

Order Number

Serial Number

PRODUCT/TEST MANUAL

2C60K4

INSTANTANEOUS OVERCURRENT RELAY

Issue Level	Date	Summary of changes
A	24/02/00	Initial issue.

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ERL	MW	MW	

1. BROAD DESCRIPTION

The 2C60K4 is a triple-pole single output instantaneous overcurrent relay having less than 20ms operate and 15ms release times at 20X setting current. Heavy-duty output contacts capable of breaking 0.5A at 125VDC resistive are provided. Air-cored current transformers are used to enable fast operate times to be maintained regardless of previous current offsets which may have occurred.

2. SPECIFICATIONS

Auxiliary Supply Voltage	250V DC +10% -25%
Auxiliary Supply Burden (at 125V)	4W output relay dropped out 23W All output relays picked up
Nominal Input Current	1A
Sensing Supply Burden (at 1A)	0.5VA
Nominal Setting Range	50% - 200% continuously variable
Number of Poles	3 (phase segregated)
Frequency Tolerance	-6% to +2% of 50Hz
Ambient Temperature Range	-5°C to 55 °C
Accuracy	±5% of maximum setting
Dropout/Pickup Ratio	90% Nominal
Withstand Current (Independent of setting)	>5x maximum continuous >20x maximum for 3 seconds
Operate Time	<20ms Symmetrical or fully offset
Release Time	<15ms Symmetrical or fully offset with current interruption at a zero current crossing.

Output Relay Contact Ratings

Make and Carry Continuously

3000 VA AC resistive with maximums of 660 Volt and 12 Amp
3000 VA DC resistive with maximums of 660 Volt and 12 Amp

Make and Carry of 0.5 Second

7500 VA AC resistive with maximums of 660 Volt and 30 Amp
7500 VA DC resistive with maximums of 660 Volt and 30 amp

AC Break Capacity

3000 VA AC resistive with maximums of 660 Volt and 12 Amp

2. SPECIFICATIONS (Cont)

DC Break Capacity (Amps)

Voltage			24V	48V	125V	250V
Resistive rating		a	12	1.5	0.5	0.25
		b	12	12	10	5
L/R=40m S	Maximum break	a	12	1	0.4	0.2
		b	30	15	5.5	3.5
	1K operations (N3 Rating)	b	12	12	5	2.5

a = Without magnetic blowouts b = With magnetic blowouts

* As tested by Powernet Yarraville laboratories in Victoria.

3. TEST EQUIPMENT REQUIRED

DC Supply
 AC Current Supply
 AC Ammeter
 Electronic timer
 Decade box
 Oscilloscope
 High Voltage Test Equipment.

4. ASSOCIATED DRAWINGS

159-060-104 Wiring Diagram
 660-279-201 PCB circuit diagram
 660-279-401 PCB Loading

5. HIGH VOLTAGE TESTING

- a) Apply 2KV RMS between the terminal groups as listed in A & B below for 1 minute.
- b) Apply three 5KV 1/50usec pulses of each polarity as listed in A & B below.

GROUP A

1&2,9&10,19&20

1&2,19&20,7&8,5&6,3&4,13&14,15&16,
 17&18

1&2,11&12

GROUP B

11&12,7&8,5&6,3&4,13&14,15&16
 17&18,E

9&10,11&12,E

19&20, E

6. CALIBRATION PROCEDURE

6.1 Current Sensing

***Note.**

The calibration of only one phase of the circuit will be described (phase A). Component reference numbers refer to 660.279.201.

- a) Adjust pot knob for equal overtravel at scale ends if necessary.
- b) Apply scale minimum current through input A (terminals 9 & 10).
- c) Connect a decade box across R60 (159-060-201 reference) located on printed circuit board 660/279-1. The value of R60 determines the value of pickup current at a particular dial setting.
- d) Apply auxiliary supply voltage of 250 V DC.
- e) Check that TP"A" waveform is clean, and varies by a factor of four to one in amplitude as the dial pot is moved from min to max setting. R3 may be decreased if the scale span is too small or increased if the scale span is too large.
- f) Check that TP"B" waveform is as smooth as possible (ie symmetrical 3 phase ripple). If percentage ripple is too great, C5 may be altered to achieve best symmetry.
- g) Adjust decade box so that relay just picks up at 2.0A for dial setting of 2.0A.
- h) Check that at the 0.5A dial setting, pickup occurs at this value.
- i) Replace decade box with nearest preference value of fixed resistor, and check the following scale calibration points.

MINIMUM	MAXIMUM	NOMINAL	ACTUAL
0.4	.6	0.5	A
0.9	1.1	1.0	A
1.4	1.6	1.5	A
1.9	2.1	2.0	A

- j) Check that hysteresis is between 80% and 90%. Repeat (f) if not.

Actual %

- k) Repeat steps (a)-(i) for input B :

Ref (b) Terminals 19 & 20

(e) TP'C' R21

(c) R61

(f) TP'D' C15

MINIMUM	MAXIMUM	NOMINAL	ACTUAL
0.4	.6	0.5	A
0.9	1.1	1.0	A
1.4	1.6	1.5	A
1.9	2.1	2.0	A

- l) Check that hysteresis is between 80% and 90%. Repeat (f) if not.

Actual %

6.1 Current Sensing (Cont)

- m) Repeat steps (a)-(i) for input C :
 Ref (b) Terminals 11 & 12 (c) R62
 (e) TP'E', R39 (f) TP'F', C25

MINIMUM	MAXIMUM	NOMINAL	ACTUAL
0.4	.6	0.5	A
0.9	1.1	1.0	A
1.4	1.6	1.5	A
1.9	2.1	2.0	A

- n) Check that hysteresis is between 80% and 90%. Repeat (f) if not.

Actual	%
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6.2 Operate Time Check

- a) Set input A dial to 2.0A and input A current to 20A.

PU time <20ms @ aux. supply 187V

ms

DO time <15ms @ aux. supply 275V

ms

- b) Set input B dial to 2.0A and input A current to 20A.

PU time <20ms @ aux. supply 187V

ms

DO time <15ms @ aux. supply 275V

ms

- c) Set input C dial to 2.0A and input A current to 20A.

PU time <20ms @ aux. supply 187V

ms

DO time <15ms @ aux. supply 275V

ms

7. GENERAL & FUNCTIONAL

- a) Check that unit operates satisfactorily over the range of 187 to 275 VDC auxiliary supply.
 b) Check that quiescent current at 250 V is 32ma +10% with output relay dropped out and <200mA with all output relays picked up.
 c) Check that the relay is electrically sound and mechanically robust as per Standard Inspection & Test Schedule 903-000-026.

PASS

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TESTED BY : _____ DATE : _____

8. CONNECTION DIAGRAM

