

Amendment Slip No. 2
Effective from 18th May 1995
to CEB Standard 021 : 1993
Specification for 36kV Current Transformer
(Out door Type)

REVISED TEXT

May 1995

1. **Clause 5 BASIC FEATURES**

5.1 Design

To amend the second sentence of the Sub Clause 5.1.2 to read as

Its windings shall be housed either in a high impact resistance porcelain insulator where normal mineral transformer oil will be the insulating medium, **“or in a high impact resistance Cast Epoxy Resin”**.

5.2 **Manufacture**

5.2.1 General

To amend the first sentence of the para (v) to read as :

“For oil filled type Current Transformer (oil) as per IEC 296) an oil level indicator, earth lug, mounting arrangements etc. shall be provided”.

To add the following para (vii) to the Clause.

- (vii) The cast resin type Current Transformer shall have the core and coil assemblies cast in Epoxy Resin, which shall be suitable to withstand high thermal and dynamix stresses due to system and climatic fluctuations. Earth lug, mounting arrangements etc. shall also be provided.

Amendment Slip No. 1
Effective from 10th June 1994
to CEB Standard 021 : 1993
Specification for 36kV Current Transformer
(out door Type)

REVISED TEXT

June 1994

Clause 5.0 BASIC FEATURES

5.2 Manufacture

5.2.1 General

Add the following **Clause** to read as,

“(vi) The Secondary Terminal Box of the Current Transformers shall be provided with sealing facilities to prevent access to the unauthorised persons”.

Clause 7.0 INFORMATION TO BE SUPPLIED WITH THE OFFER

To delete Clause No. 7.3 “(d) Switching Impulse Test”.

CEB STANDARD 021 : 1993

Specification

for

***36KV CURRENT TRANSFORMERS
(OUT DOOR TYPE)***



CEYLON ELECTRICITY BOARD

SRI LANKA

Specification

for

**36kV CURRENT TRANSFORMERS
(OUTDOOR TYPE)**

CEB Standard 021 : 1993

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SPECIFICATION FOR 36KV CURRENT TRANSFORMERS (OUTDOOR TYPE)

1.0 SCOPE

This specification covers the design, manufacture and testing of outdoor 36kV Current Transformers which are to be used in Grid Sub Station for protection of 36kV overhead lines as well as for metering purposes.

2.0 SYSTEM PARAMETERS

(a)	Nominal Voltage	:	33kV
(b)	System highest voltage	:	36kV
(c)	System frequency	:	50Hz.
(d)	Number of phases	:	03
(e)	Method of earthing	:	Resonant earthed/Non-effectively earthed neutral system
(f)	System fault level	:	25 kA

3.0 SERVICE CONDITIONS

(a)	Annual average ambient temperature	:	30 ⁰ C
(b)	Maximum ambient temperature	:	40 ⁰ C
(c)	Maximum relative humidity	:	90%
(d)	Environmental conditions	:	Humid tropical climate of heavy pollution level.
(e)	Operational altitude	:	Up to 1500M above MSL

4.0 APPLICABLE STANDARDS

The equipment and components supplied shall be in accordance with the standards specified below or subsequent editions and / or amendments thereof unless otherwise specified.

(a)	IEC 185	(1987)	Current Transformer
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In regard to the specific item and the process as mentioned below shall comply with the following Standards.

- | | | | |
|-----|---------|--------|--|
| (a) | BS 729 | (1971) | Hot dip galvanised coating on iron and steel articles. |
| (b) | IEC 296 | (1982) | Insulating Oil for Transformers and Switchgear. |
| (c) | BS 4190 | (1957) | Hexagonal Bolts and Nuts. |

5.0 BASIC FEATURES

5.1 Design

- 5.1.1 The Outdoor post-type Single Phase Current Transformer shall be used for 33kV overhead line feeder protection as well as for metering purposes.
- 5.1.2 It shall have separate cores and secondary windings for protection and metering purposes. Its windings shall be housed either in a high impact resistant porcelain insulator where normal mineral transformer oil will be the insulating medium.
- 5.1.3 It shall be suitable for mounting on steel structures and necessary fixing bolts and nuts shall be supplied with the equipment.

5.2 Manufacture

5.2.1 General

- (i) The primary and the secondary windings shall be made of high grade copper.
- (ii) The current density in the primary windings corresponding to the rated short-time thermal current shall not exceed 92 A/mm² where the winding is of copper of conductivity not less than 97% of the value given IEC 28.
- (iii) The primary terminals and connections shall also be suitable to carry the rated current specified in the schedule of prices. The secondary terminals shall be enclosed in a weather proof terminal box with gland plates at the base of the Current Transformers.
- (iv) The Current Transformer shall have dual ratios as indicated in the schedule of prices, with provision for easy change of ratios on the secondary side.
- (v) The Current Transformer shall be of the oil filled type and shall have an oil level indicator, earth lug, mounting arrangements etc. The Current Transformers shall be provided of hermetically sealed type and the insulator shall be made of glazed porcelain.
- (vi) Lifting tackles shall be provided for lifting and positioning the Current Transformers.

5.2.2 Bolts and nuts

All steel bolts and nuts shall conform to BS 4190 : 1957 the standard specified and the nuts and heads of all bolts to be of hexagonal type.

5.2.3 Galvanizing

Except where specified to the contrary all iron and steel parts shall be galvanized after sawing, shearing, drilling punching, filing, bending, and machining etc., are completed. Galvanizing shall be by the hot-dip process to comply with the BS 729.

5.2.4 Creepage Distance

The Current Transformer insulator creepage distance shall not be less than 900mm and the protected creepage distance shall not be less than 315 mm.

5.2.5 Minimum Technical Requirements

The current Transformer shall conform to the following minimum Technical requirements.

- | | | | |
|-----|---|---|------------------------------------|
| (a) | Rated Transformation ratios
(As requested in the schedule of prices) | : | 400-200/5-5A |
| (b) | Rated output | : | 30 VA |
| (c) | Accuracy Classes | | |
| | i) Protection | : | Cl. 5P |
| | ii) Metering | : | Cl. 1 |
| (d) | Accuracy Limit factor
(Protection) | : | 20 |
| (e) | Rated primary current | : | 400 A |
| (f) | Rated secondary current | : | 5 A |
| (g) | Rated Short-time Thermal Current Duration | : | Not less than 25 kA rms for 3 sec. |
| (h) | Rated dynamic current (pk) | : | Not less than 62.5kA |
| (l) | Rated Insulation level | | |
| | i) Dry Impulse withstand voltage | : | 170 kV. |
| | ii) Rated Power frequency short duration wet withstand voltage (1 min) | : | 70 kV |

6.0 ADDITIONAL REQUIREMENTS

6.1 Terminal Markings

6.1.1 The Primary and Secondary winding terminals shall be marked clearly and indelibly on their surface or in their immediate vicinity.

6.1.2 The terminal markings shall identify:

- a) The primary and secondary windings
- b) The winding sections, if any
- c) The relative polarities of windings and winding sections;
- d) The intermediate tapplings;

6.2 Rating Plate markings

6.2.1 Ratings and data of the Current Transformer conforming to IEC 185 shall be provided in the name plate which shall be weather and corrosion proof.

6.2.2 The Name plate shall be securely attached to the side of the (lower part) Current Transformer so that it could be easily read from the ground level when it is installed at a height of 2.5 m from the ground level.

6.2.3 It shall consist of the following information :-

- (a) Number and year of the standard adopted.
- (b) The manufacturer's identification.
- (c) A serial number and type designation.
- (d) The rated primary and secondary currents.
- (e) The rated frequency.
- (f) The rated output and the corresponding accuracy class.
- (g) The rated highest equipment voltage and the insulation level.
- (h) Rated short-time thermal current (I_{th}) in kA/duration.
- (i) Rated dynamic current (I_{dyn}).
- (j) Class of insulation.
- (k) The use of each secondary winding and its corresponding terminals.
- (l) The words "Property of CEB".

7.0 INFORMATION TO BE SUPPLIED WITH THE OFFER.

- 7.1 The following information shall be furnished with the offer.
- (a) Catalogues describing the equipment and indicating the Model Number and Type.
 - (b) Literature describing the operational features of the equipment.
 - (c) Constructional features, materials used for components and relevant technical literature.
 - (d) Complete dimensional drawings.
 - (e) Magnetization and core loss curves
 - (f) A list of names and addresses of recent purchasers of 36 kV Current Transformers indicating quantities supplied, delivery time and wherever possible, the documents from such purchasers certifying satisfactory performance of the equipment.
 - (g) A list of names and addresses of ten leading purchasers (of similar items only) giving times of delivery and quantities supplied during the past ten years.
 - (h) Rating plate details.
 - (i) Completed Schedule of Particulars (ANNEXURE).
 - (j) Type Test Certificates - The Test Certificates and Performance Curves of the Type Test performed conforming to the IEC 185.
- 7.2 The Type Test Certificate shall clearly identify the equipment concerned, showing the manufacturer's identity, Type/Model No. and basic technical parameters, and shall be from an Independent Testing Authority acceptable to the purchaser.
- 7.3 Following Type Test reports conforming to IEC 185 shall also be submitted with the offer.
- a) Short-time current tests
 - b) Temperature rise test
 - c) Lightning impulse test
 - d) Switching impulse test
 - e) Wet tests for out-door type current transformers
 - f) Determination of errors.

7.2 Failure to furnish the particulars asked for in Clause 7.1, 7.2, 7.3 will result in the offer being rejected.

8.0 TECHNICAL LITERATURE AND DRAWINGS

Technical Literature in English language on the installation, operation and maintenance shall be supplied with each set of equipment and they shall be descriptive and self explanatory, complete with necessary circuit diagrams and drawings.

9.0 INSPECTION & TESTING

9.1 Inspection

The selected Bidder shall make necessary arrangements for an Engineer of the Ceylon Electricity Board to inspect the equipment and witness the Routine Tests confirming to IEC 185.

The Routine Test which shall be witnessed are given in the Clause 9.2.

9.2 Routine Tests

The following Routine Tests shall be witnessed.

- (i) Verification of terminal markings.
- (ii) Power-frequency withstand tests on secondary windings.
- (iii) Power-frequency withstand tests between sections.
- (iv) Inter-turn over voltage test.
- (v) Power-frequency withstand tests on primary winding.
- (vi) Partial discharge measurement.
- (vii) Determination of errors.

10.0 ANNEXURE

Schedule of Particulars

ANNEXURE**SCHEDULE OF PARTICULARS**

The Bidders are required to furnish the following Particulars for each type of Current Transformer offered.

ITEM	DESCRIPTION	UNITS	DETAILS
1	Manufacturer	-	
2	Type (metering & protection)	-	
3	Rated voltage	kV	
4	Rated frequency	Hz	
5	Rated primary current	A	
6	Rated secondary current.	A	
7	Rated output	VA	
8	No. of Phases	-	
9	Rated Transformation Ratio	-	
10	No. of Primary Winding	-	
11	No. of Secondary Winding	-	
12	Type of insulation	-	
13	Class of insulation	-	
14	Secondary winding 1 min. inter turn withstand voltage (peak)	kV	
15	Max Temperature rise of windings	K	
16	Rated insulation level		
	i) Impulse withstand voltage (1.2/50 μ s)kV peak		
	Positive Wave	+kV	
	Negative Wave	-kV	

	ii)	Power frequency withstand voltage(wet)	kV
	iii)	Power frequency withstand voltage for secondary winding (1 min.)	kV
17		Rated short time thermal current and Duration	kA Sec.
18		Secondary winding resistance at 75°C	Metering Ω Protection Ω
19		Rated dynamic peak current	kA.
20		Creepage distance of the insulator	mm.
21		Protected Creepage distance	mm.
22		Accuracy class	Metering - Protection -
23		Rated accuracy limit factor	Protection -
24		Knee point e.m.f.	V
25		<u>Total minimum creepage distance</u> Arcing distance	- -
26		Special features (if any)	-
27		Connection drawings	-

SEAL AND SIGNATURE OF MANUFACTURER/BIDDER