

**COMMISSION of ELECTRICITY**  
**Planning and Studies division**  
**Baghdad – IRAQ**

<b>Specification NO.</b>	<b>D-09</b>
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**Technical Specification**  
**OF**  
**Outdoor L.V switchgear**  
**Pole - mounted**

<b>REVISION</b>	<b>Year 2012</b>	<b>2016</b>
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# **Outdoor L.V. Switchgear pole - mounted**

## **1.SCOPE OF THE TENDER :**

The tender includes ,design ,manufacture ,testing ,supply, packing ,shipping and delivery of circuit breaker's cabinet, and all necessary fittings for connecting cables ,accessories ,spare parts ,tools and handling equipment .etc. for 100KVA ,250KVA,400KVA

Transformer KVA	100KVA	250KVA	400KVA
C.B rated current	200 A	250A	400A

The switchgear panel composed of:-

- a- Sheet steel construction cabinet not to be less than 2 mm thickness.
  - b- Three pole 416/240 V, 50HZ , one circuit breaker for outgoing feeder control equipped with parallel or sleeve type cable connection on both sides for single core PVC insulated copper of 95 and 150 sq.mm . The C.B to be designed with thermal or micro logic O/C protection (80 -100)%, and magnetic short circuit shall be between 5-10 times rated current. The rated ultimate breaking capacity (Icu) and rated service breaking capacity (Ics) of C.B should be 35KA for both. The current capacity of C.B should be minimum 80% of its rated current at 55C.
  - c- The panel shall have hinged door type with tow screws for locking (the bolts and nuts should be non-removable type ) with provision namely
    - c-1 Flap opening for circuit breaker (ON/OFF) operation.
    - c-2 Bolted type cover for the C.B. cable connections.
    - c-3 the cabinet shall be provided with mounting bracket.
  - d- copper bus bar of suitable cross section area according to C.B current rating for connect incoming and outgoing cables and ambient temperature 55C
- Note :The C.B should be provided with free contacts for external tripping.

## **1- GENERAL REQUIREMENTS :**

The equipments shall be of first class quality and designed for continuous satisfactory operation as continuity of supply , is of prime consideration the design shall allow all necessary precautions for the safety of the operation and maintenance personnel. All, equipment shall operate satisfactorily under variations of load ,voltage and short circuit or other conditions which may occur on the system provided that these variations are within the assigned ratings the apparatus .

All the equipments shall be designed to obviate the risk of accidental short circuit or damage due to vermin's .

All openings for ventilation must have wire mesh screen .

The equipments used shall be suitable for the following climatic conditions prevailing at site .

**2-1 Ambient temperature:**

Highest maximum (in the shade)	55 deg.C. for about 6. Hours aday
Lowest minimum . . . . .	-10 deg.C.
Maximum yearly average . . . . .	+ 30 deg .C.
Maximum daily average . . . . .	+ 40 deg .C.

**2-2 Sun Temperature**

Black objects under direct sunshine may attain a temperature of 80 deg.C.

**2-3 Air humidity :**

Maximum	92% at 40 deg. C.
Minimum	12%
Yearly average	44%

**2-4 Altitudes**

From sea level up to (1000m)

**2-5 Sand storm:**

The equipments are subjected to strong and frequent sand storms. Adequate precaution must be taken to cater for this.

**2-6 Condensation:**

Enclosed compartments shall have interior surfaces treated with approved materials and shall be adequately ventilated to prevent condensation.

The interior surfaces shall be treated and approved manner to prevent mould growth. Such treatment should in no way interfere with the satisfactory operation of the equipment electrically or mechanically.

### **3- Technical requirement**

#### **3-1 System Data:**

Nominal voltage.....	416/240 Volts (+4%) (- 10%)
Frequency.....	. 50 HZ.
System .....	3 phase,4-wire with neutral solidly earthed.
Short circuit level .....	according to the transformer capacity

#### **3-2 Standards:**

All the equipments and accessories shall be in accordance with the latest issue of the international Electro – technical commission (I.E.C) specification.

Where these specifications are incomplete or not yet published, then the National standards of tender’s country shall be considered subject to our approval.

### **4- SWITCHGEAR**

The low voltage switchgear are intended to be used on the L.V side of the 11/0.416KV 400KVA 250KVA and 100 KVA transformer. The switchgear shall be of out door type, pole mounted. The cabinet should be of sheet steel construction not less than 2mm thickness with electro-static and thermal painting. The switchgear shall be provided double roof with space for maximum ventilation (Sun-shield to extend from all sides by 10cm except rear). With louvers covered with mesh wire screen. The circuit breaker shall be accommodated in a panel. Please refer to scope of operation of circuit breaker to be from outside after opening the Flap, following points are to be equipped with:

a-Sleeves type connection for all cables (cable thimbles with bolts, nuts and washer).

b- Cabinet supporting brackets to be provided.

The cabinet is to be water-proof and entirely protected against the danger of vermin and dust, the degree of protection is to be IP55. The degree of protection is to be IP34 for ventilation inlets. The synthetic material should be resistant to the atmospheric conditions of para . 2-1 to 2-6 and immune from corrosive actions of chemicals and fire proof. The cabinet should be provided with the facility of earth connection.

c-cable glands suitable for incoming and outgoing cables and also suitable with the degree of protection of the cabinet

d- Name plate

The switchgear shall be incorporated with the following:-

#### **4-1 Circuit Breaker:**

The Circuit breaker shall comply with IEC 947-2 category B and shall be air break , molded case type of the ratings specified in the schedule attached herewith. The operating machine shall be of trip free type.

. A mechanical ON/OFF indication for C.B. position is to be provided. Provision for pad locking the door or the C.B. position is to be provided and the operating handle to be engaged when the door is closed. cabinet serial No. from origin manufacturer is required.

#### **4-2 Selectivity:**

The 11KV side of the transformer is protected by means of H.R.C current limiting fuses.

The tendered will have to insure that the protection setting of the circuit breaker will make it possible to obtain selective tripping between the circuit breaker and the fuses on the 11KV sides. The selective tripping will have to be maintained throughout the ambient temperature variation.

The successful tender will be supplied with type, rating and the time/current characteristics of the fuses mounted on the 11KV side in order to insure selectivity of tripping. A mechanical (ON/OFF) indication for C.B position is to be provided.

### **5- DRAWING AND INSTRUCTION BOOKS**

**5-1**The following documents shall be submitted in three copies with the tender documents in the English language.

Technical literature giving full details of the switchgear offered also out line drawings with dimensions showing top, front and side elevation.

Technical literature giving full description of C.B offered.

**5-2** The document to be furnished by the successful tenderer in the English language should includes three copies of the following drawings within two months from the date of the order.

Schedule of the anticipated shipping dates.

Installation drawings.

Outlined drawings & sectional elevation.

All instruction for maintenance, testing and commissioning.

Renewal part list sufficient for 5 years operation.

#### **NOTE**

It must be noted that all drawings are subjected to approval by us before manufacturing.

## **6- PACKING**

The supplier will pack each set of the panels or protect the goods in the most appropriate manner. He will be responsible for any loss or damage rising from careless packing or protection up to the place of final destination after completion of the inspections and tests at the factory, each item shall be packed for export shipment. All parts provided for shipping purposes only and which are to be removed at the time of erection shall be consequently tagged.

The method of packing shall be such as to protect all item against excessive corrosion or dampness, and shall afford adequate protection against breakage or other injury, or loss due to breakage of cases or crates from the time the items leaves until finally installed at the substation during the apparatus will travel by rail by along sea voyage again by rail or truck to the site of the substation.

The apparatus will also undoubtedly stand on whares and in the open during and in between periods of transportation and will thereby be exposed to heavy rains, hot sun, humid climate and sudden changes of temperature.

Owing to the numerous handlings, the container should be very strong. Also extra ordinary care should be given to the packing of the equipment and especially the items having installing material to prevent the injury due to moisture from sources external to the packing or from excessive condensation with the packing.

## **7- TESTS**

### **7-1 Inspection:**

The material shall be subject to inspection by our inspectors at any time during manufacture. The manufacture shall provide all inspection facilities for the side inspection and testing. All testing and inspection shall be made at the place of manufacture. The inspector shall have the right of rejecting any part or all of the material at any time during manufacture if it dose not meet with the requirements of this specification in all particulars. He shall have the right of overseeing the packing and shipping of all materials to be supplied.

### **7-2 Tests at Manufacturer Work:**

tests requirements at manufacturer work shall be as follows:-

#### **a- Type test:**

Type test certificates to prove the general design of the equipment must be submitted by the tenderer.

The certificates are to be for tests which have been carried out on identical equipment. These tests are in general those detailed in the relevant IEC which pertain to the equipment being tested.

#### **b- Routine test**

the routine test shall be carried out of each of the following equipment according to IEC recommendation:

a-Switchgear – Enclosure.

b-Circuit breaker.

## **8- PAINTING**

Electro-static and thermal painting.

**NOTE:** The tenderer should be submit all technical information according to IEC 947-2 and fill the data which is required in the attached sheet.

## Attach sheet

Items	unit	200A C.B	250A C.B	400A C.B
Degree of protection According to IEC 529				
Ambient temperature -Storage(min-max) -operation(min-max) In open air In enclosure	C			
Tightening torque	N.M			
Rated operational voltage According IEC 947-2	V			
Rated insulation voltage According IEC 947-2	V			
Rated impulse withstand voltage According IEC 947-2	KV			
Mechanical durability (C.O: closing ,opening)	C.O			
Electrical durability (C.O: closing ,opening)	C.O			
Duty class	C.O/h			
Rated ultimate short-circuit breaking capacity(Icu)	KA			
Rated service short-circuit breaking capacity (Ics)	KA			
Rated short-circuit making capacity (peak value)				
Rated short –time withstand current(Icw)	Icw(1s) KA			
	Icw(3s) KA			