Order Number ____ Serial Number ____

PRODUCT / TEST MANUAL

2L9K1

BATTERY EARTH FAULT RELAY

Issue Level	Date	Summary of changes
B	27/05/1999	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. DESCRIPTION OF RELAY

The 2L9K1 is designed to monitor the substation battery to ensure that now leakage between the battery and the substation ground. It has a rotary switch on the front panel that allows the relay to detect either a positive or negative earth fault. The switch can also be set to allow automatic testing in a cyclic manner, this will test for an earth fault for a duration of 20 seconds every 15 minutes. And generate an alarm should a fault be detected. A calibrated meter on the front of the relay measures the actual resistance of the earth fault to assist in fault location. An LED on the front panel allows for local fault indication.

2. SPECIFICATION

Auxiliary Supply Voltage	50V DC +20% -25%
Auxiliary Supply Burden (at 50V)	<4W output relay dropped out <15W output relay picked up
Sensitivity	1 – 50 K ohms
Nominal Setting Range	1 – 50 K ohms continuously variable
Number of Poles	1
Ambient Temperature Range	-5^{o}C to 55^{o}C
Accuracy	$\pm$5% of maximum setting

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

3. TEST EQUIPMENT REQUIRED

50V DC Power Supply

50V DC Power Supply

Decade Box.

4. ASSOCIATED DRAWINGS

161-009-101	Connection Diagram
660-102-201	Circuit Diagram
660-102-601	Circuit Loading

5. HIGH VOLTAGE TESTING

a) Apply 2KV RMS 50 Hz between all terminals and frame.

b) Apply 3 5KV 1/50us pulses of each polarity between all terminals and frame.

6. CALIBRATION & TEST PROCEDURE

a) Allow 5 minutes warm up time before calibration.

b) Set the front panel switch to position 2 (positive earth test). Connect 50 V DC to terminals 10(+ve) and 8(-ve). Connect the decade resistance box between terminals 10 and 9. Adjust R15 until the voltage at pin 3 of IC-1 is the same when the decade box is connected between 10 and 9 or 8 and 9. (The switch must be on position 6 when the decade box is connected between terminals 8 and 9). The decade box should be set to 2K ohm for this adjustment.

c) Set the front panel switch to position 2. Set the decade box (connected between terminals 10 and 9) to 1K. Set the front panel potentiometer to 1K. Adjust R12 until the relay picks up. Set the front panel potentiometer to 50 K and adjust R28 until the relay picks up at 50 k on the decade box. Repeat the calibration until the relay is within tolerance.

d) Positive to Earth Test

SCALE	PICK-UP	PICK-UP	DROP-OUT
1K	0.5 - 1.5K		
2K	1.0 - 3.0K		
5K	4.0 - 6.0K		
10K	9.0 - 11K		
20K	18 - 22K		
30K	27 - 33K		
40K	36 - 44K		
50K	45 - 55K		

e) Negative to Earth Test

SCALE	PICK-UP	PICK-UP	DROP-OUT
1K	0.5 - 1.5K		
2K	1.0 - 3.0K		
5K	4.0 - 6.0K		
10K	9.0 - 11K		
20K	18 - 22K		
30K	27 - 33K		
40K	36 - 44K		
50K	45 - 55K		

f) Set the decade box to 1K ohm and adjust R8 until the front panel meter reads 1K (FSD). Check that the calibration other positions are within ±10%.

7. GENERAL & FUNCTIONAL

a) Check the operation of the relay contacts and that the LED becomes illuminated when the relay picks up.

b) Check all wiring and switch positions for correctness and check micro switch action and operation of CT (cam) for correctness

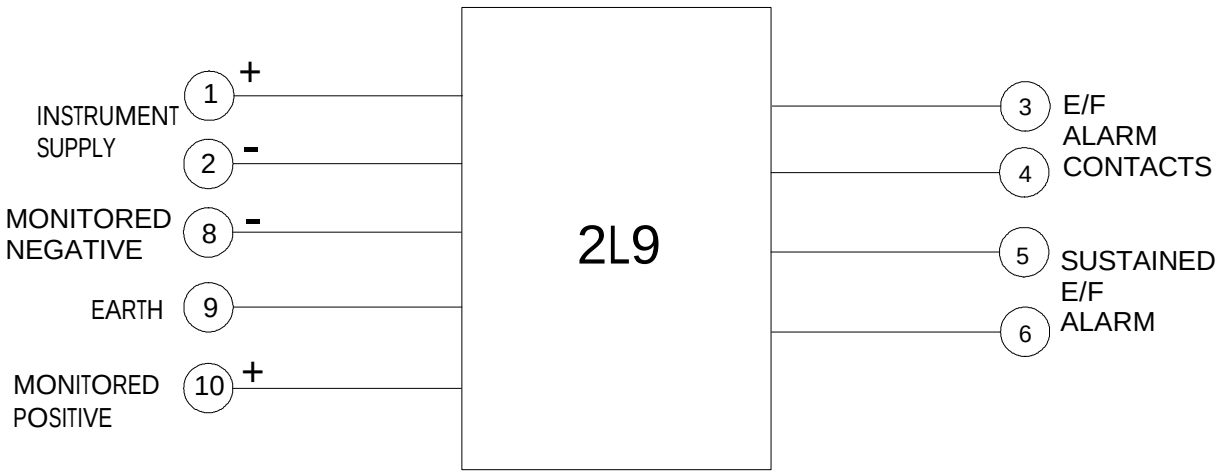
c) Check the timer operation. Contact CT1 to change state every 15 minutes and Contact CT2 is to close onto R1 just prior to the opening of CT1 in either direction and remains closed for 20 seconds after which it will revert to its original position.

d) Check that the relay is electrically sound and mechanically robust as per Standard Inspection & Test Schedule 903-000-026

PASS ☐

TESTED BY :_____DATE :_____

8.0 CONNECTION DIAGRAM


1
+
INSTRUMENT
SUPPLY
2
-
MONITORED
NEGATIVE
8
-
EARTH
9
MONITORED
POSITIVE
10
+
2L9
3
E/F
ALARM
4
CONTACTS
5
SUSTAINED
E/F
ALARM
6