

Title: **POLE-MOUNTED SERVICE
DISTRIBUTION BOXES FOR
SPLIT PREPAYMENT METERING
STANDARD**

Unique Identifier: **240-75659760**

Alternative Reference Number: **N/A**

Area of Applicability: **Engineering**

Documentation Type: **Standard**

Revision: **4**

Total Pages: **10**

Next Review Date: **July 2029**

Disclosure Classification: **Controlled
Disclosure**

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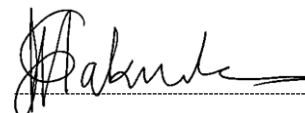


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1. Introduction

This document states the requirements for the manufacturing of pole mounted service distribution boxes for smart split prepayment metering applications. The designs of the boxes are similar for the various applications. The options include the following:

- 2-way smart split prepayment pole top box
- 4-way smart split prepayment pole top box
- 6-way smart split prepayment pole top box
- 8-way smart split prepayment pole top box

2. Supporting Clauses

2.1 Scope

2.1.1 Purpose

This standard specifies Eskom's requirements for pole-mounted service distribution boxes for smart split prepayment metering. This standard also sets out Eskom's requirements for the manufacturing of service distribution box single phase, low voltage for small electrical power users supplying adjacent customers in overhead electricity supply networks.

2.1.2 Applicability

This document shall apply throughout Eskom Holdings Limited Divisions.

2.2 Normative/Informative References

Parties using this document shall apply the most recent edition of the documents listed in the following paragraphs.

2.2.1 Normative

- [1] SANS 62208, Empty enclosures for low-voltage switchgear and controlgear assemblies — General requirements
- [2] SANS 62262:2004, Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code)
- [3] SANS 60529:2013, Degrees of protection provided by enclosures (IP Code).
- [4] IEC 60695-2-10:2021, Fire hazard testing – Part 2-10: Glowing/Hot-wire based test methods – Glow-wire apparatus and common test procedure.
- [5] SANS 1186-1:2022, Symbolic safety signs – Part 1: Standard signs and general requirements.
- [6] SANS 1195:2021, Busbars.
- [7] SANS 1507-3:2020, Electric cables with extruded solid dielectric insulation for fixed installations (300/500 V to 1 900/3 300 V) Part 3: PVC Distribution cables.
- [8] SANS 60947-2:2020, Low-voltage switchgear and controlgear – Part 2: Circuit-breakers.
- [9] SANS 556:2018, Low-voltage switchgear Part 1: Circuit-breakers.
- [10] SANS 141:2006, Glass-reinforced polyester (GRP) laminates.
- [11] BS 5734-2:1990, Polyester moulding compounds for electrical and other purposes – Part 2: Specification for dough moulding compounds for electrical purposes.
- [12] SANS 1186-1:2022, Symbolic safety signs – Part 1: Standard signs and general requirements.

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- [13] 240-75660817: Standard for non-metallic cable glands
- [14] D-DT-1042: Manufacturing drawings for a 2-way split prepayment kiosk
- [15] D-DT-1043: Manufacturing drawings for a 4-way split prepayment kiosk
- [16] D-DT-1044: Manufacturing drawings for a 6-way split prepayment kiosk
- [17] D-DT-1045: Manufacturing drawings for a 8-way split prepayment kiosk
- [18] D-DT-3055: Pole mount service distribution boxes buyers guide

2.2.2 Informative

None

2.3 Definitions

2.3.1 General

Definition	Description
split payment meter	prepayment meter that consists of a customer interface unit and a measurement unit.

2.3.2 Disclosure classification

Controlled disclosure: controlled disclosure to external parties (either enforced by law, or discretionary).

2.4 Abbreviations

Abbreviation	Description
MCB	Miniature circuit-breaker
IP	Ingress Protection
SMDB	Split Meter Distribution Box
UV	Ultraviolet

2.5 Roles and Responsibilities

The relevant sections within Eskom Distribution are responsible to implement the new design according to the requirements as listed in this document.

2.6 Process for monitoring

Adherence to this document shall be monitored through routine inspections.

2.7 Related/Supporting Documents

Not applicable

3. Requirements

3.1 Pole-mounted Service Distribution Boxes for Split Prepayment Metering

All non-metal pole-mounted service distribution boxes for split prepayment metering shall comply with this standard.

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3.1.1 Service Distribution Box types

- a) Split type 2-way for one phase. It shall be fitted with either one 50A thermal magnetic MCB (20A supplies), one 40A hydraulic magnetic MCB (20A supplies) or two 63A MCBs (60A supplies) with 5kA short circuit breaking capacity, DIN rail to accommodate two split prepayment meters and connection points for 2 customers and a streetlight.
- b) Split type 4-way for one phase: It shall be fitted with either two 50A thermal magnetic MCBs (20A supplies), two 40A hydraulic magnetic MCBs (20A supplies) or four 63A MCBs (60A supplies) with 5kA short circuit breaking capacity, DIN rail to accommodate four split prepayment meters and connection points for 4 customers and a streetlight.
- c) Split type 6-way for two phases. It shall be fitted with either three 50A thermal magnetic MCBs (20A supplies), three 40A hydraulic magnetic MCBs (20A supplies) or six 63A MCBs (60A supplies) with 5kA short circuit breaking capacity for each phase, DIN rails to accommodate six split prepayment meters and connection points for 6 customers and a streetlight.
- d) Split type 8-way for two phases. It shall be fitted with either four 50A thermal magnetic MCBs (20A supplies) or four 40A hydraulic magnetic MCBs (20A supplies) with 5kA short circuit breaking capacity for each phase, DIN rails to accommodate eight split prepayment meters and connection points for 8 customers and a streetlight.
- e) The minimum dimensions for the split meter distribution boxes are given in D-DT-1042, 1043, 1044 & 1045.

3.1.2 Box

- a) The boxes shall be suitable for wood or concrete pole mounting. Stainless steel straps shall be used for securing SMDB around the pole.
- b) The degree of protection for the SMDB shall be IP33.
- c) The SMDB door shall be hinged on top and a sturdy non-ferrous door stay shall be fitted to keep the door in a 110 degree open position.
- d) The door shall be secured through a lock lip on the box and an Eskom padlock. At least one captive screw or locking mechanism shall also be provided for the door to be secured to the SMDB.
- e) DIN rails shall be supplied and fitted with the SMDB.
- f) All rivets, bolts, hinges, washers, set screws, rails and locking mechanisms shall be of a non-ferrous metal such as brass, stainless steel or an equivalent to prevent corrosion of these components.

3.1.2.1 Material

- a) The Material of SMDB shall either be:
 - glass-reinforced polyester (GRP) conforming to the requirements of SANS 141 and BS 5734 (where applicable);
 - polycarbonate;
 - polypropylene or
 - polyethylene
- b) SMDB shall be UV protected. The design of the kiosk shall achieve the required expected service life of minimum 25 years.
- c) The SMDB colour shall be light stone (C37) or light grey (G29) in accordance with SANS 1091.

3.1.3 Mechanical requirements

3.1.3.1 Mechanical impact protection

The degree of mechanical impact protection shall be a minimum of IK 04 in accordance with SANS 62262.

3.1.3.2 Degree of protection

I The degree of protection shall be at least IP 33 in accordance with SANS 60529.

3.1.3.3 Rigidity

When installed under normal service conditions, the kiosk shall not become visibly deformed and shall retain its design and functionality.

3.1.4 Resistance to abnormal heat and fire

3.1.4.1 The non-metallic materials of the kiosk shall comply with the requirements for testing for resistance to abnormal heat and fire according to SANS 62208 and SANS 60695-11-10 respectively.

3.1.4.2 For the glow wire testing the temperature of the tip of the glow wire shall be as follows:

- for parts intended to retain current-carrying parts in position: $(960 \pm 15) ^\circ\text{C}$;
- for all other parts, including parts not intended to retain current carrying parts in position including the earth terminal and parts intended to be embedded in walls which are combustion-resistant: $(650 \pm 15) ^\circ\text{C}$.
- The duration of application shall be $(30 \pm 1) \text{ s}$.

3.1.4.3 For the fire hazard testing the materials shall conform to the requirements for the vertical burning test of category V-0 in accordance with SANS 60695-11-10.

3.1.5 Electrical equipment

3.1.5.1 Miniature circuit breakers

- a) The 20A supplies shall either have a 40A hydraulic magnetic MCB or 50A special curve D thermal magnetic MCB and shall comply with the following:
- DIN rail mounted
 - 5kA short circuit breaking capacity
 - 230V rated voltage
 - The 50A thermal magnetic special D curve MCBs shall comply with the following requirements and SANS 556-1:
 - full discrimination with a 20A standard curve MCB up to 1000A.
 - tripping curve which conforms to the limits given in the graph in appendix A.
- b) The 60A supplies shall either have a 63A hydraulic magnetic MCB or thermal magnetic curve C MCB and shall comply with the following:
- DIN rail mounted
 - 5kA short circuit breaking capacity
 - 230V rated voltage

3.1.5.2 Busbars

- a) Neutral busbar(s) shall be provided and fitted. The current rating shall be as specified in the design drawings. Busbars shall be made of tinned copper.
- b) No earth bar is required for non-steel kiosks.
- c) The busbar(s) to parallel the 63A MCBs shall be insulated and be able to carry 60A continuously.

3.1.5.3 Surge arrestors

- a) Surge arresters complying with the requirements of 240-75660532 shall be mounted in the split prepayment metering pole top box.
- b) They shall be connected between the “LIVE” input terminal of the first meter and “NEUTRAL” bar.

3.1.5.4 Power Supply cables

- a) The distribution box shall be fitted with either 10mm², 16mm² or 25mm² insulated copper supply conductors each 1,5 m long as measured from the bottom of the box. The conductors shall be UV stabilized and in accordance with SANS 1507.
- b) The supply cable connections are in addition to the number of service connections specified. There shall be 2 supply cables for the 2-way (1 phase and 1 neutral), 4 supply cables for the 4-way supplies (2 phase and 2 neutral), 6 supply cables for the 6-way supplies (3 phase and 3 neutral) and 4 supply cables for the 8-way 20A supplies (2 phase and 2 neutral).

3.1.5.5 Internal wiring

- a) The internal wiring shall be from 10mm² insulated copper conductor and as specified in the manufacturing drawings.
- b) The conductor shall be UV stabilized and in accordance with SANS 1507.
- c) The wiring shall be bend as per the manufacturing drawings to accommodate the four terminal, bottom entry split prepayment meters.
- d) The ends of the wiring shall have the insulation stripped off by 10mm ± 1mm for the MCBs and 15mm ± 1mm for the meter and busbar terminals.

3.1.5.6 Cable glands

- a) High strength cable glands for service cable entries, streetlight supply cables and customer supply cables shall be UV-stabilized and suitable for 2.5 -10 mm² concentric cables in accordance with 240-75659670. Cable glands shall comply with Eskom standard 240-75660817.
- b) All bottom cable entries, holes and cable glands shall be sealed or plugged with a stopper or equivalent to mitigate the ingress of dust, insects, and vermin.

3.1.5.7 Smart Split meters

- a) The four terminal DIN-rail mounted smart split prepayment meters shall not be supplied by the manufacturer of the SMDB.

3.2 Type tests

3.2.1 General

All type tests shall be carried out by an accredited laboratory.

3.2.2 Type test requirements

Tests are required for the following as a minimum:

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- a) Mechanical impact protection as per the requirements of paragraph 3.1.3.1
- b) Degree of protection as per the requirements of paragraph 3.1.3.2
- c) Resistance to abnormal heat and fire as per the requirements of paragraph 3.1.4
- d) UV rating. The design of the kiosk shall achieve the required expected service life of minimum 25 years.
- e) Temperature rise - Test certificates, which confirm that there is no heat damage due to temperature rise when the rated current passes through the kiosk. The rated current shall be drawn for 4 h or until the busbar (where installed) temperature stabilizes, whichever is longer. The busbar temperature shall not exceed 70 °C and the test shall be performed at an ambient temperature of 25 °C.

3.3 Marking, Labelling and Packaging

- a) Labelling and marking on the SMDB shall be in English.
- b) A danger sign of minimum size 100 mm × 60 mm shall be supplied on the door and shall form an integral part of the lid. The sign shall be as specified in table 7, WW7 of SANS 1186-1:2011.
- c) The words "Danger, Gevaar, Ingozi" shall appear as part of the danger sign.
- d) The sign shall be weather proof and UV-stable.
- e) The SMDB shall be marked legibly and indelibly with the manufacturer's name and the month and year of manufacturing (inside).
- f) The products shall be individually wrapped and sealed.
- g) The labelling and markings provided on each product shall clearly permit identification of the item.
- h) The packaging provided shall not damage the products during normal transport, handling, or storage.
- i) The top and sides of the products packaging provided shall be cling wrapped suitably.
- j) The packaging labelling and markings provided on the outside shall clearly permit identification of the items during normal transport, handling, or storage.

4. Authorisation

This document has been seen and accepted by:

Name and surname	Designation
Andreas Beutel	MV and LV services SC Chairperson
Edison Makwarela	Metering SC Chairperson

5. Revisions

Date	Rev	Compiler	Remarks
Jul 2023	4	Henri Groenewald	The standard was revised to be in alignment with the new requirements of NRS056 part 1 which will supersede NRS032 (old standard referenced in the previous version of this document). Par 3.1.2.1 Specified the various materials for the kiosks. Par 3.1.3 Added mechanical requirements. Par 3.1.4 Added requirements for resistance to abnormal heat and fire (aligned with SANS 62208). Par 3.2 Added type test requirements. Par 3.3 Additional requirements specified.
Jan 2020	3	Henri Groenewald	Technical content changed to reflect the new revised designs of the split prepayment kiosks.
March 2017	2	Jutas Maudu	Document content transferred from old template to latest SCOT template, no technical changes on the document
Feb 2014	1	Jutas Maudu	Document reformatted. No content change. This Document supersedes Document number: DSP_34-2024
Nov 2012	1	Jutas Maudu	Final Document approved Draft Document for review created from DSP 34-2024

6. Development team

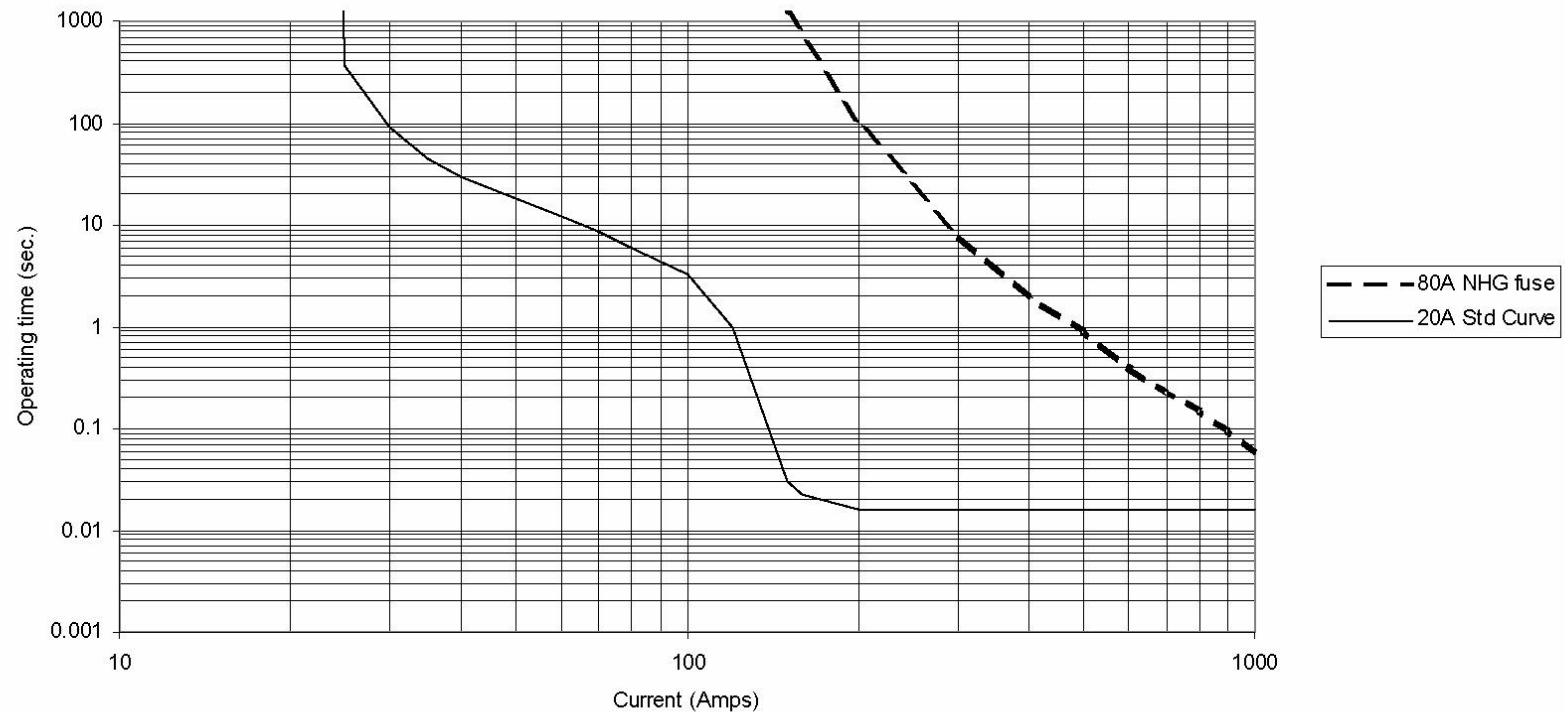
The following people were involved in the development of this document:

- Metering panels care group
- LV services care group

7. Acknowledgements

Not applicable.

Annex A – : 50A MCB tripping curve limits



10 100 1000 Current (Amps)

The 50A MCB must have a tripping curve range between the upper limit of a 20A curve MCB and the lower limit of a 80A NHG fuse.

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