ROB Earth Continuity Relay

MDA Ex (ib) 2743, QLD 92 7126XU

1. Description

The ROB Earth Continuity Relay has been designed to AS 2081.2 1988, to monitor the earth continuity of a trailing cable in an underground mining operation. The relay has been approved to be intrinsically safe and is suitable for use in Zone 1 or 2 hazardous areas.

The relay is housed in a Sprecher & Schuh enclosure with three LED indicators.

Power is supplied from a separate transformer. To prevent false operation of the relay it is necessary to ensure that the ROB module is the only device connected to the IST transformer. This is to ensure the integrity of the Intrinsically Safe control line and to prevent circulating currents and ground loops

2. Features

- Electronic design
- Plug in enclosure for quick change out
- LED indication to aid fault finding
- Mines Department Approved

3. Application

The ROB Intrinsically Safe Earth Continuity Relay is Mines Department Approved for mining applications. The relay is normally installed in a substation or flameproof enclosure to provide earth continuity protection.

The relay can also as be used as a standard on/off control, connected to two wires or connected to a pilot and earth of a cable. This allows non flameproof switches to be used in hazardous areas. A typical example is a pump float switch.

3.1 Earth Continuity Protection

In this application the relay continually monitors the earth continuity of a mining trailing cable. The pilot of the cable is terminated in the machine, with a diode connected to earth. This ensures detection of a pilot to earth fault. The cathode of the diode must be connected to earth (see typical circuit).

Provided the loop resistance is less than 31 ohms and the resistance between pilot and earth is greater than 700 ohms the relay energises. When this occurs the normally open and normally closed contacts change state.

The relay de-energises when the loop resistance of the pilot and earth exceeds 42 ohms or the resistance between the conductors is less than 500 ohms.

A time delay on pick up and drop out prevents nuisance tripping due to electrical noise or dirty slip rings, on shuttle car applications.

The relay will function normally for a period of two (2) seconds during extreme power dip or power loss.

3.2 LED Indication

OK (Healthy) - When the loop resistance is less than 31 ohms the LED on the front of the module will be illuminated. This indicates a healthy pilot/earth circuit.

OC (Open Circuit) - The LED is illuminated to indicate a trip condition, due to the pilot/earth loop resistance exceeding the upper limit of 42 ohms.

SC (Short Circuit) - The LED is illuminated to indicate a trip condition, due to leakage of less than 500 ohms between pilot and earth.

A faulty terminating diode could also cause the above condition.

4. Specifications

Supply Volts:

AC 16 - 0 - 16 Volts +10% - 25%, 3 VA

Earth Continuity Protection:

Pick up if resistance is < 31 ohms
Trip if resistance is > 42 ohms
Shunt Leakage Trip if < 500 ohms

Time Delay:

On detection of a healthy circuit:	800 mS
Drop out due to an open circuit:	400 mS
Drop out due to a short circuit:	400 mS

Relay Contacts:

1 N/O and 1 C/O contact. Rated at 5A 240 VAC, 5A 30 VDC

Dimensions:

Enclosure with front connected, polarised base:
107 H x 52 W x 134 D mm
Transformer (IST003, IST004)
97 H x 85 W x 85 D mm

5. Equipment List

E03887 ROB Earth Continuity Relay
E03898 ROB Relay Base
E03931 IST003 Transformer
Primary 110 Volts
Secondary 16-0-16, 0-6 Volts, 10VA
E03932 IST004 Transformer
Primary 240 Volts
Secondary 16-0-16, 0-6 Volts, 10VA

TYPICAL CIRCUIT