

Saudi Electricity Company



الشركة السعودية للكهرباء

SEC DISTRIBUTION MATERIALS SPECIFICATION

31-SDMS-03 Rev. 01

DATE: 21-02-2007G

31-SDMS-03

REV. 01

SPECIFICATIONS

FOR

**LOW VOLTAGE CABINET FOR
POLE MOUNTED TRANSFORMER**

**This specification is property of SEC and
subject to change or modification without any notice**



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1. SCOPE:

This SEC Distribution Material Specification (SDMS) specifies the minimum technical requirements for design, materials, manufacturing, testing, inspection and performance for low voltage distribution cabinet for Pole Mounted Transformers, to be used in the distribution network of the **Saudi Electricity Company (SEC)** in Saudi Arabia.

2. CROSS REFERENCES:

This Material Standard Specification shall be read in conjunction with the SEC Specification No: 01-SDMS-01 (latest revision), titled "General Requirements for All Equipment/ Materials", which shall be considered as an integral part of this SDMS, also be read in conjunction with SEC Purchase Order requirements or Contract Schedules.

3. APPLICABLE CODES & STANDARDS:

The latest revision of the following Codes and Standards shall be applicable for the Equipments/Materials covered in this Specification. In case of any deviation, the Vendor/ Manufacturer may propose Equipment/Material conforming to an alternate Code or Standard without jeopardizing the requirements of this SDMS. However, the provision of SEC Standard shall supersede the provision of these Standards in case of any differences.

- | | | |
|------|-------------|-------------------------------------------------------------------|
| 3.1 | 37-SDMS-01 | Low Voltage Moulded Case Circuit Breakers for Service connection. |
| 3.2 | IEC-60529 | Classification of Degree of Protection. |
| 3.3 | 50-SDMS-01 | Current Transformers. |
| 3.4 | IEC-60947 | Low Voltage Switchgear and Control gear. |
| 3.5 | IEC-60114 | Indicating Instruments. |
| 3.6 | IEC-60439-1 | Temperature Rise of Low Voltage Panel. |
| 3.7 | ASTM-B-103 | Phosphor Bronze Plate, Sheets, Strip & Rolled Bar. |
| 3.8 | ASTM-D-1535 | Paints and Colors. |
| 3.9 | ASTM-B-117 | Coating. |
| 3.10 | ASTM-D-1654 | Salt Spray Test. |



3.11 ASTM-A-153 Zinc Coating (Hot-Dip) on Iron & Steel Hardware.

4. SERVICE CONDITION:

4.1 The Cabinet shall be suitable for operation under the service condition as per SEC latest revision of General Specification No. 01-SDMS-01 latest revision.

4.2 Cabinet complete with all its fittings and attachments shall be capable of withstanding the effects of direct solar radiation at their installed locations. The temperature of metal surfaces exposed to direct solar radiation shall be regarded as 75°C, plus the effect of any internal heating.

5. DESIGN & CONSTRUCTION REQUIREMENTS:

5.1 General:

5.1.1 All Cable Terminations shall be easily accessible from the front.

5.1.2 All Insulating Materials shall be non-hygroscopic and resistant to tracking and cracking.

5.1.3 All parts of equal size and shape shall be inter-changeable.

5.1.4 All PMT Cabinets shall have the following ratings:

- a) 800 Amps Cabinet with 4 MCCBs of 200A rating.
- b) 400 Amps Cabinet with 2 MCCBs of 200A rating.

5.1.5 All bolted electrical joints shall be secured by means of corrosion proofed steel nuts and bolts.

5.2 Enclosure:

5.2.1 The enclosure shall be weatherproof and provided with watershed top. Enclosure shall be made of galvanized steel at least 3 mm or Aluzinc at least 2 mm thick.

5.2.2 The Cabinet should be suitable for mounting directly on:

- a) H-Pole for 800A cabinet.
- b) Single pole for 400A cabinet.

5.2.3 The 400 Amps Cabinet shall be provided on the roof top with cable entry hole of size 87mm diameter with cable clamps for in-coming cable up to 300 mm²



and two holes of for out-going flexible conduit pipe of size 78mm diameter to accommodate quadruplex conductor of 120 mm². It shall be provided at the bottom another 2 holes to enable the use of underground cables, all holes shall be covered with weather resistant removable plastic plugs.

5.2.4 The 800 Amps Cabinet shall be provided on the roof top with two cable entry holes of size 87mm diameter with cable clamps for in-coming cables up to 300 mm² and two holes on each side for out-going flexible conduit pipe of size 78mm diameter for two flexible conduit pipes 78mm diameter to accommodate out-going quadruplex cables of 120 mm², all holes shall be covered with weather resistant removable plastic plugs

5.2.5 The Cabinet shall have adequate mechanical strength to withstand rough handling as may be expected in normal uses.

5.2.6 Access to the Cabinet shall be from the front by means of hinged door for both 800 Amps Cabinet and for 400 Amps Cabinet, fitted with locking mechanism to secure them at the top and bottom.

a) Hinges shall be made and fitted by bolts made from stainless steel or brass.

b) Locking shall be as follows:

- Handle shall be made of durable metal.
- The handle shall be provided at the middle height of the door.
- Integral lock cylinder type suitable for SEC standard key.
- Locking rotation shall be maintained within 90 degrees.

c) A suitable provision shall be made for fixing circuit numbering plate.

5.2.7 The cabinet shall have an adequate ventilation system. It shall have a 43 degree of protection in accordance with IEC-529 and the General Requirements For All Equipments/Materials Specification No: 01-SDMS-01 latest revision.

5.2.8 Finished color of the cabinet shall be adequately protected against corrosion and painted as per SEC specification No: 01-SDMS-01 latest revision.

5.3 Bus-Bars:

5.3.1 The bus bars shall be hard drawn high conductivity tinned copper of uniform cross section.

5.3.2 The Bus bars shall carry a rated nominal continuous current of 800 Amps for H-Pole cabinet and 400 Amps for single pole cabinet, the busbars shall be



supported by epoxy resin insulators in a robust and secure manner. Three (3) Bus bars for phases and one (1) for neutral bar shall be provided.

5.3.3 The general design shall be made with minimum possible number of Joints.

5.3.4 Phase bus bars shall be color marked in sequence from top to bottom red, yellow, blue and neutral bus bar shall be marked black. The marking shall be by indelible paint at a clearly visible location.

5.4 Terminals:

The in-coming circuit terminal shall be suitable for fixing two aluminum cables for H pole cabinet and one aluminum cable for single pole cabinet of sizes up to 300mm² with the use of cable lugs. The out-going circuit breaker terminals shall be suitable for fixing either aluminum cables or a quadruplex aluminum conductors of size 120mm² with the use of cable lugs. The lugs will be provided by SEC but bolts and nuts to be provided by the supplier.

5.5 Current Transformers:

Three (3) current transformers shall be installed at the in-coming bus bars of H pole cabinet for metering purpose. It shall comply with SEC Specification No: 50-SDMS-01 latest revision including current rating and dimensions.

5.6 Ammeters:

Three (3) flush mounting Ammeters shall be provided on the PMT Cabinet. These shall have the following characteristics:

5.6.1 Bimetallic instruments with instantaneous reading and integrated 15 minutes maximum demand indicator.

5.6.2 Ammeters shall be scaled to read 0-800 Amps in the Cabinet fitted on H-Pole only as mentioned in Table (1) of this specification.

5.6.3 Size of scale shall be 96 mm x 96 mm according to DIN-43700 or other equivalent standard.

5.7 Molded Case Circuit Breakers:

5.7.1 Provision for installation of 200 Amps MCCB shall be made available for each out-going feeder and suitable for installing at least three SEC approved MCCBs.

5.7.2 200 Amps MCCB shall comply with SEC Specification No: 37-SDMS-01 latest revision, terminals shall be suitable for connecting busbar in the in-coming and



cable lugs for quadruplex aluminum conductor of size 120 mm² in the out-going, copper terminal spreaders can be used to achieve good isolation between lugs.

5.7.3 The MCCBs shall comply the following:

- a) Easily inter-changeable with at least three of approved MCCBs.
- b) Without key lock.
- c) With current limiting functions.

Table (1)

Components	PMT Cabinets	
	Fixed on H-Pole	Fixed on Single Pole
PMT Cabinet in-coming busbar rating (Amps)	800	400
CT rating on in-coming bus bar	As per SEC Spec. 50-SDMS-01	----
Number of in-coming feeders	2	1
Size of in-coming feeders (mm ² , Aluminum)	185 or 300	70 or 185
Number of out-going feeders	4	2
Size of out-going feeders (mm ² , Quadruplex)	120	120
Ammeter Scale	0-800	----
Transformer to be installed with PMT Cabinet	300 KVA 200 KVA (231/133 V) (400/231 V)	100 KVA 50 KVA (231/133 V) (400/231 V)

5.8 Grounding:

5.8.1 Two terminals having M12 stud and nut shall be provided on enclosure of the Cabinet with identified clear grounding mark.

5.8.2. Grounding studs shall be internally connected with the neutral busbar by an insulated copper wire link with terminal lugs in both sides.

5.8.3 All hinged parts shall be connected to the frame work (enclosure) through minimum 35mm² bolted copper braids.

5.9 Labels:

5.9.1 Each out-going circuit shall be numbered in sequence from right to left facing the PMT Cabinet.



5.9.2 Numbers shall be engraved on three layers trafolyte plate (white/black/white) of 3mm thickness of dimension 30mm x 80mm. These labels shall be fixed above the MCCB in suitable place.

5.9.3 Insertion Pocket for circuit number sheet shall be provided in the inner side of the door of PMT Cabinet.

5.10 Dimensions:

The maximum overall dimensions for PMT Cabinet shall be as follows:

Cabinet Type	Height (mm)	Width (mm)	Depth (mm)
200/300 KVA for H-Pole	1100	700	300
50/100 KVA for Single Pole	1100	550	300

6. NAME PLATE:

6.1 Each PMT Cabinet shall be provided with an aluminum name plate fixed on the inner side of the door bearing the following informations engraved on it as minimum in Arabic and in English.

- Reference to SEC specification
- Rated voltage (V)
- Rated current of bus bar (A)
- Short circuit current rating (kA)
- SEC purchase order number
- SEC item number
- Manufacturer's/Vendor's name
- Year of manufacture
- Gross weight when fully equipped (Kg)
- Serial number
- Tender Number

7. MONOGRAM & DANGER PLATE:

7.1 Danger Plate and SEC Monogram as per SEC drawing Nos. SEC-01-01 and SEC-01-02 respectively shall be provided and installed at the front (on SEC approved location) of the PMT Cabinet using M5 hot dipped galvanized/stainless steel/brass fasteners (oval head rounded neck bolts with nuts and external tooth lock washers) not removable/accessible from the front, that is, without opening the door/front cover.



7.2 SEC shall approve location and samples of Danger Plate and Monogram Plate prior to the installation.

8. TESTING:

The PMT Cabinet shall be tested in accordance with the latest standards and as specified herein. All test results shall be provided for review and acceptance by SEC.

8.1 Type Test:

8.1.1 Short Circuit Test:

The PMT Cabinet shall be capable of carrying the short circuit current (rms, symmetrical) for one second.

8.1.2 Temperature Rise Test:

- a) Temperature rise test shall be conducted as per IEC-60439-1.
- b) Temperature rise test at any point shall not exceed 60°C relevant to the maximum ambient temperature as specified in SEC specification No: 01-SDMS-01.
- c) For Instruments inside the Cabinet, the temperature rise shall not exceed the allowable temperature of the instruments.

8.1.3 Type test reports:

Certified test reports of type test performed including IP test on an identical unit shall be submitted to SEC for review and approval during bidding stage.

8.2 Routine Tests:

All Routine Tests prescribed in the relevant IEC shall be performed on all units prior to the delivery to SEC.

9. INSPECTION:

SEC may wish to witness the tests or to visit factory during manufacture of any or all items covered in this specification. Accordingly the supplier shall notify SEC in advance, the manufacturing and test schedule.

10. PACKING & SHIPPING:

Packing and shipping shall generally be as per SEC General Requirements 01-SDMS-01 latest revision including the following:



10.1 The PMT Cabinet shall be delivered ready for service.

10.2 Supplier shall contact Material Department of SEC for additional packing, handling and shipment instructions as applicable.

10.3 Packing crates shall be marked with the following:

- Manufacturer's name
- Country of origin
- SEC purchase order number
- SEC item number
- Gross weight in kilogram
- Handling instructions
- Final destination store

11. GUARANTEE:

The vendor shall guarantee the PMT Cabinet against all defects arising out of faulty design or workmanship or defective materials for a period of two (2) years from the date of delivery.

12. SUBMITTALS:

12.1 The vendor shall fill and submit one copy of the attached Technical Data Schedule with the quotation. In addition to Technical Data Schedule, clause by clause compliance to this specification shall also be confirmed/submitted.

12.2 Detailed dimensional drawings of the PMT Cabinet showing all mounting arrangements, terminals, electrical clearances between phase and earth, hinges, cable clamps, locking arrangement and name plate shall be submitted.

12.3 Single line diagram shall be submitted.

12.4 A comprehensive list of manufacturer's recommended spare parts with full details (item description, part number, manufacturer name, supplier name, etc.) shall be submitted separately.

12.5 Catalogue that indicates part numbers of all the components inside the PMT Cabinet shall be submitted.

12.6 Detail drawing showing the installation of CT as required in this specification, shall be submitted.

**TECHNICAL DATA SCHEDULE****P.M.T Cabinet**

(Sheet 1 of 3)

SEC Enquiry No: _____

Item No: _____

Clause	Description	SEC Specified Values	Vendor Proposed
5.	DESIGN & CONSTRUCTION REQUIREMENTS		
5.1	General		
	Rated Voltage	231V/133V, $\pm 5\%$ 400V/231V, $\pm 5\%$	
	Symmetrical Short Circuit Rating for 1 second (rms)	kA	
	Phase busbar rating	(A)	
	Neutral busbar rating	(A)	
	Minimum clearance between phases & phase/ground	25.4 mm	
5.2	Enclosure: Material Thickness of Sheet Degree of Protection Locking Arrangement Finishing Colour Number of incoming cables	Steel Sheet/Aluzinc 3 mm / 2 mm IP43 Clause 4.17.4 As per 01-SDMS- As per Table-1	
5.3	Busbars		
	Material	Tinned Copper	
	Minimum thickness of tin plating	5% of nominal composition	
	Size of phase bus bar		
	Electrical joints (bolts, nuts, washers)	Plated as per 01-SDMS-01	
	Insulating barrier to cover live parts		
	Bus colour	Red/Yellow/Blue Black for Neutral	

**TECHNICAL DATA SCHEDULE****P.M.T Cabinet**

(Sheet 2 of 3)

SEC Enquiry No: _____

Item No: _____

Clause	Description	SEC Specified Values	Vendor Proposed
5.5	Current Transformer: Class Burden Error co-efficient Insulation class Type and make	0.5 10 VA < 5 Class-E, 120° C	
5.6	Ammeters		
	Scale	As per Table-1	
	Size	96mm x 96mm	
5.7	Out-going MCCBs: Type, Model & Make Rated current Dimensions (LxWxD) mm Number of supplied MCCBs Number of provisions for fixing MCCBs	200 Amps	
5.8	Grounding: Two terminals of M12 stud Copper braid for hinged parts	Yes 35 mm ²	
5.9	Internal Lighting	100 Watt	
5.10	Labels		
5.11	Dimensions LxWxH (mm)		
5.12	Monogram & Danger Plates	Yes	



TECHNICAL DATA SCHEDULE

P.M.T Cabinet

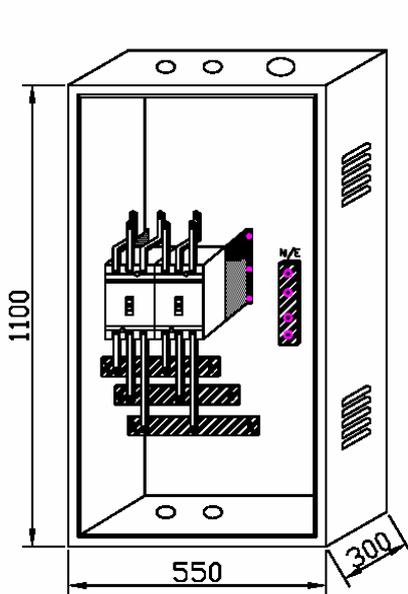
(Sheet 3 of 3)

SEC Enquiry No: _____

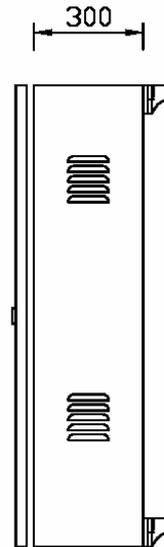
Item No: _____

- A) Additional technical information or features specified by SEC:
- B) Additional supplementary data or features proposed by Vendor/Supplier:
- C) Other particulars to be filled-up by the Vendor/Supplier:
(Use separate sheet, if needed).

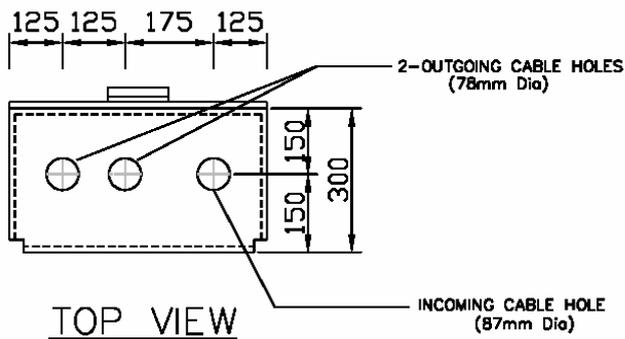
Address	Manufacturer	Vendor/Supplier
Name of Company:		
Location & Office Address:		
Authorized Name & Signature:		
Date:		
Official Seal/Stamp:		



FRONT VIEW



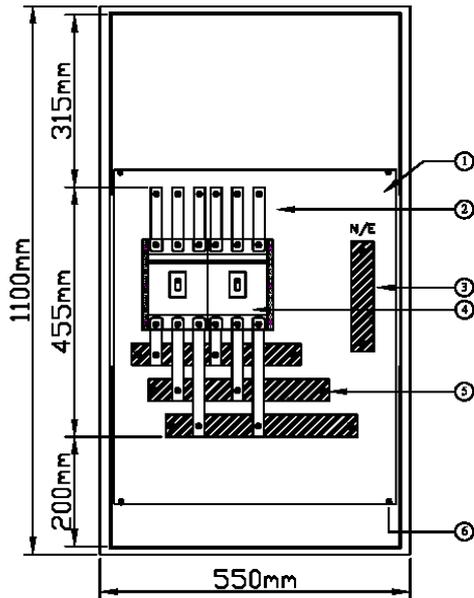
SIDE VIEW



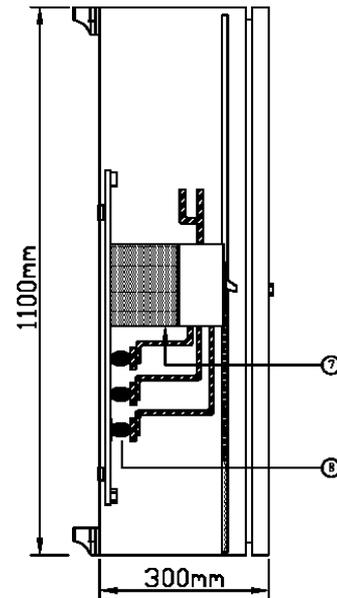
TOP VIEW

L.V. CABINET FOR POLE MOUNTED
TRANSFORMER 50KVA & 100KVA

ALL DIMENSIONS ARE IN MILLIMETER



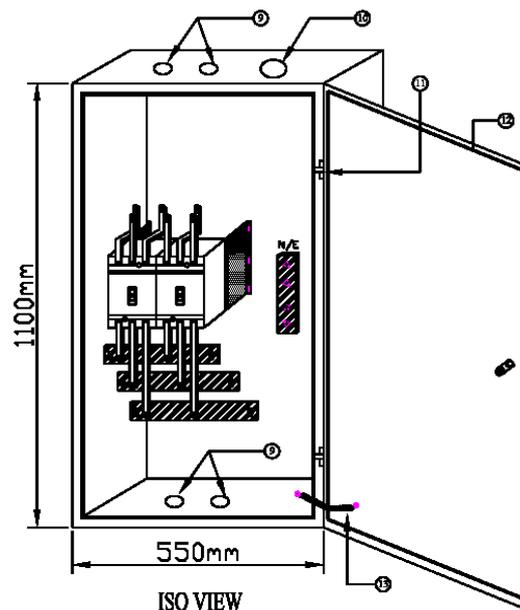
INTERNAL VIEW



SIDE VIEW

TECHNICAL DATA

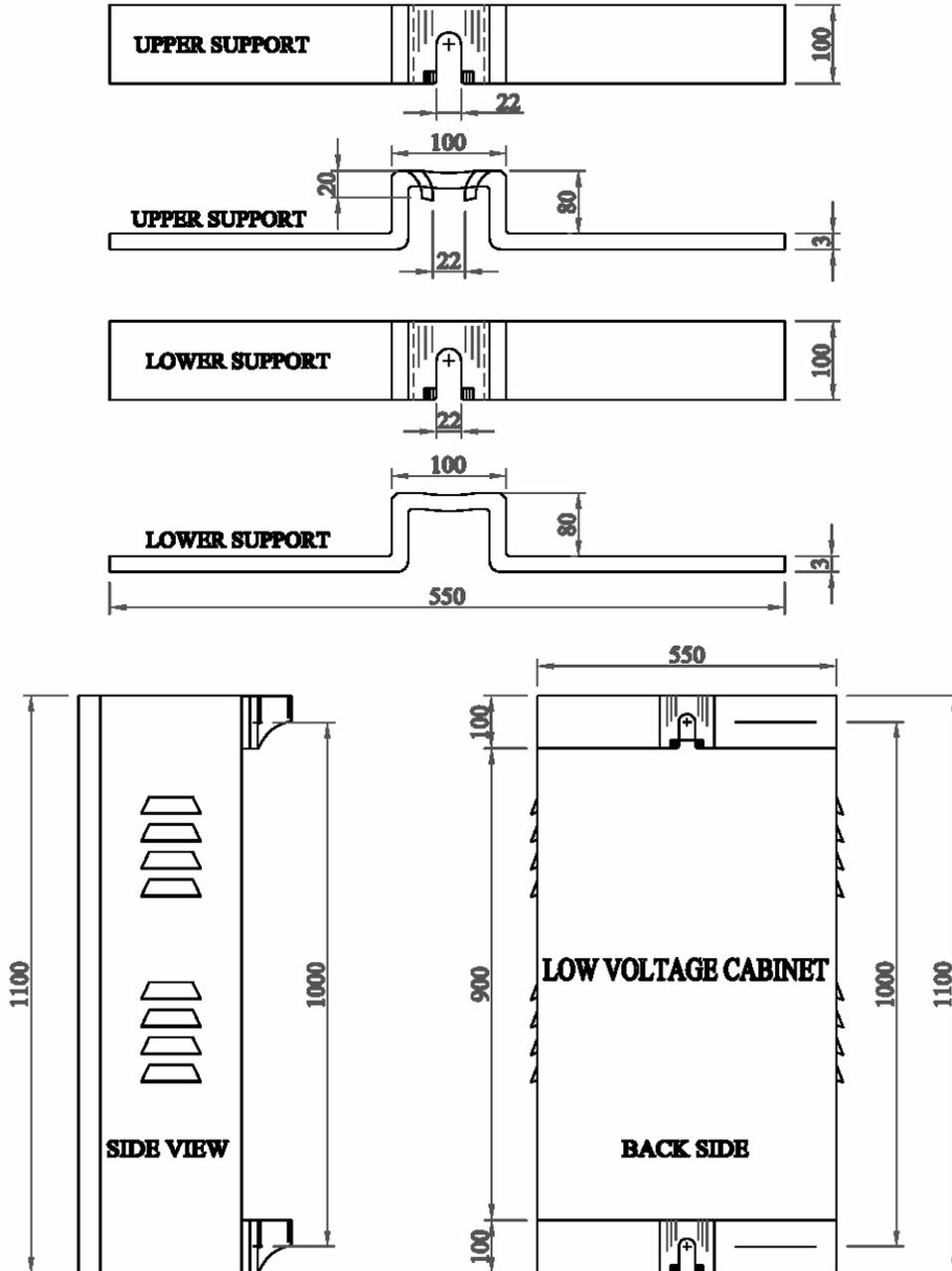
- 1- MOUNTING PLATE
- 2- OUT GOING BUSBAR
- 3- NEUTRAL & EARTHING BUSBAR (40x8mm)
- 4- BREAKER 200A
- 5- MAIN BUSBAR (40x8mm)
- 6- BOLT FOR MOUNTING PLATE
- 7- BREAKER MOUNTING
- 8- INSULATOR
- 9- OUT GOING HOLES 78mm Dia
- 10- INCOMING HOLE 87mm Dia
- 11- DOOR HINGES
- 12- GASKET
- 13- DOOR EARTHING WIRE



ISO VIEW

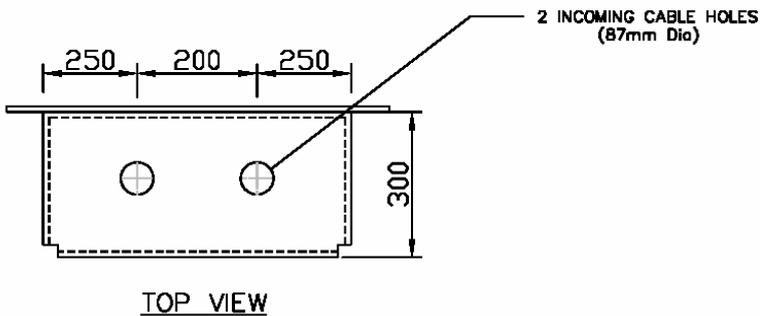
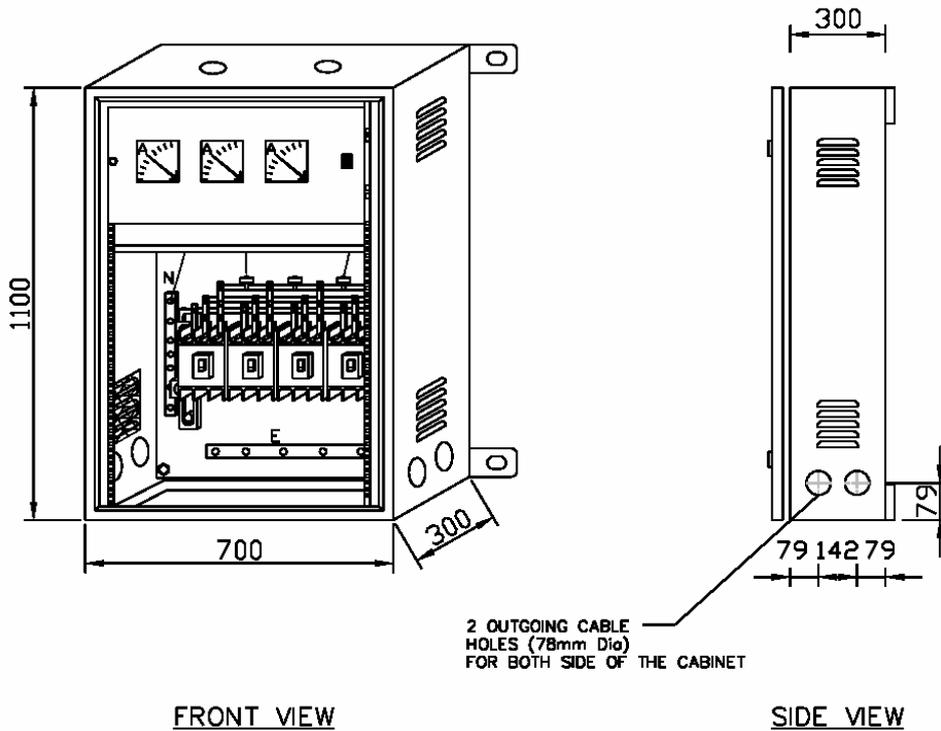
**L.V. CABINET FOR POLE MOUNTED
TRANSFORMER 50KVA & 100KVA**

ALL DIMENSIONS ARE IN MILLIMETER



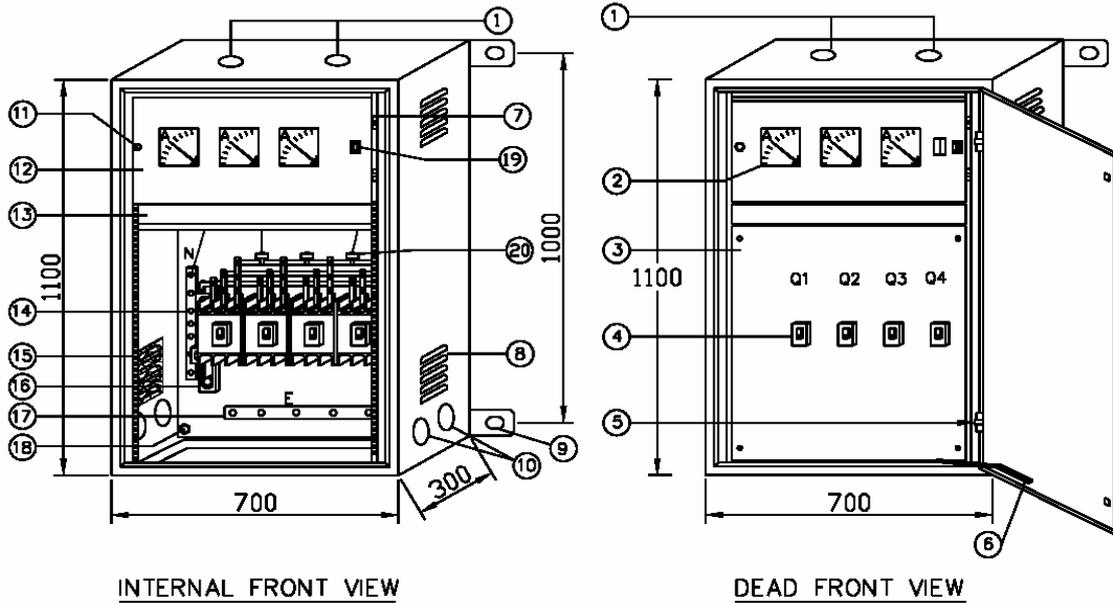
**DETAILED DRAWING FOR L.V CABINET MOUNTING SUPPORT
50KVA & 100KVA TRANSFORMER**

ALL DIMENSIONS ARE IN MILLIMETER



L.V. CABINET FOR POLE MOUNTED TRANSFORMER 200KVA & 300KVA

ALL DIMENSIONS ARE IN MILLIMETER

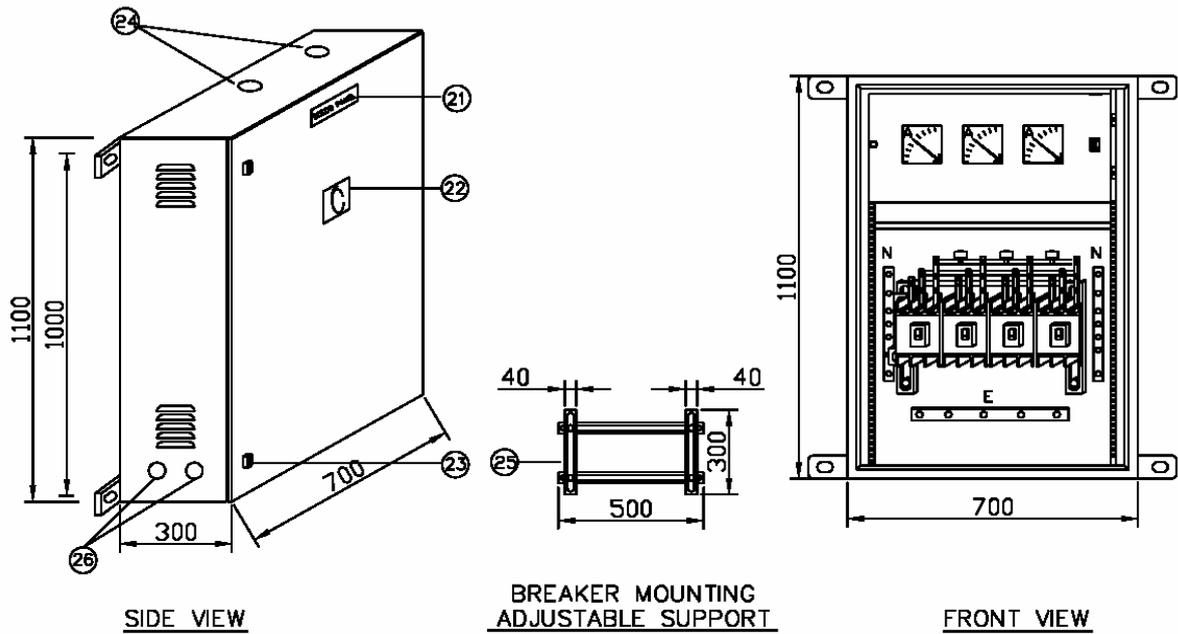


PANEL PARTS SCHEDULE:

- | | |
|----------------------------------------------|------------------------------|
| 1- 2 NOS INCOMING CABLE HOLES 87mm Dia | 11- BOLT FOR COVER |
| 2- M.D METER | 12- METERING FRONT COVER |
| 3- FRONT PLATE FOR BREAKER | 13- FRONT COVER SUPPORT |
| 4- BREAKERS | 14- NEUTRAL BUSBAR |
| 5- DOOR HINGE | 15- SCREEN FILTER |
| 6- DOOR STOPPER | 16- BREAKER MOUNTING SUPPORT |
| 7- HINGE FOR FRONT COVER | 17- EARTHING BUSBAR |
| 8- VENTILATION LOUVERS | 18- BOLT FOR MOUNTING PLATE |
| 9- WALL MOUNTING SUPPORT | 19- CT-TERMINAL BLOCK |
| 10- 2 NOS OUT GOING CABLE BOTH SIDE 78mm Dia | 20- CURRENT TRANSFORMER |

**L.V. CABINET FOR POLE MOUNTED
TRANSFORMER 200KVA & 300KVA**

ALL DIMENSIONS ARE IN MILLIMETER

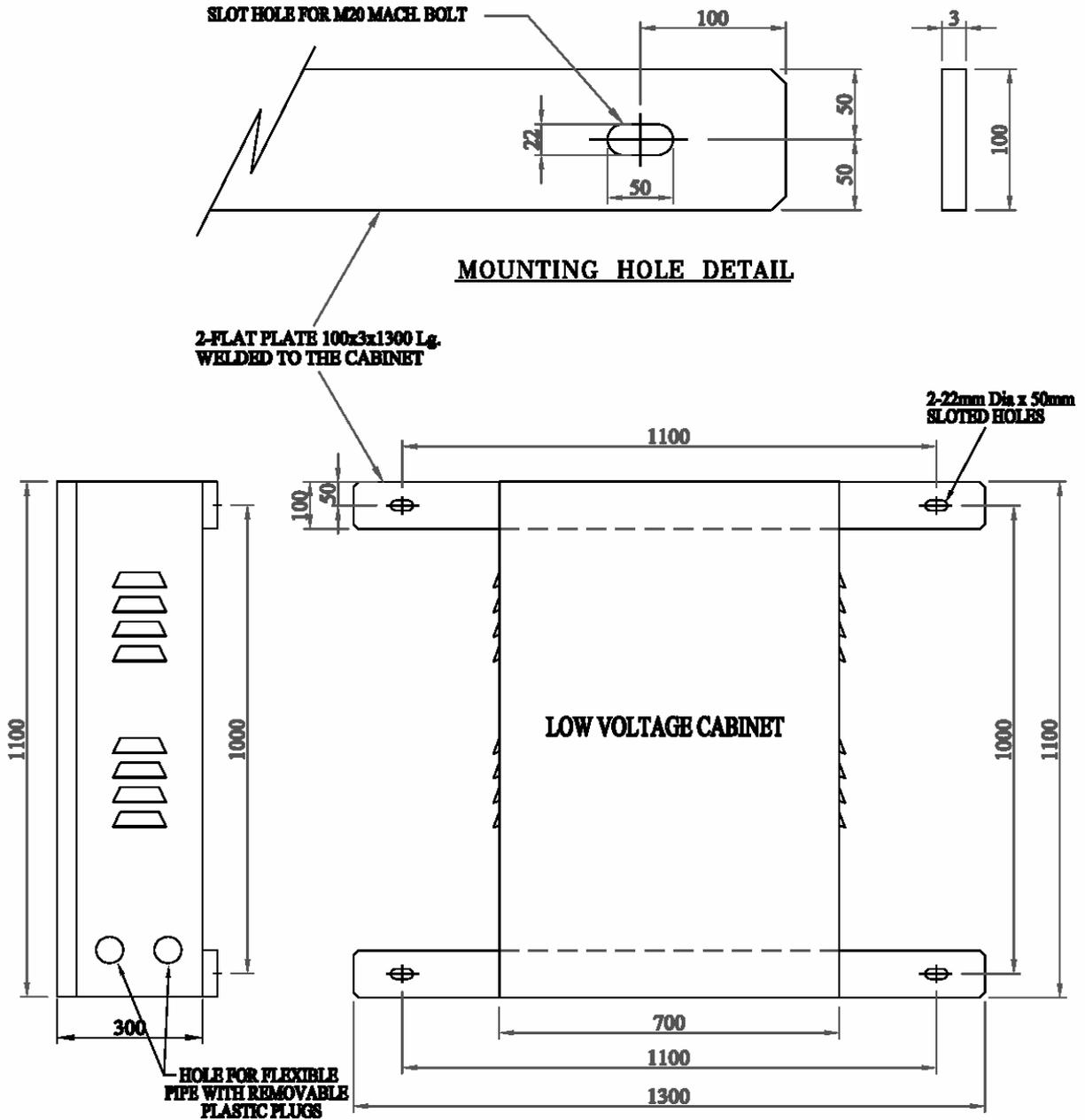


PANEL PARTS SCHEDULE:

- 21- PANEL NAME PLATE
- 22- SCECO LOGO
- 23- FRONT DOOR LOCK
- 24- 2 NOS INCOMING CABLE HOLES 87mm Dia
- 25- ADJUSTABLE SUPPORT
- 26- 2 NOS OUT GOING CABLE BOTH SIDE 78mm Dia

**L.V. CABINET FOR POLE MOUNTED
TRANSFORMER 200KVA & 300KVA**

ALL DIMENSIONS ARE IN MILLIMETER



DETAILED DRAWING FOR L.V. CABINET MOUNTING SUPPORT
200KVA & 300KVA TRANSFORMER

ALL DIMENSIONS ARE IN MILLIMETER