32-SDMS-01

Rev.03

SPECIFICATIONS FOR NON-EXTENSIBLE SF6 INSULATED RING MAIN UNIT, 17.5KV

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SPECIFICATIONS FOR NON-EXTENSIBLE SF6 INSULATED

RING MAIN UNIT, 17.5KV

Revision History:

#	Date	Revision No.	Revised By	Major Revision Description
1				
1				
3				
4				

Prepared by:

No.	Name	Department / Sector	Signature	Date
1				
2				

1. Table of Contents

1. Scope

This document specifies the minimum technical requirements for design, engineering, manufacturing, testing and performance of indoor/outdoor gas (SF6) insulated, non-extensible ring main unit (RMU), intended to be used in 13.8 kV medium voltage system of the Saudi Electricity Company (SEC) in Saudi Arabia.

2. Documents incorporated by reference

This material standard specification shall be read in conjunction with SEC specification No. 01- SDMS-01 (latest revision) for 'General Requirement for All Equipment / Materials', which shall be considered as an integral part of this SDMS (SEC DISTRIBUTION MATERIALS SPECIFICATION). This SDMS shall also be read in conjunction with all SEC latest Standard Distribution Material Specifications SDMS and Purchase Order (PO) requirements.

3. Applicable codes and standards

The latest revision / amendments of the following codes and standards shall be applicable for the equipment / materials covered in this SPECIFICATON. In case of conflict, the CONTRACTOR may propose equipment / materials conforming to one group of industry codes and standards quoted hereunder without jeopardizing the requirements of this SPECIFICATION.

- IEC 62271-100 High-voltage alternating-current circuit breakers.
- IEC 62271-101 High Voltage Switchgear and control gear.
- IEC 62271-102 Alternating current disconnectors and earthling switch.
- IEC 62271-103 High-voltage switchgear and control gear - Switches for rated voltages above 1 kV up to and including 52 kV
- IEC 62271-200 AC metal-enclosed switchgear and control gear for rated voltage above 1 kV and up to and including 52 kV.
- IEC 62271-206 High-voltage switchgear and control gear – Voltage presence indicating systems for rated voltages above 1 kV and up to and including 52 kV
- IEC 60255 Measurement relays and protection equipment.

- IEC 60947-5-1 Control switches (low-voltage switching devices for control and auxiliary circuits, including contactor relays). - Part 1: General requirements
- IEC 60376 Specification of technical grade sulfur hexafluoride (SF6) for use in electrical equipment.
- IEC 60529 Degrees of protection provided by enclosures (IP Code).
- IEC 61869 Instrument transformers
- IEC 60068 Environmental Testing
- IEEE 386 Separable Insulated Connector Systems
- ISO 2063 Metallic coatings – protection of iron and steel against corrosion – metal spraying of Zinc and Aluminum.
- 12 SDMS-01 Termination , joints & accessories up to 36 kV
- 11-SDMS-03 XLPE Insulated Power Cables for Rated Voltages from 15kV up to 36 KV (Um).
- 01 SDMS 01 General requirements for equipment/material
- DPMS-02 R0 Complete Protection IED Specifications & CTs for Automatic RMU

In case of any deviation from the listed standards, it should be indicated in the list of deviations submitted by the supplier.

4. General characteristics and ratings

4.1 General

4.1.1 The ring main unit shall be indoor/outdoor use, ground/skid mounted and SF6 insulated.

4.1.2 It shall be constructed for operation in service conditions and the degree of protection as given in SEC specification 01-SDMS-01 latest revision.

4.1.3 Additionally, the indoor unit shall be provided with adequate protection for entry of dust to the operating mechanism. Ring main unit complete with all fittings and attachments shall be capable of withstanding the effects of direct solar radiation at its installed location.
4.1.4 The temperature of metal surfaces exposed to direct solar radiation shall be regarded as 75 Celsius degrees.

4.1.5 The terminals of the switches shall be suitable for installation, operation and maintenance of cable sizes as given in SEC specification 11-SDMS-03 latest revision.

4.1.6 All live parts of the switchgear and bus bars assembly shall be grouped together and SF6 gas insulated in a gas-tight stainless steel chamber, and sealed for life.

4.1.7 It is not the intent to specify herein complete details of design and construction. The offered equipment shall conform to the relevant standards and be of high quality, sturdy,

robust and of good design and workmanship complete in all respects and capable to perform continuous and satisfactory operations in the actual service conditions at site and shall have sufficiently long life in service as per requirements.

4.1.8 The RMU shall be Front panel or side cable panel design Ring Main Units Functions

4.1.9 The Equipment offered by the Vendor shall be three and four way ring main switchgear units having various configurations non-extensible:

- Two (2) ring switches for through feed and one (1) circuit breaker for tee-off with configuration (LBS-CB-LBS).
- Three (3) ring switches for through feed and one (1) circuit breaker for tee-off with configuration (LBS-LBS--CB- LBS).
- Two (2) ring switches for through feed and two (2) circuit breakers for tee-off with configuration (LBS-CB-CB-LBS).

4.1.10 All RMU configurations shall have the tee-off feeder(s) located at the middle.

4.2 Rating

The ring main unit shall be suitable to operate under system parameters given in SEC specification 01- SDMS-01 latest revision. The ratings of RMU, for both LBS and CB, are given in the related SDMS latest revision.

5. Design and construction

5.1. General

5.1.1 The RMU shall be installed inside a building on the ground. It consists of feeder switch/, cable compartments and base frame. Protection level of main compartment is over IP54 which is prescribed by IEC 60529. Inside of RMU is well ventilated to protect from moisture and has a heater if needed. The complete RMU enclosure shall be of degree of protection IP 54 or better. The degree of protection of the inner enclosure (main tank) shall be IP 67 or better.

5.1.2 Each part of RMU completed with all fittings and attachments is capable of withstanding the effects of direct solar radiation at its installed location. It is proof against mechanical stress in case of operation, electromagnetic force in case of short circuit. It will not be opened and closed by gravitation, vibration and so on.

5.1.3 A cable connection to bushing in RMU shall use IEEE 386 standard cable connector which does not expose a part of electric conduction.

5.1.4 The Switchgear and switchboard shall be designed such that the position of the different devices shall be visible to the operator on the front of switchboard and easy to operate & prevent access to all live parts during operation without the use of tools. There shall be no access to exposed conductors.

5.1.5 For operator safety (and for the public when installed outdoor), RMU shall have 4-sides internal arc protection, conforming to IEC internal arc fault withstand classification ALFR, whether the unit is used indoor / outdoor.

5.1.6 Voltage Indicator:

The RMU shall be equipped with a voltage indication for each circuit. There should be a facility to check the synchronization of phases with the use of external device. It shall be possible for each of the function of the RMU to be equipped with a permanent voltage indication as per IEC 62271-206 to indicate whether or not there is voltage on the cables.

The capacitive dividers will supply low voltage power to sockets at the front of the unit, an external lamp must be used to indicate live cables. Three outlets can be used to check the synchronization of phases with the use of an ordinary device.

The voltage indication is requested in the RMU for operation.

5.1.7 All terminals/contacts shall be silver plated, minimum 20-micron thickness.

5.2. LBS (Load Break Switch)

5.2.1 LBS shall be load breaking and fault-making type. Ring switches shall be designed for interrupting full rated current, small inductive or capacitive currents involved in disconnecting of unloaded transformers and cables or overhead lines. It shall be suitable for making current rating.

5.2.2 LBS shall consist of a moving contact assembly with three positions; 'ON', 'OFF', and 'Earth'. Two independent manual operating mechanisms for ring and earth switches are also acceptable. The design shall prevent simultaneous closing of the main switch contacts and the earth switch contacts. The earth switch shall be naturally interlocked to prevent the main and earth switch being switched 'ON' at the same time. The earth switch contacts shall be designed to close into a fault and shall have the same short circuit capacity as the main contacts.

5.2.3 The switching operation shall be manual by means of an operating handle and independent fast acting operating mechanism. Closing and opening speeds of the switch shall be independent of the speed with which the operating handle is moved.

5.3. Tee-Off Circuit Protection

Tee-off circuit protection shall be by circuit breaker.

5.3.1 Circuit Breaker

The Circuit breaker shall be of fixed type and designed for short circuit breaking current as per SDMS. The insulation medium shall be SF6 gas and the interruption medium can be either SF6 or vacuum. Opening of the circuit breaker shall be by local manual trip button and by protective relay circuit. Closing movement charges the opening mechanism of the circuit breaker.

Earthing of tee-off circuit shall be by an off load isolator switch having the same fault make capacity as the Ring switches. Operating mechanism shall be trip free, fast acting and independent of the operator action and shall provide three positions; circuit breaker 'ON', circuit breaker and isolator 'OFF' and earthing switch 'Earth'.

5.3.2 Protective Relay

The protection relay and allied conventional CT specifications shall be as per latest RMU SDMS DPMS-02.

5.4. Operation

All operating positions shall be on the front of the unit. The Switchgear and Switchboards shall be designed such that the position of the different devices is visible to the operator on the front of the Switchboard and operations are visible.

The position of each of the switches shall be displayed on a mimic diagram. Clear indicators showing 'ON', OFF' and 'Earth' positions shall be provided by metal painted labels not less than 15 mm in height and 1.5 mm thick (sticker type labels are not acceptable). Indicator windows shall not be less than 15 mm in diameter and shall be covered with transparent UV resistant material with adequate mechanical strength.

5.4.1 Indication

Indicator	Letter	Background
ON	**White**	**Red**
OFF	**White**	**Green**
EARTH	**Black**	**Yellow**

5.4.2 The mechanisms for operating the switches shall be accessible by removing the front plate. The operating handle shall have anti-reflex action and shall be stored at the front of the unit. An anti-reflex mechanism on the operating lever shall prevent any attempts to re-open immediately after closing of the switch or earthing switch. All manual operations will be carried out on the front of the switchboard.

5.4.3 Common operating handle shall be used for all operations of both ring and tee-off switches. Operating handle inserts shall have marking as appropriate to avoid inserting the wrong end during switching operations. The handle shall be of such a length that it complies with the relevant internal arc protection requirements and extends beyond the enclosure to enable ease of operation. Physical effort required for operating any mechanism shall not exceed 400 Newton.

5.4.4 In order to prevent unauthorized access for the operation of ring main unit, operating handle entries for ring & tee-off switches and trip push button shall have padlocking provision. It shall be suitable for 9 mm shackle lockout hasp.

5.4.5 The padlocking provision material shall be adequately strong and compatible with the life of ring main unit.

5.5. Interlocks

An adequate mechanical interlock system shall be provided on the Equipment to prevent mal-operation and to ensure operator safety. The design of the interlock system must be such that it shall not be possible for the operator to physically override the interlock controls.

Interlocks shall be provided to make the following operations impossible:

a) Operation of the ring switch or circuit breaker directly from “ON” to “Earth” or from “Earth” to “ON”.

The following additional requirements apply if the unit offered has two independent manual operating mechanisms for ring and earth switches:

- Operation of the “Earth ON / Earth OFF” mechanism of earth switch unless the “ON/OFF” mechanism of ring switch is in the “OFF” position.
- Operation of the “ON/OFF” mechanism of ring switch unless the “Earth ON / Earth OFF” mechanism of earth switch is in the “Earth OFF” position.

b) Opening of the cable test cover (and/or cable test cover for units with separate test bushings) without the associated ring switch being in the “Earth” position.

c) Closing ring switch to “ON” with the test plug inserted and /or the cover open.

d) Insertion or withdrawal of the test plugs with the switch in any position other Than “Earth” position.

e) Opening cable termination box without the associated ring switch/tee off in the "Earth" position.

f) Switching the ring switch/tee off to ON position without associated cable termination box cover is properly closed.

g) Closing ring switch (Load Break Switch) to 'ON' with the test plug / probe inserted and /or the test cover open.

5.6. CABLE TESTING FACILITY

Ring main unit shall have separate test bushings facility to carry out HV tests and current injection tests for cables terminated on ring switches. For probe insertion facility (via Separable Elbow-Type Connector termination), manufacturer/vendor should provide test probe with each unit.

5.7. TERMINAL BLOCK

Terminal blocks for current injection test facility for protective relay shall be provided, identified and clearly marked

5.8. Termination /cable boxes

5.8.1. Termination in the Ring switches shall be suitable for dry type cable terminations. Dry-type inside cable boxes suitable for accepting three core Aluminum or Copper, XLPE insulated cables of outside diameter of 70-110 mm. Each cable box shall have a bottom plate and cable clamp. Bottom plate shall be in two halves with cable entry hole of 115 mm diameter. Cable clamp shall be detachable semi-circular halves suitable to hold the cable inside the cable box without cable glands. Suitable rubber grommets or bushings shall be supplied fitted to each cable entry hole to cater for the cables in order to prevent cables from coming in contact with the edges of the gland plate hole.

5.8.2. Cable termination for tee-off shall be dry-type, inside cable box, and suitable for accepting 3-core armored cable (60-70 mm outside diameter) or three 1-core unarmored cables (25-30 mm outside diameter), copper or aluminum, XLPE insulated. Each cable box shall have split-type removable bottom plates and cable clamps to facilitate cable installation. Three cable entry holes shall be provided with rubber grommets to suit the required size of cable (whichever is actually used during termination, 3-core or 1-core). Respective cable clamps (installed inside the box) shall be detachable semi-circular halves.

5.8.3. Terminal bushings for both ring and tee-off switches shall be Interface Type-C, with M16 bolted contact for terminating cables with the use of screened premolded separable connectors or elbows. However, tee-off bushings may be required to be supplied with M16/M12 reducer studs to suit cable termination with M12 lugs.

5.8.4. Distance between terminal bushing and cover of cable box shall not be less than 160 mm to suit premolded separable elbows approved by SEC. For ring switch, inter-distance between terminal bushings shall not be less than 125 mm.

5.8.5. Vertical distance from the top of cable clamp to the centerline of cable bushings shall be suitable for all type of terminations mentioned above and not less than 750 mm.

5.8.6. The design of the cable boxes shall be such that the cable box shall allow enough access during cable termination. Removal and installation of cable box cover shall be with minimum number of bolts.

5.8.7. The cable box and bus bar compartment shall be arc resistant as per IEC 62271-200 amended up to date. The internal arc fault test on cable box and bus bar compartment shall be carried out for 13.8 kV system for 21 kA for 1 second.

5.8.8. At left-hand side ring switch cable box, bottom plate entry hole with rubber bushing shall be provided for Fault Indicator's remote indicator (if provided as alternative for outside boundary wall installation) and auxiliary supply AC voltage cables.

5.8.9. All necessary bolts, nuts and washers for fixing the cable on the bushings shall be provided with each unit.

5.9. Enclosure

5.9.1 Indoor/Outdoor Ring main unit shall have a tamperproof and weatherproof steel enclosure which cover whole body of the RMU and Control Box. Enclosure shall be provided with lockable doors, door handles, doorstoppers, hasp for padlocking, ventilation louvers and lifting hooks. The degree of protection shall be IP 54 or better as specified in IEC 60529. All panel bolts of enclosure shall be accessible from outside. All nuts, bolts and washers shall be stainless steel or hot dipped galvanized.

5.9.2 The enclosure shall be adequately protected against corrosion and painted as per relevant clauses of SEC specification 01-SDMS-01 latest revision. Finish color shall be Cement Gray RAL 7035 as per ASTM D1535. SEC may consider alternative methods of protection against corrosion.

5.9.3 The enclosure should have a pocket or provision inside to store the instruction documents and other relevant information.

5.10. Dimensions

Overall sizes (Enclosure) of RMU 13.8 KV shall be:

Type	3-way	4-way
Width (W)	1500	1850
Depth (D)	1100	1100
Height (H)	1700	1700
Cable termination box width	400 (minimum)	
Operating mechanism height	1300 (maximum)	

5.11. Earthing

5.11.1 A ground bar of not less than 25 x 5 mm copper strip shall be provided bolted to the frame. It shall be located so as to facilitate earthing of cable sheaths and earthing devices.

5.11.2 When several units of the RMU (Extra LBS / Breakers) are mounted adjoining to each other, the earth bus shall be made continuous and necessary connectors and clamps for this purpose shall be included in the scope of supply.

5.11.3 In addition, a terminal having M12 stud and nut shall be provided in the back of the panel with clear grounding mark.

5.12 Fault Indicator (FI)

5.12.1 Fault indicator (SEC approved type) with automatic resetting, single-phase AC supply, split core type sensor as per SEC specification 38-SDMS-01 latest revision shall be supplied with each unit.
5.12.2 Fault indicator shall be protected inside separate sunshield cover with a mesh front (drawn from the same metal sheet). FI shall be installed on the left hand side line-feeder. Three-pin plug for testing of FI by primary current injection shall be provided in separate compartment with screwed cover, below the FI housing.
5.12.3 SEC may require to supply the FI loose in an outdoor box with 15 meters of control cable for installation on masonry wall.

5.13 SF6 Gas Pressure Indicator & Refilling Provision

5.13.1 The SF6 gas pressure inside the tank shall be constantly monitored by a temperature compensating gas pressure indicator offering a safe/ not safe indication. The gas pressure indicator shall be provided with green pressure and red pressure zones. The safe operating zone shall correspond to a temperature range of -10 C to +50 C. There shall be one Non – return valve to fill up the gas. The manufacturer shall give guarantee for maximum leakage rate of SF6 gas will be lower than 0.1 % / year.

5.13.2 A SF6 gauge shall be provided for visual indication of SF6 gas pressure inside the switchgear chamber. The SF6 gauge shall be readily visible from the front of the unit without the necessity to remove any covers and be clearly marked to indicate the normal gas pressure by a green area on the gauge face and the low gas pressure by a red area on the gauge face.

5.13.3. Refilling/re-pressurizing inlet valve shall be provided and easily accessible for field refilling.

5.14 Over-pressure Release

In order to ensure maximum personal safety, Ring Main Unit shall be designed to withstand any overpressure due to an internal fault by rupture of a gas escape membrane located at the rear or bottom of the enclosure. The gas shall be led out through a flap in the rear panel to the bottom of the enclosure.

5.15 Nameplate

Ring main unit shall be provided with Aluminum /Stainless steel / Brass nameplate showing the following information indelibly marked in Arabic and English:

1. Manufacturer's Name
2. Country of Origin
3. Type/Model
4. Vendor's Name
5. Reference of SEC specification
6. Manufacturer's Serial Number
7. SEC Purchase Order Number
8. SEC Item Number
9. Year of Manufacture
10. Voltage Rating (KV)
11. Current Rating (A)
12. BIL (KV)
13. Short Circuit Rating / Duration (KA)
14. Rated Frequency (60 Hz)
15. Rated Making Current (Peak) (KA)
16. Gross Weight (Kg)
17. (Reported IEC 62271-1 rated voltage series1)

5.16 Circuits

5.16.1 The circuits configuration, numbering order and labels are as follows:

	2L1T			**3L1T**				**2L2T**			
Circuit Configuration	L	T	L	L	L	T	L	L	T	T	L
Circuit Number from left to right	1	2	3	1	2	3	4	1	2	3	4

L : LBS T : Transformer

5.16.2 Circuit Labels :

Ring and Tee-off switches shall be provided with circuit number plates of dimension 150 x 50 mm. without inscription. Plate shall be made of three-layer traffolyte material (white/black /white) of 3 mm thickness as per drawing No. SEC-01- 03.

5.17 Monograms and Danger Plates

Danger plate and SEC monogram as per SEC drawings No. SEC-01-01 and SEC-01-02 respectively shall be provided and installed at the front (on SEC approved location) of the ring main unit 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 i.e. without opening the door / front cover.

SEC shall approve location and samples of danger & monogram plates prior to installation.

5.18 Circuit Labels and CT Ratio Plate

5.18.1 Ring and tee-off switches shall be provided with circuit number plates of dimension 150 x 50 mm without inscription. Plate shall be made of three-layer traffolyte material (white /black /white) of 3 mm thickness as per drawing No. SEC-01- 03.

5.18.2 CT ratio plate shall also be provided in a suitable location.

5.19 Foundation Mounting

RMU fixing holes shall suit SEC concrete foundation, with not less than 50 mm distance from foundation wall edges (Reference: SEC Distribution Construction Standard SDCS-02).

6 Testing and inspection

6.1 All equipment shall be successfully type tested at SEC approved laboratory in accordance and witnessed by an authorized SEC representative with the latest standards and as specified herein and test report shall be submitted for SEC review and approval.

The switchgear offered shall meet the type test requirements of at least the standards listed
below:

6.1.1 High-voltage switches per IEC 62271-103

- Dielectric Tests
- Temperature Rise Tests
- Making and Breaking Tests
- Peak and Short Circuit Withstand Current Tests
- Operation and Mechanical Endurance Tests
- Internal arc test.

6.1.2 Circuit- breaker per IEC 62271-100

- Dielectric Tests
- Temperature Rise Tests
- Measurement of the resistance of the main circuit
- Short-time and Peak Withstand Current Tests
- Mechanical and Environmental Tests
- Making and Breaking Tests
- Short-circuit Tests

6.1.3 Measurement Unit as per IEC 61869-2 and 3

- Power Frequency Withstand Voltage Tests.
- Accuracy test.

6.1.4 Control panel and parts as per IEC 60068-2-1 and 60068-2-2

- Environmental test.

6.1.5 Degree of protection as per IEC 60529 and SEC specification no. 01-SDMS-01 latest revision.

6.1.6 The cable box and bus bar compartment shall be arc resistant as per IEC 62271-200 amended up to date. The internal arc fault test on cable box and bus bar compartment shall be carried out for short circuit current.

6.2 The switchgear offered shall meet the routine test requirements of the standards listed below:

6.2.1 High-voltage switches per IEC 62271-103.

- Power Frequency Voltage Tests.
- Voltage Tests on Auxiliary Circuits.
- Measurement of Resistance of Main Circuit.
- Operation Tests.
- Operation and Mechanical Endurance Tests.

6.2.2 Circuit breaker per IEC 62271-100:

- Power Frequency Voltage Tests.
- Voltage Withstand Tests on Control and Auxiliary Circuits.
- Measurement of Resistance of Main Circuit.
- Mechanical Operating Tests.

6.2.3 Measurement Unit as per IEC 61869. Other applicable standard is acceptable depending on the type of sensor.

6.2.4 Control panel as per IEC60068-2-1 and 60068-2-2.

6.2.5 Each and Every frame equipped with protection relay a primary current injection test shall be conducted.

6.3 SEC reserves the right to visit the factory during manufacture of any or all items covered by this specification, for inspection of material or witness of tests. Accordingly, the manufacturer shall give SEC adequate notice of manufacturing and testing schedule.
The testing shall be classified into the accreditation test and acceptance test. The manufacturer should submit the test reports for the accreditation test which are tested in a reputable international test institute.

7 Packing and shipment

7.1 All units have to be supplied from same manufacturer for each tender ordered by SEC to achieve full installation compatibility. Each unit shall be delivered ready for installation.

7.2 Each unit shall be individually packed in non-returnable cases as per packing /shipping requirements in relevant clauses of 01-SDMS-01.

7.3 For container shipment, each unit bolted on wood pallet is acceptable.

7.4 Units shall be delivered with handles, fixing bolts, earthing nuts, leaflet pocket with installation & operating manuals, test plugs and bill of materials for all loose items.

8 Guarantee

8.1 Guarantee for the automatic RMU and RTU shall be against all defects arising out of faulty design or workmanship or defective material for a period of five (5) years from the date of final acceptance of the project.

8.2 Warranty period for gas tightness (seal pressure system) shall conform to IEC 62271- The CONTRACTOR shall assume full responsibility for no gas leakage during the service life.

9. Submittals

9.1. Vendor shall provide the following (hard and soft/pdf copies) along with Tender Quotation:

- Summary in table form with the following information: list of items offered, manufacturer, country of origin, catalogue number, and drawing number.
- Clause-by-clause compliance to this specification.
- Technical data schedule per Clause 9 of this specification.
- Drawing showing the full constructional details and dimensions of RMU, cable boxes, and all associated accessories.
- Drawing of mounting/fixing details with respect to SEC unified concrete foundation and the positions of cables.
- Installation, operation and maintenance instructions in both English and Arabic languages.
- Comprehensive list of manufacturer's recommended spare parts.
- Copy of type test reports.
- Descriptive leaflet and literature of RMU offered and its accessories.
- Checklist of quotation request.
- List of customers in case of new manufacturer/vendor.

9.2. Vendor shall submit the following after receipt/acceptance of purchase order:

- As-built drawings (layout and electrical) for SEC final review/approval.
- Prototype for SEC inspection/approval prior to mass production.
- FAT/Routine testing in the presence of SEC representative and final inspection prior to delivery.
- Routine test reports.

10. Technical data schedule

NON-EXTENSIBLE RING MAIN UNIT, SF6, 17.5 kV

(Sheet 1 of 3)

SEC Inquiry No. _____ *Item No……*

No.	Description	SEC Specified Values	Vendor Values
5.0	**DESIGN AND CONSTRUCTION REQUIREMENTS**		
5.1	**GENERAL**		
	1. RMU Type	Outdoor & Indoor	
	2. RMU Configuration	3-Way / 4-Way	
	3. Tee-off	Circuit Breaker	
	4. Terminal Fastener for Ring Switch	M16	
	5. Terminal Fastener for Tee-off	M16	
5.2	**RING SWITCH (LBS)**		
	1. Service Voltage	13.8 KV	
	2. Maximum Operating Voltage	17.5 KV	
	3. Rated Frequency	60 Hz	
	4. Rated Current	400 A	
	5. Short Circuit Withstand Current, 1 sec	21 KA	
	6. Rated Making Current (peak)	54.6 KA	
	7. Rated Making Current of Earthing Switch (peak)	54.6 KA	
	8. Impulse Withstand Voltage	110 KV	
	9. Power Frequency Withstand Voltage, 1 min. (Ref. 01-SDMS-01)	45 KV rms	
	9. Internal Arc Fault Withstand Current for 1 sec	21 KA	

NON-EXTENSIBLE RING MAIN UNIT, SF6, 17.5 kV

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SEC Inquiry No. _____ *Item No*……

No.	Description	SEC Specified Values	Vendor Values
5.3.1	**CIRCUIT BREAKER**		
	1. Service Voltage	13.8 KV	
	2. Maximum Operating Voltage	17.5 KV	
	3. Rated Frequency	60 Hz	
	4. Rated Current	200 A	
	5. Rated Short Circuit Level, 1 sec	21 KA	
	6. Rated Making Current	54.6 KA	
	7. Re-striking Voltage Ratio	1.4	
	8. Duty Cycle	O-t_1-CO-t_2-CO	
	9. Making Time	ms	
	10. Opening Time	ms	
	11. Arc Duration	ms	
	12. Total Breaking Time	ms	
	13. Operating Mechanism	Spring charged	
5.8	**TERMINATIONS/CABLE BOX**		
	Cable Box Size (w x h x depth)	mm	
	Vertical Distance Between Terminal Bushings to Top of Clamp		
	Ring Switch	mm	
	T-Off	mm	
5.9	**ENCLOSURE**		
	Overall Dimensions (W x D x H)	mm	
	Degree of Protection	As per 01-SDMS-01	
	Finish Color	RAL 7035	

NON-EXTENSIBLE RING MAIN UNIT, SF6, 17.5 kV

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SEC Inquiry No: …….. *Item No: ……*

A. ADDITIONAL TECHNICAL INFORMATION OR FEATURES SPECIFIED BY SEC:

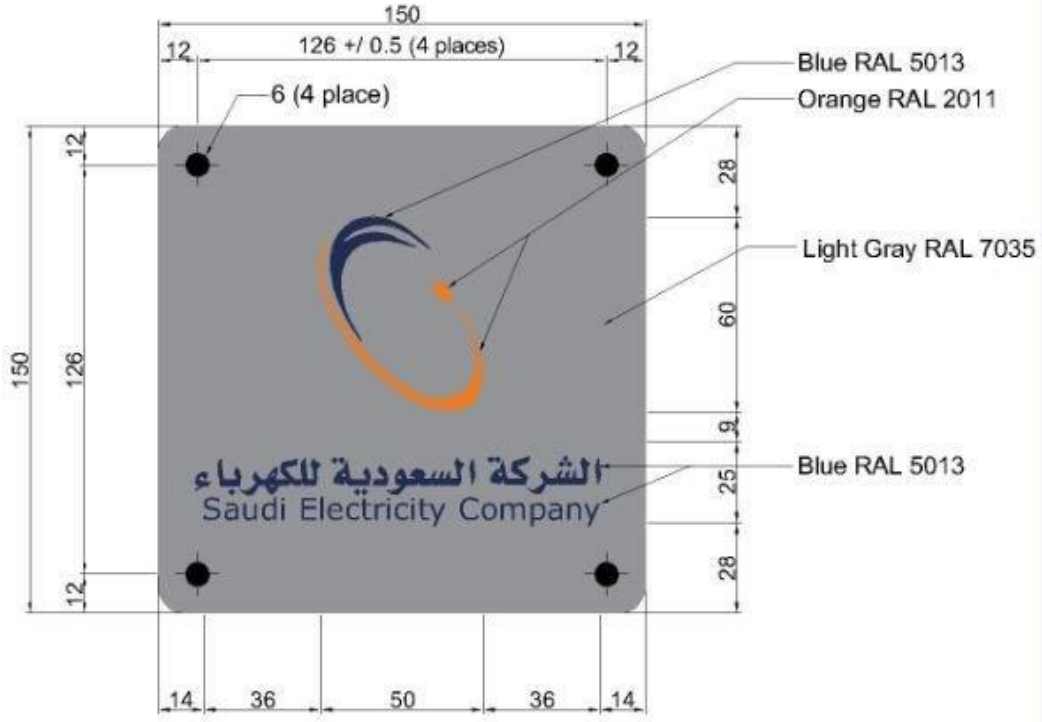
B. ADDITIONAL SUPPLEMENTARY DATA OR FEATURES PROPOSED BY BIDDER/VENDOR/SUPPLIER:

C. OTHER PARTICULARS TO BE FILLED UP BY BIDDER/VENDOR/ SUPPLIER:

D. LIST OF DEVIATIONS & CLAUSES TO WHICH EXCEPTIONS ARE TAKEN BY THE BIDDER/VENDOR/SUPPLIER: (USE SEPARATE SHEET IF NECESSARY)

	MANUFACTURER	**VENDOR / SUPPLIER**
Name of Company		
Location and Office Address		
Name and Signature of Authorized Representative		
Official Seal / Stamp		

11. Drawings



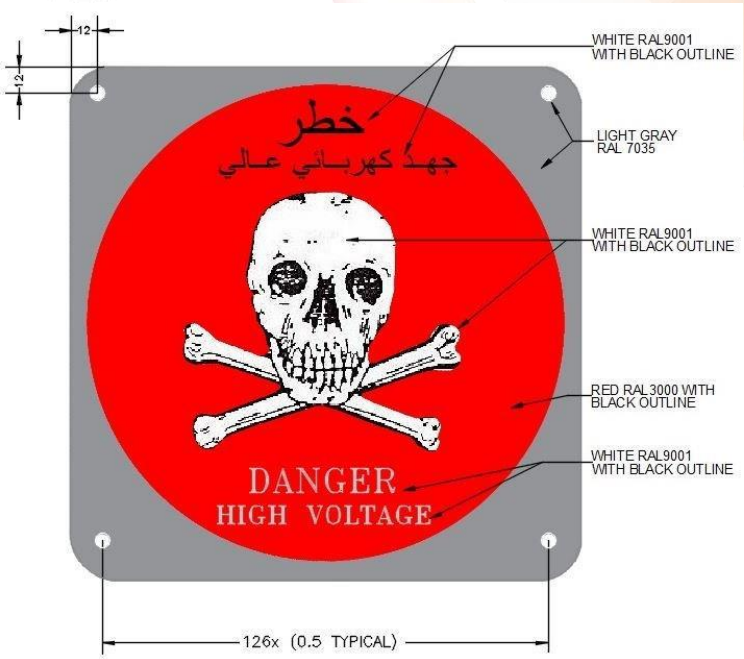
Note:

1) All Dimension are in millimeters.
2) 150 X 150 X 1.5 thick, aluminum plate with three (3) color monogram.
3) Specimen for color shades shall be obtain from SEC.
4) Size of symbols and lettering shall be proportion to the overall dimension of the monogram.

MONOGRAM FOR EQUIPMENT MOUNTING

DRAWING NO.
SEC-01-01

DANGER SIGN FOR EQUIPMENT



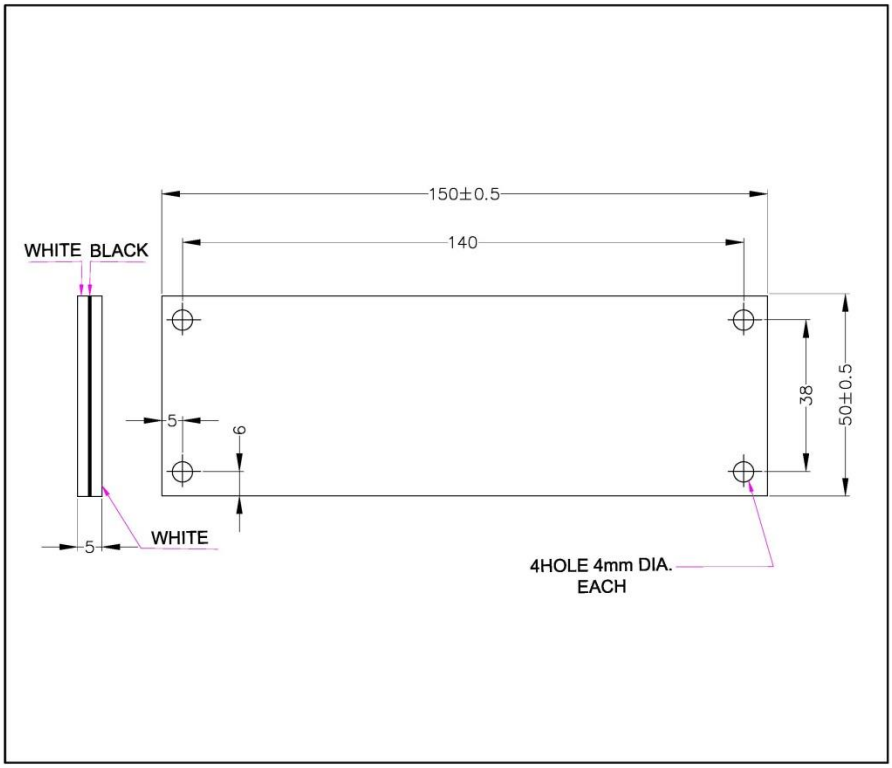
Note:

1) All dimension is in millimeters.
2) 150 x 150 x 1.5 Thick, Aluminum plate for equipment mounting.
3) Specimen for color shoes shall be obtained from SCE.
4) High gloss enamel paint.
5) Size of symbol and lettering shall be proportional to the overall dimension of the sign.
6) For the installation of this sign on the parameter fence and gate of the Transmission substation. The size of the sign shall be 510 x 510 and 255x255 respectively, where in the hole centers will be 25 & 15 & hole diameters will be 10 & 6 respectively.
7) The sign plate shall have rounded corners and NO sharp rough edges.

DANGER SIGN FOR EQUIPMENT

DRAWING NO.
SEC-01-02

CIRCUIT LABEL PLATE



Note:

1) Dimension are in millimeters.
2) Material Traffolyte white – black – white Thickness 3mm.
3) This plate will be used to engrave letters and numbers by using Engraving machine.

CIRCUIT LABEL PLATE

DRAWING NO.
SEC-01-03