

Order Number

Serial Number

PRODUCT/TEST MANUAL

2V69K1

Under/Over Voltage Relay

Issue Level	Date	Summary of changes
A	30/05/00	Initial issue.

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ERL	MW	MW	

1. DESCRIPTION OF OPERATION

The 2V69 is a definite time under and over voltage relay. The output contacts will change state if the sensing voltage remains outside the set limits for the time of the setting on the timer. If the sensing voltage falls below 60% the under voltage feature will cause the relay to inhibit any output contact operation. LED indicators on the front panel of the relay indicate the operational status of the under/over voltage and timing functions. A switchmode power supply generates the voltages needed for operation of the internal electronics, this makes a wide range of operating input voltages possible.

2. SPECIFICATIONS

Auxiliary Supply	40 - 275 volts AC and 40 - 300 volts DC
Auxiliary Burden	Approx 10 watts operated.
Sensing Voltage	63.5 / 110 volts AC
Hysteresis	< 0.5%
Sensing setting range	
O/V	105 - 120 % of nom volts AC
U/V	80 - 100 % of nom volts AC
Undervoltage lockout	60% of nominal
Time setting range	
O/V	1 - 10 seconds
U/V	1 - 10 seconds
Output contacts	2 changeover per function
	1 changeover for Under Volt Lockout
	1 changeover for P/S Fail

3. TEST EQUIPMENT REQUIRED

Adjustable AC Supply	C R O
Digital Multimeter	Timer

4. ASSOCIATED DRAWINGS

165-069-101	Wiring Diagram
660-312-201	Schematic Diagram Primary PCB
660-312-301	Loading Diagram Primary PCB
660-313-201	Schematic Diagram Secondary PCB
660-313-301	Loading Diagram Secondary PCB

5. HIGH VOLTAGE TESTING

- a) Apply 2KV 50Hz test for 1 minute between terminal Groups A and B.
- b) Apply three 5KV 1/50 impulses of each polarity between terminal Groups A and B.

Group A	Group B
1,3,4,6,7,8,9,11,23,25,27	10 - 18,20,22,24,26,
1,3,23,25,27,10,12,14,22,24,26	7,9,11,4,6,8,16,18,20,13,15,17
1,3,7,9,11,10,12,14,16,18,20	23,25,27,4,6,8,22,24,26,13,15,17
All terminals	Frame

6. CALIBRATION & TEST PROCEDURE

6.1 Preliminary checks & transformer calibration

- a) Apply auxiliary supply to terminals 1 & 3, check the correct voltages appear on the test points as per the following table. Measure with respect to TP01-A

TP01-B	TP01-F	TP01-D	TP01-H
+24 VDC	+18 VDC	+12 VDC	-12 VDC

6.2 Transformer calibration

- a) Apply the 110 volts AC sensing voltage to terminals 7 & 11, use a voltmeter to monitor this voltage.
 b) Monitor between TP01-A (negative) and TP01-G, Adjust VR01 for a reading of 11.000 volts AC.
 c) Monitor between TP01-A (negative) and TP01-L and adjust VR03 for 10.000 volts DC.

6.3 Overvoltage calibration

- a) Monitor between TP01-K and TP01-A (negative) with an oscilloscope, adjust “O/V set (VR04)” and AC input volts to 120 % (132 VAC) and adjust VR02 until TP01-K just goes high.
 b) Set “O/V set” to 105% (115.5 VAC) and adjust VR05 until TP01-K goes high.
 c) Repeat steps a) and b) until scale is calibrated.
 d) Ensure the hysteresis measured at TP01-K and TP01-A (negative) is not less than 99.5 % at maximum setting.
 e) Record results below:

Setting	Nominal	Minimum	Maximum	Actual	Drop out	Hysteresis
105%	115.5	114.9	116.10			
110%	121.0	120.40	121.60			
115%	126.5	125.86	127.13			
120%	132.0	131.34	132.66			

6.4 Undervoltage calibration

- a) Set VR08 to approximate mid scale and “U/V set (VR07)” to 100% (110 VAC), apply 110 volts AC to the sense input.
 b) Monitor between TP01-J and TP01-A (negative) with an oscilloscope and adjust VR06 until TP01-J just goes low.
 c) Set “U/V set” (VR07) to 80 % (88 VAC) and adjust VR08 until TP01-J just goes low.
 d) Repeat steps b) and c) until scale is calibrated.
 e) Ensure the hysteresis measured at TP01-J and TP01-A (negative) is not less than 99.5 % at maximum setting.

6. CALIBRATION & TEST PROCEDURE (Cont)

6.4 Undervoltage calibration (Cont)

f) Record results below.

Setting%	Nominal Volts	Minimum Volts	Maximum Volts	Actual	Drop out	Hysteresis
80	88	87.56	88.44			
85	93.5	93.03	93.97			
90	99.0	98.50	99.49			
95	104.5	103.98	105.02			
100	110.0	109.45	110.55			

6.5 Undervoltage lockout calibration

a) Set input sensing volts to 66, monitor TP01-I and TP01-A (negative), adjust VR09 until this pin just goes low Remove test leads.

Nominal	Minimum	Maximum	Actual
66	65.7	66.3	

6.6 Overvoltage timer calibration

- a) Set sensing input voltage to 120 and "O/V set (VR04)" control to 105%
- b) Monitor TP02-A and TP02-G (negative) with a frequency counter set to monitor period. Adjust VR10 to obtain a span of 10:1 irrespective of actual period.
- c) Set timer control "O/V Delay" (VR11) to maximum setting and select C59, 60,61 to give a period reading of 2.44 mS.
- d) Record results at nominal time settings below:

Nominal (seconds)	Minimum	Maximum	Actual
1	0.5	1.5	
3	2.5	3.5	
5	4.5	5.5	
7	6.5	7.5	
10	9.5	10.5	

6. CALIBRATION & TEST PROCEDURE (Cont)

6.7 Undervoltage timer calibration

- a) Set sensing input voltage to 88 and “U/V set (VR07)” control to 100%
- b) Monitor TP02-I and TP02-G (negative) with a frequency counter set to monitor period. Adjust VR12 to obtain a span of 10:1 irrespective of actual period.
- c) Set timer control “U/V Delay” (VR13) to maximum setting and select C65, 66,67 to give a period reading of 2.44 mS.
- d) Record results below:

Nominal (seconds)	Minimum	Maximum	Actual
1	0.5	1.5	
3	2.5	3.5	
5	4.5	5.5	
7	6.5	7.5	
10	9.5	10.5	

7. GENERAL & FUNCTIONAL

- a) Check operation of LED's.

OK

- b) Check operation of Power supply fail contacts and Undervoltage Lockout contacts.
- c) Check that the relay is electrically sound and mechanically robust as per Standard Inspection & Test Schedule 903-000-026.

PASS

TESTED BY: _____

DATE: _____

8. CONNECTION DIAGRAM

