

Order Number

Serial Number

PRODUCT/TEST MANUAL

2C61K1

DEFINITE TIME OVERCURRENT RELAY

Issue Level	Date	Summary of changes
A	26/10/98	Initial issue.

Due to RMS continuous product improvement policy this information is subject to change without notice.

Document updated	Checked	Registered	.pdf file created	.pdf uploaded to web site

1. BROAD DESCRIPTION

The 2C61K1 is a triple-pole single or phase segregated output definite time overcurrent relay having less than 20ms operate and 15ms release times at 20X setting current. Air-cored current transformers are used to enable fast operate times to be maintained regardless of previous current offsets which may have occurred. For the output contacts to operate the "Timer Enable Input" must have voltage applied and an input current which exceeds the dial setting

2. SPECIFICATIONS

Auxiliary Supply Voltage	40 - 275 V DC
Auxiliary Supply Burden (at 125V)	3W output relay dropped out 11W output relay picked up

CURRENT SECTION

Nominal Input Current	5A
Sensing Supply Burden (at 1A)	0.5VA
Nominal Setting Range	50 - 200% of nominal continuously variable
Number of Poles	3
Frequency Tolerance	-6% to +2% of 50Hz
Ambient Temperature Range	-5°C to 55° C
Accuracy	±5% of maximum setting
Dropout/Pickup Ratio	< 85% 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.

TIMER SECTION

Initiate Input	75 - 150 Volts DC Energise initiate input to actuate timer functions
Flag Reset	24 Volts DC
Accuracy	The setting and repeat accuracy is: ±0.5% of setting (plus the inherent minimum time).

Output Relay Contact Ratings

Make and Carry Continuously

1700 VA AC resistive with maximums of 380 Volt and 8 Amp
1700 VA DC resistive with maximums of 250 Volt and 8 Amp

AC Break Capacity

1700 VA AC resistive with maximums of 380 Volt and 8 Amp

2. SPECIFICATIONS (Cont)

Maximum Contact Capacity (Amps)

Voltage	DC			AC		
	30	125	250	110	220	250
Resistive	10	2.4	1.2	10	7	6.6
Inductive L/R 7 ms	7.5	1.8	.9	7.5	5	4.4

3. TEST EQUIPMENT REQUIRED

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

4. ASSOCIATED DRAWINGS

159-061-101	Wiring Diagram
660-292-201	PCB circuit diagram
660-292-301	PCB Loading
660-283-202	Power supply & Timer

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

ØA, ØB, ØC,C4 - C12,A5 -A10

ØA, ØC,A11,A12,C1,C2

ØA, ØB,A11,A12,A3,A4

ALL TERMINALS

GROUP B

A11,A12,A3,A4,A1,A2,C1,C2

ØB,C4 - C12,A5 - A10,A3,A4,A1,A2

ØC,C4 - C12,A5 - A10,C1,C2,A1,A2

FRAME

6. CALIBRATION PROCEDURE

6.1 Current Sensing

Prior to calibration check the DC levels on the following test points using TP02F as common reference.

TP02-F	Common	TP02-B	+ 24	TP02-J	- 24	
TP02-H	+ 12	TP02-L	- 12	Check		<input type="text"/>

***Note.**

The calibration of only one phase of the circuit will be described (input no. A). Component reference numbers refer to 660.292.201

- Adjust pot knob for equal overtravel at scale ends if necessary.
- Apply scale minimum current through input A (terminals \emptyset A).
- Connect a decade box across R01 TP01-H & TP01-J located on board 660.292.101. The value of R01 determines the value of pickup current at a particular dial setting.
- Apply nominal auxiliary supply voltage.
- Check that TP01-D 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. R13 may be decreased if the scale span is too small or increased if the scale span is too large.
- Check that TP01-B waveform is as smooth as possible (ie symmetrical 3 phase ripple). If percentage ripple is too great, C22 may be altered to achieve best symmetry.
- Apply scale maximum current and adjust decade box so that relay just picks up at 10.0 A for dial setting of 10.0 A
- Apply minimum scale current and check that at the 2.5 A dial setting, pickup occurs at this value.
- Replace decade box with nearest preference value of fixed resistor, and check the following scale calibration points.

MINIMUM	MAXIMUM	NOMINAL	ACTUAL
2.1	2.9	2.5	<input type="text"/> A
4.6	5.4	5.0	<input type="text"/> A
7.1	7.9	7.5	<input type="text"/> A
9.6	10.4	10.0	<input type="text"/> A

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

Actual %

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6.1 Current Sensing (Cont)

- k) Repeat steps (a)-(i) for input B :
 Ref (b) Terminals Ø B (c) R02 TP01-G & TP01-K
 (e)TP01-F, R14 (f) TP01-A, C23

MINIMUM	MAXIMUM	NOMINAL	ACTUAL
2.1	2.9	2.5	A
4.6	5.4	5.0	A
7.1	7.9	7.5	A
9.6	10.4	10.0	A

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

Actual %

- m) Repeat steps (a)-(i) for input C :
 Ref (b) Terminals ØC (c) R03 TP01-I & TP01-L
 (e) TP01-E, R15 (f) TP01-C, C24

MINIMUM	MAXIMUM	NOMINAL	ACTUAL
2.1	2.9	2.5	A
4.6	5.4	5.0	A
7.1	7.9	7.5	A
9.6	10.4	10.0	A

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

Actual %

6.3 Timer Calibration

- a) Connect timing apparatus to measure interval between energisation of the initiate input and output relay contact closure. Set JO5 jumper N/O (Pins 1 & 2)
- b) Set range switch to range A and time to 000.
- c) Record pick-up time for auxiliary voltage of 40 V.

Maximum	Actual	Unit
20	<input type="text"/>	ms

- d) Record dropout time for auxiliary voltage of 275 V

Maximum	Actual	Unit
20	<input type="text"/>	ms

- e) Record times for the following settings (range A)

Setting	Minimum	Maximum	Nominal	Actual	Unit
111	121	131	123	<input type="text"/>	ms
222	232	242	234	<input type="text"/>	ms
444	454	464	456	<input type="text"/>	ms
888	898	908	900	<input type="text"/>	ms

6.3 Timer Calibration (Cont)

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- f) Set time to 100 and set range to B.

Minimum	Maximum	Nominal	Actual	Unit
1.01	1.02	1.01	<input type="text"/>	s

- g) Set range switch to C and record pick-up time.

Minimum	Maximum	Nominal	Actual	Unit
10.01	10.02	10.01	<input type="text"/>	s

7. GENERAL & FUNCTIONAL

- a) Check that unit operates satisfactorily over the range of 40 volts to 275 volts auxiliary supply.
- b) With no volts applied to the "Timer Enable Input" and an input current over the set value on any phase ensure that the relay output contacts are blocked.
- c) Apply 120 volts DC to the "Timer Enable Input" and ensure that after the set time the output relays contacts operate.
- d) Check that the flag can be reset remotely by applying 24 volts DC to terminals C1& C2.
- e) 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

