g		GE Energy	Functional Testing Specification				
	Parts & Repa Louisville, KY		LO	U-GED-115D2227	'G4		
	Test F	Procedure for a voltage	comparator	ard 115D2227	Gx series.		
DOCUI	MENT REVISION STATUS	Determined by the last entr	y in the "REV" a	nd "DATE" columr	1		
REV.		DESCRIPTION		SIGNATURE REV. DATE			
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PREPA	ARED BY	ED TO OTHERS, EXCEPT WITH REVIEWED BY	H THE WRITTEN I		ENERAL ELECTRIC CO		
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DATE 06/14	/13	DATE	DATE		DATE 6/17/2013		

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	Louisville, KY	

1. SCOPE

1.1 This is a functional testing procedure for a voltage comparator card 115D2227Gx series.

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 P3K-AL-0349-A01

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
1		Fluke 87 DMM (or Equivalent)
1		Dual Power Supply
1		Millivolt Source
1		Oscilloscope

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Testing Procedure

6.1.1 Follow Procedure Below

~	ON SHEEL 2 SH NO. 1 FIRST MADE FOR EHC MARK II 150227	Too.
킨 :	I. SCOPE	REV
I.	This instruction outlines the test specifications for circuit board 115D2227. Groups 1, 2, and 3. (Schematics 115D2228, 133D6534, 137D5135 and 145D3820). CIRCUIT DESCRIPTION	0
Trows	This circuit is used for all voltage comparison functions in the Mark II system with the exception of the Power Load Unbalance, Early Valve Actuation, and Standby functions which have their own specialized voltage comparators.	PAULIDINA
2	Each circuit board contains two identical Voltage Comparator functions. The circuit, in general, looks at two input voltages and picks up a relay when one voltage exceeds the other in accordance with the following rules:	9
C SPECIF	TYPE A Relay (and LED) picks up when the voltage on Input #1 is more positive than the reference voltage which is connected on Input #2.	1
A) BAC	TYPE B Relay (and LED) picks up when the voltage on Input #2 is more negative than the reference voltage which is connected on Input #1.	W. 266 216 33
TYPE A	TYPE C Relay (and LED) picks up when the voltage on Input #1 is more positive than the voltage on Input #2. (The internal reference voltage is not used in this case).	Selv. 3.
	The relay contects available per voltage comparator are two single pole double throw dry circuit contacts with 3.0 amp capacity at 28 VDC and resistance load.	2 2
×	Circuit Description:	
	This circuit, in general, consists of a high input impedance discrete component differential amplifier; an integrated circuit differential comparator; a transistor relay driver; a relay with bifilar coil and dry contacts; and a temperature compensated adjustable reference voltage with plus and minus capability.	
	A balance potentiometer is provided in the differential amplifier section so that the firing point can be adjusted exactly in spite of small component differences in each half of the amplifier. A hysteresis potentiometer is provided around the integrated circuit comparator to allow some adjustment of the difference between the pick-up point and drop-out point of the cir-	
	cuit. Having some hysteresis also prevents the relay from chattering if the input voltage is holding near the reference voltage. In order to improve noise immunity and to prevent false triggering on narrow pulses, two R-C filter networks have been included. One is on the input of the differential	273
	amplifier and the other is on the input of the integrated circuit differential comparator.	273
COP	THIS DESIGNATION SHOULD SHOW THE THE CONTROL OF THE	273 273 FRIM
HADE	Polncek Sept. 14, 1977 Steam Turbine by on par Al 1979 AC	4

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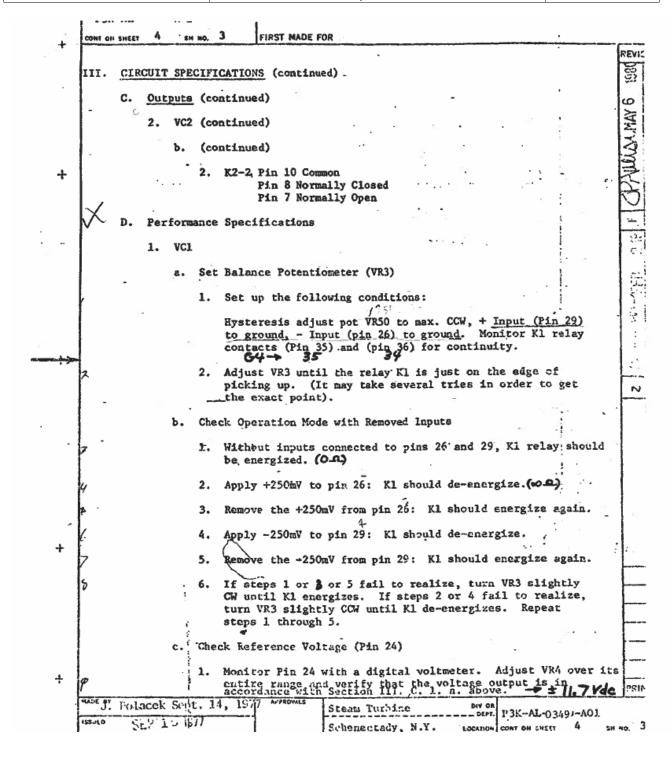
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	10	Р3К-	-AL(349-	-v\01		TEST TW	21K0C110N2	FUK VUL	LIAGE C	ALL WAYN FA	W-DIUM	runs.	
- 1	+	CONT ON	SHEET	3	\$H H	o. 2	FIRST MADE	FOR						DEVICE:
		m.	CIRCUIT SPECIFICATIONS											REVISI
			Α.	Pow	wer Supply Requirements						1			
					Powe	er Supply		.000 + 0.0 at 150 ma					,	MAYO
				2.		er, Supply Pin 41	y 2: -22	.000 + 0.0 at 60 ma	O2 VDC					PAULINE
	+		в.	Tnn		ignal Le	e fat		14					
		ĺ	ь.		VC1	remar De	7610							10
				•	a.		(Pin 29) (Pin 26)							
				•		-		-						3
				2.	VC2	4 Tonut	(Pin 4) +	15 0 VDC	may					120
		٠.					(Pin 3) ±						-	U
			c.	Out	puts								•	2
				1.	VCl									
-	+>	1			a.	Referen	ce Voltage ge <u>+</u> 11.7	(Pin 24) VDC with	adjusta coleranc	ble by e <u>+</u> 5%	changin	15 VR4 0	ver 1,12)	200
	1000				ъ.	Relay K	1 Contacts							п
						1. K1-		Common Normally (Normally (34 36			_	3170 047 1811
						2. Kl-		Common Normally (Normally (33				ight sandmann chi-
				2.	VC2									
					a.	Referen	ce Voltage	(Pin 2) a	adjustab rance <u>+</u>	ole by	changin;	g VR2- ov	er the	
	+				ъ.	Relay K	2 Contacts			-				
						1. K2-	1 Pin 12					~		
								Normally Normally	_					_
									-					-
							2. 2.		11.12					
	+													PRINT
		MADE BY	Po1	acek	Sept 5 13	. 14, 19	77 APPROVALS	4	Turbine		DIV OR 9CPT.	P3K-AL	-0349-A01	l.
		Ŀ	<u></u>	ան տե	- 10	-	L	Schene	ctady, 1	M.I.	FOCKHOW! CO	mi yn angti		

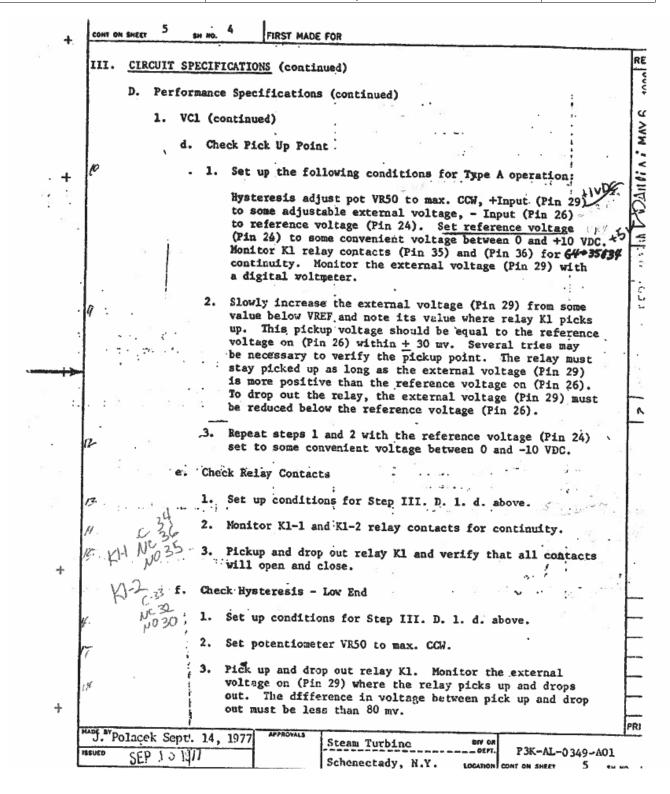
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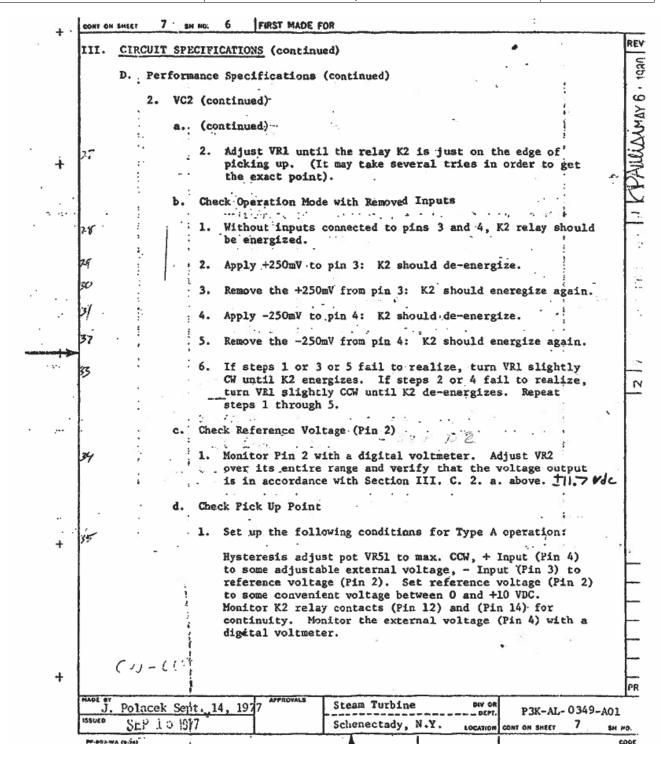
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+	CONT ON	\$HEET	6	\$H .	NO. 5 FIRST MADE	FOR		
	III. CIRCUIT SPECIFICATIONS (continued)							
		D.	Per	forma	nce Specifications	(continued)	,:	1380
			1.	VC1	(continued)		;	9 A
	. (d		:	g.	Check Hysteresis -	High End	· · · . · . · . · . · . · . · . · . · .	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\
+	ti	Ť	!		 Set up conditi 	ons for Step III. D.	l. d. above.	
. ×	20	ı	:		2. Set potentione	ter VR50 to max. CW.		Z .
88	Żi			*	voltage on (Pi	op out relay Kl. Monin 29) where the relay in voltage between pin 125 mv.	picks up and drops	
				h.	Check Pickup Time		*	品
6)	27 -				Hysteresis adj to a voltage s can be switche	lowing conditions for ust pot VR50 to max. (ource and switch (S1) d from OV to +5V, - Ir age (Pin 24). Set ref	CCW, + Input (Pin) such that this input (Pin 26) to	put
-			•		to 1.0 V. Mon through the KI	itor DC voltage source -1 normally ôpen relay Trigger the oscillose	of nominally 24 to contacts with an	VDC -
***	23			·		bserve on the oscillos acts Kl-1 to close. 7 0 ms.		
		- 1		i.	Check Drop Out Tim		l	. 8
	24			rei.	 This test can above with the 	be performed at the s same set up.	same time as III.	D. 1. h.
+	25				it takes for r	and observe on the ose clay contacts K1-1 to ess than 34 ms.	open. The drop or	ne ut
			2.	VC2			ķ9:	70.
P57	X.				Set Balance Potnet: 1. Set up the fol:	iometer (VR1)	. 1.1 5.1	153
+	01.8 810	Ì			to ground, - Incompany to ground, - Incompany to the contacts (Pin)	ust pot VR51 to max. (nput (Pin 3) to ground (Pin 14) for c	. Monitor K2 rela	4) ay
7	ISSUE0	Pola	cek s SEP	ept.	14, 197	Stcam Turbine	P3K-AL-03	
						Schenectady, N.Y.	LOCATION CONT ON SHEET	6 \$H NO. 1

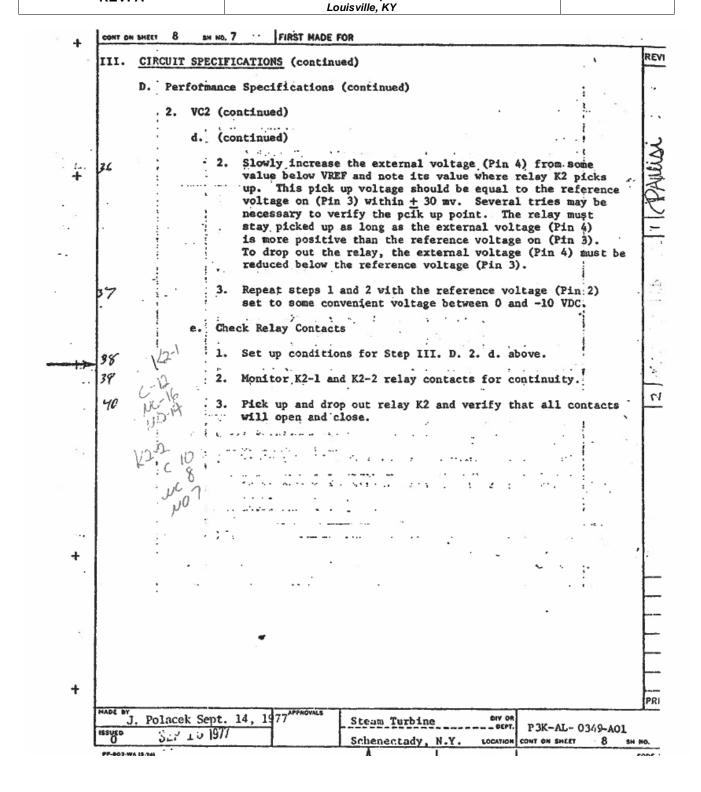
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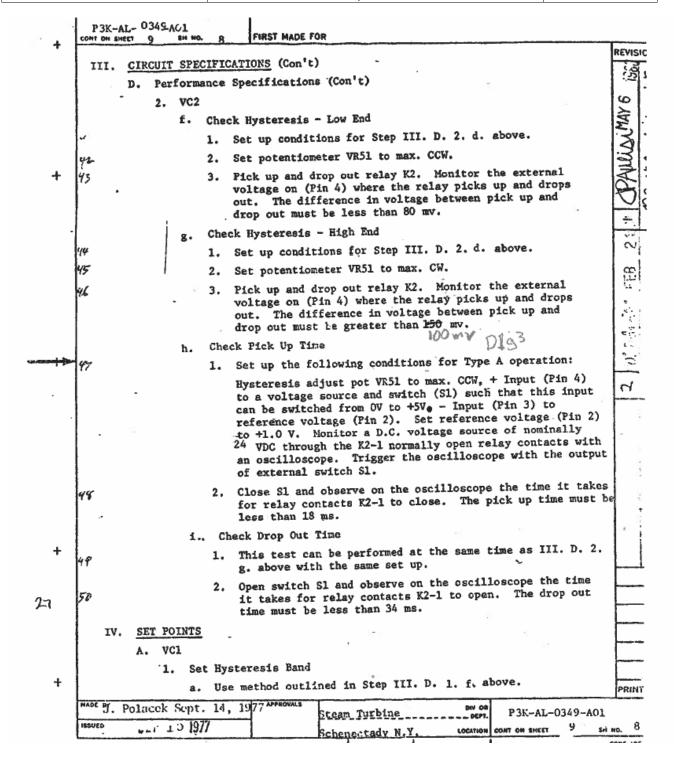
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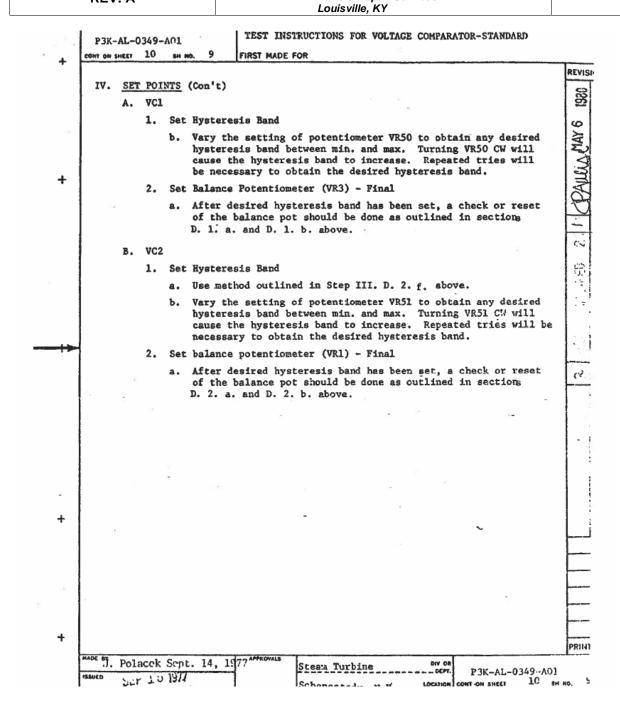
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6.2 ***TEST COMPLETE ***

7. Notes

7.1 None at this time.