

**Saudi Electricity Company**



الشركة السعودية للكهرباء

**SEC DISTRIBUTION MATERIALS SPECIFICATION**

**38-SDMS-03**

**DATE: 29 July 2009G**

**38-SDMS-03**

**SPECIFICATIONS**

**FOR**

**LV DIGITAL PANEL METERS**

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## 1.0 SCOPE

This SEC Distribution Materials Specification specifies the minimum technical requirements for design, engineering, manufacturing, inspection, testing and performance of Digital Panel Meters intended to be used in low voltage distribution panels, cabinets and boards 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	Electromagnetic compatibility Measurements and Testing
3.2	IEC 62052	Electricity metering equipment - General requirements, tests and test conditions
3.3	IEC 61010	Safety Requirements for Electrical Equipment for Measurement, Control & Laboratory Use
3.4	UL 508	Standard for Safety Industrial Control Equipment
3.5	IEC 60664	Insulation coordination within low voltage system including clearances and creepage distance for equipments
3.6	IEC 61554	Panel Mounted Equipment – Electrical Measuring Instruments – Dimensions for Panel Mounting
3.7	IEC 60529	Degrees of protection provided by enclosures (IP Code)
3.8	IEC 61557-12	Requirement for combined performance measuring and monitoring devices



3.9	IEC 60060-1	HV Test Techniques – General Definitions & Test Requirements
3.10	IEC 60688	Electrical Measuring Transducers for Converting A.C. Electrical Quantities to Analogue or Digital Signals
3.11	IEC 60359	Electrical and Electronic Measurement Equipment- Expression of Performance
3.12	50-SDMS-01	Current Transformers Up to 36 kV
3.13	10-SDMS-01	Low Voltage Power and Control Cables

#### 4.0 DESIGN AND CONSTRUCTION REQUIREMENTS

##### 4.1 General

- 4.1.1 The digital panel meters 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 digital panel meters, 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 digital panel meters shall be manufactured and tested in accordance with the relevant international standards.
- 4.2.2 The digital panel meter shall be designed to be installed indoor and/or outdoor as referred to SEC General Specification No. 01-SDMS-01 (latest revision), in outdoor installations the digital panel meter will be enclosed inside the low voltage distribution panels, cabinets and boards and shall be capable to withstand temperature from -10°C up to 70°C.
- 4.2.3 The digital panel meter housing shall be made of weather proof, robust, non metallic, fire retardant, UV stabilized material. The dimensions shall be 96 mm (L) X 96 mm (W) as per relevant standard.
- 4.2.4 The digital panel meter shall have a degree of protection IP54. It shall be suitable for installation/removal on any distribution panels, cabinets and boards with standard tools.



- 4.2.5 The display of the panel meter shall be multi-lines, alpha numeric, high contrast LCD type with digit/letter height not less than 4mm, minimum number of digits shall be 5 including the decimal point.
- 4.2.6 Highly visible LCD is a main requirement however back light is acceptable but not mandatory.
- 4.2.7 The digital panel meter shall be maintenance free, fully self-powered without external auxiliary supply, and not require any additional source of power.
- 4.2.8 The digital panel meter shall have a facility for self testing the display as well as the internal circuitry while in working condition.
- 4.2.9 The digital panel meter shall have auto-range facility for phase to phase and phase to neutral voltage reading. Voltmeter shall be designed for any system voltage between 50 to 600 Volts AC.
- 4.2.10 The digital panel meter shall be designed for input currents of 5 amperes. It shall have auto-range facility for direct (actual) line current reading of 3-phase systems from 0 to 4000 Amps AC.
- 4.2.11 The digital panel meter shall have a maximum demand indication for currents of the 3 phases with resetting facility as follow:
- a- Manual resetting by push button or menu select.
  - b- Automatic resetting by adjusting time intervals up to 30 minutes in pre-programmed steps.
  - c- In case of power failure, the recorded maximum demand currents shall be available until power restoration.
- 4.2.12 All terminals shall be grouped in a terminal block of adequate insulating properties and mechanical strength. The terminals shall be suitable for stranded copper conductors of size 2.5mm, it shall be possible to disconnect easily but not accidentally the relevant wires.
- 4.2.13 Setup shall be available for each individual digital panel meter, it shall include all internal variables such as C.T ratios and interval time for maximum demands etc., setup can be done thru menus or push buttons, pre programmed data shall be protected against false operation by mean of password or any suitable way advised by manufacturer.



#### 4.3 Marking

Each digital panel meter 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
- Information about installation and connections.

### 5.0 TESTS

#### 5.1 General

- 5.1.1 All digital panel meters 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 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 approved independent testing agency shall be submitted to SEC.

#### 5.2 Routine Tests

Following routine tests shall be carried out by the manufacturer on every digital panel meter:

- 5.2.1 Operating voltage Test
- 5.2.2 Operating Current Test
- 5.2.3 Maximum demand test
- 5.2.4 Interval time 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 Outdoor Weathering of Plastic Test
- 5.3.3 Impact Resistance Test
- 5.3.4 Short Time Current Test
- 5.3.5 Operating Current Test
- 5.3.6 Time current test
- 5.3.7 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 digital panel meters 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 digital panel meter, operating manuals, and installation instructions, fixing hardware.
- 6.3 A main box can contain several individual boxes, 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 digital panel meter 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 digital panel meters offered.

8.1.2 Guaranteed Ex-works delivery date.

8.1.3 Type Test Certificates.

8.1.4 Dimensional drawings of the digital panel meters 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

**DIGITAL PANEL METERS**

(Sheet 1 of 2)

SEC Inquiry No. \_\_\_\_\_

Item No. \_\_\_\_\_

REF. SEC.	DESCRIPTION	SEC SPECIFIED VALUES	VENDOR PROPOSED VALUES**
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4.0	<b>DESIGN AND CONSTRUCTION REQUIREMENTS</b>
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1. Reference Manufacturing Standard	Required	
2. Temperature operating range	-10 to 70 ° C	
3. Maximum housing dimensions (mm)	96 (L) X 96 (w)	
4. Degree of protection	IP54	
5. Terminal conductor diameter (mm)	Up to 2.5 mm	
6. Display	High contrast LCD	
Indication visibility at day light	High contrast	
Indication visibility at night	Back light/ High contrast	
Number of lines	3 min	
Number of digits	5 min	
7. Resetting Options	Required	
8. Interval time for demand	1 to 30 min programmable	
9. programmed values protection	Password protected	
10. Self powered	Required	
11. Rated Operating Voltage (Line to Line)	Up to 600 V AC	
12. Rated Operating current (Line)	Up to 4000 A AC	
13. Self test facility	Required	
14. Submittals as per this spec. enclosed	Required	
15. frequency	60 Hz	
16. symmetrical fault current	As per 01-SDMS-01	
17. Accuracy Class	±3% Max	
18. POWER CONSUMPTION CURRENT CIRCUIT (VA)	≤5VA	
19. POWER CONSUMPTION VOLTAGE CIRCUIT (VA)	≤15VA	



## 9.0 TECHNICAL DATA SCHEDULE

**DIGITAL PANEL METERS**

(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		