

Saudi Electricity Company



الشركة السعودية للكهرباء

SEC DISTRIBUTION MATERIALS SPECIFICATION

38-SDMS-02

DATE: 24 June 2009G

38-SDMS-02

**SPECIFICATIONS
FOR
FAULT INDICATORS
FOR
OVERHEAD DISTRIBUTION NETWORKS**

**This specification is property of SEC and
subject to change or modification without any notice**



CONTENTS

<u>Clause</u>	<u>Page</u>
1.0 SCOPE	3
2.0 CROSS REFERENCES	3
3.0 APPLICABLE CODES AND STANDARDS	3
4.0 DESIGN AND CONSTRUCTION REQUIREMENTS	4
5.0 TESTS	6
6.0 PACKING AND SHIPPING	6
7.0 GUARANTEE	7
8.0 SUBMITTALS	7
9.0 TECHNICAL DATA SCHEDULE	8



1.0 SCOPE

This SEC Distribution Materials Specification specifies the minimum technical requirements for design, engineering, manufacturing, inspection, testing and performance of Fault Indicators (FI) used in conjunction with MV overhead network system of Saudi Electricity Company (SEC), Saudi Arabia.

2.0 CROSS REFERENCES

This Specification shall always be read in conjunction with SEC General 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.

This SDMS shall also be read in conjunction with SEC Purchase Order or Contract Schedules and the Scope of Work and Technical Specifications for project, as applicable.

3.0 APPLICABLE CODES AND STANDARDS

The latest revision of the following Codes and Standards shall be applicable for the equipment/material covered in this SDMS. In case of conflict, the vendor/manufacturer may propose equipment/material conforming to one group of Codes and Standards quoted hereunder without jeopardizing the requirements of this SDMS.

3.1	IEC 61000-4	Electromagnetic compatibility Measurements and Testing
3.2	IEC 61000-6-2	Electromagnetic compatibility Generic Standards – Immunity for Industrial Environment
3.3	IEC 61089	Round Wire Concentric Lay Overhead Electrical Stranded Conductors
3.4	IEC 60529	Degrees of protection provided by enclosures (IP Code)
3.5	ASTM B 549	Concentric Lay Stranded Aluminum Conductors, Aluminum Clad Steel Re-enforced (ACSR/AW)
3.6	IEEE Std 495	IEEE Guide For Testing Faulted Circuit Indicators
3.7	IEC 60060-1	Dielectric test
3.8	10-SDMS-01	13.8 & 33KV overhead Lines conductors (ACSR/AW Type) latest revision



4.0 DESIGN AND CONSTRUCTION REQUIREMENTS

4.1 General

- 4.1.1 The Fault Indicators shall meet or exceed the requirements of this specification in all respects.
- 4.1.2 Manufacturer's drawings, as required by 01-SDMS-01, shall show the outline of the Fault Indicators, together with all pertinent dimensions. Any variations in these dimensions due to manufacturing tolerances shall be indicated.

4.2 Design Criteria

- 4.2.1 Unless otherwise specified, the Fault Indicators shall be manufactured and tested in accordance with the relevant international standards.
- 4.2.2 The Fault Indicators shall be designed to meet the operating conditions specified in 01-SDMS-01 (latest revision) and shall be capable to withstand temperature from -10°C up to 70°C and suspension arrangements suitable for overhead line conductor temperature. It shall be suitable for mounting on overhead line conductors up to 25 mm overall diameter.
- 4.2.3 The Fault Indicator housing shall be made of weather proof, robust, non metallic, fire retardant, UV stabilized material. The dimensions shall not be more than 200 mm (L) X 150 mm (w) or (Φ).
- 4.2.4 The Fault Indicator shall be suitable for outdoor installation with IP65 degree of protection. It shall be suitable for installation/removal on live overhead lines with a standard insulated hot stick, it's accepted to use a suitable adapter provided by supplier. Also it shall withstand wind pressure without falling or moving.
- 4.2.5 The indicating mechanism shall be multi-display type with high intensity LEDs as well as highly visible reflective red colored mechanical target. Any additional indicating method may be studied by SEC; the indication mechanism shall have clear 360° visibility from a distance of 50 meters during daylight and 200 meters at night.
- 4.2.6 The Fault Indicator shall be maintenance free, fully self-contained without external transformer or connections, and not require any additional source of supply. Battery for driving the indicators shall be easily replaceable using normal tools without de-soldering. It shall have minimum 10 years operating life, and total continuous indicating time of 500 hours or more.



4.2.7 The Fault Indicator should be bi-directional and able to detect all line to line and line to ground fault conditions with built-in restraints to prevent false operation due to sudden variations in load current, proximity to other circuits, inrush currents due to feeder switching or auto recloser operation, etc.

4.2.8 The Fault Indicator shall have a facility for testing the indication devices while hanging on live line.

4.2.9 The Fault Indicator shall be provided with Manual reset such as Magnet, Remote or any other method from ground level, in addition to the following selectable and adjustable reset options:

Automatic reset: 10 up to 30 seconds after recovering the line voltage (re-energized line).

Timed reset: From 1 up to 8 hours in steps of one hour.

4.2.10 The Fault Indicator shall be provided with manual pre adjusted trip current value of load currents in steps up to 500 amperes or load dependent self adjusted value of trip current.

4.2.11 The Fault Indicator shall be with adjustable response time from 20 to 200 ms (accuracy: $\pm 10\%$) and shall be capable to prevent operation due to in-rush currents.

4.3 Marking

Each Fault Indicator shall have a clear name plate engraved or printed with indelible Ink/paint with following information:

- SEC item number
- Rated voltage
- Rated frequency
- Manufacturer name and reference number
- Serial number
- Year of manufacture
- Country of origin
- SEC purchase order number
- Reference to SEC specification
- SEC Monogram



5.0 TESTS

5.1 General

- 5.1.1 All Fault Indicators shall be tested in accordance with the latest standards and as specified herein. Supplier shall provide all test results for review and acceptance by SEC.
- 5.1.2 The full range of Routine, Special and Type tests specified in relevant specifications shall be carried out as applicable.
- 5.1.3 Routine and/or special tests shall be carried out in the supplier's factory. Type test report/certificate from an independent testing agency shall be submitted to SEC.

5.2 Routine Tests

Following routine tests shall be carried out by the manufacturer on every Fault Indicator:

- 5.2.1 Operating Current Test
- 5.2.2 Reset Test
- 5.2.3 Instantaneous Trip Test

5.3 Type Tests

All tests to be done according to applicable standards mentioned in this specification.

- 5.3.1 Temperature Cycling Test.
- 5.3.2 Water Submersion Test
- 5.3.3 Outdoor Weathering of Plastic Test
- 5.3.4 Salt Spray Test
- 5.3.5 Immersion Corrosion Test
- 5.3.6 Impact Resistance Test
- 5.3.7 Short Time Current Test
- 5.3.8 Operating Current Test
- 5.3.9 Time current test
- 5.3.10 Effect of current from adjacent conductors

6.0 PACKING AND SHIPPING

In addition to the applicable items per 01-SDMS-01, packing and shipping of the Fault Indicators shall conform to the following:

- 6.1 All equipment shall be delivered for sea-worthy transport and stored indoor under normal environmental conditions.



6.2 The units shall be packed in strong box in completely assembled condition. Each box shall contain a Fault Indicator, operating manuals, and installation instructions.

6.3 A main box can contain several individual boxes, and an adaptor for hot stick if required.

The cover of the main box shall carry the following information:

- Purchase Order number
- Manufacturer Name
- Vendor Name
- Gross weight
- Content description
- Position of slinging points and other relevant handling instructions.

6.4 Packing notes in Arabic and English shall be included in each case giving a description of the goods packed.

7.0 GUARANTEE

The supplier shall guarantee the Fault indicators against all defects arising out of faulty design or workmanship, or of defective material for a period of two years from date of delivery.

8.0 SUBMITTALS

8.1 Submittals Required with Tender

8.1.1 The supplier shall complete and return one copy of the attached Data Schedule for the Fault indicators offered.

8.1.2 Guaranteed Ex-works delivery date.

8.1.3 Type Test Certificates.

8.1.4 Dimensional drawings of the Fault Indicators along with Technical Data and Catalogues shall be submitted by the supplier to facilitate evaluation of the offer.

8.1.5 Clause by clause compliance list of this specification.

8.2 Submittals Required Following Award of Contract

8.2.1 Factory Test Reports.



9.0 TECHNICAL DATA SCHEDULE

FAULT INDICATORS

(Sheet 1 of 2)

SEC Inquiry No. _____ Item No. _____

REF. SEC.	DESCRIPTION	SEC SPECIFIED VALUES	VENDOR PROPOSED VALUES**
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4.0	DESIGN AND CONSTRUCTION REQUIREMENTS
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1. Reference Manufacturing Standard	Required	
2. Temperature operating range	-10 to 70 ° C	
3. Maximum housing dimensions (mm)	200(L) X 150(w) or (Φ)	
4. Degree of protection	IP65	
5. Maximum conductor diameter (mm)	Up to 25	
6. Indicating devices	Reflective target + LED	
Indication visibility distance at day light	Up to 50 m	
Indication visibility distance at night	Up to 200 m	
7. Resetting Options:		
7.1. Automatic (Seconds)	10 to 30	
7.2. Timed (Hours)	1 to 8, in steps	
7.3 Manual	Required	
8. Rated Operating Voltage (Line to Line)	Up to 36 KV AC	
9. Battery Life Minimum	10 years	
10. Battery continuous operating life Minimum	500 indicating hours	
11. Tripping Current	Up to 500A, in steps	
12. Response Time	20 to 200 msec	
13. Inrush current restraint	Required	
14. Test facility	Required	
15. Submittals as per this spec. enclosed	Required	
16. frequency	60 Hz	
17. symmetrical fault current	25KA/160ms	



9.0 TECHNICAL DATA SCHEDULE

FAULT INDICATORS

(Sheet 2 of 2)

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 EXCEPTION IS TAKEN BY THE BIDDER/VENDOR/SUPPLIER: (USE SEPARATE SHEET IF NECESSARY):**

	MANUFACTURER OF MATERIALS/EQUIPMENT	VENDOR / SUPPLIER
Name of Company		
Location and Office Address		
Name and Signature of Authorized Representative and Date		
Official Seal / Stamp		