



Order Number

Serial Number

2C135K17 TEST PROCEDURE

DEFINITE TIME SENSITIVE EARTH FAULT RELAY WITH HARMONIC SUPPRESSION

1. TEST EQUIPMENT REQUIRED

DC Auxiliary Supply,
AC Variable Current & Frequency Supply
Ammeter
Frequency Counter
Oscilloscope
HV Test Equipment
Electronic Counter (for measuring operate & release times).

2. ASSOCIATED DRAWINGS

159-135-017	Descriptive Manual 2C135K17
159-135-217	Circuit Diagram PCB 2C135K17
660-194-301	Loading Diagram PCB

3. HIGH VOLTAGE TESTING

- a) Apply 2KV RMS 50 Hz between terminal Groups 1 and 2 in Table 1 for 1 minute.
- b) Apply 3 5KV 1/50us pulses of each polarity between terminal Groups 1 and 2 in Table 1.

TABLE 1

GROUP 1

1,2,3,4
1,2,5,8
9,10

GROUP 2

5,8,9,10,FRAME
3,4,9,10,FRAME
FRAME

4. CALIBRATION & TEST PROCEDURE

- a) Connect 120V AC Auxiliary power supply to terminals 5(+) & 8(-).

4. CALIBRATION & TEST PROCEDURE(cont)

- b) Connect variable frequency adjustable current supply via Pickup/Dropout time measuring equipment and Ammeter to the current input terminals (9 and 10).
- c) Set timer switches to 2.0sec.
- d) Check that 12V supply rail is within tolerance. (Measure between auxiliary supply negative and transformer shield can.)

MIN	MAX	NOM	ACTUAL	UNITS
11.5	12.6	12.0	<input type="text"/>	V DC

- e) Check that 24V supply rail is within tolerance. (Measure between auxiliary supply negative and R63).

MIN	MAX	NOM	ACTUAL	UNITS
23.0	25.2	24.0	<input type="text"/>	V DC

- f) Connect oscilloscope 0V connection to +12V rail (shield can of input transformer is a convenient point) and monitor IC1-3 pin 8.
- g) With zero input current, set trimpot R6 to mid setting, SW2 to .5% Inom (5mA), and adjust R12 to give zero DC offset as observed on the oscilloscope.

ACTUAL
 OK

- h) Set current setting switch to 2% setting (20mA), and apply 50Hz input current such that a 5V peak to peak signal is observed on the oscilloscope at IC1-4 pin 14.
- i) Change input current frequency to 150Hz and adjust trimpot R20 for minimum signal amplitude on the CRO. Note that C11 may be padded if necessary.
- j) Temporarily short out diode D9, set input frequency to 50Hz and adjust

input amplitude until square waves just appear at IC2-3 pin 8.



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4. CALIBRATION & TEST PROCEDURE(cont)

- k) Connect CRO second channel to IC4-2 pin 4 (D13 anode) and adjust trimpot R42 so that IC4-2 pin 4 goes high 8ms after IC2-3 pin 8 goes low.

MIN	MAX	NOM	ACTUAL	UNITS
8.0	9.0	8.0	<input type="text"/>	ms

- l) Remove temporary short circuit from across D9.
- m) Set timer switches to zero.
- n) Adjust trimpot R6 until output relay just picks up at input current of 20mA.
- o) Set current setting DIL switch to .5% and input current to zero. Check IC1-3 pin 8 output offset voltage is zero and adjust R12 if necessary.

that

ACTUAL	OK
<input type="text"/>	OK

- p) Connect frequency counter to IC4-1 pin 3 and apply 50mA to 2C135 sensing input (DIL switch should still be set at .5% (5mA)).
- q) Adjust trimpot R58 to give an oscillator frequency within 3% of 1 second.

C22 may be altered if R58 has insufficient range.

MIN	MAX	NOM	ACTUAL	UNITS
0.97	1.03	1.00	<input type="text"/>	

- r) Connect pickup/dropout time measuring equipment to measure the time between application of 50mA and subsequent closure of RL2-1 contact. Note that the pickup time of the instantaneous current sensing element plus output relay will be approximately 50ms. Record operate times at the following settings:

the

SETTING	MIN	MAX	NOM	ACTUAL	UNITS
1.0	0.7	1.3	1.0		Sec
2.0	1.6	2.4	2.0		Sec
4.0	3.6	4.4	4.0		Sec
8.0	7.4	8.6	8.0		Sec
16.0	15.2	16.8	16.0		Sec
31.0	29.8	32.2	31.0		Sec



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- s) Set timer to zero and record the following pickup and hysteresis currents at the indicated settings:

SETTING	MIN	MAX	NOM	ACTUAL	UNITS
0.5 % PU	4.4	5.6	5.0		mA
Hysteresis	0.3	0.5	0.5		mA
1.0 % PU	9.3	10.7	10.0		mA
Hysteresis	0.6	1.0	1.0		mA
2.0 % PU	19.0	21.0	20.0		mA
Hysteresis	1.2	2.0	2.0		mA
4.0 % PU	38.4	41.6	40.0		mA
Hysteresis	2.4	4.0	4.0		mA
8.0 % PU	77.2	82.8	80.0		mA
Hysteresis	4.8	8.0	8.0		mA
15.5 % PU	150	160	155		mA
Hysteresis	9.2	15.4	15.4		mA

- t) Set input current to 22mA and record pickup and dropout times for auxiliary supply voltage of 120V:

	NOM	ACTUAL	UNITS
PICK UP	80		ms
DROP OUT	80		ms

5. GENERAL & FUNCTIONAL

- a) Check that magnetic disc flag operates correctly when the output relay picks up.

OK

b) Check that reset button resets the flag.

OK

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

PASS

TESTED BY : _____ DATE : _____