		GENERAL 🚳 ELECTRIC	P3K-AL-0390-A01		
REV (a)	-AL-0390-A01	TITLE TEST INSTRUCTIONS FOR VOLTAGE COMPANION HYSTERESIS	·	^{NO.} 1	
CONT ON	SHEET 2 SH NO. 1	FIRST MADE FOR			
ı.	SCOPE			REVIS	SION
	This instruction our 125D4413 Groups 1, 2	tlines the test specifications for cir 2 and 3 (Schematics 125D3221, 137D2100		EB 1 0 1 33-	MANG
II.		d for special voltage comparison funct n require a small hysteresis or deadba opout point.		2. Schneible-FEB	HANCES
	The circuit, in gene	contains two identicial Voltage Compareral, looks at two input voltages and age exceeds the other in accordance wi	picks up a	-	HU HU
*	tive than t	LED) picks up when the voltage on Inp he reference voltage which is connect	ed on Input #2.		:
米	TYPE B Relay (and tive than t	LED) picks up when the voltage on Inp he reference voltage which is connect	ut #2 is more nega- ed on Input #1.		+
	tive than t	LED) picks up when the voltage on Inp he voltage on Input $\#2$. (This intern not used in this case).	ut #1 is more posi- al reference		
		vailable per voltage comparator are try circuit contacts with 3.0 amp capac			-
A CONTRACTOR OF THE CONTRACTOR	CIRCUIT DESCRIPTION	BY DATE 7-3	Granus timeseen		
FANCE ACCONTRACTOR WITH A SECOND CONTRACTOR OF CONTRACTOR	component differenti comparator; a transi	neral, consists of a high input impeda al amplifier; an integrated circuit d stor relay driver; a relay with bifil temperature compensated adjustable re capability.	lifferential ar coil and		
CONTRACTOR AND TO THE TOTAL AND THE TOTAL AN	so that the firing promponent difference	ter is provided in the differential a oint can be adjusted exactly in spite s in each half of the amplifier. A h ound the integrated circuit comparato	e of small hysteresis potentio-		
15352	-	fference between the nick up noint an		072	7.0

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 circuit. 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 amplifier and the other is on the input of the integrated circuit differential comparator.

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GENERAL (%) ELECTRIC P3K-AL-0390-A01 CONT ON SHEET SH NO. NO. 2 TITLE TEST INSTRUCTIONS FOR VOLTAGE COMPARATOR P3K-AL-0390-A01 LOW HYSTERESIS CONT ON SHEET sh no. 2 FIRST MADE FOR REVISIONS CIRCUIT SPECIFICATIONS III. \bigcirc Power Supply Requirements 2. 2- Mary le FEB Power Supply 1: +22.000 + 0.002 VDC Pin 37 at 150 ma Power Supply 2: -22.000 + 0.002 VDC Pin 41 at 60 ma Input Signal Levels 1. VC1 a. + Input (Pin 29) + 15.0 VDC max. - Input (Pin 26) \pm 15.0 VDC max. 2. VC2 a. + Input (Pin 4) \pm 15.0 VDC max. b. - Input (Pin 3) + 15.0 VDC max. C. **Outputs** VC1 1. Reference Voltage (Pin 24) adjustable by changing VR4 over the range \pm 11.7 VDC with tolerance \pm 5%. Relay K1 Contacts 1. Kl-1 Pin 35 Common 34 Pin 38 Normally Closed 36 Pin 36 Normally Open 35 33 2. K1-2 Pin 34 Common Pin 32 Normally Closed Pin 30 Normally Open 2. VC2

- a. Reference Voltage (Pin 2) adjustable by changing VR2 over the range + 11.7 VDC with tolerance + 5%.
- b. Relay K2 Contacts
 - Pin 12 Common
 Pin 16 Normally Closed
 Pin 14 Normally Open

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	GENERAL 🤲 ELECTRIC	P3K-AL-0390-A01
REV	TITLE	CONT ON SHEET 4 SH/NO. 3
P3K-AL-0390-A01 CONT ON SHEET 4 SH NO. 3	TEST INSTRUCTIONS FOR VOLTAGE COMPA LOW HYSTERESIS FIRST MADE FOR	RATOR
III. CIRCUIT SPECIFICA	ATIONS (continued)	REVIS
C. Outputs (conf	cinued)	0
2. VC2 (cont	inued)	
	cinued)	ibet
2. I	<pre>X2-2 Pin 10 Common Pin 8 Normally Closed Pin 7 Normally Open</pre>	2. Schnable FEB
D. Performance S	Specifications	
1. VC1		
a. Set I	Balance Potentiometer (VR3)	
1. 9	Set up the following conditions:	·
t	Hysteresis adjust pot VR50 to max. CCW, - to ground, - Input (pin 26) to ground. N contacts (Pin 35) and (pin 36) for contin	onitor Kl relay
. I	Adjust VR3 until the relay K1 is just on cicking up. (It may take several tries in the exact point).	
b. Check	Operation Mode with Removed Inputs	
	Hithout inputs connected to pins 26 and 2 oe energized.	9, K1 relay should
2. A	Apply +250mV to pin 26: Kl should de-ene	rgize.
3. I	Remove the +250mV from pin 26: K1 should	energize again.
4. A	Apply -250mV to pin 29: K1 should de-ene	rgize.
5. F	Remove the -250mV from pin 29: K1 should	energize again.
(t	If steps 1 or 2 or 5 fail to realize, turn W until Kl energizes. If steps 2 or 4 for a VR3 slightly CCW until Kl de-energizateps 1 through 5.	ail to realize,
c. Check	Reference Voltage (Pin 24)	
1. M	Monitor Pin 24 with a digital voltmeter.	Adjust VR4 over its

entire range and verify that the voltage output is in accordance with Section III. C. 1. a. above. PRINTS TO MADE BY J.Polacek Sept. 19, 1977 DIV OR Steam Turbine P3K-AL-0390-A01 SEP 20 1977 ISSUED sh No. 3 Schenectady, N.Y. LOCATION CONT ON SHEET CODE IDENT N

	GENERAL (6) ELECTRIC	P3K-AL-0390-A	v01
NO.	TITLE TEST INSTRUCTIONS FOR VOLTAGE COMPA	CONT ON SHEET 5	sh NO. 4
P3K-AL-0390-A01 cont on sheet 5 sh no. 4	LOW HYSTERESIS FIRST MADE FOR		
SH NO. 4 III. CIRCUIT SPECIFICATIO D. Performance Spec 1. VC1 (continue d. Check Pi 1. Set Hystos tos tor (Pin Moni cont a di 2. Slow value up. volt be ne stay is me To de be re 3. Reperset e. Check Re 1. Set 2. Moni	FIRST MADE FOR NS (continued) iffications (continued) ed) ck Up Point up the following conditions for Type eresis adjust pot VR50 to max. CCW, + ome adjustable external voltage, - In eference voltage (Pin 24). Set refer 24) to some convenient voltage betwee tor K1 relay contacts (Pin 24) and (Pin inuity. Monitor the external voltage gital voltmeter. ly increase the external voltage (Pin e below VREF and note its value where This pickup voltage should be equal age on (Pin 26) within + 30 mv. Seve ecessary to verify the pickup point. picked up as long as the external volta rop out the relay, the external volta rop out the relay, the external volta educed below the reference volta rop out the relay, the reference volta rop out the relay, the external volta educed below the reference voltage (P at steps 1 and 2 with the reference v to some convenient voltage between 0 lay Contacts up conditions for Step III. D. 1. d. tor K1-1 and K1-2 relay contacts for	Input (Pin 29) put (Pin 26) ence voltage VR4 en 0 and +10 VDC. in 36) for (Pin 29) with 29) from some relay K1 picks to the reference ral tries may The relay must ltage (Pin 29) ge on (Pin 26). ge (Pin 29) must in 26). oltage (Pin 24) and -10 VDC.	NO COST TO 19EAN
will	up and drop out relay Kl and verify topen and close.	hat all contacts	
-	steresis - Low End up conditions for Step III. D. 1. d.	above.	

voltage on (Pin 29) where the relay picks up and drops out. The dffference in voltage between pick up and drop out must be less than 28 mv.

Set potentiometer VR50 to max. CCW.

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Pick up and drop out relay Kl. Monitor the external

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1. Set up the following conditions:

Hysteresis adjust pot VR51 to max. CCW, + Input (Pin 4) to ground, - Input (Pin 3) to ground. Monitor K2 relay contacts (Pin 12) and (Pin 14) for continuity.

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J.Polacek Sept. 19, 1977	APPROVALS	Steam Turbine	DIV OR	P3K-AL-	0390-	AO1		
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	REV NO.	TITLE	CONT ON SHEET
P3K-AL-0390	P3K-AI-0390-A01	TEST INSTRUCTIONS FOR VOLTAGE COMPARA	ror
	I JK-AL-OJJO-AOI	LOW HYSTERESIS	

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CIRCUIT SPECIFICATIONS (continued) III.

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- Performance Specifications (continued)
 - VC2 (continued)
 - (continued)
 - 2. Adjust VR1 until the relay K2 is just on the edge of picking up. (It may take several tries in order to get the exact point).
 - Check Operation Mode with Removed Inputs
 - Without inputs connected to pins 3 and 4, K2 relay should be energized.
 - Apply +250mV to pin 3: K2 should de-energize.
 - Remove the +250mV from pin 3: K2 should energize again.
 - Apply -250mV to pin 4: K2 should de-energize.
 - Remove the -250mV from pin 4: K2 should energize again.
 - If steps 1 or 3 or 5 fail to realize, turn VR1 slightly CW until K2 energizes. If steps 2 or 4 fail to realize, turn VR1 slightly CCW until K2 de-energizes. Repeat steps 1 through 5.
 - Check Reference Voltage (Pin 2)
 - Monitor Pin 2 with a digital voltmeter. Adjust VR2 over its entire range and verify that the voltage output is in accordance with Section III. C. 2. a. above.

 Vultage RAUGE FROM + 11.7 to -11.7
 - Check Pick Up Point
 - 1. Set up the following conditions for Type A operation:

Hysteresis adjust pot VR51 to max. CCW, + Input (Pin 4) to some adjustable external voltage, - Input (Pin 3) to reference voltage (Pin 2). Set reference voltage (Pin 2) to some convenient voltage between 0 and +10 VDC. Monitor K2 relay contacts (Pin 12) and (Pin 14) for continuity. Monitor the external voltage (Pin 4) with a digital voltmeter.

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LOW HYSTERESIS

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FIRST MADE FOR

III. CIRCUIT SPECIFICATIONS (continued)

- Performance Specifications (continued)
 - VC2 (continued)
 - d. (continued)
 - Slowly increase the external voltage (Pin 4) from some value below VREF and note its value where relay K2 picks up. This pick up voltage should be equal to the reference voltage on (Pin 3) within + 30 mv. Several tries may be necessary to verify the pcik up point. The relay must stay picked up as long as the external voltage (Pin 4) is more positive than the reference voltage on (Pin 3). To drop out the relay, the external voltage (Pin 4) must be reduced below the reference voltage (Pin 3).
 - Repeat steps 1 and 2 with the reference voltage (Pin 2) set to some convenient voltage between 0 and -10 VDC.
 - Check Relay Contacts
 - Set up conditions for Step III. D. 2. d. above.
 - Monitor K2-1 and K2-2 relay contacts for continuity.
 - 3. Pick up and drop out relay K2 and verify that all contacts will open and close.
 - Check Hysteresis Low End
 - Set up conditions for Step III. D. 2. d. above.
 - Set potentiometer VR51 to max. CCW.
 - Pick up and drop out relay K2. Monitor the external voltage on (Pin 4) where the relay picks up and drops out. difference in voltage between pick up and drop out must be less than 28 mv.

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P3K-	-AL-	0390	-A01			TEST INSTRUCTIONS FOR VOLTAGE COMPAR LOW HYSTERESIS	RATOR	•		
CONT ON	SHEET	9	SH I	٧٥.	8	FIRST MADE FOR			· · · · · · · · · · · · · · · · · · ·	
									REVIS	SIONS
III.	CIR	CUIT	SPEC	CIFI	CATIO	NS (continued) .			1.2	
	D.	Per	forma	ance	Spec	ifications (continued)			<u> </u>	
		2.	VC2	(co	ntinue	ed)			世	
			g.	Che	ck Hys	steresis - High End			2. Solneider FEB	7
				1.	Set	up conditions for Step III. D. 2. d.	above.		Spirite.	Ü
				2.	Set 1	potentiometer VR51 to max. CW.			3	20 V
				3.	volta	up and drop out relay K2. Monitor tage on (Pin 4) where the relay picks The difference in voltage between pout must be greater than 120 mv.	up and drops.			
		ļ	h.	Che	ck Pi	ck Up Time	- -			
				1.	Set	up the following conditions for Type	A operation:			
	·				to a can l refer to +: 24 Vi an	eresis adjust pot VR51 to max. CCW, A voltage source and switch (S1) such be switched from OV to +5V, - Input or rence voltage (Pin 2). Set reference 1.0V. Monitor a DC voltage source of DC through the K2-1 normally open reloscilloscope. Trigger the oscilloscout of external switch S1.	that this input (Pin 3) to e voltage (Pin 2) f nominally lay contacts with			
•				2.	for	e S1 and observe on the oscilloscope relay contacts K2-1 to close. The press than 18 ms.	the time it take ick up time must	: S		•
			i.	Che	ck Dr	op Out Time				
				1.		test can be performed at the same to bove with the same set up.	ime as III. D. 2.	,		
					it t time	switch S1 and observe on the oscillo akes for relay contacts K2-1 to open must be less than 34 ms.	. The drop out			
IV.	SET	POI	NTS	D	o no	+ Do This test unless Set	points are		-	
	A.	· VC1	•	Ğ	vjen.	- just 1/1/88.	•			
÷		1.	Set			is Band			-	
			а.	Use	meth	od outlined in Step III. D. 1. e. ab	ove.		PRIN'	TS TO
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TEST INSTRUCTIONS FOR VOLTAGE COMPARATOR

LOW HYSTERESIS

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FIRST MADE FOR

TITLE

IV. SET POINTS (continued)

> Α. VCl (continued)

> > 1. (continued)

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- Vary the setting of potentiometer VR50 to obtain any desired hysteresis band between min, and max. Turning VR50 CW will cause the hysteresis band to increase. Repeated tries will be necessary to obtain the desired hysteresis band.
- 2. Set Balance Potentiometer (VR3) Final
 - a. After desired hysteresis band has been set, a check or reset of balance pot should be done as outlined in section D. 1. a. and D. 1. b. above.

В. VC2

- 1. Set Hysteresis Band
 - Use method outlined in Step III. D. 2. e. above.
 - Vary the setting of potentiometer VR51 to obtain any desired hysteresis band between min. and max. Turning VR51 CW will cause the hysteresis band to increase. Repeated tries will be necessary to obtain the desired hysteresis band.
- Set Balance Potentiometer (VR1) Final
 - After desired hysteresis band has been set, a check or reset of the balance pot should be done as outlined in section D. 2. a. and D. 2. b. above.

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