

7PG23 5B3

Restricted Earth Fault

Document Release History

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Pre release

02/2010	Document formatted due to rebrand

Software Revision History

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1. INTRODUCTION

Experience gained in the manufacture and application of the 2B3, 3B3, & 4B3 relays has resulted in the development of the 5B3 relay. The 5B3 relay is ideal for restricted earth fault protection of transformer windings or phase and earth fault protection of reactors and the stator windings of large machines. This relay may also be used for high impedance busbar protection.

High impedance schemes have the advantages over low impedance schemes that a more sensitive setting can be obtained without any loss of stability and the primary fault setting calculation is simpler. Low impedance current operated schemes are more susceptible to maloperations from through faults unless greater care is taken with the selection of current transformers.

For some restricted earth fault applications the primary fault setting needs to be greater at harmonic frequencies than the setting at the fundamental frequency. The 5B3 relay uses a low pass filter circuit to achieve this.

2. FUNCTIONS

The relay operating element is a type B61 d.c. attracted armature element energised via a low pass filter circuit and a full wave rectifier. This element is of robust construction and fitted with three heavy duty contacts and a hand reset flag indicator. The contacts are suitable for the direct operation of the circuit breaker trip coil.

The low pass filter ensures that when the relay is used in the above applications the primary fault setting of the protective scheme at harmonic frequencies will always be greater than the setting at the fundamental frequency. Thus no adverse reduction in fault setting can occur with the high frequency current produced in certain installations during switching.

The relay has a preset setting of 15V and other resistors are introduced into the circuit to provide a voltage setting range up to 270V in increments of 5V using heavy duty DIL switches. Non-linear resistors are included to limit the peak voltage output from the current transformers (eg. for high fault current in-zone) and so protect the insulation on the current transformer secondary winding and the wiring to the relay as well as the relay components.