GE
Grid Solutions

SCS
System Controls & Switchgears

CAG 14 & CAG 34

Circulating Current Relay

CAG14 relay is applied for high impedance restricted earth fault protection of generator, transformer, reactor and bus bars. It is also used with a follower timer for time delayed earth fault protection.

Other applications include capacitor bank unbalance protection, generator inter turn fault protection etc.

Application

In circulating current protection schemes, the sudden and often asymmetrical growth of the system current during external fault conditions can cause the protective current transformers to go into saturation, resulting in a high unbalanced current. To ensure stability under these conditions, the modern practice is to use a voltage operated, high impedance relay, set to operate at a voltage slightly higher than that developed by the current transformers under maximum external fault conditions.

Type CAG 14 relay, used with a stabilizing resistor, is designed for such applications where sensitive settings with stability on heavy through faults are required.

Type CAG 14 relay has its operating coil connected in series with small choke and capacitor forming a series resonant circuit. This circuit is energized from an internal autotransformer which is tapped to provide seven equally spaced current settings.

The relay circuit, tuned to the supply frequency, rejects the harmonics produced by CT saturation. A slight time delay on operation helps to provide stability on heavy external faults and is obtained by allowing the auto transformer to saturate above the relay setting. This limits the current supplied, and the relay operates only on the slower part of its time/current curve.

The external stabilizing resistor supplied with the relay allows continuous adjustment of the relay voltage setting over a wide range. The total impedance of the relay and the series stabilizing resistor is usually low enough to prevent the current transformers developing voltages over 2 kV during maximum internal faults, but in some applications a non-linear resistor is required to limit this voltage.

Types CAG 14 and CAG 34 are single and triple pole relays respectively.

Features

- Simple and robust construction
- High stability on external faults
- Sensitive high speed protection on internal faults

Application

- Differential protection of ac machines, reactors, auto transformers and busbars
- Balanced and restricted earth fault protection of generators and transformer windings
- Transverse differential protection of generators and parallel feeders

Key Benefits

- High stability on external faults
- Tuned to rated frequency
- 25 ms operating time at 5 times current setting

Technical Data

Current rating

1 A or 5 A

Settings

20-80% or 10-40% - in seven equal steps as standard.
Continuously variable external stabilising resistors of 200 and 50 ohms are supplied as standard for 1 A and 5 A relays respectively. Stabilizing resistors with other ohmic values are also available.

Operating Time

25 milliseconds at 5 times the current setting (see time/current characteristic in Figure 1).

Burdens

0.9 VA at current setting on lowest tap. 1.0 VA at current setting on highest tap.

Current transformer requirements will be given on request.

Short Time

- 20x setting current for 3 seconds.

Accuracy

- Error class index
- E 10.0 as per BS 142 - 1966
- 10.0 as per IS 3231 – 1965

Operation Indicator

Hand reset operation indicator provided.

Contacts

- Two pairs of self reset`make' contacts
- Insulation: The relay meets the requirements of IS 3231 -1965/ IEC 255-5 Series C- 2 kV for 1 minute

External and Internal Circuit Connections

See Figure 2.

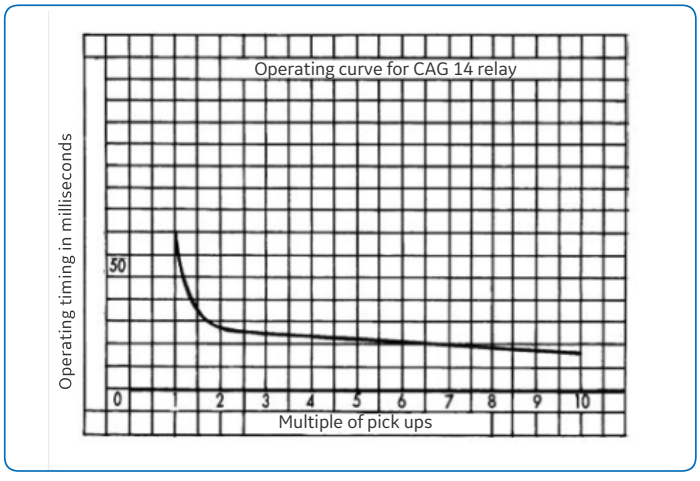

Figure 1: Time/current characteristic

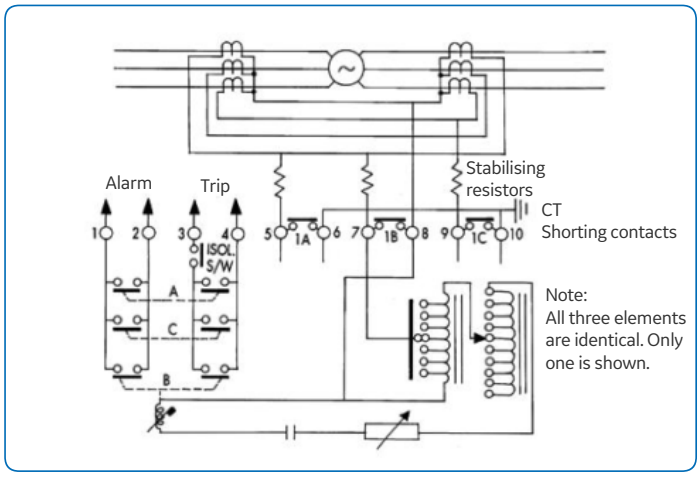

Figure 2: Typical external and internal circuit connections for type CAG 34 generator differential relay

Thermal Rating

The maximum continuous current rating for 60 °C rise coil temperature are as follows:

Operating coil tap	Lowest tap 1	2	3	4	5	6	Highest tap 7
Times current setting	8.5	7.74	6.9	6.4	5.74	5.3	5.05

Contact Ratings

	Make and carry Continuously	Make and carry for 0.5 second	Break
AC	1250 VA with maxima of 5 A and 660 V	7500 VA with maxima of 30 A and 660 V	1250 VA with maxima of 5 A and 660 V
DC	1250 W with maxima of 5 A and 660 V	7500 W with maxima of 30 A and 660 V	100 W (resisitive) 50 W (inductive) with maxima of 5 A and 660 V

Dimensions and Weights

Relay type	Case size	Maximum overall dimensions			Approximate gross weight
		Height	Width	Depth*	
		mm	mm	mm	kg
CAG 14/34	1D vert.	233	170	203	6.0

Stabilising resistor - 41 mm diameter x 273 mm long
* Add 76 mm for maximum length of terminal studs, alternatively,29 mm for terminal screws.
The approximate gross weights given above is inclusive of cartons, mounting appendages and terminal details.
The relays comply fully with the requirements of IS 3231-1965 and are suitable for use in normal tropical environments.

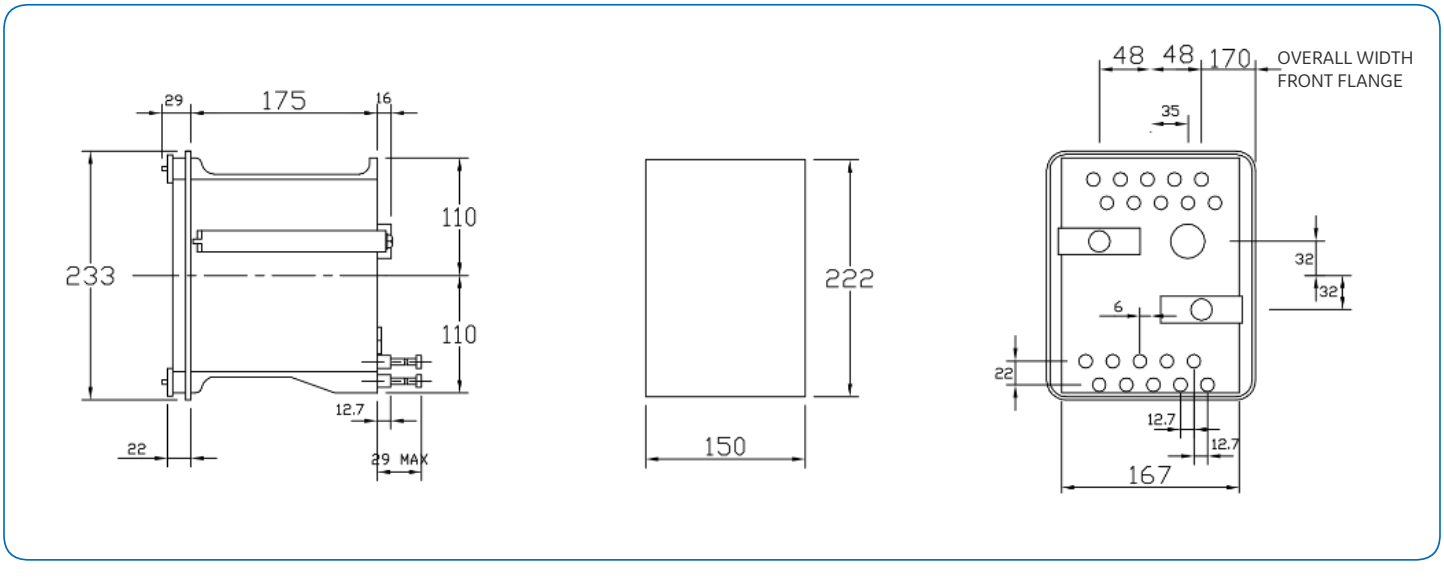

Figure 3 : Case and panel cut-out dimensions for case 1D (All dimensions in mm)

Case and Finish

1D vertical drawout case suitable for flush mounting finished twin tone and tropicalised. Suitable trip isolating switches and CT shorting switches provided on cradle assembly/case.

Information Required With Order

.1. Type of relay	CAG 14		CAG 34	
2. Current transformer secondary rating	1 A		5 A	
3. Current setting range	20-80%		10-40%	
4. a. Application. Res. E/F	Differential		Buszone Protection	

For more information please contact
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