Saudi Electricity Company

الشركة السعودية للكهرباء

SEC DISTRIBUTION MATERIALS SPECIFICATION	37-SDMS-04
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37-SDMS-04

SPECIFICATIONS

FOR

INTERFACE LOW VOLTAGE MAIN CIRCUIT BREAKERS

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1.0 SCOPE:

This SEC Distribution Material Specification (SDMS) specifies the minimum technical requirements for design, engineering, manufacturing, inspection, testing and performance of Main Circuit Breaker, to be used in the LV distribution system of Saudi Electricity Company (SEC) in Saudi Arabia. These Circuit Breakers are supplied by the Consumer. At the boundary between SEC and Consumer inside the Consumer panel which shall be fed directly from the SEC transformer or the LV Distribution Board through single core copper, XLPE insulated 630mm² cables.

2.0 CROSS REFERENCES:

This specification shall be read in conjunction with SEC Specification No: 01-SDMS-01 (latest revision for "General Requirements 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 of the following codes and standards shall be applicable for the equipment/material covered in this SDMS. In case of any deviation, the manufacturer/vender may propose equipment/material conforming to alternate codes or standards. However, the provision of SEC standards shall supercede the provisions of these standards in case of any difference.

3.1 IEC 60947-1 Low Voltage Switchgear and Control gear General Rules.

3.2 IEC 60947-2 Low Voltage Switchgear and Control gear for Circuit Breakers.

3.3 ASTM B633 Electro-deposited coatings of Zinc on Iron and Steel.

4.0 ELECTRICAL REQUIREMENTS:

4.1 Continuous Current Ratings:

The Circuit Breakers are required in seven different capacities to have the following current ratings:

1000 A 1250A 1600A 2000A 2500A 3200A 4000A

4.2 The Circuit Breakers shall confirm the following requirements:

4.2.1 The Circuit Breaker must have minimum ultimate interrupting rating of 40 KA at 380V and 65 KA at 220 V symmetrical.

4.2.2 Rated insulation voltage 750 Volts. AC

4.2.3 Rated impulse withstand voltage 8 KV

5.0 DESIGN & CONSTRUCTION REQUIREMENTS:

Circuits Breakers described in this specification shall be suitable for operation in SEC system parameters and service conditions as mentioned in 01-SDMS-01. The Circuit Breaker up to 1600A shall be Molded Case Circuit Breaker (MCCB) and above 1600A shall be MCCB or Air Circuit Breaker (ACB).

5.1 General Description:

The general specification of the Circuit Breaker is as follows:

5.1.1 Indoor Type, Three-pole, for surface or panel mounting.

5.1.2 The terminals shall be suitable for installation of 630mm² Cable by using SEC standard cable lugs (Fig-2 12-SDMS-02).The number of single core cable per phase corresponding to each breaker capacity shall be as per the following table:

BREAKER RATED CURRENT	NO. OF CABLE/PHASE
1000 1250 1600	2
2000 2500 3200	4
4000	6

5.1.3 Circuit Breakers with electronic control shall be equipped with electronic solid state trip-control unit for overload and short circuit protection which can be adjusted at required rating with sealing provision.

5.1.4 The circuit breaker shall have adjustable time delay overload tripping characteristics (alternatively with thermal trip characteristics) such that the breaker can sustain short-time overloads without tripping, so that magnetic in-rush current experienced by the starting of an air-conditioner compressor will not affect operation.

5.1.5 The breaker shall have instantaneous short circuit tripping characteristics such that the fault will trip the breaker in a fraction of a second.

6.0 NAME PLATE:

Each circuit breaker shall have a clear name plate engraved or printed with indelible ink/paint with the following information:

6.1 Rated current at 55°C ambient temperature
6.2 Rated voltage
6.3 Rated frequency
6.4 Breaking capacity at 220 and 380 volts
6.5 IEC 60947-2
6.6 Manufacturer name and reference number
6.7 Serial Number
6.8 Year of manufacture
6.9 Country of origin

7.0 TESTING:

The circuit breaker shall be tested as per IEC 60947-2 and test report certificate shall be provided with it.

SEC may carryout testing at their lab. The breaker will be assumed as rejected if any functions of the breakers are found faulty.

7.1 Type (Design) Test:

Test report shall include the following type tests:

7.1.1 Short circuit breaking / making capacities.

7.1.2 Temperature rise.

7.1.3 Over load performance.

7.1.4 Short-time withstand current

7.1.5 Dielectric properties.

7.1.6 Tripping limits and characteristics.

7.1.7 Operational performance capability.

7.2 **Routine (Production) Test**:

All routine (production) tests prescribed in the relevant IEC 60947-2 standard shall be performed.

8.0 PACKING & SHIPPING:

The packing shall be as per 01-SDMS-01, in addition to the following:

8.1 Each MCCB/ACB and its accessories shall be separately packed as a complete unit/assembly and shall be delivered ready for services.

8.2 Packing shall be protected against damage during shipment and handling to installation site.

8.3 Packing openings shall be closed to prevent entry of dust, dirt and other foreign matters.

8.4 Packing shall be marked with following:

8.4.1 Manufacturer's name

8.4.2 Country of origin

8.4.3 Weight in kilogram

9.0 GUARANTEE:

9.1 The manufacturer shall guarantee the MCCB/ACB against all defects arising out of faulty design or workmanship, or defective material for a period of one (1) year from the date of commissioning or two (2) years from the date of delivery.

10.0 SUBMITTALS:

10.1 **Submittals required with each breaker**:

10.1.1 The supplier shall complete and return one copy of the attached technical data schedule for each MCCB/ACB type being offered.

10.1.2 A detailed dimensional drawing is required for each size of breaker offered.

10.1.3 Breaker time/current characteristics curves for thermal overload elements are required for each breaker rating offered.

10.1.4 Catalogue for all components used with catalogue numbers marked clearly.

10.1.6 Factory test reports.

11.0 TECHNICAL DATA SCHEDULE
INTERFACE LV MAIN CIRCUIT BREAKERS
(Sheet 1 of 2)

SEC REF.	D E S C R I P T I O N	SEC SPECIFIED VALUES	VENDOR PROPOSED VALUES
1.0	DESIGN AND CONSTRUCTION REQUIREMENTS		
1.1	General		
	Rated Current		
	Operation Voltage	220/127 ± 5% 380/220 ± 5%	
	Electrical Joints (Bolts, Nuts, Washers)	Plated as Type II of ASTM B633	
1.2	Casing		
	Material		
	Temperature Index	55º C.	
1.3	Terminals		
	1000 up to 4000 Amps	Suitable for connection of cable 630mm² with SEC standard cable lugs	
	Material	Tinned copper	
1.4	Releases		
	Thermal		
	Magnetic		
2.0	ELECTRICAL REQUIREMENTS		
	Rated insulation voltage Ui	750 Volts, AC	
	Rated impulse withstand Voltage Uipm (Sea level)	8 kV	

11.0 TECHNICAL DATA SCHEDULE
INTERFACE LV MAIN CIRCUIT BREAKERS
(Sheet 2 of 2)

	Rated breaking capacity Icu (Max. assumed fault current)		
	At 380 Volts, AC	40 KA	
	At 220 Volts, AC	65 KA	
	Rated breaking capacity Ics (during operation, % of Icu)	100% Icu	
	Rated making capacity		
	Number of poles	3	
3.0	TESTING		
	Type tests report Available or not? ``	Short circuit breaking capacities	
		Temperature rise	
		Dielectric properties	
		Over load performance	
		Tripping limits and Characteristics	
		Operational performances capability	
		Short time withstand current	
4.0	ELECTRONIC CONTROL		