

Order Number

Serial Number

## PRODUCT / TEST MANUAL

**2C58K2**

**INSTANTANEOUS OVERCURRENT**

<b>Issue Level</b>	<b>Date</b>	<b>Summary of changes</b>
A	22/10/02	Initial issue.

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ERL	DG	DG	

## 1. DESCRIPTION OF RELAY

The 2C58K2 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 125V DC 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. SPECIFICATION

Auxiliary Supply Voltage	125V DC +20% -25%
Auxiliary Supply Burden (at 110V)	<4W output relay dropped out <16W output relay picked up
Nominal Input Current	1A
Sensing Supply Burden (at 1A)	<0.1VA
Nominal Setting Range	10% - 40% continuously variable
Number of Poles	3 (with common output)
Frequency Tolerance	-6% to +2% of 50Hz
Ambient Temperature Range	-5°C to 55°C
Accuracy	±5% of maximum setting
Dropout/Pickup Ratio	Not less than 85%
Withstand Current	10A continuous
(independent of setting)	40A 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

### DC Break Capacity (Amps)

Voltage			24V	48V	125 V	250V
Resistive rating		a	12	1.5	0.5	0.25
		b	12	12	10	5
L/R=40 mS	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 Auxiliary Supply	AC Current Supply
AC Ammeter	Electronic Counter (for measuring operate and release times)
Oscilloscope	Decade Boxes
	High Voltage Test Equipment

### 4. ASSOCIATED DRAWINGS

159-058-102	2C58K02 Wiring Diagram
660-301-201	Circuit Diagram Main PCB
660-309-201	Circuit Diagram Current Sensing PCB

### 5. HIGH VOLTAGE TESTING

- Apply 2KV RMS 50 Hz between terminal groups as listed in A & B below for 1 minute.
- Apply 5KV 1/50us pulses of each polarity as listed in A & B below.

**Group A**  
1,2,9,10,11,12,19,20  
3,4,7,8,9,10,11,12  
5,6,7,8,19,20  
All

**Group B**  
3,4,5,6,7,8,13,14  
1,2,5,6,13,14,19,20  
1,2,3,4,11,12,13,14  
Frame

### 6. CALIBRATION & TEST PROCEDURE

#### 6.1 Current Sensing

**Note:** The calibration of only one phase of the circuit will be described (Input A). Component reference numbers refer to 660.309.201.

- Adjust pot knob for equal overtravel at scale ends if necessary.
- Apply scale minimum current through input A (terminals 9 & 10)
- Connect a decade box across R1 (158.058.154 reference) TP01-H & TP01-J on Motherboard 660/301-1. The value of R1 determines the value of pickup current at a particular dial setting.
- Apply auxiliary supply voltage of 125V DC
- Check that the following voltages appear on the test points indicated. TP01-A –125VDC, TP01-D – 0 VDC, TP01-B- 24VDC, TP01-C- 12 VDC
- Check that TP"E" waveform is clean and varies by a factor of four to one in amplitude as the dial pot is moved from minimum to maximum setting. R3 may be decreased if the scale span is too small or increased if the scale span is too large.
- Check that TP"F" 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.
- Adjust decade box so that relay just picks up at 800mA for a dial setting of 0.8A.
- Check that at the 0.20A dial setting pickup occurs at this value.

### 6.1 Current Sensing (Cont)

- j) Replace decade box with nearest preferred value of fixed resistor and check the following scale calibration points.

MINIMUM	MAXIMUM	NOMINAL	ACTUAL	UNIT
0.19	0.24	0.20	<input type="text"/>	A
0.38	0.44	0.40	<input type="text"/>	A
0.57	0.64	0.60	<input type="text"/>	A
0.76	0.84	0.80	<input type="text"/>	A

- k) Check that Hysteresis is not less than 85% at the above settings Repeat f) if not.

**Actual**  %

- l) Repeat steps a) to i) for Input B:  
 Ref b) Terminals 19 & 20  
 e) TP "C", R21

- c) R2 (TP01-G & TP01-K)  
 f) TP"D", C15

Minimum	Maximum	Nominal	Actual	Unit
0.19	0.24	0.20	<input type="text"/>	A
0.38	0.44	0.40	<input type="text"/>	A
0.57	0.64	0.60	<input type="text"/>	A
0.76	0.84	0.80	<input type="text"/>	A

- m) Check that Hysteresis is not less than 85% at the above settings Repeat f) if not.

**Actual**  %

- n) Repeat steps a) to i) for input C:  
 Ref b) Terminals 11 & 12  
 e) TP "A", R39

- c) R3 (TP01-I & TP01-L)  
 f) TP"B" C25

Minimum	Maximum	Nominal	Actual	Unit
0.19	0.24	0.20	<input type="text"/>	A
0.38	0.44	0.40	<input type="text"/>	A
0.57	0.64	0.60	<input type="text"/>	A
0.76	0.84	0.80	<input type="text"/>	A

- o) Check that hysteresis is not less than 85% at the above settings. Repeat f) if not.

**Actual**  %

## 6.2 Operate Time Check

The following tests are to be done on both min & max scale settings for each phase. Tolerance is +/- 2 mS. Pick up and drop out to be less than 20 ms

Pick up					Drop out		
Input	Setting	Phase A	Phase B	Phase C	Phase A	Phase B	Phase C
400mA	0.2						
1600mA	0.8						
4.0 Amp	0.2						
16.0 Amp	0.8						

- a) Apply 4 Amp to each input in turn apply nominal auxiliary volts and ensure that the pick up is less than 20 ms from application of DC.

Setting	Phase A	Phase B	Phase C
0.2			
0.8			

- b) Apply 4 Amp to each phase in turn and remove the auxiliary DC volts, ensure that the dropout time is less than 20 mS from removal of the DC

Setting	Phase A	Phase B	Phase C
0.2			
0.8			

## 7. GENERAL & FUNCTIONAL

- Check that unit operates satisfactorily over the range of 93.5 volts to 150 volts auxiliary supply.
- Check that R7 and R8 have been correctly loaded on motherboard.
- 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

