RH
***As Found:** IN TOLERANCE
***As Left:** IN TOLERANCE

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, 1999 and ANSI/NC SL Z540-1-1994 which are equivalent to relevant requirements of the ISO 9000-1994 series of standards. This certificate may not be reproduced, except in full, without the written approval of the Southwest Research Institute Calibration Laboratory. The results of this calibration relate only to the individual instrument described above. This certificate shall not be used to claim product endorsement by the American Association for Laboratory Accreditation (A2LA) or any agency of the U. S. Government.

Uncertainty evaluation includes the item under test and is calculated in accordance with the ISO "Guide to the Expression of Uncertainty in Measurement" (GUM). The uncertainty represents an expanded uncertainty using a coverage factor of k=2 to approximate a 95% confidence level. The calibration process provides a Test Uncertainty Ratio (TUR) of less than or equal to 25% (4:1) of the test limit unless otherwise stated in remarks or an attachment.

*The client has sole responsibility for determination of in/out of tolerance or compliance/noncompliance. An in/out of tolerance opinion is provided for your convenience based only on the Test Instrument (TI) reading(s) and limits as reported. The reported uncertainty relates only to the results at the time of calibration and does not imply any short or long term stability of the TI.

**Calibration interval is determined by the client and does not assure the instrument will remain within tolerance until this date. Any number of factors may cause the instrument to be out of tolerance before the next calibration date.

Remarks: None

Standards Used

Asset	Manufacturer	Model	Description	Cal Due
006413	FLUKE	5520A/SC1100	MULTI-PRODUCT CALIBRATOR	Jan 17, 04



Approved by: Walt Hill
Metrology Group Leader
m:\Non21a1.rpt Rev date 15, August 02



Measurements by: Vince Morales
Metrology Technician

Southwest Research Institute
Calibration Laboratory
Calibration Report

Work Order:	444055346	Mfr.	ABB	Technician	Vmorales
Asset No.	2292	Model	SE120	Procedure	
Serial No.	0515265	Type.	Chart Recorder	Cal Date.	16-Sep-03
Remarks:					

Function/Range	Test Point	TI Reading	Difference	+/-Limit	+/-Uncertainty	Found/Left
DCV Ch 1	mVolts	mVolts	mVolts	mVolts	mVolts	Result
1 mV	1.000	1.004	0.004	0.010	0.58	Pass
2 mV	2.000	2.009	0.009	0.010	0.58	Pass
5 mV	5.000	5.014	0.014	0.025	0.58	Pass
10 mV	10.00	10.02	0.02	0.05	0.58	Pass
20 mV	20.00	20.05	0.05	0.10	0.58	Pass
50 mV	50.00	50.15	0.15	0.25	0.58	Pass
100 mV	100.0	100.3	0.3	0.5	0.58	Pass
	50.0	50.0	0.0	0.3	0.58	Pass
	25.0	24.9	-0.1	0.1	0.58	Pass
DCV	Volts	Volts	Volts	Volts	Volts	
1 V	1.000	1.003	0.003	0.005	0.58	Pass
2 V	2.000	2.008	0.008	0.010	0.58	Pass
5 V	5.000	5.016	0.016	0.025	0.58	Pass
10 V	10.00	10.03	0.03	0.05	0.58	Pass
20 V	20.00	20.06	0.06	0.10	0.58	Pass
50 V	50.00	50.15	0.15	0.25	0.58	Pass
100 V	100.0	100.3	0.3	0.5	0.58	Pass
200 V	200.0	200.5	0.5	1.0	0.58	Pass
DCV Ch 2	mVolts	mVolts	mVolts	mVolts	mVolts	
1 mV	1.000	0.997	-0.003	0.010	0.58	Pass
2 mV	2.000	1.995	-0.005	0.010	0.58	Pass
5 mV	5.000	4.997	-0.003	0.025	0.58	Pass
10 mV	10.00	9.97	-0.03	0.05	0.58	Pass
20 mV	20.00	19.96	-0.04	0.10	0.58	Pass
50 mV	50.00	49.89	-0.11	0.25	0.58	Pass
100 mV	100.0	99.8	-0.2	0.5	0.58	Pass
	50.0	49.9	-0.1	0.3	0.58	Pass
	25.00	24.98	-0.02	0.13	0.58	Pass
DCV	Volts	Volts	Volts	Volts	Volts	
1 V	1.000	0.998	-0.002	0.005	0.58	Pass
2 V	2.000	1.996	-0.004	0.010	0.58	Pass
5 V	5.000	4.990	-0.010	0.025	0.58	Pass
10 V	10.00	9.98	-0.02	0.05	0.58	Pass
20 V	20.00	19.97	-0.03	0.10	0.58	Pass
50 V	50.00	49.91	-0.09	0.25	0.58	Pass
100 V	100.00	99.90	-0.10	0.50	0.58	Pass
200 V	200.0	199.8	-0.2	1.0	0.58	Pass

END OF REPORT



SOUTHWEST RESEARCH INSTITUTE™

6220 Culebra Road, P.O. Drawer 28510
Institute Quality Systems
Institute Calibration Laboratory
Phone: 210-522-5215 Fax 210-522-3692



Certificate of Calibration

0972-01

Submitted By: DIV20
Address: B57
Contact: DARRELL DUNN
Manufacturer Model: ABBEON SE 120
Description: STRIP CHART RECORDER
Serial No: 0515265
Asset No: 002292
Procedure: CL-75, Jun/99

Work Order: 444061099
Date Issued: Oct 18, 2004
Calibration Date: Oct 18, 2004
****Calibration Due:** Oct 18, 2005
Calibration Location: Bldg. 64
Environment: Temp. 73.0°F Hum. 40 %RH
***As Found:** IN TOLERANCE
***As Left:** IN TOLERANCE

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, 1999 and ANSI/NCCL Z540-1-1994 which are equivalent to relevant requirements of the ISO 9000-1994 series of standards. This certificate may not be reproduced, except in full, without the written approval of the Southwest Research Institute Calibration Laboratory. The results of this calibration relate only to the individual instrument described above. This certificate shall not be used to claim product endorsement by the American Association for Laboratory Accreditation (A2LA) or any agency of the U. S. Government.

Uncertainty evaluation includes the item under test and is calculated in accordance with the ISO "Guide to the Expression of Uncertainty in Measurement" (GUM). The uncertainty represents an expanded uncertainty using a coverage factor of k=2 to approximate a 95% confidence level. See Remarks or attached Calibration Report with the same Work Order number for calibration data.

*The client has sole responsibility for determination of in/out of tolerance or compliance/noncompliance. An in/out of tolerance opinion is provided for your convenience based only on the Test Instrument (TI) reading(s) and limits as reported. The reported uncertainty relates only to the results at the time of calibration and does not imply any short or long term stability of the TI.

**Calibration interval is determined by the client and does not assure the instrument will remain within tolerance until this date. Any number of factors may cause the instrument to be out of tolerance before the next calibration date.

Remarks: None

Standards Used

Asset	Manufacturer	Model	Description	Cal Due
004164	FLUKE	5500A/SC300	CALIBRATOR	Aug 03, 05

Approved by: Walt Hill
Metrology Group Leader
m:\a2la1.rpt Rev date 11, May 04

Measurements by: Scott Kester
Metrology Technician

Southwest Research Institute
Calibration Laboratory
Measurement Report

Work Order:	444061099	Mfr.	ABB	Technician	SRK
Asset No.	002292	Model	SE120	Procedure	
Serial No.	0515265	Type.	Chart Recorder	Cal Date.	18-Oct-04
Remarks:					

Function/Range	Test Point	TI Reading	Difference	+/-Limit	+/-Uncertainty	Found/Left
DCV Ch 1	mVolts	mVolts	mVolts	mVolts	mVolts	Result
1 mV	1.000	1.000	0.000	0.005	0.58	Pass
2 mV	2.000	2.000	0.000	0.010	0.58	Pass
5 mV	5.000	5.000	0.000	0.025	0.58	Pass
10 mV	10.00	10.000	0.00	0.05	0.58	Pass
20 mV	20.00	19.950	-0.05	0.10	0.58	Pass
50 mV	50.00	49.875	-0.13	0.25	0.58	Pass
100 mV	100.0	99.750	-0.3	0.50	0.58	Pass
200 mV	200.0	199.500	-0.5	1.00	0.58	Pass
500 mV	500.0	498.750	-1.3	2.50	0.58	Pass
DCV	Volts	Volts	Volts	Volts	Volts	
1 V	1.000	0.995	-0.005	0.005	0.58	Pass
2 V	2.000	1.990	-0.010	0.010	0.58	Pass
5 V	5.000	4.988	-0.012	0.025	0.58	Pass
10 V	10.00	9.950	-0.05	0.05	0.58	Pass
20 V	20.00	19.900	-0.10	0.10	0.58	Pass
50 V	50.00	49.750	-0.25	0.25	0.58	Pass
100 V	100.0	99.500	-0.5	0.5	0.58	Pass
200 V	200.0	199.000	-1.0	1.0	0.58	Pass
DCV Ch 2	mVolts	mVolts	mVolts	mVolts	mVolts	
1 mV	1.000	1.000	0.000	0.010	0.58	Pass
2 mV	2.000	2.000	0.000	0.010	0.58	Pass
5 mV	5.000	5.000	0.000	0.025	0.58	Pass
10 mV	10.00	10.000	0.00	0.05	0.58	Pass
20 mV	20.00	20.000	0.00	0.10	0.58	Pass
50 mV	50.00	50.000	0.00	0.25	0.58	Pass
100 mV	100.0	100.000	0.0	0.5	0.58	Pass
200 mV	200.0	199.500	-0.5	1.0	0.58	Pass
500 mV	500.00	498.750	-1.25	2.50	0.58	Pass
DCV	Volts	Volts	Volts	Volts	Volts	
1 V	1.000	0.998	-0.002	0.005	0.58	Pass
2 V	2.000	2.000	0.000	0.010	0.58	Pass
5 V	5.000	5.000	0.000	0.025	0.58	Pass
10 V	10.00	10.000	0.00	0.05	0.58	Pass
20 V	20.00	20.000	0.00	0.10	0.58	Pass
50 V	50.00	50.000	0.00	0.25	0.58	Pass
100 V	100.00	100.000	0.00	0.50	0.58	Pass
200 V	200.0	200.000	0.0	1.0	0.58	Pass

END OF REPORT