Type CAEM 21
Battery Earth Fault Relay

ALSTOM

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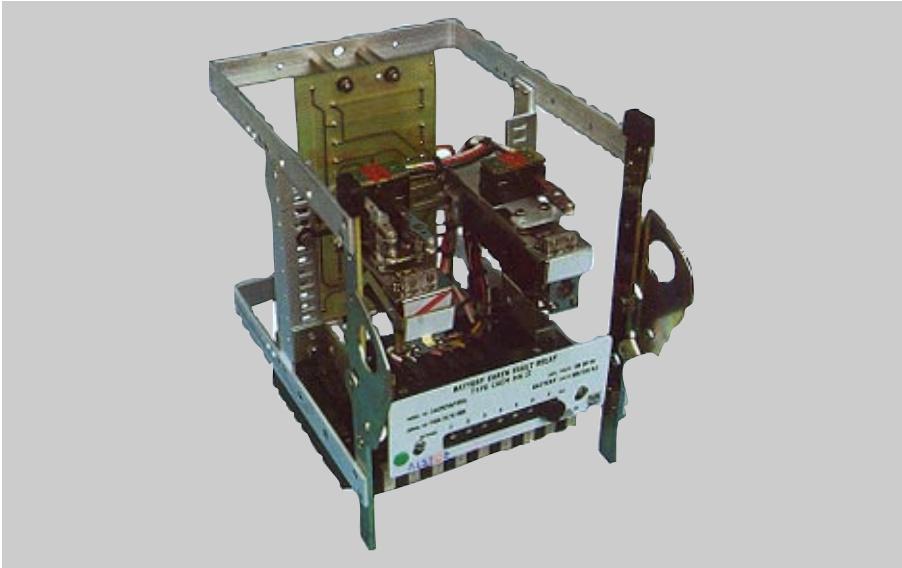

CAEM 21 relay
withdrawn from case

Features

- High sensitivity.
- Variable setting range.
- Fast operation.
- High drop-off/pick-up ratio.
- Self powered. No aux. supply is required.
- Applicable for a wide range of battery voltages.
- Provision for using external milliammeter.
- Drawout case and tropicalised finish.

Application

The battery earth fault relay type CAEM 21 is used to detect earth faults and deterioration of wiring insulation in either pole of the battery.

Description

The scheme consists of a centre tapped resistor, a measuring relay, a plug setting bridge, an auxiliary relay and a rectifier bridge. For different battery voltages different values of centre tapped resistors are used. For ratings above 250V a standard 250V relay is used with a suitable external resistor board. Variable sensitivities are provided by means of the tapped coil whose taps are connected to the plug setting bridge. The centre tap of the resistor is brought to one of the terminals of the relay and this terminal is either directly earthed or earthed through a centre zero milliammeter.

The schematic diagram shown (Figure 1) gives the general arrangement of the scheme. Under healthy condition no current flows through the measuring relay coil and in the event of an earth fault in any pole of the battery or a wiring insulation failure, current flows through the measuring relay coil and relay operates. The auxiliary relay operates through the measuring relay and initiates the alarm scheme. If a milliammeter is provided in the scheme its deflection also indicates the faulted pole of the battery.

Technical data

Ratings

The relays can be supplied for application on battery voltages of 24V - 1000V dc

Settings

The relay settings are adjustable between 1 and 7 mA in 7 equal steps. With the relays set at 1mA, the corresponding insulation resistance of either the positive or negative bus for different dc voltages will be as shown in the Table given below. The Table also indicates the burden of the relay at rated voltage and the operating voltage band.

Table 1

Version number	Battery/dc rating in volts	Insulation resistance value in kilo ohms at 1 mA tap	Burden in watts at rated voltage	Operating voltage band
1	24/30	5/8.5	4/6	16.8V to 36V
2	48/60	17/23	7/12	33.6V to 72V
3	100/125	39/51	4/6	70V to 150V
4	200/250	87/111	8/12	100V to 300V
5	275/325	123/148	11/15	138V to 390V
6	400/480	181/221	15/22	200V to 576V
7	500/600	229/279	19/27	250V to 720V
8	625/750	289/353	25/35	313V to 900V
9	800/1000	370/470	48/74	400V to 1200V

Case dimensions

Case	Maximum overall dimensions		
	Height (mm)	Width (mm)	Depth* (mm)
1D	233	170	203

* Add 76 mm for maximum length of terminal studs, alternatively, 29 mm for terminal screws.

The relays comply fully with the requirements of IS 3231 and are suitable for use in normal tropical environments.

Contacts

The relay will be fitted with two pairs of standard normally open output contacts. The contacts will be rated as follows:

	Make and carry continuously	**Make and carry for 3 seconds**	**Break**
AC	1250VA with maxima of 5A and 660V	7500VA with maxima of 30A and 660V	1250VA with maxima of 5A and 660V
DC	1250W with maxima of 5A and 660V	7500W with maxima of 30A and 66V	100W (resistive) 50W (inductive) with maxima of 5A and 660V

Notes

1. Additional resistor/capacitor/ diode will be included depending upon battery voltage.
2. Above 250V dc rating, the same relay with external resistor will be supplied.
3. The bias coil and the operating coil are wound on the same core.

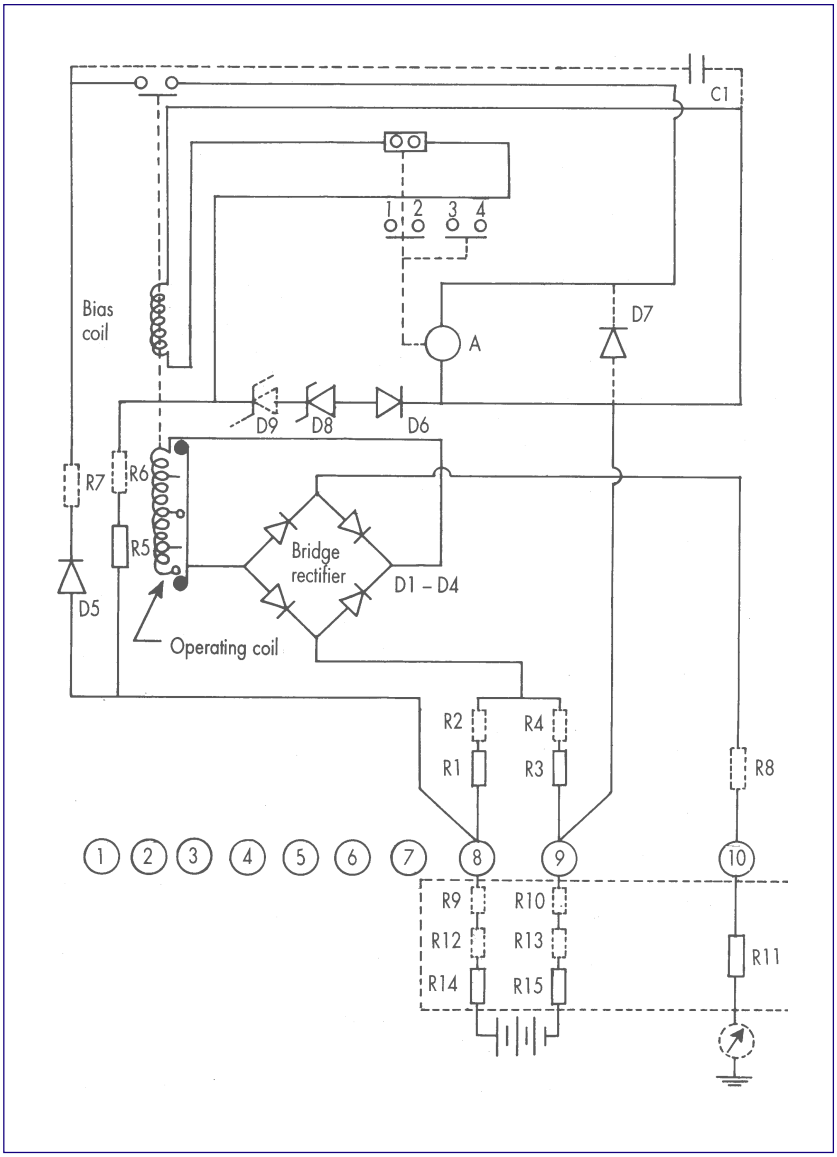

Figure 1:
Schematic diagram of external and internal connections for CAEM 21 relay

Notes

1. Even though two voltage ratings are indicated against each version number such as 24/30V, 48/60V etc. the same relay is used for a given version. For example, if it is version 3, the same relay will be used from 100V to 125V dc rating.
2. The insulation resistance values correspond to each voltage rating for a given version. Consider for example version 3. The insulation resistance values will be 39 and 51 kilo ohms for 100V and 125V dc systems respectively.
3. Similarly burden figures. For example relay burden is 4W and 6W at 100V and 125V dc respectively for version 3.
4. The indicated insulation resistance values are subject to a tolerance of ±10%.

Operating time

The operating time range is 40 to 60 milliseconds, at five times the setting.

Drop-off/pick-up ratio

Between 60% and 80%.

Insulation

The relay meets the requirements of IS 3231/IEC 225-5 Series 'C' - 2 kV for 1 minute.

Operation indicator

A hand reset mechanically operated flag indicator is provided on auxiliary unit A as standard.

Case

The relay is supplied, mounted in a size 1D drawout case, suitable for flush mounting. The finish will be egg-shell black and the cases are fully tropicalised. The cases are also fitted with a breather unit to equalise the inside and outside pressures without admitting dust.

Information required with order

Battery rating (V dc)

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