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I T F II3 - II4 - II5

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ZERO SEQUENCE DETECTORS FOR LOW VOLTAGE NETWORKS

Publication R. I439

I T F II3 - II4 - II5

APPLICATION

ITF II3 is an overcurrent indicator with a short, fixed time delay, detecting very low zero sequence currents. It embodies a circuit which controls a built-in neon warning lamp (manually cancelled) and provides an output change-over contact that can be used to operate an external auxiliary tripping relay or the coil of a switch.

ITF II4 is identical to ITF II3 except that the neon warning lamp can be mounted externally to the relay.

Both are fed from a ring type current transformer on the feeder to be protected, and operate with an A.C. auxiliary supply usually taken from the system.

ITF II5 is the D.C. version of ITF II3.

DESCRIPTION

Note : all component circuit references are taken from the C.E.E. publication R I439 circuit diagram.

The ITF II3 comprises :

A detector circuit,

A timer,

An alarm circuit,

An auxiliary voltage circuit.

The detector is supplied directly from a ring current transformer and consists of a bridge rectifier protected by a low-pass filter, a transistor TI and a potentiometer PI which allows the threshold to be adjusted.

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Normally, in the absence of a fault, TI is saturated. When a zero sequence current occurs, the transistor TI cuts off. The circuit is in fact designed to operate as a voltage detector when the current is below the operating current since the input impedance is then very high. However, the impedance becomes very low as soon as the threshold is passed. This allows the equipment to detect very low fault currents (of the order of 100 mA primary current, with certain ring transformers) and also to provide a high continuous overload capacity.

The timer, of a conventional type, consists of a transistor T2 and a capacitor C3 which is charged through a resistor R5 when the transistor TI is cut off. As soon as the voltage through C3 reaches the conductive threshold of T2, T2 conducts and by means of resistor R7, causes transistor T3 to become conductive which in turn energises a two contacts relay.

One of these closes the alarm circuit (which comprises a neon lamp in a push-button) on a part of the primary winding of the small supply transformer. The other one is an output changeover contact which switches on when the relay operates.

When the fault is eliminated, transistor TI becomes conductive again. T2 and T3 however continue conducting, until the alarm is manually cancelled by the push-button provided in the auxiliary voltage circuit, which switches the output contact off and resets the relay.

The auxiliary supply circuit operates from an A.C. low voltage network. It contains a transformer, a filter and a bridge rectifier and is protected and stabilised by Zener diode.

CHARACTERISTICS

Supply and adjustments :

In the three versions, the operating threshold is adjustable by potentiometer within a range varying according to the characteristics of the ring transformer used. As examples, the following ranges can be suggested in connection with the ring transformers of the types mentioned :

Type L :	I,500 turns, non opening, internal diameter 25 mm	0,080 - 0.500 Amp. primary current 0.300 - I.200 Amp. primary current
Type M :	I,500 turns, non opening, internal diameter 50 mm	I.000 - 4.000 Amp. primary current 3.000 - 8.000 Amp. primary current

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Type N : I,500 turns, non opening, internal dimensions 65 x 65	0.I00 - 0.500 Amp. primary current
Type O : I,500 turns, opening internal diameter 80 mm	0.300 - I.200 Amp. primary current I.000 - 4.000 Amp. primary current
Type P : I,500 turns, opening internal diameter I05 mm	3.000 - 8.000 Amp. primary current

Accuracy :

On threshold : ± I5 %

Overload :

I50 Amp permanently - 600 Amp during I sec.

Practically, the overload is limited by the ring transformer's power.

Operating time :

Fixed : 0.4 or I sec.

Auxiliary supply :

ITF II3/II4 : II0 V or I27 V or 220 V A.C.
ITF II5 : II0 V or 220 V D.C.

Burden :

0.8 VA - on I27 V or 220 V

Contacts :

One changeover contact with maximum of 220 V and 5 Amp A.C.

Breaking capacity : 50 W on resistive load.

Operation indicator :

Neon warning lamp mounted in a resetting push-button.

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Insulation :

Voltage tests : 2 KV for I minute between all terminals and the ground.
I KV for I minute between all non connected circuits.

Case details :

Moulded epoxy resin unit. The small auxiliary relay providing the output contact is of a plug-in type and mounted at the rear.

INFORMATION TO BE SUPPLIED WITH ORDER

I° - Quantity

2° - Type of relay

3° - Available auxiliary supply

4° - Required range of adjustment (in terms of primary current)

5° - Characteristics of ring transformers required

6° - Language to be used for inscriptions.