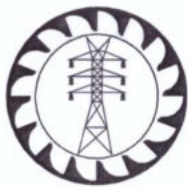


050-2: 2022

CEB  
SPECIFICATION

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**METER ENCLOSURES FOR BULK  
SUPPLY**

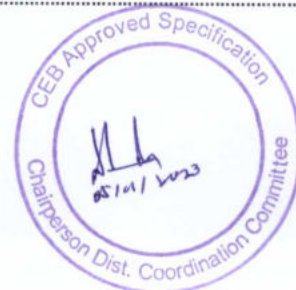


**CEYLON ELECTRICITY BOARD  
SRI LANKA**



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## SPECIFICATION FOR METER ENCLOSURES FOR BULK SUPPLY

### 1.0 SCOPE

This specification covers the general requirements of the manufacture and testing of Meter Enclosure for housing the Programmable Poly Phase Meter (PPM) and Current Transformer as per drawings (DS&S/2000/50-2c & DS&S/2000/50d) attached.

- (i). Meter Enclosure Steel - Bulk Supply - TYPE C
- (ii). Meter Enclosure Steel - Bulk Supply - TYPE D

### 2.0 SYSTEM PARAMETERS

(a)	Nominal voltage (U)	400/230V
(b)	System highest voltage ( $U_m$ )	440/250V
(c)	System frequency	50Hz
(d)	Method of earthing	Effectively earthed
(e)	System fault level	25kA

### 3.0 SERVICE CONDITIONS

(i).	Annual average ambient temperature	30 °C
(ii).	Maximum ambient temperature	40 °C
(iii).	Maximum relative humidity	90%
(iv).	Solar Radiation	4.5 kWh/m <sup>2</sup> /day
(v).	Environmental conditions	Humid tropical climate with heavily polluted atmosphere
(vi).	Operational altitude	From M.S.L. to 1900 m above M.S.L.
(vii).	Isokeraunic (Thunder days) level	100 days



### 4.0 APPLICABLE STANDARDS

The equipment and components supplied shall be in accordance with the latest editions of the standards specified below and amendments thereof.

(a)	BS EN 10025-1:2004	Hot rolled products of structural steels Part 1: General technical delivery conditions
(b)	BS 7668: 2021	Weldable structural steels - Hot finished structural hollow sections in weather resistant steels - Specification
(c)	BS EN 13438:2013	Paints and varnishes. Powder organic coatings for hot dip



		galvanised or sherardised steel products for construction purposes
(d)	BS EN ISO 1461:2009	Hot dip galvanized coatings on fabricated iron and steel articles. Specifications and test methods

Material conforming to other International Standards which are not less stringent than the Standards stipulated above may be offered. When such alternative Standards are used, reference to such Standards shall be quoted and English language copies of such Standards shall be provided with the offer.

However, in the event of discrepancy, details given in this CEB specification supersede above standards.

## 5.0 BASIC FEATURES

### 5.1 General

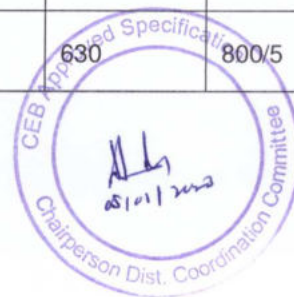
The Bulk Supply Meter Box shall be made of zinc coated steel sheet of thickness not less than 2mm, suitable for housing three Nos. of Ring Type Current Transformers, (CT) one No. PPM. The Ingress Protection (IP) rating of the enclosure shall be IP 33.

### 5.2 Types

The bulk supply meter boxes shall be of two types, ie Type C, Type D according to the number of Main cables per phase as indicated below table 1.

- (i). The "**Type C**" meter box will be suitable for use with 100 kVA - 250KVA substation. The maximum size of the main and load cable to be used will be single 240mm<sup>2</sup> (per phase).
- (ii). The "**Type D**" meter box will be suitable for use with 400 kVA - 1000 kVA substation. The maximum size of the main and load cable to be used will be three numbers of 300 mm<sup>2</sup> per phase.

Type of Meter Box (C/D)	Bulk Supply (KVA)	No. & Size of Neutral Cable (CU/PVC) (mm <sup>2</sup> )	No. & Size of Phase Cable (CU/PVC/PVC) (mm <sup>2</sup> )	Maximum Size Of MCCB Amps	C.T. Ratio (A-A)	No. & Size of Neutral Bar/& No. Of Holes Required mm x mm
C	100	1X70mm <sup>2</sup>	1x70mm <sup>2</sup>	160	200/5	1x36x4 1 hole
C	160	1x120mm <sup>2</sup>	1x120mm <sup>2</sup>	250	400/5	1x36x4 1 hole
C	250	1x240mm <sup>2</sup> or 2x70mm <sup>2</sup>	1x240mm <sup>2</sup> or 2x70mm <sup>2</sup>	400	400/5	1x36x4 1/2 hole
D	400	2x150mm <sup>2</sup>	2x150mm <sup>2</sup>	630	800/5	2x50x6 3 holes



D	630	3x185mm <sup>2</sup>	3x185mm <sup>2</sup>	1000	1000/5	2x50x6 3 holes
D	800	3x240mm <sup>2</sup>	3x240mm <sup>2</sup>	1250	1200/5	2x50x6 3 holes
D	1000	3x300mm <sup>2</sup>	3x300mm <sup>2</sup>	1600	1600/5	2x50x6 3 holes

Table 1.

### 5.3 Construction

The Steel Meter Box shall have a base and a detachable cover. The base shall have two compartments one to house the Current Transformers (CT) and Neutral Link and the other to house the PPM. The dimensions of the Type "C" and Type "D" meter boxes shall be as indicated in drawing No. DS&S/2000/50-2c and DS&S/2000/50-2d respectively.

The detachable cover shall be hinge mounted to the base and Acrylic Sheet (clear) thickness not less than 2mm shall be fitted in the cover to view the Current Transformers, as shown in the drawing. Windscreen type Rubber beading shall be fitted around the Acrylic Sheet. The edges of the Acrylic Sheet shall be curved.

All steel works shall be constructed of steel sheets with a minimum of thickness of 2mm.

The Steel Meter Box shall be suitable for mounting on a wall or steel structure with four steel anchor bolts of 8mm diameter. The plated mounting anchor bolts shall also be provided. Four holes of 10mm diameter shall be provided as per the drawing for fixing of the steel box. Once the meter box is fitted to the wall, there shall be a spacing of 10mm between the wall and the box by placing rubber washers.

The outer surface of the enclosure shall have smooth and of good finish powder coating suitable for indoor application of light gray (preferably RAL 7035) / beige (RAL 7032) color or any other color approved by CEB. At least it shall be designed and treated for corrosivity environment C3 category as per ISO/EN 12944-2. In the painting process the surface shall be thoroughly cleaned and shall be treated with Zinc rich primer of minimum 60 micron thickness. Then it shall be powder coated with a minimum thickness of 60 micron thickness. The total nominal dry film thickness (NDFT) shall not be less than 120 microns (ISO/EN 12944-2). The inner surface of the enclosure shall be powder coated with a minimum thickness of 60 microns ensuring the overall durability.

Suitable clamping/resting arrangement shall be provided in the CT compartment to keep the current transformers in the horizontal position without touching the walls of the CT compartment.

Wiring harness as per Clause 5.7 shall be provided with the Bulk supply Meter Box.





### 5.3.1 Metering Compartment

A small window fitted with an Acrylic (clear) sheet shall be provided on the cover in the Metering Component for the purposes of re-setting the maximum demand indicator.

A Wooden board as per Clause 5.6 shall be fixed to the base of the metering compartment for the purpose of mounting the PPM.

### 5.3.2 Current Transformer Compartment

#### a) Type C Box

The top and bottom sides of the CT compartment shall be provided with 4 Nos. cable entry holes of 40mm dia. and these holes shall be connected to each other with 2mm slot as per the drawing.

The insulating fiber sheet (280mm x 60mm) thickness not less than 2mm shall be laminated to the Inner Side of top and bottom of the cable entry faces of the box by using 10 Nos. Pop Reverts to firmly grip the metal base. Rubber Grommets, 8 Nos. of correct size shall be provided to fix the cable entry and exit holes as per drawing.

The size of the fiber sheet and no of holes for the Type C Meter Boxes are indicated in the drawing No. DS&S/2000/50-2c.

#### b) Type D box

The top and bottom sides of the CT compartment shall be provided with 3 Nos. 110mm diameter and 3 Nos. 40mm diameter cable entry holes and these holes shall be connected to each other with 2mm slots as per the drawing.

The insulating fiber sheet (525mm x 130mm) thickness not less than 2mm shall be laminated to the Inner Side of top and bottom of the cable entry faces of the box by using 16 Nos. Pop Reverts to firmly grip the metal base. The 12 Nos. cable entry holes shall be half punch in the fiber sheet to break if necessary. Rubber Grommets, 24 Nos. of correct size shall be provided to fix the cable entry and exit holes as per drawing.

The size of the fiber sheet and no of holes for the Type D Meter Boxes are indicated in the drawing DS&S/2000/50-2d.

### 5.4 Piercing Connectors

For the purposes of tapping voltage connection from three phases, three number of piercing connectors with insulated cover shall be provided. Manufacturer shall take necessary actions to avoid corrosion in the piercing connector.



- a) The piercing connectors for "C" type meter box shall be suitable to be used with 70mm<sup>2</sup> to 240mm<sup>2</sup> stranded copper cables stipulated in Table 1.
- b) The piercing connectors for "D" type meter box shall be suitable to be used with 150mm<sup>2</sup> to 300mm<sup>2</sup> stranded copper cable as stipulated in Table 1.

### 5.5 Neutral Links

The Neutral Link shall be made of tinned EC grade flat copper bar mounted on insulating base/bases. The Neutral Link shall be positioned between the CT compartment and the metering compartments as indicated in the drawing.

Neutral Bar shall be positioned at a height of 115mm from the base in such a manner that the Neutral Cables shall fit into the Neutral connector with ease and with minimum bending and strain of cable during installation.

- a) Type C meter box shall be fixed with copper bar of (36mm x 4mm). Neutral bar shall be provided with 02 holes of diameter 14mm clamping the incoming and outgoing neutral cable sockets effectively using 02 Nos of 12mm stainless steel bolts and nuts with spring washers.
- b) Type D meter box shall be fixed with 02 Nos copper bar of (50mm x 6mm). Each bar shall be provided with 03 holes of diameter 14mm clamping the incoming and outgoing neutral cable sockets effectively using 02 Nos of 12mm stainless steel bolts and nuts with spring

In both cases, an additional 4mm hole with 3mm bolt and nut shall be provided in the neutral bar for the purpose of providing neutral connection to the meters with fork type socket.

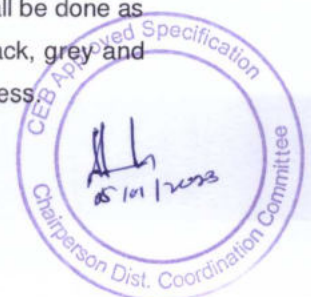
### 5.6 Wooden Board

The Wooden board shall be fixed to the base of the metering compartment for the purpose of mounting the PPM. The Wooden Board shall be of class 1 Timber or MDF Board. It shall be suitably treated to prevent deterioration by termites or fungus attack. The thickness of the Wooden Board shall not be less than 15mm and of size 255mm x 405 mm. Wooden Board shall be spray painted with orange colour.

### 5.7 Wiring Harness

The wiring harness as per attached wiring diagram No DS&S/2022/50-2a shall also be provided with the Bulk Supply Meter Box. The wires shall be neatly fixed to the wooden board in such a way to make easy connections to the PPM and the current transformer.

Numbering of the terminals and the markings of the Phases and the CT terminals shall be done as indicated in the Drawing No DS&S/2022/50-2a. Colours of wires shall be brown, black, grey and blue for the cables used for L1, L2, L3 phases and Neutral respectively in wiring harness.



The size of the connecting cable shall not be less than 2.0mm<sup>2</sup>.

Ferrule type Cable terminals shall be provided for PPM whereas Fork type cable terminals shall be provided for current transformer connections, voltage transformer connections and neutral bar connections. All Terminals shall be marked as shown in the Drawing.

#### 5.8 Earthing Facilities

A 12mm stud with nut, lock nut and washers shall be provided as indicated in the drawing for the purpose of earthing the meter box.

#### 5.9 Locking and Sealing Facilities

The detachable door and the small door (for PPM) shall be provided with a locking and sealing facilities to prevent access by unauthorized persons as per drawing nos. DS&S/2000/50-2c and DS&S/2000/50-2d.

### 6.0 REQUIREMENTS FOR SELECTION

#### 6.1 Quality Assurance

The manufacturer shall possess ISO 9001:2015 or latest Quality Assurance Certification for the design, manufacture of meter box. The certificate shall be valid throughout the delivery period of this bid.

#### 6.2 Manufacturing Experience

The manufacturer shall have minimum of 5 years' experience in manufacturing meter box. The manufacturer shall have supplied meter box similar to the offered, to minimum of 5 Electricity Authorities/Utilities out of which at least 3 are from outside the country of manufacture during last 5 years.

The manufacturer shall furnish a list of Authorities/Utilities to whom meter box were supplied during the past 5 years, indicating their names, addresses and contact details clearly. The purchaser reserves the right to communicate with electricity supply authorities/utilities to whom meter box have been supplied with regard to the performance of the meter box.





### 6.3 Test Certificates

Manufacturer shall submit test certificates as per the relevant standards stipulated in clause 4.0.

### 7.0 INFORMATION TO BE FURNISHED WITH THE OFFER

The following shall be furnished with the offer.

- a) Thickness of the Zinc coated steel sheets used for base and the cover of the box
- b) Gross Weight
- c) Constructional features and dimensional drawing
- d) Neutral Link size
- e) Piercing Connector size/ Manufacturer Test details
- f) Wiring harness details
- g) Locking and sealing arrangement details
- h) Mounting Arrangement details
- i) CT clamp/holder details
- j) Thickness of Powder Coating

**Not furnishing above documents and details may result in offer being rejected.**

### 8.0 SAMPLES

A Sample Bulk Supply Meter Box shall accompany the Bid to facilitate analysis and evaluation.

The Samples of the unsuccessful Bidder will be returned once the award is made. The sample of the successful Bidder would be retained and set off from the total quantity to be supplied.

### 9.0 SPARES

Not applicable

### 10.0 PACKING AND LABELING/MARKING

#### 10.1 Packing

The Bulk Meter Box shall be packed in a corrugated carton box top shall be covered with 12mm Regi foam sheet to avoid impact while storing and transportation. The top side of the carton should indicate "This Side Up" and Type of the Bulk Meter. Type C (100kVA - 250 kVA) or Type B (400kVA - 1000kVA)



## 10.2 Identification and Labelling/Marking

The Bulk Supply Meter Box shall be provided with the following markings.

1. The Mark "CEB"
2. Name of Manufacturer
3. Date of Manufacture
4. Type "C" for 100 kVA - 250 kVA  
Type "B" for 400 kVA - 1000 kVA
5. The mark "IN" and "OUT" to indicate entry and exit points of cables
6. The mark "DANGER"
7. The mark "Earth"

## 11.0 INSPECTION AND TESTING

### 11.1 Inspection

The selected Bidder shall make necessary arrangements for inspection by an Engineer appointed by the Purchaser before and after the powder coating of the box to carry out in his presence necessary routing/ sample tests on the materials offered.

The contractor should notify the purchaser for inspection of the fabricated boxes of each batch before applying of the powder coating. The entire batch will be rejected if the powder coating is done without the approval of the engineer.

Purchaser shall have the right to inspect and test the raw materials, manufacturing process and partially finished boxes at any point in time of the manufacturing process.

The items shall be stored in such a manner for easy selection of samples to carry out Sample/Acceptance Tests as given below.

### 11.2 Acceptance tests

The following Sample/Acceptance Tests shall be witnessed by the Engineer appointed by the Purchaser.

- (i). Verification of Dimensions
- (ii). Checking the thickness of powder coating and quality of workmanship.

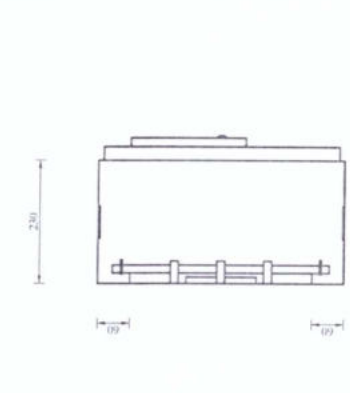


## 12.0 ANNEXES

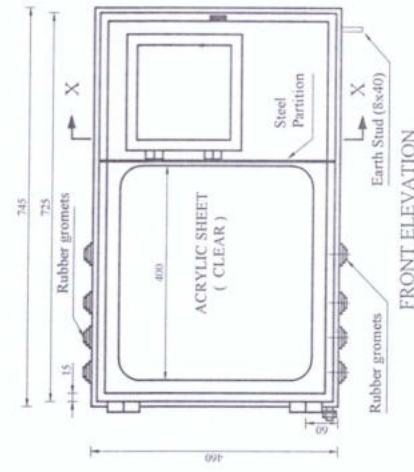
- Annex – A1: Bulk Supply Meter Enclosure Type - C
- Annex – A2: Bulk Supply Meter Enclosure Type - D
- Annex – A3: Wiring Diagram for Bulk Supply Poly Phase Meters
- Annex – B: Schedule of Technical Particulars – To be filled by the Manufacturer
- Annex – C: Non - Compliance Schedule



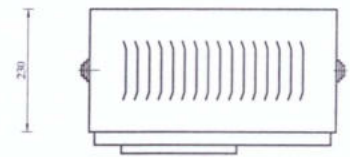




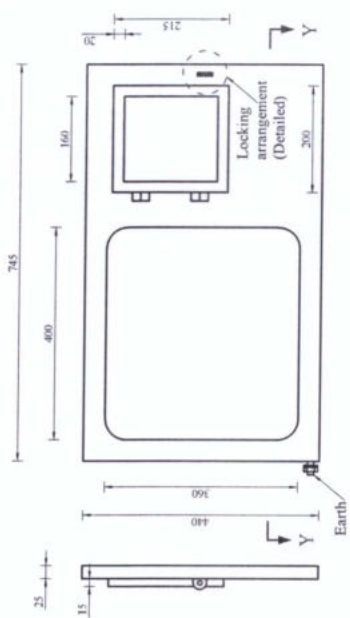
SECTIONAL END ELEVATION AT X-X



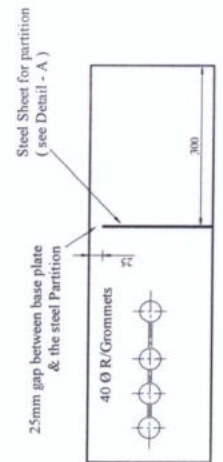
FRONT ELEVATION



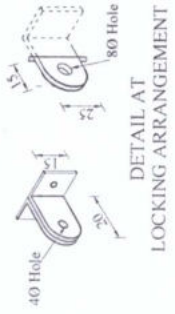
END ELEVATION



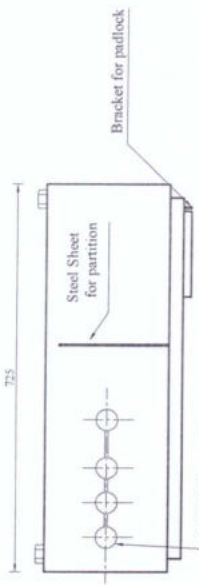
DETAILS OF FRONT COVER WITH DOOR (2mm thk.)



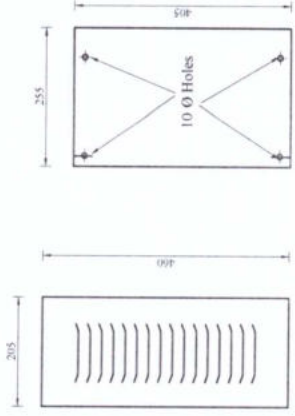
SECTIONAL PLAN (WITHOUT TOP COVER) AT Y-Y



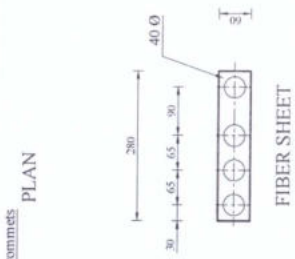
DETAIL AT LOCKING ARRANGEMENT



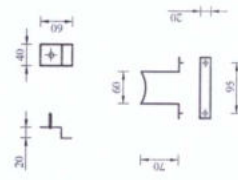
PLAN



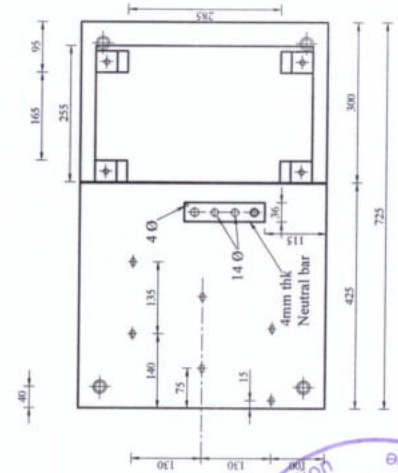
DETAIL - A STEEL PARTITION



FIBER SHEET (2mm thk.)



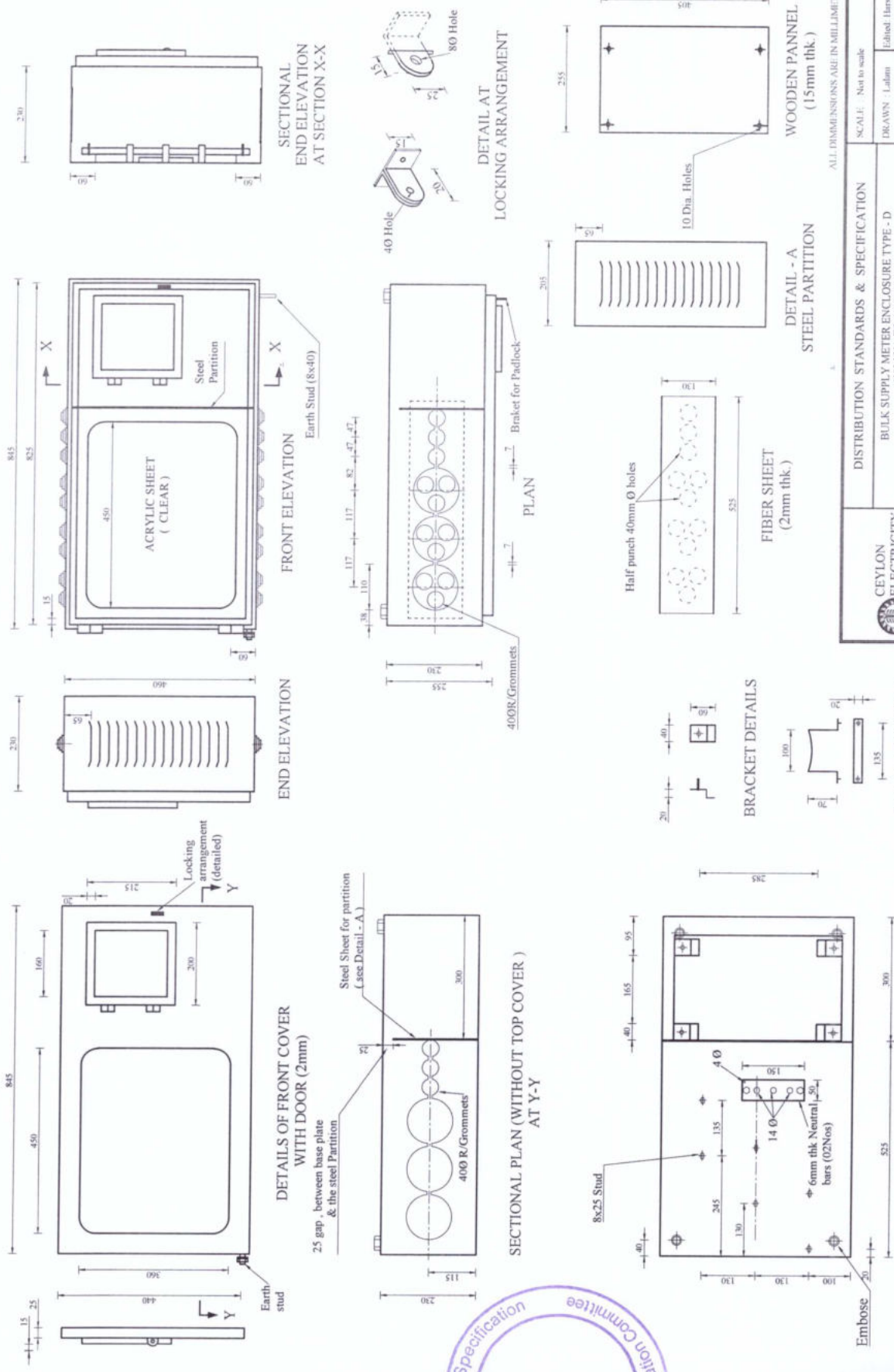
BRACKET DETAILS



SECTIONAL FRONT



SCALE : Not to scale	
DRAWN : Lahan	Edited Harsha
DATE : NOV 2022	
DRG NO : DSKS/2022/50-2C	
SOP/CL : DSKS/2004/9C	
DESIGNED BY	
APPROVED BY	
REVISIONS	
CHAIRMAN SPECIFICATION COMMITTEE	
DISTRIBUTION STANDARDS & SPECIFICATION	
BULK SUPPLY METER ENCLOSURE TYPE - C (100 KVA TO 250 KVA)	
CEYLON ELECTRICITY BOARD	
DISTRIBUTION COORDINATION BRANCH	

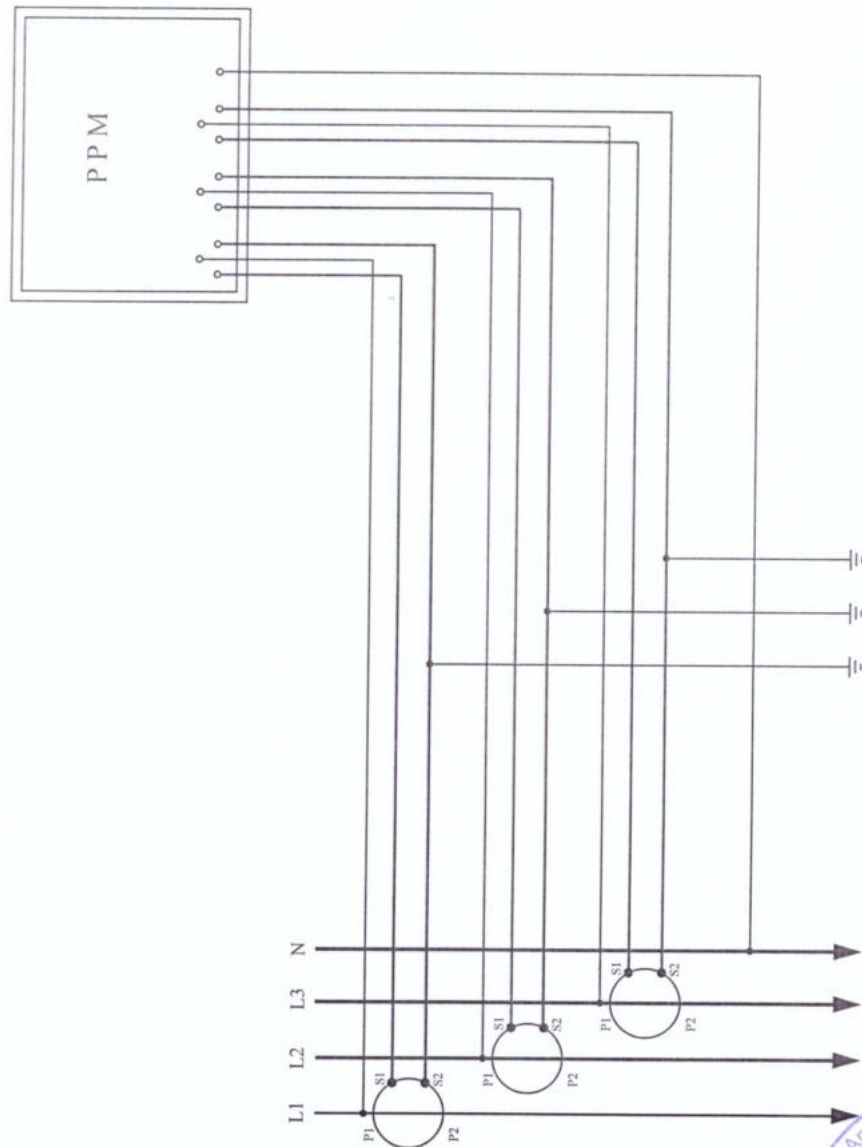



<b>DISTRIBUTION STANDARDS &amp; SPECIFICATION</b> BULK SUPPLY METER ENCLOSURE TYPE-D (400 VVA TO 1000 VVA)		SCALE: Not to scale DRAWN: Labin DATE: NOV 2022 DESIGNED BY:	CHECKED: Harsha DATE: NOV 2022 APPROVED BY:
CEYLON ELECTRICITY BOARD DISTRIBUTION COORDINATION BRANCH		CHAIRMAN SPECIFICATION COMMITTEE	SOURCE: DSKS/2004/50D

ALL DIMENSIONS ARE IN MILLIMETRES

13/16





 <p>CEYLON ELECTRICITY BOARD</p> <p>DISTRIBUTION COORDINATION BRANCH</p>	DISTRIBUTION CONSTRUCTION STANDARDS		SCALE : NOT TO SCALE	
	WIRING DIAGRAM FOR PROGRAMMABLE POLY PHASE METER (PPM)		DRAWN : KUMAR	EDITED : HARSHA
	DESIGNED BY	APPROVED BY	DATE : NOV. 2022	
		CHAIRMAN, SPECIFICATION COMMITTEE	DRG. NO : DS&S/2022/50-2A	
	EE (DC)		SOURCE : P&D/R3/2006/09	



**Annex- B: SCHEDULE OF TECHNICAL REQUIREMENTS AND GUARANTEED TECHNICAL PARTICULARS**

(CEB Requirements shall be filled by the procurement entity and information of the offer shall be filled by the manufacturer)

		CEB Requirement	Offered
1.	Name of the Manufacturer		
2.	Country of Origin		
3.	Offered Model		
4.	Type of the meter enclosure	Type C/ Type D	
5.	Material of enclosure		
6.	Thickness of the base		
7.	Thickness of the cover		
8.	Sealing method		
9.	Applicable voltage level	V	
10.	Applicable incoming cable sizes	mm <sup>2</sup>	
11.	Applicable outgoing cable sizes	mm <sup>2</sup>	
12.	Ingress Protection Class of the enclosures	IP 33 or higher	
13.	Mounting Method	As per cl. 5.3	
14.	Applicable corrosivity category	C3 (min)	
15.	Outer surface paint thicknesses	As per cl. 5.3	
16.	Colour code of the painting	RAL 7035/ RAL 7035/ colour approved by CEB	
17.	Whether constructed as per the relevant drawing?	Yes	
18.	Whether ISO 9001:2015 or latest quality assurance certificate provided with the offer as per clause 6.1?	Yes	
19.	Whether evidence provided for the requirements stipulated in clause 6.2?	Yes	
20.	Whether sample is provided as stipulated in clause 6.4?	Yes	
21.	Whether information as per clause 7.0 is furnished with the offer?	Yes	

.....  
Signature and seal of the Manufacturer

.....  
Date

I/We certify that the above data are true and correct

.....  
Signature and seal of the Bidder

.....  
Date



**Annex C - NON-COMPLIANCE SCHEDULE**

On this schedule the bidder shall provide a list of non-compliances with this specification, documenting the effects that such non-compliance is likely to have on the equipment life and operating characteristics. Each non-compliance shall be referred to the relevant specification clause.

Clause No.	Non-Compliance

.....  
**Signature of the Manufacturer**

.....  
**Date**

**I/We certify that the above data are true and correct**

.....  
**Signature of the Bidder and seal**

.....  
**Date**

