



Technical Bulletin

TB 0250 - HV fuses in metal clad switchgear

Purpose

To clarify the requirements of high voltage (HV) fuses in metal clad distribution switchgear. This document addresses an issue where old Holec MD4 HV switchgear fuses are being installed in metal-clad switchgear.

Background

Current limiting HV fuses are used in switchgear to protect the network from downstream faults. It has been identified that employees retrofitting Holec MD4 HV switchgear with metal-clad switchgear are re-using the old fuses. Some older fuses are not suitable for metal-clad switchgear.

There are various types of HV fuses currently installed in the distribution network as follows:



Figure 1 - Fuses with open end caps with striker



Figure 2 - Fuses with one end open, the other closed with striker



Figure 3 - Fuses with closed end caps with striker

The fuse in Fig. 1 is not suitable for metal-clad switchgear, as the striker will not strike the plunger of the metal clad switchgear when released during a fault. This is because the striker travel distance is insufficient outside the external envelope of the fuse (Fig.5). The fuses shown in Figures 2 and 3 have sufficient striker travel distance. In the event of a single phase fault the fuse in Fig. 1 will not trip all three phases of the metal-clad switchgear. The transformer will be operating on 2 phases instead of 3. This increases the negative sequence current and can cause overheating of 3 phase equipment.



Figure 4 - Fuse holder with plunger



Figure 5 - Fuse (Fig 1) striker insufficient travel

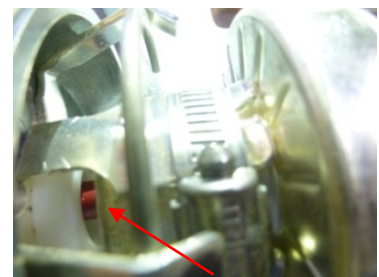


Figure 6 - Fuse (Fig 3) strikes the plunger

Actions

The following need to be adhered to when replacing fuses in distribution switchgear used in the distribution network:

- (i) When Holec switchgear is retrofitted with metal clad switchgear, **new fuses** must be used. The fuses in all phases should be of the same fuse rating, the same model or type and be from the same manufacturer. Refer to Table 1 for the relevant fuse sizes and Table 2 for the stock codes.
- (ii) Regions to identify substations where the fuse in Fig. 1 has been used on metal-clad switchgear during inspections and operation. An outage must be arranged to replace with new fuses.
- (iii) Removed HV fuses which are in good condition must be returned to the Testing & Instrument section in Glendenning. Only fuses that have been tested and deemed acceptable are allowed to be re-used in the distribution network.
- (iv) When one or two phases of a HV fuse installation are blown, replace all three (3) phases.

Table 1: Fuse sizes for distribution transformers

Transformer size (kVA)	11kV	22kV
300 - 315	50 Amp	25 Amp
500	63 Amp	32 Amp
750 -1000	100 Amp	50 Amp
1500	Circuit breaker	

Table 2: HV fuse stock codes

Stock code	Description
SF19024	12kV 50A Back up fuse DIN 292mm
1013956	12kV 63A General purpose fuse DIN 292mm
SF19059	12kV 100A Back up fuse DIN 292mm
SF19225	24kV 25A General purpose fuse DIN 442mm
SF10730	24kV 31.5A Back up fuse DIN 442mm
—	24kV 50A Back up fuse DIN 442mm

Future initiatives

Substation Design - Protection is currently reviewing the fuse sizes and types to be used in the distribution network based on current standards. An update will be provided once this review is approved.

Contacts

For further information contact:

Raymond Danam, Engineer – Distribution Substation Assets, (98534129 / 0423842533)

Beau Radford – Field Operations Manager, (98534085 / 0409772059)

Ken Duck – Operations Manager Testing & Instruments, (98537112 / 0418213927)