

**Saudi Electricity Company**



**الشركة السعودية للكهرباء**

**SEC DISTRIBUTION MATERIALS SPECIFICATION**

**33-SDMS-02**

**DATE: 20-07-2004G**

**33-SDMS-02**

**SPECIFICATIONS**

**FOR**

**MV AUTOMATIC LINE SECTIONLIZER  
UP TO 36 KV**

**This specification is property of SEC and  
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## 1.0 SCOPE

This SEC Distribution Materials Specification (SDMS) specifies the minimum technical requirements for design, engineering, manufacture, inspection, testing and performance requirements for pole mounted Automatic Line Sectionalizer intended to be used in medium voltage overhead distribution system of Saudi Electricity Company (SEC) in Saudi Arabia.

## 2.0 CROSS REFERENCES

This material standard specification shall be read in conjunction with SEC specification No.01-SDMS-01 latest revision for 'General Requirement for all Equipments/Materials', which shall be considered as an integral part of this SDMS. This SDMS shall also be read in conjunction with SEC purchase order requirements.

## 3.0 APPLICABLE CODES & STANDARDS

The latest revision / amendment of the following codes and standards shall be applicable for the equipment / material covered in this SDMS.

- |     |             |  |
|-----|-------------|--|
| 3.1 | IEC-60265   | High voltage switches for rated voltages above 1KV and less than 52KV.   |
| 3.2 | IEC-60137   | Insulated bushings for alternating voltage above 1000 Volts.   |
| 3.3 | IEC-60296   | Specification for un-used mineral insulating oils for transformers and switchgears.                            |
| 3.4 | IEC-60376   | Specification and acceptance of new sulphur hexafluoride.  |
| 3.5 | IEC-60437   | Radio interference test on high voltage insulators.  |
| 3.6 | ANSI-C37.63 | Requirements for overhead, pad-mounted, dry-vault and submersible automatic line sectionalizer for AC systems. |
| 3.7 | ISO-2063    | Metallic coatings-protection of iron and steel against corrosion, metal spraying of zinc and aluminum.         |
| 3.8 | BS-729      | Guidelines for zinc coating.   |



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3.9 ASTM-123 Standard specification for zinc coating (hot dip galvanized) coating of iron and steel.

3.10 ASTM-153 Standard specification for zinc coating (hot dip) on iron steel hardware.

#### 4.0 SERVICE CONDITIONS

4.1 Sectionalizer shall be suitable for operation under the service conditions as per latest revision of general specification No. 01-SDMS-01.

4.2 Sectionalizers are to be designed for installation in a dry, dust storm, desert areas where temperature may rise to 55° C.

#### 5.0 DESIGN & CONSTRUCTION REQUIREMENTS

5.1 Ratings:

Ref	Description	Unit	Specified Value	
1	Nominal Voltage	KV	13.8	33
2	Continuous Current Rating	Amps	400	400
3	Symmetrical Interrupting Current	Amps	880	880
4	Making and momentary current, Asymmetrical	Amps	15000	15000
5	Rated short-time current symmetrical, 1- second	Amps	10000	10000
6	Minimum Creepage Distance: For Coastal and High Altitude Areas For Dry Areas	mm mm	552 345	1320 825
7	Radio Influence Voltage (max.) for 1 MHZ	μV	500	650

5.2 Sequence of operation:

The sequence of operations must have the following characteristics:

- The sectionalizer counts each over current interruption of the back-up re-closing device and will open after a pre set number of counts have been registered,



within a pre -determined time span. The sectionalizer shall only lock-out during the open interval of the re-closing back-up device.

- Total number of counts to opening, adjustable to 1, 2 or 3. Each instantaneous (fast) and delayed interruption of back-up device will be counted individually.

#### 5.3 Adjustment and settings:

Minimum actuating-current settings: phase fault sensing; adjustable from 16 to 640 Amps.

Earth fault sensing: adjustable from 3.5 to 320 Amps.

Reset / Memory time: adjustable up to 420 second.

#### 5.4 Interrupting medium & Insulation:

The sectionalizer shall be oil or SF6 insulated. In case of SF6 gas as insulating medium, an appropriate gas pressure indication gauge shall be provided to indicate the gas pressure.

#### 5.5 Control unit:

The sectionalizer shall have electronic control unit with following capabilities

- i) Processing the command of electrical function
- ii) Fault detection, inrush restraint and count restraint function
- iii) Communication interface facility for local and remote communication.

#### 5.6 Position indicator:

The sectionalizer shall be provided with position indicator, or other suitable means, which will clearly indicate the position OFF (in Green) and ON (in Red). This indicator shall be visible from the ground.

#### 5.7 Voltage transformer:

A power voltage transformer (VT, conforming to international standards and to be installed outside the sectionalizer) including mounting frame for SEC standard pole, with respective MV rating and preferably dual LV rating of 127V, 231V (phase - neutral) or 220V-380V(phase-phase), as auxiliary source of supply shall be supplied with sectionalizer and its cost will be included in the respective bid price.

**5.8 Current transformer:**

Three CT's for fault detection shall be provided as an integral part of the sectionalizer.

**5.9 Operating mechanism:**

Means shall be provided to permit manual operation of the sectionalizer through operating rod or built in extensible lever system from the ground level.

**5.10 Pole mounting frame:**

All units shall be supplied with a galvanized steel mounting frame suitable for SEC standard octagonal steel pole. Appropriate clamping ring shall be provided for the sectionalizer and control unit to secure the unit with a pole without using bolts through the octagonal steel pole.

**5.11 Lifting lugs:**

Lifting lugs shall be provided such that sectionalizer can be lifted with a single hook without damage.

**5.12 Grounding terminal:**

All units shall be provided with an appropriate ground terminal.

**5.13 Tank:**

5.13.1 The tank shall be preferably made of stainless steel of minimum thickness 3 mm, strong enough to support the vibration of the sectionalizer.

5.13.2 The tank and its accessories shall be adequately protected against corrosion and the supplier shall include a statement of the method of protection proposed.

5.13.3 Hot dip galvanization is preferred (in case tank is not stainless steel fabricated), otherwise large size tanks shall be sand-blasted and then immediately zinc sprayed to an average weight deposit in accordance with BS-729.

This shall be followed by zinc or zinc chromate based primary paint and two coats of durable oil and weather resisting paint shall be applied. These colors



of each coat shall be easily distinguishable. The final coat shall be epoxy based. Finish color shall be cement gray RAL-7033, as per Duetaches Institute Normung e.v. Zinc spray shall be in accordance with ISO-2063.

5.13.4 The inside of tanks shall be oil resistant in case of oil as insulating medium to avoid oil contamination.

5.13.5 The tank shall be perfectly sealed and dielectric fluid tight, with all fittings in place. The tank shall be weather proof, sealed and suitable to operate under all operating conditions.

5.13.6 The tank shall be equipped with two brackets each to accommodate three nos. lightning arresters (conforming to 35-SDMS-01 for Surge Arresters) both on incoming and outgoing side respectively.

#### 5.14 Bushings:

The sectionalizers shall be fitted with porcelain or polymer bushings conforming to latest respective international Standards and compatible with SEC service conditions and system parameters. The bushings shall be provided with anti bird devices / caps. The bushings shall be terminated by flat pad terminals to accept vertical connection with ACSR conductor size 70 mm<sup>2</sup> to 170 mm<sup>2</sup>.

#### 5.15 Name Plate:

Each sectionalizer shall be fitted with an easily readable nameplate of weather Proof material giving the following details marked in English.

- Manufacturer Name
- Serial Number
- Year of manufacture
- Rated maximum voltage
- CT & VT ratio rating and class
- Rated symmetrical interrupting capacity
- Interruption medium
- Insulation Medium
- Rated continuous current
- Rated frequency
- Rated impulse withstand voltage
- Gross weight
- P.O. number



## 6.0 TESTING AND INSPECTION

### 6.1 General:

6.1.1 All equipment shall be tested in accordance with the latest standards mentioned in this specification.

6.1.2 The supplier shall provide acceptable type test certificates of the tests dully witnessed by SEC representative from an international recognized laboratory.

### 6.2 Type Test:

The following tests shall be carried out in accordance with ANSI-C37.63 except for item 5.2.8, which shall be as per IEC-60437.

6.2.1 Impulse and power frequency voltage withstands tests.

6.2.2 Interruption test.

6.2.3 Operating tests.

6.2.4 Making current test.

6.2.5 Minimum tripping current test.

6.2.6 Temperature rise test.

6.2.7 Time current test.

6.2.8 Radio influence voltage test.

### 6.3 Testing Procedure:

#### 6.3.1 Type test:

The method of test, including test circuit arrangements, shall be in accordance with: ANCI-C37.63 and IEC-60437.





#### 6.3.2 Routine test:

The method of test, including test circuit arrangements, shall be in accordance with ANSI-C37.63 and IEC-60437.

#### 6.4 Acceptance and rejection:

Any item not meeting the routine test requirements shall be rejected.

### 7.0 PACKING AND SHIPMENT

7.1 The sectionalizers shall be delivered ready for service.

7.2 They shall be packed in sea-worthy non-returnable crates.

7.3 Packing notes shall be included in each crate giving a description of goods packed.

7.4 Packing shall be designed to protect against mechanical damage and ingress of moisture and dust.

7.5 Sectionalizers shall not be packed in any organic material.

7.6 Electrically conducting components shall be marked conducting, clearly and permanently.

7.7 Components or materials, if subject to a shelf life limitation, shall have the final data of use prominently and permanently shown on all cases.

7.8 Catalogue for the sectionalizer including internal wiring diagram indicating CT connections monitoring equipment wiring.

7.9 Each crate shall be printed with the following information:

- (a) Sectionalizers catalogue number.
- (b) Purchaser's order number
- (c) Manufacturer's name.
- (d) Year of manufacture.
- (e) Gross weight in kilogram.
- (f) Position of slinging points and other relevant handling instructions.

**8.0 SPARE PARTS**

- 8.1 A comprehensive list of manufacturer's recommended spare parts shall be included in the tender. The quantities offered should be adequate for the initial five (5) years of operation.
- 8.2 A firm price and delivery period shall be quoted for each item.
- 8.3 Spares supplied shall be packed to provide long storage without deterioration. Each package shall be clearly marked and labeled in Arabic and English with the description of its contents.
- 8.4 If any spare part requires special storage conditions, these conditions shall be detailed.

**9.0 GUARANTEE**

The supplier shall guarantee the sectionalizers against all defects arising out of faulty design, faulty workmanship or of defective material for period of two (2) years from the date of delivery.

**10.0 TRAINING**

The supplier shall provide at site training, regarding programming and commissioning for an adequate period, to be agreed upon by the SEC and the supplier after supply of the sectionalizer.

**11.0 SUBMITTALS**

11.1 Submittals required with tender:

The Bidder shall submit the following along with the tender.

- a) The Bidder shall complete and return one copy of Technical Data Schedule.
- b) Type test reports complete as per clause 5.2
- c) Clause by clause compliance of the specification and clear indication of any deviations.



- d) The Bidder shall also provide original catalogs giving details of the equipment being offered along with accessories available and the maintenance requirements.

#### 11.2 Submittals required following award of contract:

The following submittals shall be provided by the supplier following the award of contract.

- a) Details of manufacturing and test schedule.
- b) Factory test reports.
- c) Detailed installation and commissioning instructions.
- d) Literature, drawings and photographs adequate to explain in detail the functioning of the sectionalizers.
- e) Detailed maintenance manuals and maintenance instructions.

#### 11.3 Details of drawings required:

The following drawings shall be provided with the tender.

- a) Detailed dimensional drawings.
- b) Time-current characteristics of auto re-closers for ratings being offered.
- c) Mounting details for pole mounted units (Sectionalizer and Control).



## 12.0

## TECHNICAL DATA SCHEDULE

## MV SECTIONALIZER UPTO 36 kV

SEC Inquiry No: \_\_\_\_\_

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

(Sheet 1 of 2)

Sl. No.	Description	SEC Specified values		Vendor Proposed values
1	Nominal System Voltage (kV)	13.8	33	
2	Maximum Operating Voltage (kV) (Nominal)	15.2	36	
3	B.I.L. (kV)	95, 110	170, 200	
4	Continuous Current Rating (Amps.)	400	400	
5	Minimum Actuating current (Amps.)	16 - 640 (adjustable)		
6	Minimum Earth fault-sensing current (Amps.)	3.5 - 320 (adjustable), block		
7	Number of counts to open	1, 2, 3		
8	Inrush restraint	Phase (cycle)	5 - 20	
		Ground (sec)	0.3 - 5	
9	Phase actuating level multiplier (inrush restraint)	X1 - X8, block		
10	Interrupting Rating Max. Value (Amps)	880	880	
11	Rated making current RMS, asymmetrical. (Amps)	15000	15000	
12	Short time Current for 1 second. (Amps)	10000	10000	
13	Creepage length of Bushings: - For Coastal and High Altitude Areas - For Dry Areas	552 mm 345 mm	1320mm 825 mm	
14	Voltage Transformer	Required	Required	
15	Radio Influence Voltage ( $\mu$ V)	500	650	
16	Pole Mounting Frame	Required for steel octagonal poles		
17	Current Transformer	Yes	Yes	



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## TECHNICAL DATA SCHEDULE

## MV SECTIONALIZER UPTO 36 kV

SEC Inquiry No: \_\_\_\_\_ Item No: \_\_\_\_\_

(Sheet 2 of 2)

- 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 the Bidder / Vendor / Supplier.
- D. List of Deviations and Clauses to which exception is taken by the Bidder / Vendor / Supplier. (Use separate sheet, if necessary).

Description	Manufacturer of Material/Equipment	Vendor/Supplier
<b>Name of Company</b>		
<b>Office Address</b>		
<b>Name and Signature of Authorized Representative</b> <b>Date</b>		
<b>Official Seal / Stamp</b>		