

CEB STANDARD 027 : 1998

Specification

for

***LOW VOLTAGE RING TYPE MEASURING
CURRENT TRANSFORMERS***

CEYLON ELECTRICITY BOARD

SRI LANKA

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No. 50, Sir Chittampalam A. Gardiner Mawatha, Colombo 2.
Sri Lanka

Telephone: 94-1-430471, 421720 Facsimile: 94-1-430473
E-mail : cebdp@mega.lk

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SPECIFICATION FOR LOW VOLTAGE RING TYPE MEASURING CURRENT TRANSFORMERS

1.0 SCOPE

This Specification covers the general requirements of the design, manufacture and testing of Low Voltage Ring Type Measuring Current Transformers suitable for use with three phase four wire bulk supply Energy Measuring Meters.

2.0 SYSTEM PARAMETERS

a)	System Voltage	-	400 V
b)	System Highest Voltage	-	440 V
c)	System Frequency	-	50 Hz
d)	Method of Earthing	-	Solidly earthed
e)	System Fault Current	-	25 kA

3.0 SERVICE CONDITIONS

a)	Maximum ambient temperature	-	40°C
b)	Maximum relative humidity	-	90%
c)	Annual average ambient temperature	-	30°C
d)	Environmental condition	-	Humid tropical climate with heavily polluted atmosphere
e)	Highest altitude	-	From MSL to 1000 M above MSL

4.0 APPLICABLE STANDARDS

The Low Voltage Measuring Current Transformers supplied shall be in accordance with the latest editions / amendments of the Standard specified below.

a)	IEC 44-1 : (1996) Part 1	-	Instrument Transformers - Current Transformers.
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5.0 BASIC FEATURES

5.1 Design

5.1.1 The low voltage measuring current transformers (CT) are required for use with three phase four wire bulk supply energy measuring meters { kilowatt-hour meters (kWh) and maximum demand indicators (MDI)}.

5.1.2 The current transformer shall be of the bar primary type having a ring type core with wound secondary. The accuracy class of the measuring current transformers shall be .2 and .5, as per the Technical Requirements and Schedule of Prices.

- 5.1.3 The ring type low voltage measuring current transformer shall be of the PVC tape insulated type suitable for operation in tropical climatic conditions as stipulated in Clause 3.0 above and the dielectric strength shall not be less than that stipulated in the Technical Requirements.
- 5.1.4 The current transformers having 5 Amp secondary current shall be used with electro-mechanical kWh meters and their burden shall not be less than 15VA. The current transformers having 1 Amp secondary current shall be used with static electronic kWh meters and their burden shall not be less than 2.5VA as stipulated below.
- 5.1.5 The standard rated transformation ratio and the burden shall be as stipulated below and the item to be supplied shall be as stipulated in the schedule of prices.

	For Electro-mechanical kWh meters	Static Electronic kWh meters
	Primary /Secondary / Burden	Primary /Secondary/ Burden
	Amp / Amp / VA	Amp / Amp / VA
a)	200 / 5 / 15	200 / 1 / 2.5
b)	400 / 5 / 15	400 / 1 / 2.5
c)	800 / 5 / 15	800 / 1 / 2.5
d)	1200 / 5 / 15	1200 / 1 / 2.5
e)	1600 / 5 / 15	1600 / 1 / 2.5

- 5.1.6 The internal diameter of the ring current transformers shall not be less than the value stipulated below

	Current Transformer size	Internal diameter of the CT
	Amps	mm (min.)
a)	200 / 5A & 200 / 1A	45
b)	400 / 5A & 400 / 1A	75
c)	800 / 5A & 800 / 1A	80
d)	1200 / 5A & 1200 / 1A	90
e)	1600 / 5A & 1600 / 1A	100

- 5.1.7 The relative polarities shall be permanently marked on the current transformers as per IEC 44-1. Brass bolts, nuts and spring washers shall be provided at the secondary terminals to accommodate 2.5 sq mm wire leads.
- 5.1.8 The secondary terminals of the current transformer shall be housed in a terminal box with sealing facilities to prevent access to unauthorised persons. The terminal box shall be provided with transparent cover to detect any tampered terminal connections.
- 5.1.9 Suitable steel foot stand with mounting holes of 6mm dia shall be provided to facilitate mounting the current transformer to the meter board and it shall be suitably protected from corrosion by galvanizing / chrome plating or insulated.

5.1.10 The B.H curve and saturation characteristic of each type of transformer shall be furnished with the offer

5.2 Technical Requirements

a)	Type	-	Ring (indoor)
b)	Nominal Voltage	-	400 V
c)	Rated Voltage	-	440 V
d)	Frequency	-	50 Hz
e)	Power Frequency Withstand Voltage	-	3kV rms
f)	Impulse withstand Voltage	-	6kV peak
g)	Accuracy Class	-	.2 / .5
h)	Rated burden for;		
	i) Electro-mechanical energy meters	-	15 VA
	ii) Static electronic energy meters	-	2.5 VA
i)	Limits of current error and phase displacement	-	IEC 44-1
j)	Primary current	-	200A/400A/800A 1200A/1600A
k)	Secondary current for;		
	i) Electro-mechanical energy meters	-	5 A
	ii) Static electronic energy meters	-	1 A
l)	Short-time withstand current/Duration	-	25kA/1 Sec.
m)	Type of Insulation	-	PVC Tape
n)	Class of Insulation (as per IEC 85)	-	A
o)	Temperature rise (max.)	-	60 ^{EC}
p)	Seable Terminal box	-	to be provided
q)	Foot Stand	-	to be provided

The current transformer shall be designed and constructed in such a way as to avoid introducing any danger in normal use and under normal working conditions, so as to ensure especially personal safety against electric shock, effects of excessive temperature and shall not produce any hum/noise.

5.3 Routine Tests

The following Routine Tests shall be carried out on all Current Transformers as per IEC 44-1 and the routine test report shall be submitted to the Inspector appointed by the purchaser at the time of inspection of the items.

- a) Power frequency withstand voltage on secondary windings
- b) Determination of errors
- c) Verification of terminal markings and inner diameter

6.0 QUALITY ASSURANCE

The manufacturer shall have obtained Quality assurance certification conforming to ISO 9001 for the manufacturer of Low Voltage Measuring Current Transformers. Bidders shall furnish documentary evidence to prove this with the offer.

7.0 ADDITIONAL REQUIREMENTS

7.1 Manufacturing Experience.

The Manufacturer shall have at least 10 years of experience in the manufacture of current transformers of Accuracy Class .2 and .5 to the IEC. The manufacturer shall furnish sufficient documentary evidence in the Bid to prove his manufacturing experience.

7.2 Marking

Every current transformer shall have a name plate indelibly marked with the following information;

- a) Name of manufacturer/Identification.
- b) Serial number/type designation
- c) Rated primary and secondary current
- d) Rated frequency
- e) Accuracy Class, Rated Burden & instrument security factor
- f) Rated Voltage
- g) Rated Insulation Level
- h) Insulation Class
- i) Rated Short-time current/duration & Dynamic peak current

7.3 Packing

Low Voltage Measuring Current Transformers (CT)shall be suitably packed in cardboard boxes to prevent damage during handling and transport. Each cardboard box shall contain three current transformers of the same CT ratio and the box shall be clearly marked with the relevant particulars of the CT. The cardboard boxes shall be packed again in a wooden box of (maximum size) 1m x 1m x 1m with wooden block base for forklift handling. Bio - degradable material shall be used for packing purposes.

8.0 INFORMATION TO BE SUPPLIED WITH THE OFFER

The following shall be furnished with the offer.

- a) Catalogues describing the equipment and indicating the type and model number.
- b) Constructional features, materials used and relevant technical literature.
- c) Complete dimensional drawings.
- e) Manufacturing Experience as stipulated in clause 7.1.
- d) The details of the information indicated on the Name Plate (Clause 7.2 above).
- e) Completed Schedule of Particulars (ANNEXURE - A).
- f) The B.H curve and saturation characteristic of each type of transformer.
- g) Quality assurance certification conforming to ISO 9001.
- h) The following Type Test Certificates conforming to IEC 44-1 from a **recognised testing authority acceptable to the Purchaser** shall be furnished;
 - i) Short -time current tests
 - ii) Temperature rise test
 - iii) Determination of errors
 - iv) Dielectric tests.

The Type Test Certificates shall clearly indicate the following;

- i) Name, Address and Country of the Testing Authority.
- ii) Date of Testing
- iii) Name of Equipment Type Tested
- iv) Number of Pages of the Type Test Certificates.
- v) Manufacturer's identity/ Catalogue Reference Number, etc.
- vi) Basic parameters.
- vii) The Standard to which the equipment Type Tested.
- viii) Comments and Observations of the Testing Authority.

The Type Test Certificates shall be submitted in complete form as furnished by the testing Authority. Incomplete Type Test Certificates or parts of Certificates will not be considered.

Offers of Bidders who fail to furnish the above particulars in full, and samples as stipulated in clause 9.0 will be rejected.

9.0 SAMPLE

One sample low voltage measuring current transformer of each type shall be handed over to the Purchaser along with the offer.

10.0 INSPECTION AND TESTING

10.1 Inspection

The selected Bidder shall make necessary arrangements for inspection by an Engineer appointed by the Purchaser and to carry out in his presence necessary sample / acceptance tests on the current transformers offered.

10.2 Acceptance / Sample Test

The following test as per IEC 44-1 shall be witnessed by the representative of the Purchaser.

- a) Verification of terminal markings
- b) Power frequency withstand voltage on secondary windings
- c) Determination of errors

11.0 TECHNICAL LITERATURE, DRAWINGS AND TEST REPORTS

Technical Literature in English language on the installation, complete with necessary connection diagrams and drawings shall be supplied with the item and they shall be descriptive and self explanatory. Routine test reports and Inspection test reports shall also be supplied with the current transformers.

12.0 ANNEXURE

A - Schedule of Particulars - To be filled by the Bidder

ANNEXURE A**SCHEDULE OF TECHNICAL PARTICULARS**

Bidders shall complete and submit with the Bid the schedule of technical particulars given below for each rating.

1)	Name of Manufacturer & Country of manufacture		-
2)	Applicable Standards		-
3)	Model No./ Catalog Ref.No.		-
4)	Type		-
5)	Nominal Voltage	V	-
6)	Rated Voltage	V	-
7)	Frequency	Hz	-
8)	Primary current	A	-
9)	Secondary current	A	-
10)	Accuracy Class		-
11)	Rated burden	VA	-
12)	Insulation type		-
13)	Class of Insulation (as per IEC 85)		-
14)	Instrument Security factor		-
15)	Limits of current errors at;		
	i) 5% of the rated current	%	-
	ii) 20% - do -	%	-
	iii) 100% - do -	%	-
	iv) 120% - do -	%	-
16)	Limits of phase displacement at;		
	i) 5% of the rated current	minutes	-
	ii) 20% - do -	minutes	-
	iii) 100% - do -	minutes	-
	iv) 120% - do -	minutes	-
17)	Power Frequency Withstand Voltage	kV	-
18)	Impulse withstand Voltage	kV	-
19)	Short-time withstand current/Duration	kA/Sec.	-
20)	Temperature rise (max.)	°C	-
21)	Power Losses		-
22)	Type of Terminal and terminal marking		-
23)	Whether the sealable terminal box provided	Yes/No	-
24)	Whether the transparent terminal box cover provided	Yes/No	-
25)	Whether the foot stand with mounting holes provided	Yes/No	-
26)	Whether the requested Type Test certificate As per IEC 44-1 furnished in complete form, from Recognized Testing Authority, (indicate the deviations if any).	Yes/No	-
27)	Whether the B.H. curves furnished	Yes/No	-
28)	Whether the ISO 9001 certification furnished.	Yes/No	-
29)	Whether the Acceptance Tests (Cl. 10.2) will be carried out	Yes/No	-
30)	Internal diameter	mm	-

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Seal and Signature of the Manufacturer/ Date

IV^{ct}