

Rothe Development Inc.

Metrology Services Division

4614 SINCLAIR RD., SAN ANTONIO, TEXAS 78222 512-648-3131 FAX 512-648-4091

Certificate of Calibration

20102

CAL DATE: 01/17/91

DUE DATE:

ISSUED TO:

Southwest Research Institute

6220 Culebra, Blds. 68/Division 5

San Antonio, TX 78284

684-5111 * 2702

CONTROL:

114 - 936

PROCEDURE/TOL: MFG SPECS

MFG

Keithley

MODEL

602

SERIAL #

19831

TYPE

Electromtr

IN-SPECS [**RECEIVED**

OUT-OF-SPECS [*]

All Calibration measurements performed at ROTHE DEVELOPMENT INC. METROLOGY SERVICES meet the requirements of MIL-STD-45662A, and are traceable to the National Institute of Standards and Technology through Primary NIST Calibration or Secondary Calibration performed by other Metrological facilities. Ambient conditions: 72.0oF **Temperature** , Relative Humidity 31%

Test Report Number and Calibration Standards Used

Ref	#	Model #	Mfar	Serial #	Bescription	Cal Date In	t
TR	20	5700A	FLUKE	4605002	CALIBRATOR	12/07/90	3
TR	125	1644-A	GR	1011	MEGOHM BRIDGE	10/11/90 1	2

Test Report Numbers -

FLUKE CERT# DH70

CERT# 658637

TEST# 244645

CERT# 245046

WWVB Transmission

BDI 1001

Rothe Development, Inc. 4614 SINCILAIR AD. SAN ANTONIO, TEXAS 78222-2099 51216 ST. FAX: 512-648-4091

METROLOGY SERVICES DIVISION PRECISION MEASUREMENT EQUIPMENT LABORATORY TRACEABLE TO NIST

CHARGE # 107

CONTROL # 936

WORK ORDER # 24261

RECEIVED FROM	Southwest Research Institute	(5) D	ATE 11/12/90		MFG Keithley		
ADDRE6S	6220 Culebra, Blds. 68/Divisio	on 5 PHON	^{IE#} 684-5111 *	2702	MODEL 602		
CONTACT (NAME)	San Antonio, TX 78284 Mr. Jim Patterson	FA	AX# 6 84- 3133	ļ			
PURCHASE ORDER #				E			
				N	ACCES.		
CUSTOMER COMMENTS	NON TAXABLE .				ROVD. Manual		
REPAIR	CALIBRATIO	N DATE	17 Jan 91	CALIBE INTE	RATION RECEIVED IN SPECS		
OPERATIONAL CALIBRATION	L CHECK	5	17 701 91	ŕ	RECEIVED INOPERAT		-
T REF # QTY.	MFG PART #		CRIPTION	COST	ROTHE TECH.	OUR P.0	
	R-281-106	Res		18 -			
	1, 231, 120	1000			PIS		
					REPAIR LABOR HRS.	SERVICE	CODE
					2	F	
					PARTS TOTAL	18	74
					REPAIR LABOR	68	00
		Ì			SHIPPING		
					TEAR DOWN CHARGE		<u> </u>
					TAX		<u> </u>
					CALIBRATION	68	.00
					TOTAL	154	74
's 20, 129	<u> </u>						
MENTS							
K PERFORMED:	July 16-16	476 6	(CC) V	د	10.10 Food 6	righ	
	Texported 10	-ان ټردادـ	-4 4				
			j				
	/? •	71					
. <u>72</u> °F	$\mathcal{L}^{\mathcal{T}}$	10					
<u> </u>							
2002		* 					
IP VIA:	DATE:	<u> </u>	RECEIVED BY:				
		1					

SOUTHWEST RESEARCH INSTITUTE

POST OFFICE DRAWER 28510 + 6229 CULEBRA ROAD + SAN ANTONIO, TEXAS, USA 78284 + (512) 604-6111+TELEX 78-7367

Division 05 - Instrument Repair and Calibration Laboratory

1	Calibr	ation Re	cord		
TEM X 6171810	1 ACC	THOMEST	M		
1	SN		SWRI NO.		
PLUG-INS, ETC. NONE					
	<u> </u>				
TOLERANCE MFGR SPEC	3				
		STANDARDS			
Considered No. 1/202 1/			CAI Cal	Des	Cal Bas No
Standard No. MPGR M SEE CERTIFICATE O	F CALIBRATTO	J Ronte	DEVELOPMENT	Doe	Cal. Rec. No.
-					
			•• •••		
* ENVIRONMENT: Temp			_ Humdity		
	I	PROCEDURE			
# Essentially as outlined	in MFGRS Service Man				
		ONCLUSION			
4					
, · · · - ·					
Item ADJ/repaired to a	olerance				
Calibration was in accord with re	cuinements of MII .STD.	45624 700	#48 # 1801 MIT -1745	708 Meann	remanu era ivacaabla
to the National Institute of Stands	rds and Technology. Ins	pection and test de	us are on file and avai	ilable for insp	COOL
		SIGNED		Atte	
	0006342	DATE			-17-51
RECORD NUMBER:	<u> </u>	_ NEXT CALIB	ATION DUE:		-17-91

SOUTHWEST RESEARCH INSTITUTE

POST OFFICE DRAWER 28510 • 6220 CULEBRA ROAD • SAN ANTONIO, TEXAS, USA 78284 • (512) 684-5111•TELEX 76-7357

Division 05 – Instrument Repair and Calibration Laboratory

Calibration Record

MODEL <u>602</u> S/N <u>/9</u> .				
LUG-INS, ETC. None				
COLERANCE SEE NE Specie				
	STANDARI	os		
Standard No. MFGR Model I	Description	S/N	Cal. Due	Cal. Rec. No
SEE CERTIFICATE OF CALIBA	EATTON, ROTT	HE DEVELOP	MENT, INC	#
ENVIRONMENT: Temperature		Humidity		
-				<u>, , , , , , , , , , , , , , , , , , , </u>
Location				
	PROCEDU	. D		
	INCCEPCE	Œ		
Пъ и и и метова и				
Essentially as outlined in MFGRS Service				
Essentially as outlined in MFGRS Service				
Essentially as outlined in MFGRS Service				
Essentially as outlined in MFGRS Service				
Essentially as outlined in MFGRS Service				
Essentially as outlined in MFGRS Service	ce Manual	-		
Essentially as outlined in MFGRS Service		-		
Essentially as outlined in MFGRS Service	CONCLUSIO	ON		
	CONCLUSIO	DN		
Item within tolerance	CONCLUSIO	DN		
Item within tolerance	CONCLUSIO	DN		
Item within tolerance Item out of tolerance Item ADJ/repaired to tolerance Calibration was in accord with requirements of MII	CONCLUSIO	DN -Q-9858A, and M	IL-I-45208A. Mea	asurements are trac
Item within tolerance	CONCLUSIO	DN -Q-9858A, and M	IL-I-45208A. Mea	asurements are trac
Item within tolerance Item out of tolerance Item ADJ/repaired to tolerance Calibration was in accord with requirements of MII	CONCLUSIO	ON -Q-9858A and M est data are on file	IL-I-45208A. Mea and available for in	isurements are trac
Item within tolerance Item out of tolerance Item ADJ/repaired to tolerance Calibration was in accord with requirements of MII	CONCLUSIO L-STD-45662A, MII gy. Inspection and to	DN -Q-9858A, and M	IL-I-45208A. Mea and available for in	isurements are trac



Rothe Development, Inc.

4614 SINCLAIR RD. SAN ANTONIO, TEXAS 78222-2099

512-648-3131 FAX: 512-648-4091

METROLOGY SERVICES DIVISION
PRECISION MEASUREMENT EQUIPMENT LABORATORY
TRACEABLE TO NIST

CHARGE # 107

CONTROL # 114 -

936

							WORK ORDER # 27650		
	REC	EIVED FR	DM Southwest Research Institute	(5)	DATE 07/30/91		MFG Keithley		
		ADDRE	ss 6220 Culebra, Blds. 68/Divisio San Antonio, TX 78284	on 5 PH	ONE# 684-5111	* 2702	MODEL 602		
	CON	TACT (NAM	E) Mr. Jim Patterson		FAX# 684-3133	- . T	SERIAL # 19831	~	
1	PURCHA	SE ORDEI	# ST# 175646			E	TYPE Electrometr		
	CUSTOMER	COMMEN	_{TS} non taxable			•	ACCES. RCVD.		
	REPA	1.	CALIBRATIO AL CHECK	1	15 Aug 91	CALIBRA INTER	I I DECEIVED INCDEDA		
	X CALI	BRATIC			15 Aug Fel	<u> </u>	RECEIVED OUT OF		
Cł	KTREF#	QTY.	MFG PART #	DE:	SCRIPTION	COST	ROTHE TECH.	OUR P.O	Э. <i>#</i>
							2 Z F		
							REPAIR LABOR HRS.	SERVICE (CODE
	•							J	
							PARTS TOTAL		
							REPAIR LABOR		
						,	SHIPPING		
							TEAR DOWN CHARGE		
							TAX		
							CALIBRATION	68	.00
							TOTAL	68	00
R#	"s 1, 7	٤, ١	25,75						
OM	IMENTS '	UC T	E: Coulonbs	Sead.0.	v 100 t	Culid			
OF	K PERFOR	MED:	Coulombs	10.37.34	chreles	-/		1	
			Coulones		د ۱۸ ۶ ورد ه	C(.	1	ŧ	
				4					
EMF	2. <u>73</u> °1	4							
	36,			3)22					
	01 2002					·		. 107	
S	HIP VIA:		DATE:	:	RECEIVED BY:				



Rothe Development Inc.

Metrology Services Division

4614 SINCLAIR RD., SAN ANTONIO, TEXAS 78222 512-648-3131 FAX 512-648-4091

Certificate of Calibration

22168

CAL DATE: 08/15/91

ISSUED TO:

Southwest Research Institute

6220 Culebra, Blds. 68/Division 5

San Antonio, TX 78284

684-5111 * 2702

CONTROL:

114 - 936

PROCEDURE/TOL: MFG PROCEDURE/MFG SPECS

DUE DATE:

MFG

Keithler

MODEL

602

19831

SERIAL #

TYPE

Electromtr

IN-SPECS 🗷 **RECEIVED**

All Calibration measurements performed at ROTHE DEVELOPMENT INC. METROLOGY SERVICES meet the requirements of MIL-STD-45662A, and are traceable to the National Institute of Standards and Technology through Primary NIST Calibration or Secondary Calibration performed by other Metrological facilities. Ambient conditions: **Temperature** , Relative Humidity 73.0oF

Test Report Number and Calibration Standards Used

Ref	#	Model #	Mfar	Serial #	Description	Cai Date	Int
TR	1	5100B	FLUKE	2520018	CALIBRATOR	06/25/91	6
TR	72	3490A	HP	1637A05174	DMM	06/20/91	6
TR	125	1644-A	GR	1011	MEGOHM BRIDGE	10/11/90	12
TR	75	NMN	JRL	<i>7</i> 5	RESISTANCE BOX	12/14/90	12

FLUKE CERT# DH70 FLUKE CERT# 658637 NIST TEST# 244645

- Test Report Numbers --

TEMP CERT# 245046

WWVB Transmission

COMMENTS:

coulombs section not calibrated

RDI 1001



Rothe Development Inc.

Metrology Services Division

4614 SINCLAIR RD., SAN ANTONIO, TEXAS 78222 512-648-3131 FAX 512-648-4091

Certificate of Calibration

26801

CAL DATE: 09/21/92

DUE DATE: 03/21/93

ISSUED TO: Southwest Research Institute

6220 Culebra, Blds. 68/Division 5

San Antonio, TX 78284

684-5111 * 2702

CONTROL:

114 - 936

PROCEDURE/TOL: MFG SPECS WORK ORDER #: 34177

CUSTOMER PO #:03602/ST#202084/06-0760

ı

MFG Keithley

MODEL 602

SERIAL # 19831

TYPE

-

RECEIVED IN-SPECS OUT-OF-SPECS

Electromtr

ose A Mendga

All Calibration measurements performed at ROTHE DEVELOPMENT INC. METROLOGY SERVICES meet the requirements of MIL-STD-45662A, and are traceable to the National Institute of Standards and Technology through Primary NIST Calibration or Secondary Calibration performed by other Metrological facilities. Ambient conditions: Temperature 72.00F, Relative Humidity 43%.

Test Report Number and Calibration Standards Used

Ref	#	Model #	Mfar	Serial #	Description	Cal Date	Int	Cal Due
TR	20	5700A	Fluke	4605002	CALIBRATOR	08/11/92	3	11/11/92
TR	13	8860A	Fluke	3335024	DMM	08/20/92	6	02/20/93
TR	182	1433-H	GEN RAD	32941	DECADE RESISTOR	08/10/92	12	08/10/93

--- Test Report Numbers --

OCV FLUKE CERT# DH70

ACV FLUKE CERT# 658637

OHM NIST TEST# 244645

TEMP CERT# 245046

Hz WWVB Transmission

INSPECTED BY

COMMENTS:

COULOMBS FUNCTION NOT CAL'D.

RDI 1001



Rothe Development, Inc.

4614 SINCLAIR RD. SAN ANTONIO, TEXAS 78222-2099

512-648-3131 FAX: 512-648-4091

METROLOGY SERVICES DIVISION
PRECISION MEASUREMENT EQUIPMENT LABORATORY
TRACEABLE TO NIST

CHARGE # 107

CONTROL # 114 -

936

WORK ORDER # 34177

RECE	EIVED FROM	Southwest Resear	cn Institute	(5)	DATE	09/ 17/92			MFG	*eithley			
	ADDRESS	6220 Culebra, Blo San Antonio, TX		5 PI	HONE#	634-5111	2702	ľ	MODEL	5 02			
CONT	TACT (NAME)Mr. Jim Patterson	n		FAX#	68 4- 3133		1.0	SERIAL #	19831			
PURCHAS	SE ORDER #	⊭ 03602/ST#202084/0	06-0760					E M	TYPE	Electromit			
CUSTOMER	COMMENTS	HON TAXABLE							ACCES. RCVD.				
REPA	JIR				· 1 · 67	~ ^ ~ ~ ~ ~	CAL	IBRAT] DECEMED IN	DECC.		_
OPE	RATIONA	L CHECK	CALIBRATIO					TERVA	<u> </u>	RECEIVED IN S			
	BRATION		DATE DUE_					MO.	×	RECEIVED OU	T OF SPEC	S.	
CKT REF #	QTY.	MFG PAR	Τ#		ESCRIPTI		COS	ST	B	OTHE TECH.	- (OUR P.O	. #
11-61	6	61122		9 V	Fiz tl		St		,	(
									REF	AIR LABOR HRS	. SI	RVICE C	ÖDE
• •												٢	
		and resident							PARTS	TOTAL			_
									REPAIR	LABOR			
			That a						SHIPPIN	IG .			
			:						TEAR D	OWN CHARGE			
			· · ·						CALIBR	ATION			<u></u>
									TAX				
									TOTA				
R #'s∧	; 3	. 7								1			
/	,		,	+									
ORK PERFOR		urbs far											
			.003 1266 4			14 n z = s	- 7	7 7,	100) y/(e	= 1:	ろ	
		,	rlpaned	16	<i>N</i> 4 <i>-</i>	< w							
			cloaned 1 - f - rer	bott	•	•							
		,	12/2/										
:MP. 72 °F		í	•										
4. 43	6												
RDI 2002					T								
SHIP VIA:		DA	NTE:		RECE	EIVED BY	·					~ ~	
					1							-	

SOUTHWEST RESEARCH INSTITUTE

Department of Quality Assurance Calibration Laboratory

CERTIFICATE OF CALIBRATION

979

Issued to: DIV06 B128 WALTER MACHOWSKI Device No:

Manufacturer: KEITHLEY Model: 602

Nomenclature: ELECTROMETER

Serial Number: 19831 SwRI No: 13223

Remarks

Accuracy: MFGR SPECS Procedure: MFGR

ENVIRONMENT

Temperature: 72 Humidity: 43 Location: ROTHE DEVE.INC., SAN ANTONIO, TX

CONCLUSION

Tolerance/Remarks: Received out of tolerance, repaired to specifications

Calibrated by Rothe Deve., Inc. Cal Cert. # 26801.

"LIMITED CALIBRATION": Coulombs Function "NOT" Calibrated.

.003 and .001 ranges read 7% low. Repaired to specifications, Cleaned switch contacts and replaced battey.
Reduced cal cycle to 6 months.

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: 09/21/92

Record Number: 00009801 Next Calibration Due: 03/21/93