

	CENTRAL REGION TECHNICAL BULLETIN		
Document classification:	Controlled Disclosure		
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Title: Combi Unit Application Guide

1. Background

The Combi Unit has been evaluated and accepted by IARC as an optional technology that can be used on Eskom Distribution networks.

Eskom Distribution Central Region acknowledges the benefit that can be realised by the use of this new technology on certain installations, but also realised the need for a controlled approach in the use of the Combi Units to maximise the benefits, hence the release of this guide.

2. Purpose

This document is intended to offer guidance to Eskom Distribution Central Region's Project Engineers, Plant Engineers and Field Service Engineers on where the installation of the Combi Units can offer maximum benefit.

3. Applicability and Responsibilities

This Technical Bulletin is applicable to all Eskom Distribution Project Engineers, Plant Engineers and Field Services Engineers and external contractors who build new MV overhead distribution lines or does maintenance work on MV overhead distribution lines throughout Central Region.

4. Normative and Informative References

The following documents contain provisions that, through reference in the text, constitute requirements of this document. At the time of publication, the editions indicated were valid.

All standards and specifications are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the documents listed below.

Information on currently valid national and international standards and specifications can be obtained from the Information Centre and Technology Standardization Department at Megawatt Park.

DSP 34-1962: Rev 0: *Specification for a combined cut-out fuse and drop-out surge arrester unit*

D-DT-1876: Rev 0: *Equipment Links – Combi unit on H-pole structure*

D-DT-1877: Rev 0: *Equipment Links – Combi unit on single pole structure*

D-DT-3158: Rev 0: *Combined cut-out fuse and drop-out surge arrester Buyers Guide*

4. Terminology and Abbreviations

Combi Unit: Combined cut-out fuse and drop-out surge arrester unit

GLD: Ground Lead Disconnecter

PMT: Pole-mounted Transformer

6. Instruction

6.1 Operation

The combined cut-out fuse and drop-out surge arrester unit, referred to as the Combi Unit, is a device that has the functionality of a standard cut-out fuse (as defined in DSP 34-416), as well as the functionality of a distribution class drop-out surge arrester (as defined in DSP 34-417), built into a single device.

In the event of a surge arrester failure, the GLD of the surge arrester operates and the failed arrester drops out, disconnecting it automatically from the network. This, at the same time, causes the fuse carrier to also drop out automatically and thereby isolating the affected phase of the PMT from the network. See figure 1 and figure 2 below.

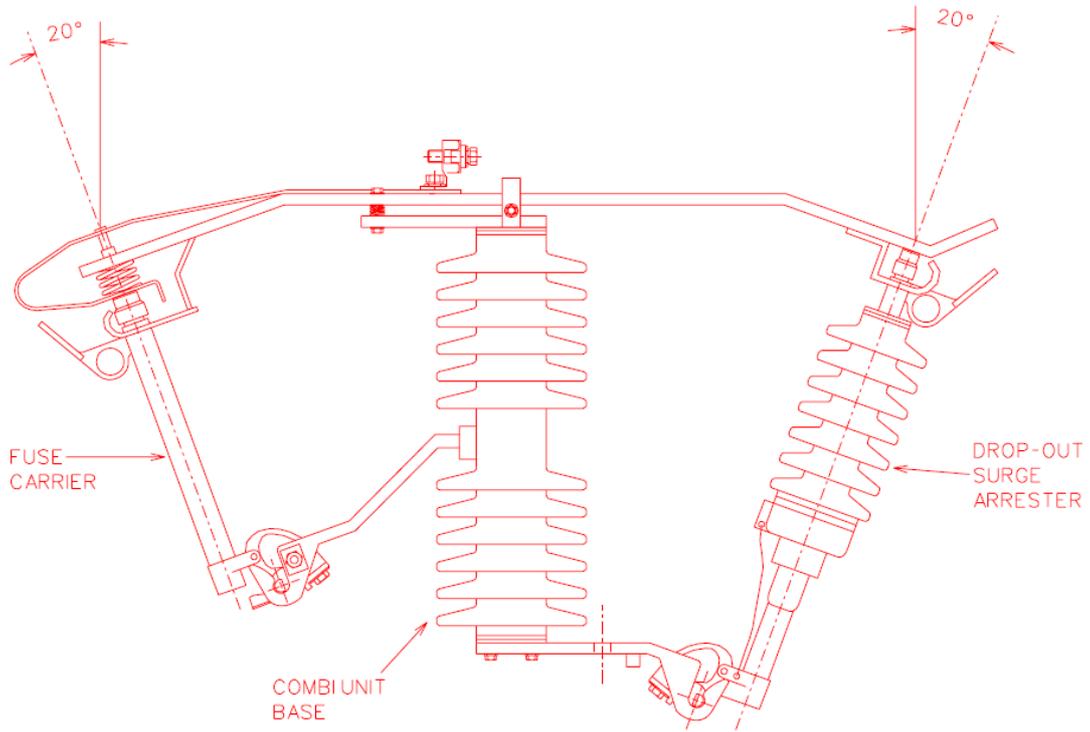


Figure 1: Combi unit Assembly Drawing

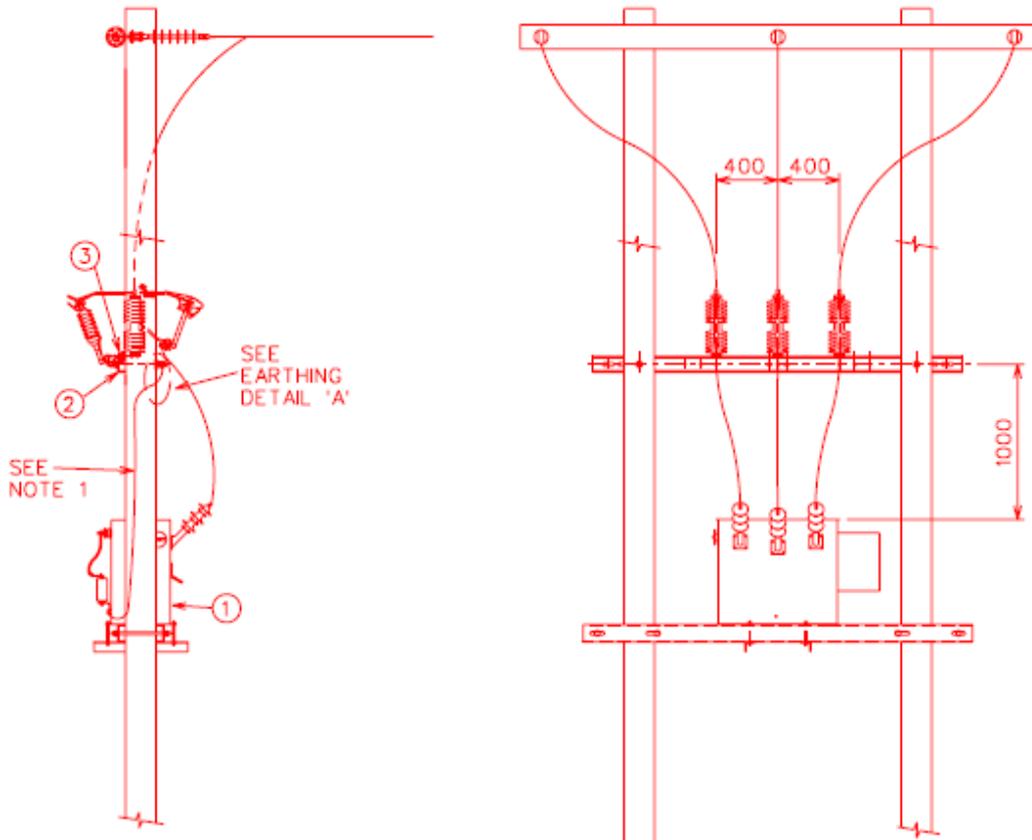


Figure 2: Combi unit Assembly Drawing on H-pole structure

If Combi Unit is to be installed in an area where there are high incidents of copper theft, copper-clad steel earthing down-wire (or the new wooden poles with concealed earthing down-wire) should be used.

Ensure MV earthing resistance is $\leq 30\Omega$, otherwise the MV fuses shall not clear MV earth faults occurring below them, PMT internal fault and LV faults fast enough and might result in the operation of upstream PMB or feeder breaker.

Combi Unit protects against lightning surge related failures only and is not overload protection equipment.

6.2 Application guide

The installation of Combi Units is recommended on PMT installations where:

- Installation that has back-up power supply, e.g. Telecommunication towers that are difficult to access.
- Very few customers will be affected by a power outage, due to failed surge arresters and subsequent Combi unit operation.
- On MV rural feeders or isolated transformer installations where line inspections are difficult to conduct and done very far apart due to excessive length of the feeder or difficult terrain conditions.
- On smaller sizes of PMTs that have a history of repeated transformer failures.
- On all transformers sizes $\geq 100\text{kVA}$ that have a history of blown fuses and surge arrester failures, provided these units do not have many customers connected to them, e.g. water / irrigation pumps.
- Install Combi Units on transformer installations of rural feeders that have no 500mm B.I.L Gap and down-wires to drain lightning surge.
- Install Line Surge Arresters, one span away or before the transformer installation that's fitted with a Combi Unit.

The rationale behind this is to ensure that there are reduced lightning surges to be drained by the Combi Unit's surge arresters thus reducing their risk of failure or operation of the combi unit's surge arresters and thus lessening the risk of the potential power outage.

- A Combi Unit can be installed to protect a short tee-off that has very few transformers (1-5 small transformers with a limited number of customers) connected to it. In this instance the MV fuses of the Combi Unit should be replaced with a solid link or select the rating of the MV fuses as per group fusing requirements stated in Table 5 of D-ST 34-1198: Rural Network Protection Philosophy.
- No Combi Unit is to be installed without assessing its impact on SAIFI and SAIDI.
- Installation of Combi Units in urban electrification areas is not recommended. Such areas have a high number of surge arresters per km² and generally have adequate B.I.L co-ordination.

Anticipated cause of PMT failures in such areas is due to PMT overload than lightning surges.

- In electrification of rural areas, Combi Units can be installed on transformer installations that Plant has identified to be located in areas where there's high flash density, based on a FALLS case study.

7. Revisions

Date	Rev.	Compiler	Remarks
Sept '11	0	BB Mofu	Document's first issue

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