

## NEW ZEALAND POST OFFICE

### VOLTAGE ALARM UNITS MK I AND MK II

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#### 1. GENERAL.

- 1.1 The voltage alarm unit is designed for use with power plants to monitor the power plant voltage. In the event of high or low voltage an alarm will be extended. This will take the form of :-
- (a) Voltage Alarm Unit MK I : Earth alarm for conventional positive earth power plants.
- (b) Voltage Alarm Unit MK II : Earth alarm for both positive and negative earth power plants depending on the strapping of T1 - T3 on the unit.
- 1.2 The MK II unit also has an isolated change-over contact set available for use.
- 1.3 The unit is manufactured for 50V operation but with minor circuit alterations ( ref para. 4.4 ) will operate on 24V or 12V systems.

#### 2. ASSOCIATED DRAWINGS.

NZPO 39333 Voltage Alarm Unit MK I, 12V/24V/50V  
NZPO 40462 Voltage Alarm Unit MK II, 12V/24V/50V

#### 3. DESCRIPTION.

- 3.1 The unit consists of a 66 x 107 mm printed circuit board on which are mounted various electronic components, capacitors, resistors and one relay.
- 3.2 A removable link is provided to facilitate testing and setting up. For normal operation, the link must be in the position designated "N".

#### 4. INSTALLATION.

- 4.1 For +ve earth telecommunications installations either the MK I or MK II unit can be used but for -ve earth installations or if the auxiliary contact set is required, the MK II unit should be used.
- 4.2 The unit is to be mounted on four 4BA CSK brass screws in a readily accessible position inside the D.C. distribution panel or other suitable enclosure. The 4BA screws are to be held in position on the mounting panel with lock washers and nuts. Additional nuts and lock washers should be positioned on the screws so as to stand off the unit approximately 13 mm from the mounting panel.
- 4.3 There are three external connections to the unit consisting of 1 metre lengths of flexible wire. Details are as follows :-

Blue wire (-ve) connects to D.C. negative  
Red wire (+ve) connects to D.C. positive  
Orange wire (alarm) extends an earth to the operators switchboard or other alarm facility.

4.4 Before connecting the leads, check that the unit is correctly wired for the D.C. supply voltage. Drawing NZPO 39333 or 40462 Note 1 gives detailed instructions for converting the unit from 50 volts to 24 or 12 volt working.

5. ADJUSTMENT.

5.1 The unit is to be set to the values specified by Engineering Instruction POWER General A 4010.

5.2 Turn RV1 (LV) and RV2 (HV) fully clockwise.

5.3 Remove the link.

5.4 Adjust the supply voltage to the value specified for low volts alarm.

5.5 Turn RV1 slowly anticlockwise until the relay releases, extending an alarm.

5.6 Increase the voltage until the relay operates, then reduce slowly, noting the voltage when the alarm operates. Readjust if necessary.

5.7 Adjust the supply voltage to the value specified for high volts alarm.

5.8 Turn RV2 slowly anticlockwise until the relay releases, extending an alarm.

5.9 Decrease the voltage until the relay operates, then increase slowly, noting the voltage when the alarm operates. Readjust if necessary.

5.10 Replace the link in the normal position (N). This completes the adjustment.

6. TESTING.

6.1 Low Volts

Turn off the A.C. supply to all rectifiers. The alarm should be extended when the voltage drops to the prescribed value. To restore, turn on the rectifiers.

6.2 High Volts

Pull out the removable link, and reinsert it in the high volts test position (H.V.Test). To restore, replace the link in the normal position (N).

7. CIRCUIT EXPLANATORY.

7.1 IC1/1 to IC1/4 consists of four operational amplifiers enclosed in a single package. The package is designated IC1 on the printed circuit board.

7.2 Integrated circuit IC1/3 and zener diode D1 act as a constant voltage reference source for the high and low volts detection stages IC1/1 and IC1/2.

7.3 When the supply voltage goes outside the preset limits, the error is detected by IC1/1 (high volts) or IC1/2 (low volts).

- 7.4 When either IC1/1 or IC1/2 detect an out of limit voltage, the output from the operational amplifier will increase from 0.2 volts to approximately 12 volts. When this happens, the delay capacitor C1 starts to charge. After approximately 10 seconds the voltage across C1 will reach a value at which IC1/4's output will turn off, reducing the base voltage of TR1 from 12 volts to 0.2 volts.
- 7.5 With a base voltage of 0.2 volts, TR1 will not conduct and therefore relay A will release, extending an earth via contact A2.
- 7.6 When the link is removed, capacitor C1 is open circuited, removing the delay from the circuit to facilitate setting up.
- 7.7 When the link is inserted in the H.V. test position, IC1/1 is biased so as to simulate a high volts alarm condition.