Type CDG 11
Overcurrent and Earthfault Relay
**Type CDG 11**

**Overcurrent and Earthfault Relay**

**Features**
- Identical time/current characteristics on all taps.
- Self-powered, no necessity for separate auxiliary supply.
- High torque, ensuring consistent timing even under adverse conditions.
- Very low overshoot.
- Simple construction, easily accessible.
- Comprehensive range of high-set unit ratings.
- Dustproof drawout case and tropicalised finish.

**Application**
Selective phase and earthfault protection, in time graded systems for AC machines, transformers, feeders etc.

**General description**
A non-directional heavily damped induction disc relay which has an adjustable inverse time/current characteristic with a definite minimum time. The relay has a high torque movement combined with low burden and low overshoot. The relay disc is so shaped that as it rotates the driving torque increases and offsets the changing restraining torque of the control spring. This feature combined with the high torque of the relay ensures good contact pressure even at currents near pick-up. Damping of the disc movement is by a removable high retentivity permanent magnet.

The unique method of winding the operating coil ensures that the time/current characteristics are identical on each of the seven current taps. Selection of the required current setting is by means of a plug setting bridge which has a single insulated plug. The maximum current tap is automatically connected when the plug is withdrawn from the bridge, allowing the setting to be changed under load without risk of open circuiting the current transformers.

The IDMT relay has an auxiliary unit which is powered by a secondary winding on the electromagnet through a rectifier and as such a separate auxiliary supply is not required. The disc unit operates and closes its contacts, the auxiliary element connected across the secondary winding on the electromagnet operates, one normally open contact of the auxiliary element reinforces the disc contact. Two other contacts of the auxiliary element are brought out to the terminals of the relay (Refer Figure 4).
The relay operating time can be adjusted by movement of the disc backstop which is controlled by rotating a knurled moulded disc at the base of the graduated time multiplier scale.

A high-set instantaneous overcurrent/earth fault unit, type CAG17 can be fitted in the same case to provide instantaneous protection under maximum short circuit conditions and to improve discrimination on time graded protective systems.

For full details of the high-set instantaneous units refer to relevant publications.

Type CDG 21 relay is a single pole type CDG 11 relay with a high-set instantaneous unit. Type CDG 31 is a triple pole version of the type CDG 11 with three overcurrent units or two overcurrent units and one earthfault unit in the centre. Type CDG 61 relay is a triple pole version of type CDG 21 relay.

**Technical data**

**Current ratings**
1A or 5A.

**IDMT settings**
- 50 - 200% in seven equal steps of 25%.
- 20 - 80% in seven equal steps of 10%.
- 10 - 40% in seven equal steps of 5%.
- Other setting ranges available on request.

**Starting current**
103 - 105% of current setting.

**Closing current**
Not more than 130% of current setting.

**Instantaneous highset settings**
- E/F 100 - 800%
- O/C 250 - 2000%

**Time settings**

**Operating time**
- 0 - 3 seconds or 10 times 0 - 1.3 seconds current setting.
- Time/current characteristics given in Figures 1 and 2.

**Resetting time**
- 4 seconds for 1.3 seconds relay.
- 9 seconds for 3 seconds relay.

**Overshoot**
- Overshoot time on removal of 20 times setting current.
  - Less than 0.065 second for 1.3 seconds relay.
  - Less than 0.04 second for 3 seconds relay.

**Thermal rating**
- Maximum continuous current rating for 60°C rise in coil temperature.

**Accuracy**
- Error class index: E7.5 as per BS 142-1966
- 7.5 as per IS 3231-1965

**Frequency error**
- Timing error less than 8% for 2 Hz frequency variations. Time grading unaffected by such small error, since
Temperature error
For 10 times setting current, at ambient temperature between 
$+45^\circ$C and $-5^\circ$C, percentage timing errors are as follows:

- 3 seconds relay: $-3\%$ and $+4\%$
- 1.3 seconds relay: $-4\%$ and $+4\%$.

Auxiliary units and operation indicators
Self-powered auxiliary unit will have following contact combinations:
1. S/R–2N/O
   or
2. H/R–2N/O + 2 N/C.

Contact ratings auxiliary unit contact
Make and carry for 0.5 second 7500 VA with maxima of 30 amps/660 volts ac/dc.

Insulation
The relay meets the requirements of IS 3231-1965/IEC.265-6 series C-2 kV for 1 minute.

External and internal circuit connections
See Figure 4.

Burden
3VA nominal
2VA on the lowest tap
3.5VA on high-set tap.
Typical impedance/current curves given in Figure 3.

Case and finish
1D vertical or 3D vertical, horizontal case suitable for flush or projection mounting and finished eggshell black and tropicalised. Suitable trip isolating switch and CT shorting switches provided on the cradle assembly/case.

Figure 2:
Time-current characteristic inverse time relay CDG11 3 sec.
Dimensions and weights

<table>
<thead>
<tr>
<th>Relay</th>
<th>Case size</th>
<th>Maximum overall dimensions</th>
<th>Approximate gross weight</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Height mm</td>
<td>Width mm</td>
</tr>
<tr>
<td>CDG 11/21</td>
<td>1D Vert.</td>
<td>233</td>
<td>170</td>
</tr>
<tr>
<td>CDG 31/61</td>
<td>3D Horz.</td>
<td>233</td>
<td>454</td>
</tr>
<tr>
<td></td>
<td>3D Vert.</td>
<td>524</td>
<td>170</td>
</tr>
</tbody>
</table>

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

The approximate gross weights given above are 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: Impedance/Current Curves for type CDG relays
2.5-10 AMP 3 VA 50 Cycle Multi-strand Coil
Information required with order

1. Type of relay (CDG 11, 21, 31 or 61) and system frequency.
2. Current transformer secondary rating.
3. Current setting range.
4. Characteristic (0 - 3.0 sec. or 0 - 1.3 sec. at 10 times current setting).
5. Operation indicator inscription, if required.
6. Auxiliary contacts – hand or self reset.
7. Current setting range of high-set unit, if required.
8. Case size.
9. Type of mounting – flush or projection.

Figure 4:
Typical external and internal connections for type CDG 31 relay
Our policy is one of continuous development. Accordingly the design of our products may change at any time. Whilst every effort is made to produce up to date literature, this brochure should only be regarded as a guide and is intended for information purposes only. Its contents do not constitute an offer for sale or advice on the application of any product referred to in it. ALSTOM Limited cannot be held responsible for any reliance on any decision taken on its contents without specific advice.