

**SPECIFICATIONS FOR COMPACT
POTENTIAL TRANSFORMER – CPT - UP TO
36KV**

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**SPECIFICATIONS FOR COMPACT POTENTIAL
TRANSFORMER – CPT - UP TO 36KV**

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Recommended by:

**MUSAB MOHAMMED
ALBURIKAN**

Approved by:

**IBRAHIM ABDULLAH
ABDULAZIZ ALQUTIE**

Division Manager
Design Refinement
Division

Department Manager
Engineering Development
Department

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1 Scope

This SEC Distribution Materials Specification specifies the minimum technical requirement for design, materials, manufacturing, testing, inspection and performance for indoor/outdoor type medium voltage compact potential transformer (CPT) up to 36 KV, to be used as a self-power feeding supply for the smart equipment’s in the medium voltage distribution network of the Saudi Electricity Company (SEC) in Saudi Arabia.

2 Cross references to other SEC standards

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. This SDMS shall also be read in conjunction with SEC Purchase Order (PO) requirements

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3 Applicable codes and standards

The latest revision of the following codes and standards shall be applicable for the equipment/materials covered in this specification. In case of any deviation, the vendor/manufacturer may propose equipment/materials conforming to alternate codes or standards. However, the provisions of SEC standards shall supersede the provisions of these alternate standards in case of any difference.

Standard #	Title
IEC 61869-1	Instruments transformers
IEC 61869-3	Voltage Transformers
ISO 2063	Metallic coatings – protection of iron and steel against corrosion – metal spraying of Zinc and Aluminum
01-SDMS-01	General requirements for equipment/material
50-SDMS-03	PRIMARY SUBSTATION POTENTIAL TRANSFORMERS 11KV THROUGH 69KV
12 SDMS-01	Termination, joints & accessories up to 36 kV
12-SDMS-02	Lugs And Connectors For MV/LV Distribution System
11-SDMS-04	Specification for Aluminum Unarmored XLPE/LLDPE Insulated Power Cables For Rated Voltages From 15kv Up To 36kv
11-SDMS-03	XLPE Insulated Power Cables for Rated Voltages From 15kV up to 36 KV (Um).
10-SDMS-01	13.8 & 33 KV Overhead Line Conductors (ACSR / AW Type)
11-SDMS-01	Low Voltage Power and Control Cables
11-SDMS-02	LV Overhead Line Conductor Type Quadruplex
34-SDMS-02	M V & L V fuse links

Table 1: List of applicable standards

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4 Material, design and construction requirements

4.1. General

- 4.1.1 The compact potential transformer – CPT – is a voltage transformer used as a power supply feeding the smart equipment's by the auxiliary voltage 220 VAC, which is need for the automation and panel control, it shall be compact and matched with all smart equipment's which is need like smart RMU/MRMU, and smart LBS/AR if required.
- 4.1.2 The CPT shall be indoor/outdoor compatibility as the indoor CPT will install inside the RMU MV compartments, and for the outdoor applications it shall be used with the smart sectionalizer, LBS or the auto recloser if requested by SEC.
- 4.1.3 CPT size shall be compact to be matched with the minimum dimension for the cable compartments in the SRMU
- 4.1.4 Outdoor CPT, which is used for the overhead LBS, sectionalizer and A/R if requested, shall be matched with the installation construction standard for the mentioned above SEC items and SEC requirements.
- 4.1.5 CPT shall be supplied with all accessories which are needed for the installation of the CPT on the SRMU or on the overhead equipment.
- 4.1.6 13.8 KV CPT dimensions shall be max. Height's 2866 mm, max. width 380 mm, max depth 160 mm, with steel base for fixing on it, compact to that dimension and to with space enough to install a LV MCV beside the CPT, for the 33.0 CPT the dimension will vary and could be accepted with extra 25% than the 13.8 KV dimensions.
- 4.1.7 For the CPT which will install on the RMU shall be supplied with elbow termination and connection MV lugs as per SEC specifications, with a MV cable, all is ready for the connection.
- 4.1.8 For the CPT LV, 220 V AC with 10 % tolerance, protected by a LV AC MCB, with burden compact to the CPT burden, protect the CPT LV circuit for short circuit and ground fault.
- 4.1.9 For the CPT MV side to be protected with a built-in fuse with suitable rate to the CPT burden and comply with SEC specifications, the replaceable fuse shall be easy to be removed and replaced without any special tools.
- 4.1.10 CPT parameters and technical data shall be complied with all SEC relevant standards.

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4.2 CPT burden

- 4.2.1 CPT shall have an enough burden to supply the targeted smart equipment, as the burden of CPT shall be not less than 600 VA, or up to SEC recommendation and requirements.

4.3 CPT accessories

The CPT shall be delivered in one set with all the required accessories to be connected to the electrical system from MV and up to LV cabinet, as per below (not limited to):

- 4.3.1. MV connection including elbow both sides compact to the MV RMU bushing and CPT MV bushing/connector, MV lugs for both sides, MV flexible cable with length not less than 700 mm, and a fixing MV screw and bolts suitable and compact with the elbow and MV bushing for the RMU, all materials shall be from approved SEC vendor.
- 4.3.2. LV cables 2 wire not less than 2.5 mm², red/black color coded as red for line and black for neutral all on a protective flexible conduit, with termination lugs from both sides, MCB side and LV control box side, the overall length shall be not less than 6 meters.
- 4.3.3 LV MCB, prefixed on a channel din rail, on the fixing metal base for the CPT marked and labeled as a main LV MCB, rated of the AC MCB shall compact to the CPT burden and have the protection of, the overload, short circuit, and earth fault, protect the secondary circuit for the CPT.
- 4.3.4 All the sets shall be fixed on a fixing metal base with dimension compact with the CPT dimension and the additional installation requirements like the AC MCB, that metal base shall be equipped by a main grounding stud, preconnected with earthing wire, ready to connect to the RMU compartment main grounding.
- 4.3.5 A 2-set warning/caution stickers tags, dimension not less than 300 mm * 300 mm, a red color background, and a white color typing, the stickers should be UV resistance and with high quality printing with immunity to direct solar radiation and outdoor conditions.
- 4.3.6 For the outdoor CPT for the OHL smart equipment, all the connection accessories shall be compact with the SEC OHL construction standards.
- 4.3.7 A quick installation instructions guide shall be provided inside the boxes.
- 4.3.8 All accessories shall be from the approved SEC manufacture/vendor.
- 4.3.9 A 2 set of voltage damping end cap, SRMU busing size compatibility, to be used to cover the unused/connected SRMU busing adjacent to the CPT connection one.

All the above sets shall be arranged and delivered in one box marked and tagged from outside, as per SEC requirements.

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4.4 CPT main technical data:

- 4.4.1 Rated primary voltage 33.0KV or 13.8KV up to the distribution network MV rated voltage.
- 4.4.2 Secondary voltage shall be 220 V AC, with tolerance 10%.
- 4.4.3 The BIL for the CPT shall be as per 1-SDMS-01 as below:

	For 13.8 KV	For 33.0 KV
BIL	110	200

Table 1: BIL requirements

- 4.4.4 Rated frequency 60 HZ.
- 4.4.5 Voltage factor VF shall be as IEC 61869-3 as below:

	For 13.8 KV	For 33.0 KV
VF	1.2Un Continuous,	1.2Un Continuous, 1.9Un for 8 hours for Single-phase transformers with a neutral primary terminal

- 4.4.6 Ambient temperature shall be as per 1-SDMS-01 requirements.

4.5 Earthing

A ground bolt shall be installed on the metal fixing plate, with main earthing wire length not less than 1M, with lugs, ready to be connected to the main grounding system, and it shall be marked.

4.6 Nameplate

The CPT fixing plate, shall be provided with Aluminum /Stainless steel / Brass nameplate showing the following information indelibly marked in Arabic and English:

- Manufacturer's Name
- Country of Origin
- Type/Model
- Vendor's Name
- Reference of SEC specifications
- Manufacturer's Serial Number
- SEC Purchase Order Number
- SEC Item Number
- Year of Manufacture

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- | | |
|------------------------------------|------|
| • Voltage Rating primary/secondary | V |
| • BIL | kV |
| • Rated Frequency | 60Hz |
| • Gross Weight | kg |
| • class/ accuracy. | |
| • Connection diagram. | |
| • IEC standard. | |
| • Indoor/outdoor. | |
| • VF | |
| • Ambient temperature | |

5 Testing and Inspection:

All equipment shall be type tested at an independent laboratory from approved laboratory list for SEC. in accordance with the latest standards and as specified herein and test report shall be submitted for SEC review and approval.

The type test shall be as per IEC 61869

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.

Routine test

All routine tests prescribed in the relevant IEC or equivalent IEEE standard shall be performed

6 Packing and shipment

- CPT shall be delivered ready for installation
- CPT set shall be individually packed in non-returnable cases as per packing/ shipping requirements in relevant clauses of 01-SDMS-01, marked from out side with full technical data for the package.
- Units shall be supplied completely with all operation and installation accessories.

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7 Guarantee

The guarantee for the CPT 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 delivery.

8 Submittals

The vendor shall complete and return one copy of the attached Technical Data Schedule.

The vendor shall provide the following with the Quotation:

- a. Clause by clause compliance with this specification.
- b. Drawing shows the full constructional detail with dimensions of CPT and all associated accessories.
- c. Drawing of mounting details with respect to the position of cables in the SRMU compartments.
- d. Schematic Diagrams showing the SLD.
- e. Installation and maintenance instructions.
- f. Copy of type test report.
- g. Checklist of quotation requests.
- h. List of customers in case of new manufacture / vendor.
- i. Provide connecting cables as per description on clause no.4.3.

The vendor shall provide the following after signing of purchase order:

- a. Details of manufacturing and testing schedules.
- b. Routine test reports.

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9 Technical data schedule

Compact potential transformer – CPT- (Sheet 1 of 3)

SEC Inquiry No:

Item No:

No	Description	SEC Specified Values (*)	Vendor Proposed Values (**)
1	General		
1.1	model	*	*
1.2	Type	Indoor/outdoor	*
1.3	Rated Voltage	13.8 kV / 33 KV	*
1.4	Voltage factor	1.2 Un for continuous 1.9 Un for 8 hours for the 33.0 KV voltage rated	*
1.5	Rated Frequency	60 Hz	*
1.6	Basic insulation level BIL	110 KV/ 200 KV	*
1.7	Impulse Withstand Voltage	As per (01-SDMS-01)	*
1.8	Power Frequency Withstand Voltage (1 min.)	As given in (01-SDMS-01)	*
1.9	Dimension Hight /Length /Depth	*	*
1.10	Rated secondary voltage	*	*
1.11	class	3P or 6P	*
1.12	Insulation class	*	*
1.13	Burden	As SEC recommendation	*
1.14	Connection on primary single/double phase	*	*
1.15	VA thermal	*	*
1.16	Weight	*	*
1.17	MV fuse rated	*	*

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Compact potential transformer – CPT- accessories.
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SEC Inquiry No:

Item No:

No	Description	SEC Specified Values (*)	Vendor Proposed Values (**)
4	ACCESSORIES		
4.1	MV Termination type used	*	*
4.2	MV Termination manufacture	*	*
4.3	MV cable size	*	*
4.4	MV cable length	*	*
4.5	MV cable manufacture	*	*
4.6	MV lugs size	*	*
4.7	LV wires manufacture	*	*
4.8	LV wire length	*	*
4.9	LV wire size.	*	*
4.10	LC MCB manufacture	*	*
4.11	LC MCB type	*	*
4.12	LC MCB rated currant	*	*
4.13	LV connection TB manufacture.	*	*
4.14	Main name plate	yes	*
4.15	Danger/caution stickers	yes	*

(*) – Values to be provided/proposed by the Vendor

(**) – Please provide explanation for deviations, if any

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SEC Inquiry No:

Item No:

- Additional Technical Information or Features Specified by SEC
- Additional Supplementary Data or Features Proposed by Bidder/Vendor/Supplier.
- Other Particulars to be filled up by the Bidder/Vendor/Supplier.
- List of Deviations and Clauses to which exception is taken by the Bidder/Vendor/Supplier. (Use separate sheet, if necessary).

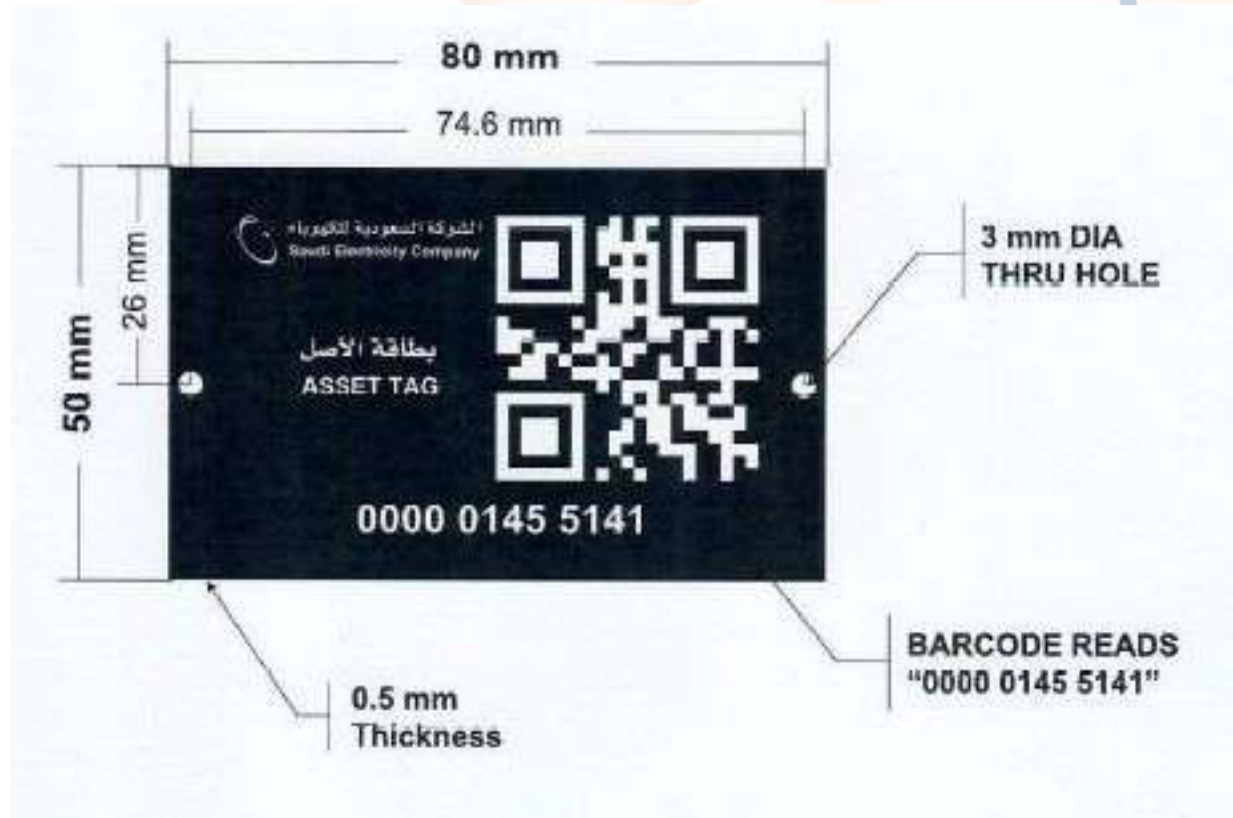
Description	Manufacturer of Material/Equipment	Vendor/Supplier
Name of Company		
Location and Office Address		
Name and Signature of Authorized Representative with Date		
Official Seal / Stamp		

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Note:

- 1) Aluminum Plate
- 2) Multi Protected Layered (Nano Coating)
- 3) Black / Matt Finish
- 4) Variable (Numbering QR)
- 5) Company Name with LOGO
- 6) Durability 10 Years Minimum
- 7) Double Sided Tape at the Back 3M 468MP or 3M 9472