

**Saudi Electricity Company**



**الشركة السعودية للكهرباء**

**SEC DISTRIBUTION MATERIALS SPECIFICATION**

**42-SDMS-02**

**DATE: 27-08-2007G**

**42-SDMS-02**

**SPECIFICATIONS**

**FOR**

**FIBERGLASS REINFORCED LOW VOLTAGE  
SERVICE CABINET  
FOR 800A BULK CUSTOMERS**

**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 Service Cabinet intended to be used for outdoor installation to feed bulk consumers of loads 800A in the Distribution Network of 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 it shall 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 SDMS (SEC Distribution Materials Specification)**

- a) 12-SDMS-02 Lugs And Connectors For MV/LV Distribution System, last revision.
- b) 37-SDMS-01 rev.2 Low Voltage Molded Case Circuit Breakers For Service Connections.
- c) 50-SDMS-01 Current Transformers Up To 36KV.

**3.2 SASO (Saudi Arabian Standard Organization)**

- a) SASO-SSA-775 Fiberglass reinforced polyester meter boxes.
- b) SASO-SSA-774 Method of testing fiberglass reinforced polyester meter boxes.

**3.3 VDE (Verband Deutscher Elektrotechnike)**

- a) VDE-0660 Regulations for Low Voltage Switchgear.
- b) VDE-0220 Terminal of Energy Distribution Panels.



### 3.4 DIN (Deutsche International Normen)

- a) DIN-16911 Polyester Resin Molding Materials.
- b) DIN-43629 Dimensions of Cabinet.

### 3.5 International Electro-Technical Commission:

- a) IEC-60529 Classification of Degree of Protection provided for enclosures.
- b) IEC-60947 Low voltage switch gear and control gear.
- c) IEC-60439-1 Temperature rise of low voltage panel.
- d) IEC-60439-5 Particular requirements for assemblies for power distribution in public networks.
- f) IEC-60335-1 Safety of household and similar electrical appliances.

### 3.6 ASTM (American Standard Testing Material).

- a) ASTM B103 Phosphor bronze plate, sheets, strip and rolled bar.

## 4. SERVICE CONDITION:

- 4.1 The service cabinet shall be suitable for operation under the service condition as per SEC latest revision of General Specification No. 01-SDMS-01.
- 4.2 Service 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 with minimum clearance for connections not less than 25.4mm (one inch) between phases and phase to ground.
- 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 The service cabinet shall have one 800A rated MCCB.

5.1.5 All Electrical joints shall be made of minimum number of joints and shall be secured by means of corrosion proofed steel nuts and bolts.

5.1.6 The mounting arrangement of the MCCB and the bus bar shall be as per the drawing SEC/SB-02.

## 5.2 Enclosure:

5.2.1 The service cabinet shall be made of impact proof, heat resistant, self extinguishing, hot molded, non-inflammable, fiberglass reinforced polyester with a minimum thickness of 5mm and shall be covered by SASO approved epoxy coating to protect surface degradation and for ultra violet protection. The service cabinet shall be of free-standing type mounted on a Fiberglass Reinforced Polyester base with mounting dimensions in accordance with Drawing No. (SEC/SB-01), (SEC/SB-02), (SEC/SB-03), (SEC/SB-04). The service cabinet shall be with a canopy type roof.

5.2.2 The service cabinet shall have adequate mechanical strength to withstand rough handling as may be expected in normal uses.

5.2.3 Access to the service cabinet shall be from the front by means of hinged door fitted with locking mechanism to secure it at the top and bottom, it shall be openable up to 180 deg.

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

b) Locking shall be as follows:

- Handle shall be made of high grade durable metal.
- The handle shall be provided in the middle as per drawing no. SEC/SB-01.
- Integral lock cylinder type suitable for SEC standard key.
- Locking rotation shall be maintained within 90 degrees.

c) The inner side of the door shall have a storing pocket.

d) A suitable provision shall be made for fixing circuit numbering plate as shown in the drawing No. SEC/SB-01.

5.2.4 The service cabinet base shall have a side opening in both sides for entering an emergency cable 300mm<sup>2</sup>.



5.2.5 The service cabinet shall have an adequate ventilation system. It shall have in all respects a degree of protection suitable for outdoor application in accordance with IEC-60529 and the General Requirements for all Equipments/Materials Specification No: 01-SDMS-01 (Latest Revision).

5.2.6 The finished color of the service cabinet shall be light grey (RAL-7035).

5.2.7 MCCB mounting, busbars and insulators shall be fixed/installed on adequate supporting plate and suitable for minimum 3 approved MCCB suppliers.

### 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 normal continuous current of 800 Amps. It shall be supported by insulators of epoxy resin in a robust and secure manner. Three (3) Bus bars for phases and one (1) short link bar for neutral 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 visible location.

### 5.4 **Terminals:**

The in-coming circuit terminals of the MCCB shall be suitable for fixing two aluminum cables of size up to 4x300 mm<sup>2</sup> with the use of SEC standard cable lugs. The out-going circuit terminal shall be suitable for fixing two Aluminum Cables of size 4x300 mm<sup>2</sup>, or two Copper Cables of size 4x185 mm<sup>2</sup> connections to be done with the use of cable lugs. The lugs will be provided by SEC but bolts and nuts to be provided by the Supplier.

Test terminal block of a standard SEC type shall be provided for connection of revenue meter.

### 5.5 **Cabinet base:**

5.5.1 The Service Cabinet Base shall comply with DIN-43629. It shall be made of self-extinguishing glass reinforced polyester.

5.5.2 The design of the Service Cabinet Base shall conform to Drawing No: (SEC/SB-04). The front plate of the base shall be of two removable parts with the upper part to enable cable clamping, while the lower part to enable access for cable



installation. Four fixing bolts with spring washers and lock washers shall be provided for fixing the cabinet on the base.

5.5.3 Cable clamps with cable support bar shall be suitable for holding securely four copper/aluminum cables of sizes from 4x185Sq.mm. up to 4x300mm<sup>2</sup> and one 12x2.5mm<sup>2</sup> pilot cable.

5.5.4 All metal parts shall be made of hot dip galvanized steel.

#### 5.6 Current Transformers:

Three (3) current transformers rated 800/5 shall be provided installed on the bus bars at the out going side of the MCCB for revenue metering. It shall be as per SEC Specification 50-SDMS-01. The secondary wiring shall be connected to a SEC standard terminal block at a suitable location with a sealable cover to enable a connection of a revenue metering.

#### 6. MOLDED CASE CIRCUIT BREAKERS:

- 6.1 MCCB shall be in accordance with SEC specs 37-SDMS-01 latest revision.
- 6.2 The MCCB shall be easily inter-changeable with at least three of SEC approved MCCB suppliers.
- 6.3 MCCB of rating 800 A shall be provided installed as per the tender request.

#### 7. GROUNDING:

- 7.1 Back plate and all metal work shall be bounded together at a copper terminal having M12 stud and nut provided inside the enclosure of the service cabinet with clear identification of grounding mark.
- 7.2 The grounding copper terminal shall be supplied connected to the neutral bus bar with a removable copper link to insure the bonding of system grounding and L.V. neutral.

#### 8. LABELS:

Insertion Pocket for circuit number sheet shall be provided in the inner side of the door of the service cabinet.

#### 9. DIMENSIONS:

The maximum overall dimensions of the service cabinet shall be as follows:

Height	Width	Depth
1100mm	800mm	350mm

**10. NAME PLATE:**

The service 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
- Manufacturer's/Vendor's name
- Year of manufacture
- Gross weight when fully equipped (Kg)
- Serial number
- Tender No.
- SEC item No.

**11. MONOGRAM & DANGER PLATE:**

11.1 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 service 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, without opening the door.

11.2 SEC shall approve location and samples of Danger Plate and Monogram Plate before start manufacturing the service cabinets.

**12. TESTS:**

The service cabinets 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.

**12.1 Type Test:**

12.1.1 Service Cabinet shall be type tested in an independent testing laboratory for all the applicable tests as per SASO-774 and IEC-60439-5.

12.1.2 Certified type test reports for the service cabinet shall be performed on an identical unit and shall be submitted to SEC for review and approval during bidding stage and before shipping.



**12.1.3 Short Circuit Test**

The service cabinet shall be capable of carrying the short circuit current (rms, symmetrical) for one second as per specification 01-SDMS-01 latest revision.

**12.1.4 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.

**12.1.5 Degree of Protection tests**

It shall be conducted as per IEC-60529 and 01-SDMS-01 (latest revision)

**12.2 Routine Tests:**

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

**13. INSPECTION:**

SEC may wish to witness 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.

**14. MARKING:**

14.1 The following information shall be clearly embossed on the front outer surface of the service cabinet door.

- a) SEC Monogram.
- b) SEC Item Number.
- c) Manufacturer's Name.

14.2 A single line diagram plate shall be fixed inside the service cabinet, it shall be drawn indelibly by black on white background.

14.3 Provision 4-holes for fixing circuit numbering plate as per drawing SEC/SB-01 shall be provided.

**15. PACKING & SHIPPING:**

15.1 Packing and shipping shall generally be as per SEC General Requirements 01-SDMS-01 and shall be marked with the following

- Manufacturer's name
- Country of origin
- SEC purchase order number/Tender No.
- SEC item number
- Gross weight in kilogram
- Handling instructions
- Final destination store

15.2 Each service cabinet shall be packed separately in a wooden frame for handling and storage convenience. The whole unit shall be shrouded with a polythene bag for protection in outdoor storage.

15.3 The service cabinet shall be delivered ready for service.

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

**16. GUARANTEE:**

The vendor shall guarantee the service cabinet against all defects arising out of faulty design or workmanship or defective materials for a period of one (1) year from the date of installation or two years from the date of delivery. SEC certificates for date of installation shall be accepted by the vendor.

**17. SUBMITTALS:**

17.1 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.

17.2 If no exception/deviation are taken to this specification and no list of deviation is submitted, it shall be deemed that, in every respect, the offered service cabinet and their accessories conform to this specification.

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

17.4 Single line diagram shall be submitted.



- 17.5 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.
- 17.6 Catalogue that indicates part numbers of all the components inside the service cabinet shall be submitted.
- 17.7 Detail drawing showing the installation of CT as required in this specification, shall be submitted.
- 17.8 Duly filled-in, signed and stamped "Technical Data Schedule" attached to this specification for all related materials such as MCCB and CT.
- 17.9 Test Reports of an Independent Testing Laboratory.
- 17.10 Catalogues of the equipment offered.



SEC DISTRIBUTION MATERIALS SPECIFICATION

42-SDMS-02

DATE: 27-08-2007G

**TECHNICAL DATA SCHEDULE****Fiber Glass Reinforced Low Voltage Service Cabinet For 800A Bulk Consumers**

(Sheet 1 of 3)

SEC Enquiry No: \_\_\_\_\_

ItemNo: \_\_\_\_\_

S.No.	Description	Unit	SEC Requirement	Bidder's offer
1	Conformance to Drawing No.		yes	
2	Polyester Reinforced Fiberglass Body/ Any Equivalent Material		yes	
3	Thickness	mm	5	
4	Locking Arrangement		As per SEC Standard	
5	Degree of Protection as per IEC-60529.		IP-54	
6	System Voltage		231V/133V 400V/231V	
7	Size of Bus bar	mm	For 800 Amps	
8	Bus bar material		Tinned Copper	
9	Symmetrical Short Circuit Rating for 1 second (rms)	kA	As per specs	
10	Phase busbar rating	(A)	As per specs	
11	Neutral busbar rating	(A)	As per specs	
12	Bus bar color		Red/Yellow/Blue Black for Neutral	
13	<b>Current Transformer:</b> Class Burden Error co-efficient Insulation class Type and make		0.5 10 VA < 0.5 Class-E, 120 ° C -	



### TECHNICAL DATA SCHEDULE

#### Fiber Glass Reinforced Low Voltage Service Cabinet For 800A Bulk Consumers

(Sheet 2 of 3)

SEC Enquiry No: \_\_\_\_\_

Item No: \_\_\_\_\_

14	<b>MCCBs:</b> Type, Model & Make Rated current Dimensions (LxWxD) mm		800Amps As per 37-SDMS-01	
15	Cable Connection Terminals for Cables: a) In-coming Aluminum b) Out-going Copper / Aluminum		2x 4x300 mm <sup>2</sup> 2x 4x185/300 mm <sup>2</sup>	
16	Impact strength as per DIN-53453		yes	
17	Tensile strength as per DIN-53453		yes	
18	Flexibility strength as per DIN-53452		yes	
19	Fault Current Rating for the Bus-bar	A	As per specs	
20	Color of the Enclosure		RAL-7035	
21	Weight in Kilograms		-	
22	Height, Width and Depth		As per specs	
23	Monogram & Danger Plates		yes	
24	Voltage Class	V		



**TECHNICAL DATA SCHEDULE**

**Fiber Glass Reinforced Low Voltage Service Cabinet For Bulk Consumers**

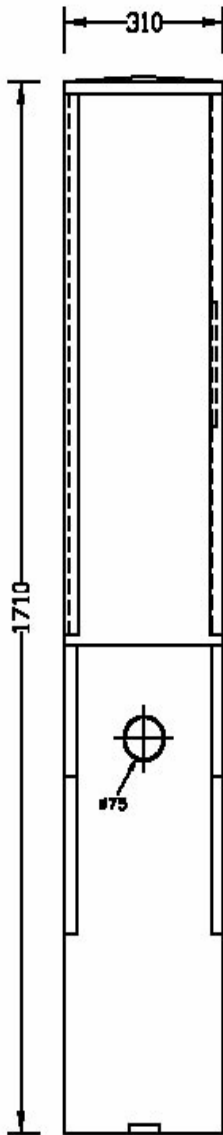
(Sheet 3 of 3)

SEC Enquiry No: \_\_\_\_\_

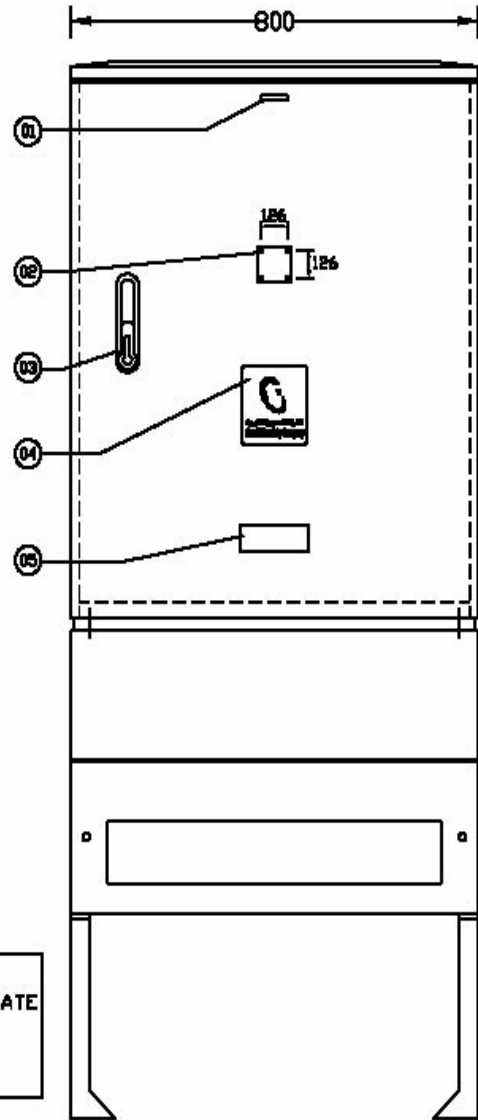
Item No: \_\_\_\_\_

- 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 Vendor/Supplier.  
(Use separate sheet if needed).

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



**SIDE VIEW**



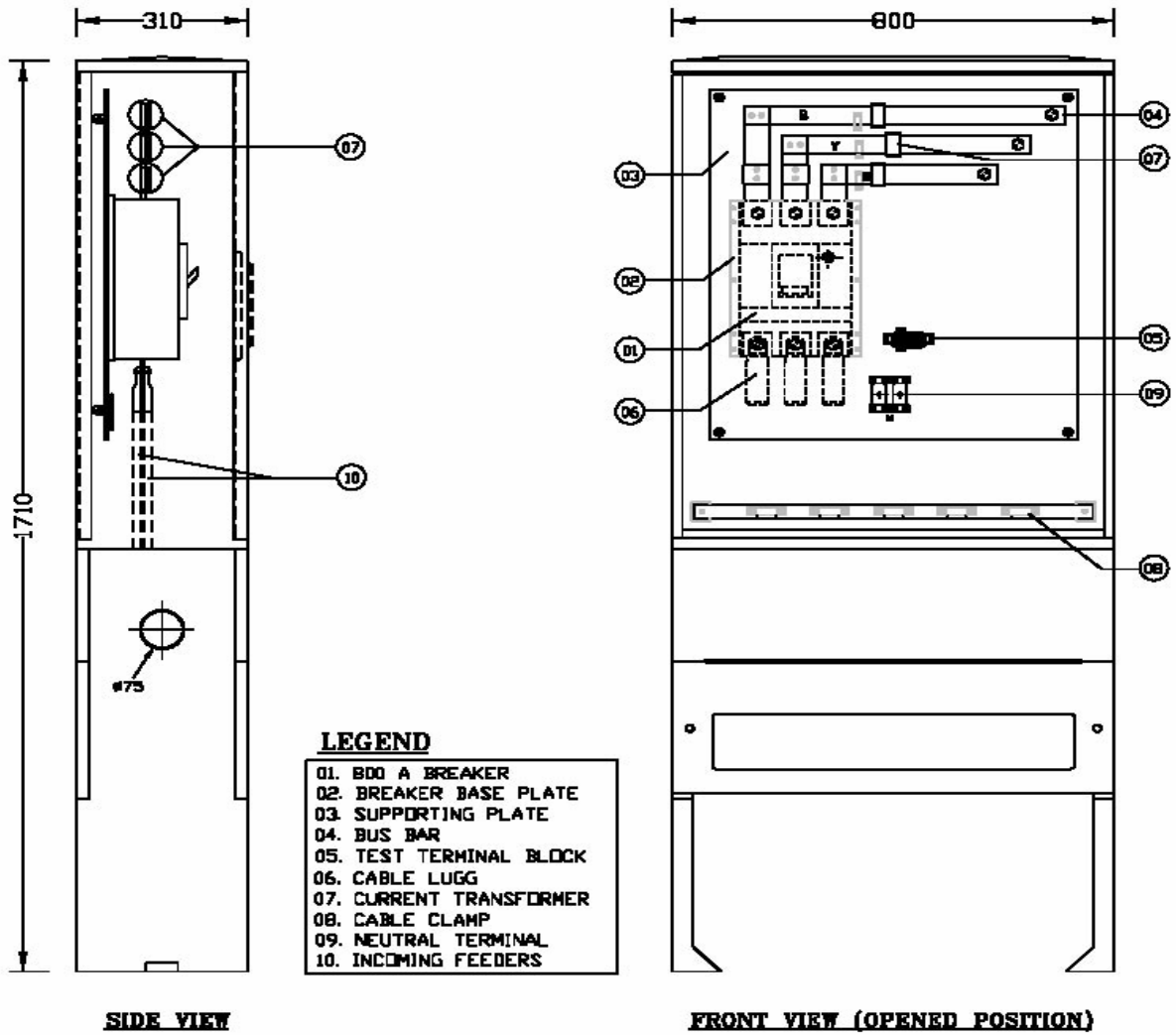
**FRONT VIEW (CLOSED POSITION)**

**LEGEND**

- 01. SEC NUMBER
- 02. Ø4 HOLES FOR FIXING DANGER PLATE
- 03. LOCKING DEVICE
- 04. SEC MONOGRAM
- 05. MANUFACTURER MONOGRAM

**LOW VOLTAGE SERVICE CABINET FOR 800 AMPS CONSUMMERS**

DRAWING NO. SEC/SB-01

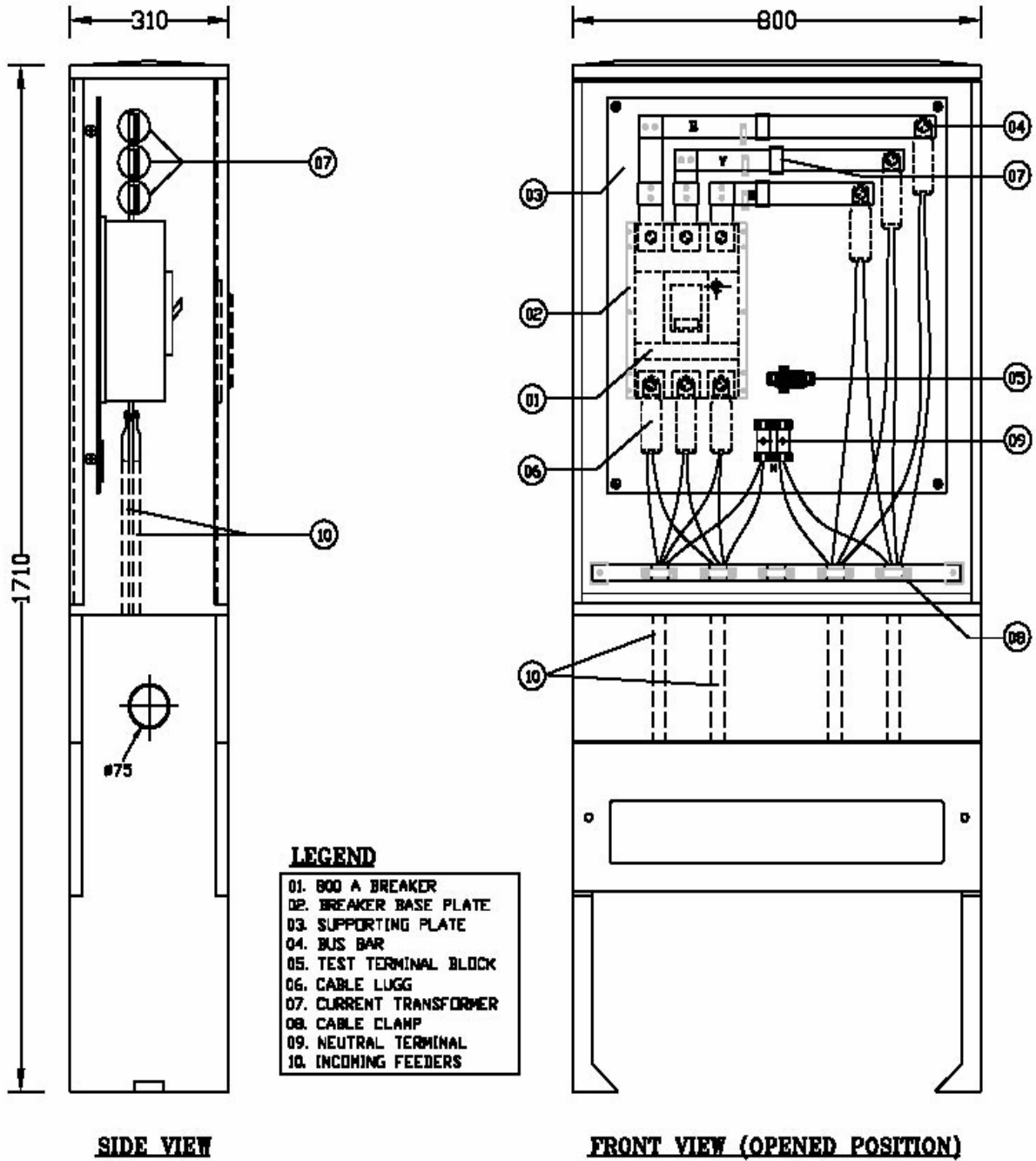


**LOW VOLTAGE SERVICE CABINET FOR 800 AMPS CONSUMMERS**

**(INTERNAL DETAILS)**

DRAWING NO. SEC/SB-02

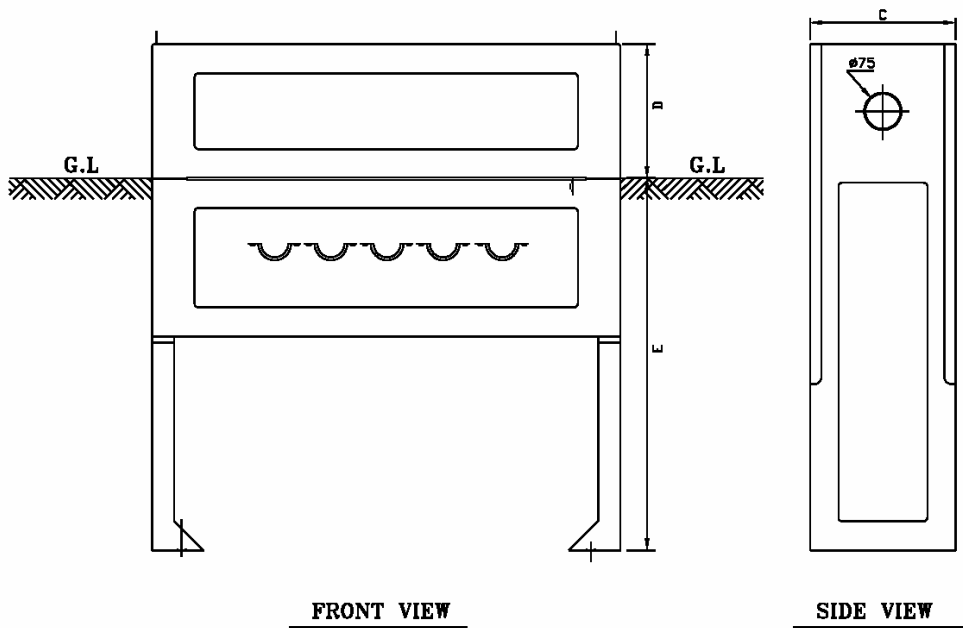




**LOW VOLTAGE SERVICE CABINET FOR 800 AMPS CONSUMMERS**

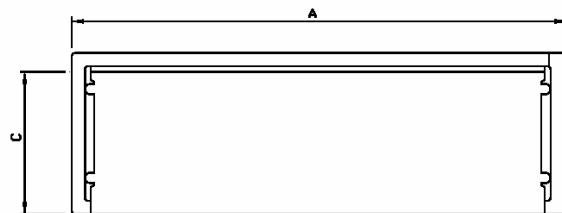
**(CONNECTION DETAILS)**

DRAWING NO. SEC/SB-03



FRONT VIEW

SIDE VIEW



TOP VIEW

	A	B	C	D	E
Dimension (mm)	800	830	310	280	600
Deviation (mm)	±30	±30	±30	±30	±30

**LOW VOLTAGE SERVICE CABINET FOR 800 AMPS CONSUMMERS  
(BASE DETAILS)**

DRAWING NO. SEC/SB-04