ABB EPIS	Functional Testing Specification
Parts & Repair Services *Louisville, KY*	**LOU-GED-44C331863G02**

Test Procedure for a GENERREX Relay card 44C331863-G02 card.

DOCUMENT REVISION STATUS: Determined by the last entry in the "REV" and "DATE" column

REV.	DESCRIPTION	SIGNATURE	REV. DATE
A	Initial release for -G02 versions only. G01 can be adapted later to this procedure.	J. Francis	09/05/2018

PREPARED BY	REVIEWED BY	REVIEWED BY	QUALITY APPROVAL
J. Francis			L. Groves
DATE	**DATE**	**DATE**	**DATE**
09/05/2018			9/5/2018

1. SCOPE

1.1 This is a functional testing procedure for a GENERREX Relay Card 44C331863-G02 card.

2. STANDARDS OF QUALITY

2.1 Refer to the current revision of the IPC-A-610 standard for workmanship standards.

3. APPLICABLE DOCUMENTS

3.1 The following document(s) shall form part of this specification to the extent specified herein. Unless otherwise indicated, the latest issue shall apply.

3.1.1 Check board's electronic folder for more information.

4. ENGINEERING REQUIREMENTS

4.1 Equipment Cleaning

4.1.1 Equipment should be clean and free of debris prior to applying power unless performing an initial check. Refer to site specific SRA's for cleaning guidelines.

4.2 Equipment Inspection

4.2.1 Equipment should be visually inspected for any defects prior to applying power. This inspection should include the following as a minimum:

4.2.1.1 Wires - broken, cracked, or loosely connected
4.2.1.2 Terminal strips / connectors - broken or cracked
4.2.1.3 Components - visually damaged
4.2.1.4 Capacitors - bloated or leaking
4.2.1.5 Solder joints - damaged or cold
4.2.1.6 Circuit board - burned or de-laminated
4.2.1.7 Printed wire runs / Traces - burned or damaged

5. EQUIPMENT REQUIRED

5.1 The following equipment is required to perform the process requirements. Equipment may be substituted provided that all accuracy's and test ratios are equivalent or better.

Qty	Reference #	Description
2	*	Fluke 87 DMM (or Equivalent)
2	*	Tenma Dual Power Supplies
1	*	44C Patch board

6. TESTING PROCESS

6.1 Testing Procedure

6.1.1 Insert Unit Under Test (UUT) into 44C Patch board.

6.1.2 Adjust F1P pot fully CCW.

6.1.3 Adjust F2P pot fully CCW.

6.1.4 Remove Fuses F1F and F2F.

6.1.5 Connect jumper F1S to terminals 1 to 2.

6.1.6 Connect jumper F2S to terminals 1 to 2.

6.1.7 Connect jumper F3S to terminals 2 to 3.

6.1.8 Connect jumper F4S to terminals 2 to 3.

6.1.9 Static connection checks

From:	To:	Results:
Pin 11	Pin 13	w/F1P fully CCW – 1060 to 1200 Ohms
Pin 11	Pin 13	w/F1P fully CW – 300 to 330 Ohms
Pin 11	Pin 15	w/F2P fully CW – 385 to 427 Ohms
Pin 13	Pin 15	w/F2P fully CW – 90 to 92 Ohms
Pin 9	Pin 28	Open
Pin 7	Pin 17	Open
Pin 19 (Positive lead)	Pin 22 (Neg Lead)	180 to 220 Ohms (FAR coil resistance)
Pin 19 (Neg lead)	Pin 22 (Positive lead)	180 to 220 Ohms (FAR coil resistance)
F2D Anode	F2D Cathode	Not Shorted
F3D Anode	F3D Cathode	Not Shorted

6.1.10 Visually check the following Components for correct values

6.1.10.1 Capacitors F1C and F2C are .33 uF

6.1.10.2 Resistors F10R and F11R are 150 Ohms.

6.1.11 Setup – Do not apply power at this time.

6.1.11.1 Connect 28 VDC Lamps to the following connections:

6.1.11.1.1 Pin 18 to Pin 28

6.1.11.1.2 Pin 20 to Pin 28

6.1.11.1.3 Pin 26 to Pin 28

6.1.11.1.4 Pin 27 to Pin 28

6.1.11.2 Connect jumper from Pin 21 to Pin 7.

6.1.11.3 Connect +24 VDC positive output to Pin 7 and 24 VDC return to Pin 9.

6.1.12 Testing

6.1.12.1 Apply Power to UUT.

6.1.12.1.1 Lamp connected to Pin 27 should light.

6.1.12.1.2 Lamp connected to Pin 20 should light.

6.1.12.1.3 "OUTPUT OFF" LED on front of UUT should light.

6.1.12.2 Press "OUTPUT ON" button on front of UUT. Lights should not change. Release button.

6.1.12.3 Connect Pin 17 to Pin 23.

6.1.12.4 Press "OUTPUT ON" button on front of UUT. Lights should not change. Release button.

6.1.12.5 Connect Pin 24 to Pin 25.

6.1.12.6 Press "OUTPUT ON" button on front of UUT.

6.1.12.6.1 "OUTPUT OFF" LED on front of UUT and lamp connected to Pin 27 should go out as long as button is pressed.

6.1.12.6.2 "OUTPUT ON" LED on front of UUT and lamp connected to Pin 26 should light as long as button is pressed.

6.1.12.7 Connect Pin 19 to Pin 10.

6.1.12.8 Connect Pin 22 to Pin 24.

6.1.12.8.1 Lamp connected to Pin 20 should go out.

6.1.12.8.2 Lamp connected to Pin 18 should light.

6.1.12.9 Press and release "OUTPUT ON" button of front of UUT. UUT should latch in this condition.

6.1.12.9.1 "OUTPUT OFF" LED on front of UUT and lamp connected to Pin 27 should go out.

6.1.12.9.2 "OUTPUT ON" LED on front of UUT and lamp connected to Pin 26 should light.

6.1.12.9.3 Press and release "OUTPUT OFF" button on front of UUT. Conditions listed in steps 6.1.12.9.1 and 6.1.12.9.3 should reverse.

6.1.12.9.4 Press and release "OUTPUT ON" button on front of UUT. Conditions listed in steps 6.1.12.9.1 and 6.1.12.9.3 should resume.

6.1.12.10 Disconnect Pin 17. "OUTPUT ON" LED should be off.

6.1.12.11 Connect Pin 17. "OUTPUT ON" LED should be off.

6.1.12.12 Disconnect Pin 24. "OUTPUT ON" LED should be off.

6.1.12.13 Connect Pin 24. "OUTPUT ON" LED should be off.

6.1.12.14 Press and release “OUTPUT ON” button on front of UUT.

6.1.12.14.1 “OUTPUT ON” LED should light.

6.1.12.15 Adjust F1p pot fully CCW.

6.1.12.15.1 Check resistance between Pin 11 to Pin 15 is between 950 to 1150 Ohms.

6.1.12.15.2 Check resistance between Pin 11 to Pin 13 is between 1050 to 1150 Ohms.

6.1.12.15.3 Check resistance between Pin 15 to Pin 13 is between 90 to 110 Ohms.

6.1.12.16 Connect adjustable power supply, set for 0 VDC, from Pin 11 and connect return to Pin 13.

6.1.12.17 Connect DMM, set to measure DC Volts, positive lead to Pin 15 and negative lead to Pin 13.

6.1.12.18 Slowly increase input on Pin 11 to +10 VDC -/+ 0.003, making sure the “OUTPUT” meter on front of UUT tracks and follows input visually, within 3%.

6.1.12.19 With +10 VDC input connected to Pin 11, adjust F1P pot to read +1.00 VDC -/+.03 VDC on meter connected to Pin 15.

6.1.12.20 Repeat steps 6.1.12.18 and 6.1.12.19 using negative voltages.

6.1.12.21 Adjust input on Pin 11 to +1.00 VDC.

6.1.12.22 Verify meter connected to Pin 15 reads +0.1 -/+ 0.003 VDC.

6.1.12.23 Adjust input on Pin 11 to -1.00 VDC.

6.1.12.24 Verify meter connected to Pin 15 reads -0.1 -/+ 0.003 VDC.

6.1.12.25 Press “OUTPUT OFF” button on front of UUT.

6.1.12.25.1 “OUTPUT OFF” LED should light.

6.1.12.25.2 Meter connected to Pin 15 should read 0 VDC.

6.1.12.26 Press “OUTPUT ON” button on front of UUT.

6.1.12.26.1 “OUTPUT ON” LED should light.

6.1.12.26.2 Meter connected to Pin 15 should read -0.1 -/+ 0.003 VDC.

6.1.12.27 Remove all power and connections.

6.2 ***TEST COMPLETE ***

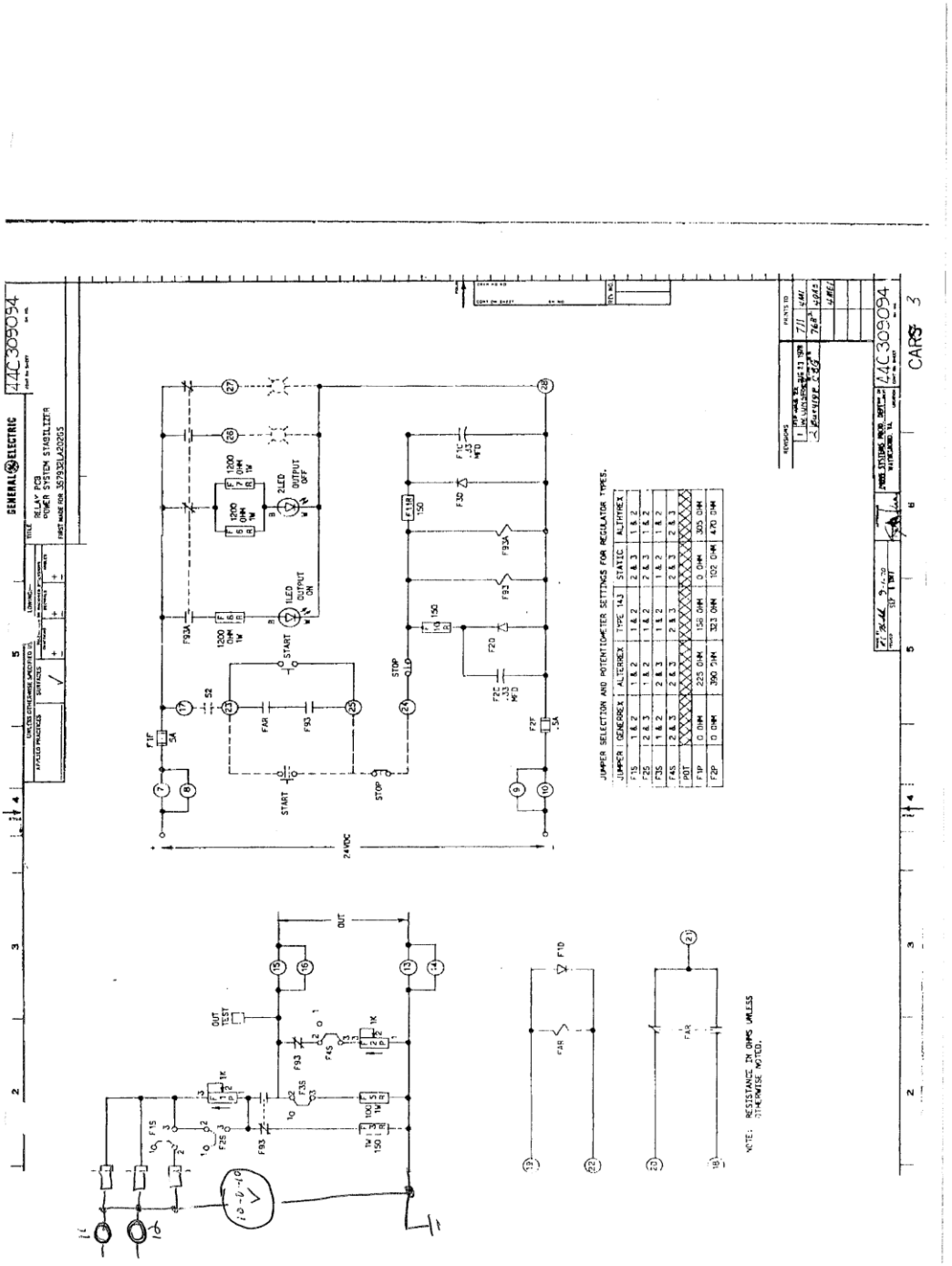
7. NOTES

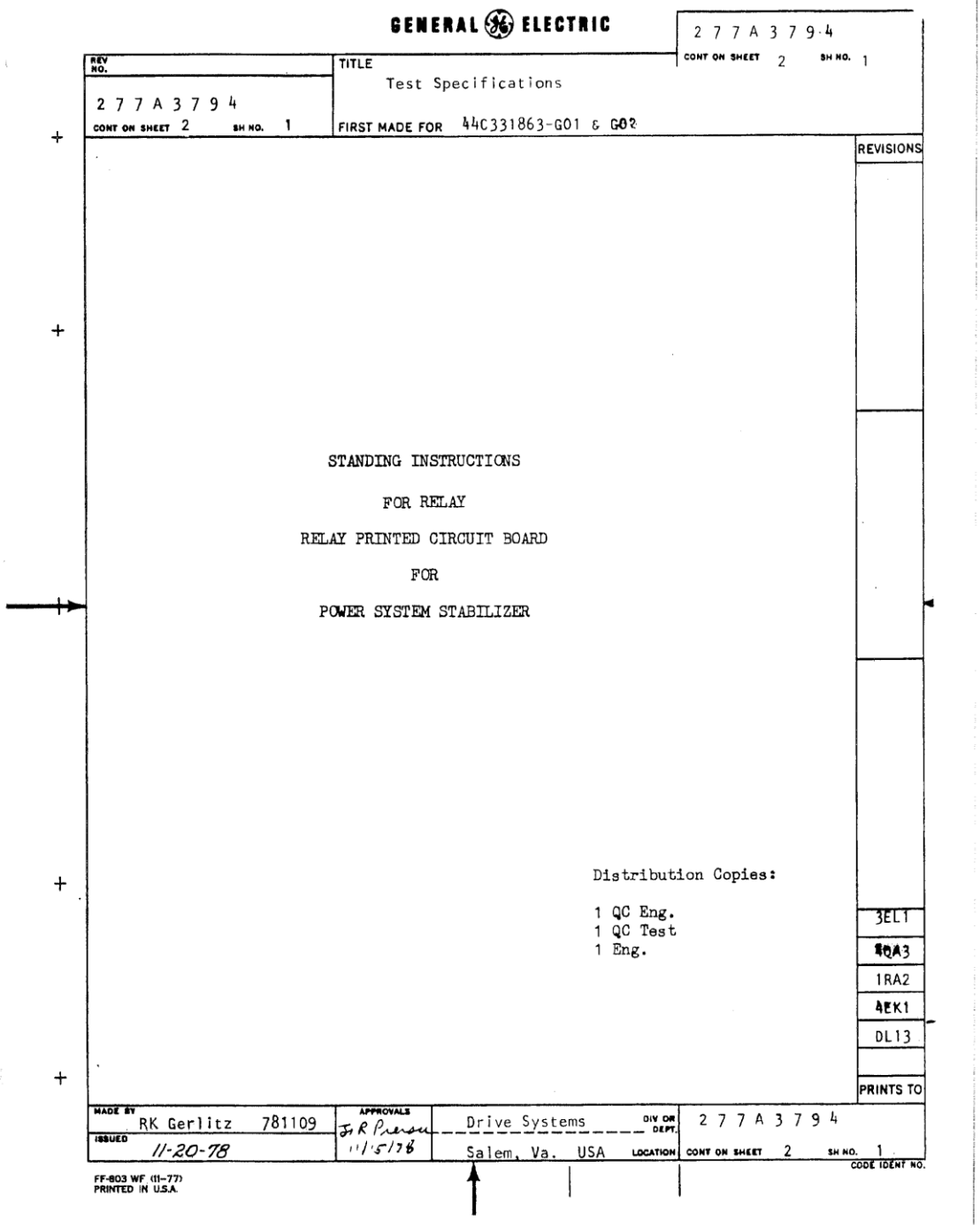
7.1 Schematic Diagram 8.1 for setup reference.

7.2 Original test in 8.2 for testing reference.

8. ATTACHMENTS

8.1





GENERAL ELECTRIC

277A3794

REV NO. | TITLE: Test Specifications

277A3794 CONT ON SHEET 2 SH NO. 1

FIRST MADE FOR 44C331863-G01 & G02

REVISIONS

STANDING INSTRUCTIONS

FOR RELAY

RELAY PRINTED CIRCUIT BOARD

FOR

POWER SYSTEM STABILIZER

Distribution Copies:

1 QC Eng.
1 QC Test
1 Eng.

3EL1
[illegible]A3
1RA2
[illegible]EK1
DL13
PRINTS TO

MADE BY	APPROVALS	DIV OR DEPT.	
RK Gerlitz 781109	J R Pierson 11/15/78	Drive Systems	277A3794
ISSUED 11-20-78		Salem, Va. USA LOCATION	CONT ON SHEET 2 SH NO. 1 CODE IDENT NO.

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8.2

GENERAL ELECTRIC

277A3794 CONT ON SHEET 3 SH NO. 2

REV NO.

TITLE Test Specifications

277A3794 CONT ON SHEET 3 SH NO. 2

FIRST MADE FOR 44C331863-G01 & G02

REVISIONS

I. Test Equipment Required

A. Printed Circuit Board test setup 44C931365

B. Adaptor Cable - Amp. Mod. II 30 pin.

C. Adaptor Cable - Power Supplies

D. Oscilloscope - Tektronix model 7403N or equivalent

E. Patchboard PB-3.

F. Drawings

44C306569	Elementary	for G01 (3)
44C309094	"	for G02
44C331863	Assembly	
44C931365	Test Fixture	

II. Connections

A. Connect the Amp Mod II adaptor cable to "PL-1" on the Universal Tester (U.T.)

B. Connect the Power Supply adapter cable to "PL-3" on the U.T. and to Power Supplies per lead markings.

C. Insert patchboard PB-3 into carrier of U. T. and close.

D. Connect a digital voltmeter to "BJ-1" and another to "BJ-2." (Red + and Black -).

III. Resistance Check

Adjust 1P completely CCW. Remove F1F and F2F fuse. Connect Jumper 1S to Ter. 1-2 and Jumper 2S to Ter. 1-2, 3S to Ter. 2-3 and 4S to Ter. 2-3.
(1) Adjust 2P completely CCW.
Measure the following resistance:

Pin	To	Pin	1P	Resistance (Ohms)
11		13	CCW	1060 to 1200
11		13	CW	264 to 282

(3) G02 only 2060 to 2200

3EL1
4QA3
1RA2
4EK1
DL13

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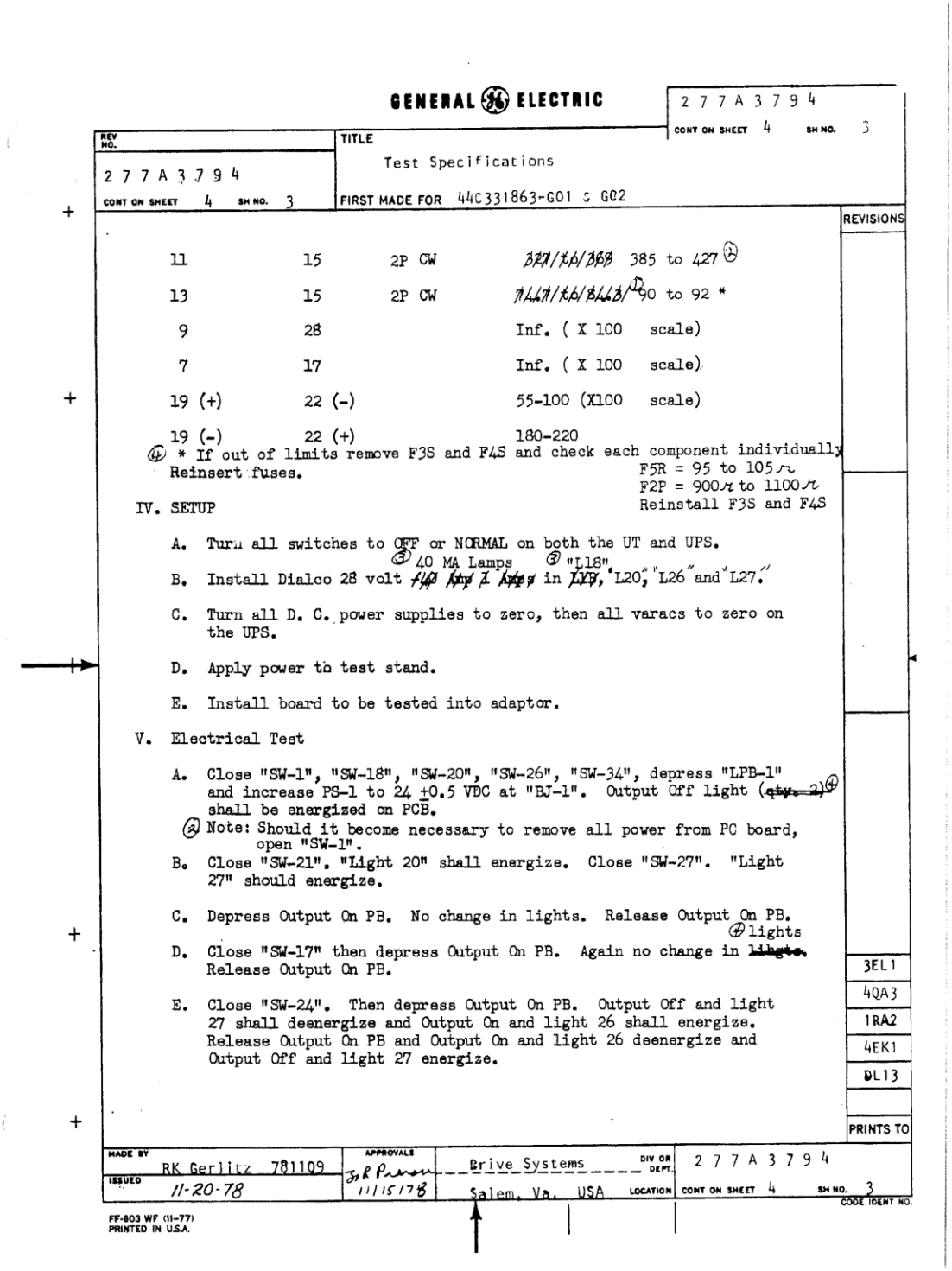

GENERAL ELECTRIC 277A3794 CONT ON SHEET 4 SH NO. 3

REV NO. 277A3794 CONT ON SHEET 4 SH NO. 3

TITLE Test Specifications

FIRST MADE FOR 44C331863-G01 & G02

REVISIONS

11	15	2P CW	~~327/AA/369~~ 385 to 427 ③
13	15	2P CW	~~AAA/AA/BAB~~ 90 to 92 * ①
9	28		Inf. (X 100 scale)
7	17		Inf. (X 100 scale)
19 (+)	22 (-)		55-100 (X100 scale)
19 (-)	22 (+)		180-220

④ * If out of limits remove F3S and F4S and check each component individually
Reinsert fuses.
F5R = 95 to 105Ω
F2P = 900Ω to 1100Ω
Reinstall F3S and F4S

IV. SETUP

A. Turn all switches to OFF or NORMAL on both the UT and UPS.

B. Install Dialco 28 volt ~~40 MA I Amps~~ ③ 40 MA Lamps in ~~LXB~~ ③ "L18", "L20", "L26" and "L27."

C. Turn all D. C. power supplies to zero, then all varacs to zero on the UPS.

D. Apply power to test stand.

E. Install board to be tested into adaptor.

V. Electrical Test

A. Close "SW-1", "SW-18", "SW-20", "SW-26", "SW-34", depress "LPB-1" and increase PS-1 to 24 ±0.5 VDC at "BJ-1". Output Off light ~~(qty. 2)~~ ④ shall be energized on PCB.

② Note: Should it become necessary to remove all power from PC board, open "SW-1".

B. Close "SW-21". "Light 20" shall energize. Close "SW-27". "Light 27" should energize.

C. Depress Output On PB. No change in lights. Release Output On PB.

D. Close "SW-17" then depress Output On PB. Again no change in ~~lights~~ ④ lights. Release Output On PB.

E. Close "SW-24". Then depress Output On PB. Output Off and light 27 shall deenergize and Output On and light 26 shall energize. Release Output On PB and Output On and light 26 deenergize and Output Off and light 27 energize.

3EL1
4QA3
1RA2
4EK1
DL13

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GENERAL ELECTRIC

277A3794

REV NO. | TITLE: Test Specifications | 277A3794 CONT ON SHEET FL SH NO. 4

277A3794 CONT ON SHEET FL SH NO. 4 | FIRST MADE FOR 44C331863-G01 & G02

REVISIONS

F. Close SW-22. Light 20 shall deenergize and light 18 shall energize.

G. Depress and release Output on PB. Output Off and light 27 shall deenergize and Output On and light 26 shall be energized.

H. Perform the following SW function and insure PCB will transfer from Output On to Output Off to Output On.

SW Open	SW Closed	Depress & Release	Output
17			"OFF"
	17		"OFF"
		Output ON	"ON"
24			"OFF"
	24		"OFF"
		Output ON	"ON"

I. Adjust 1P completely CCW. Measure the following resistance.

Pin to Pin		Resistance (Ohms)
11	15	950 to 1150
11	13	1015 to 1150
15	13	90 to 110

Remove Ohmeter

J. ~~Connect an oscilloscope across 2D (or 20) then across 3D (or 1C) and check voltage delay time when Output Off PB is depressed. (Note the ground side of the oscilloscope can be connected to pin 28). TC = 25m sec.~~ Verify F1C and F2C are .33 mfd. F10R and F11R are 150 ohm.

K. Place "PS-1" to position on 1, close "SW-11" and slowly increase PS-4 to 10 volts at "BJ-2". Note that -10-0+10 voltmeter tracks BJ-2 voltage in a positive direction within 3%. Return PS-4 to Zero.

L. Place "SW-11" down and repeat step K this time the voltage shall track in a negative direction. Return PS-4 to Zero.

M. Open SW-1 then return remaining switches to OFF or Normal. Return power supplies to zero.

① N. Measure forward resistance of F2D and F3D. Each shall be 7 to 8 0 ohms.

3EL1
4QA3
1RA2
4EK1
DL13

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