

General Technical Particulars (GTP)



Core Balance / Residual Current Transformers (CT)

Product: Core Balance (Residual) Current **Application:** For residual current / earth-leakage detection and protection for distribution panels, MCCs, switchboards and protection relays. Designed to detect residual currents in the range **30 mA to 3000 mA (0.03 A – 3.0 A)**, selectable at factory or per order.

1. Scope

This specification covers design, manufacture, testing and supply of Core Balance CTs with window/window-sizes of **30, 50, 70, 100, 150, 200, 250, 300, 400 and 600 mm** (window dimension = nominal internal diameter or rectangular window, as ordered) and rated primary (sensitivity) range **30 mA to 3000 mA**. The CTs shall be suitable for use with protection & relay devices, metering or monitoring units.

2. Standards

The equipment shall comply with the latest applicable standards and regulations, including but not limited to:

- IEC 61869 (CT performance & testing) as applicable
- IEC 60044 / IEC 60044-8 (residual current transformers) where applicable
- Relevant national standards (e.g., IS equivalents) and safety regulations.

(Exact standard clause references will be confirmed at order stage.)

3. Types and Construction

- **Type:** Toroidal / rectangular core, split or solid window as per customer requirement.

- **Core material:** Cold-rolled grain-oriented silicon steel or equivalent low-loss magnetic material laminated / pressed and annealed for low residual magnetism.
- **Winding:** Single secondary winding (or multiple secondaries when specified). Secondary winding shall be insulated enamelled copper wire, adequately insulated to meet voltage withstand requirements.
- **Encapsulation / Insulation:** Resin filled or epoxy-moulded housing for mechanical robustness and moisture protection (option: open frame for indoor dry locations if specified).
- **Housing:** Flame-retardant, UV-stable, thermoset material. Provision for mounting clamps or bolt holes as per ordering.

4. Ratings

- **Rated primary (sensitivity):** 30 mA, 50 mA, 70 mA, 100 mA, 150 mA, 200 mA, 250 mA, 300 mA, 400 mA, 500 mA, 600 mA, 1000 mA, 1500 mA, 2000 mA, 3000 mA — (i.e., any value in the range 30 mA to 3000 mA to be offered as a standard option or special order). *Note: the customer shall specify the required primary (sensitivity) value on the PO.*
- **Secondary rated current:** 1 A or 5 A (standard options). Secondary current and internal turns ratio will be selected to achieve the required sensitivity and to match user relay/meters. Secondary termination: screw terminal block or wire leads per order.
- **Rated frequency:** 50 Hz / 60 Hz.
- **Thermal rating:** Continuous operating current up to specified primary rating; short-time withstand where applicable to be specified.
- **Insulation level:** Routine dielectric test 3.75 kV rms (or as per applicable standard). Impulse withstand: 5 kV (or as per order/spec).

5. Window Sizes (Mechanical)

The transformer shall be supplied in the following standard window sizes (nominal internal opening). Customer may specify rectangular window instead of circular where required.

Model / Size Code	Window inside dimension (mm)	Typical application
CB-30	30 mm	Small cables / single conductor up to ~25 mm dia
CB-50	50 mm	Small power cables / busbars
CB-70	70 mm	Lighting circuits and small feeders
CB-100	100 mm	Distribution feeders / small panels
CB-150	150 mm	Larger feeders / compact busbars
CB-200	200 mm	Main feeders / larger busbars
CB-250	250 mm	Cable bundles / multi-core feeders
CB-300	300 mm	Large cable/jacketed cables and bus ducts
CB-400	400 mm	Bus ducts / large conductors
CB-600	600 mm	Very large bus bars, cable trays and multi-core bundles

Note: Window dimension equals internal window diameter for circular cores, or internal width/height for rectangular cores as specified on order.

6. Accuracy & Performance

- **Accuracy class (protection):** Typically Class 1.0 or 0.5 (selectable), or as required by relay/manufacture. For residual CTs used for protection, the accuracy shall meet the protection class selected across the specified operating range.
- **Phase error & ratio error:** Shall comply with selected accuracy class across the rated burden.
- **Lowest magnetizing current & residual flux:** Designed for low magnetizing current to ensure reliable measurement at low primary (mA) levels.
- **Rated burden:** Typical provision 1 VA to 10 VA depending on secondary rating and customer requirement. Specify burden when ordering.

7. Mechanical & Environmental

- **Degree of protection:** IP20 (indoor) standard. Higher IP rating (IP54 / IP65) available on request for specific housings.
- **Operating temperature:** -10 °C to +55 °C (standard). Extended temperature ranges available on request.
- **Storage temperature:** -20 °C to +70 °C.
- **Humidity:** Up to 95% RH non-condensing.
- **Vibration / Shock:** Designed to meet normal industrial environment conditions; details on request.

8. Terminals & Connections

- **Secondary terminals:** Clearly marked S1, S2 or Sec +, Sec -. Connections shall be screw type terminals or flying leads as specified.
- **Earthing:** Core/body earth provision where applicable — marking and earthing point provided.
- **Polarities / direction:** Marked on housing. For split-core units, clear open/close direction marking.

9. Mounting

- **Mounting options:** Clamp-on / panel mount / DIN-rail mount / bolt-on mounting feet as per model and customer requirement.
- **Fixing hardware:** Supplied with each unit, unless otherwise specified.

10. Tests

Routine Tests (each unit)

- Visual & dimensional inspection.
- Insulation resistance test.
- Ratio test at specified primary current.
- Polarity check.

- Dielectric (voltage) test as per applicable standard.
- Winding continuity and resistance check.

Type Tests (manufacturer's lab)

- Temperature rise test.
- Impulse voltage test (if specified to standard levels).
- Accuracy and burden tests over specified ranges.
- Vibration / mechanical tests (if specified).

Acceptance Criteria

- Test certificates to be supplied for routine tests for each lot. Type test certificates to be supplied once per design or upon significant change.

11. Marking & Documentation

Each unit shall be permanently marked with:

- Manufacturer name / trade mark
- Type / model
- Serial number
- Window size
- Rated primary sensitivity (mA)
- Secondary rating (1 A / 5 A)
- Frequency and accuracy class
- Year of manufacture

Documentation to be supplied with each delivery:

- Packing list
- Routine test certificates
- Installation and instruction manual
- Dimensional drawings and wiring diagram

12. Packing & Delivery

- Suitable packing for sea/road transport, protecting the product from mechanical damage and moisture.
- Units to be supplied in cartons with cushioning.

13. Options (to be specified in PO)

- Split-core construction for retro-fit installation
- Secondary termination type (terminal block / flying leads)
- Secondary rated current (1 A or 5 A)
- Accuracy class and rated burden
- Special IP rating or conformal coating for hostile environment
- Mounting accessories (DIN rail, clamps, brackets)

14. Example Ordering Information

Example 1: CB-100 — 100 mm window, primary sensitivity 30 mA, secondary 1 A, split-core, DIN-rail mount, IP20.

Example 2: CB-300 — 300 mm window, primary sensitivity 3000 mA, secondary 5 A, solid toroidal core, bolt-on mount, epoxy moulded.