

Engineering Instruction Electrical Distribution Unit	EI D 18-20
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This Engineering Instruction includes urgent engineering information. Adherence to the information in this Instruction is <b>MANDATORY</b> .	
<b>Locking of Hawker Siddeley SafeBond Switchgear Disconnecter</b>	
Audience: <ul style="list-style-type: none"> <li>Network Maintenance Division</li> <li>Infrastructure and Services Division, TfNSW</li> </ul>	Main Points: <ul style="list-style-type: none"> <li>Replacement of locks on the Locking mechanism of the Rail Connection Function</li> </ul>
Primary Affected Document: PR D 78105 DANGER Tags for Electrical Equipment PR D 78104 Locking Systems for Electrical Equipment	

## Scope

This Engineering Instruction sets out the requirements to remove the current metallic lock attached to the SafeBond Disconnecter (rail connecting function) and replace it with a non-metallic fastener (cable tie) and Danger Tag.

## Background

TfNSW via the Power Supply Upgrade program has introduced new DC switchgear into the network. The new switchgear (Hawker Siddeley SafeBond) incorporates a motorised rail connection feature (with an alternate manual drive) for use in future remote 1500V rail connection operations.

To prevent inadvertent operation of the manual drive, an access cover secured in position by a metallic padlock is fitted to the SafeBond Disconnecter.

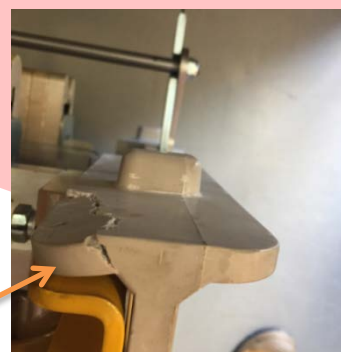
During commissioning this has been locked with a special metallic padlock and associated danger tag by commissioning staff as per the manufacturer's manual.

Rail connecting is still carried out via separate facilities per PR D 78305.

Two known incidents occurred, involving the metallic padlock

- the metallic padlock may impact on the frame of the breaker

Damaged Frame at rear of switchgear



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2. the metallic padlock has the potential to create a flash over within the breaker

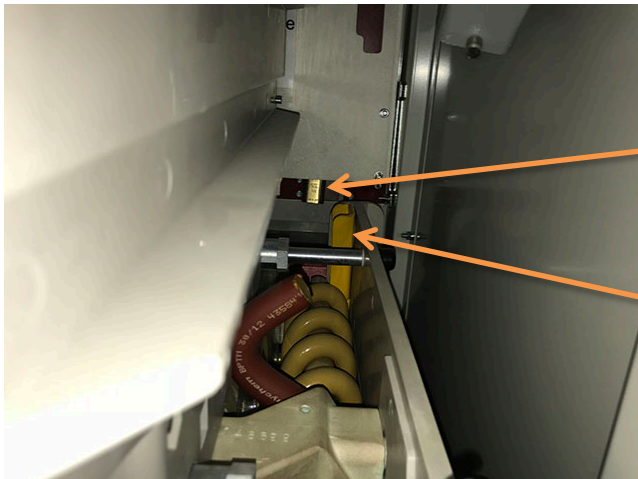
### Cubicle Shutter barrier Raised



### Cubicle Shutter Barrier Lowered



### Cubicle HSCB Racked In



Padlock and associated danger tag to be replaced

Live 1500V DC

## Action required

1. All Hawker Siddeley Lightning Switchgear shall be inspected for damage to the frame.
2. All Locks and Danger Tags applied to the Hawker Siddeley Switchgear SafeBond Disconnecter access cover shall be replaced with a non-metallic cable tie with the tail cut off and a Danger Tag secured in such a manner that it cannot protrude beyond the shutter barrier when raised.
3. Prior to racking in the DCCB truck, check for foreign objects e.g. spanners.
4. Review and update Equipment Local Instructions on securing and restoration process of Hawker Siddeley Lightning Switchgear.

## Contact

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Engineering Procedure  
Electrical Distribution Unit

PR D 78105

# DANGER Tags for Electrical Equipment

Version 1.1

Date in Force: 28 October 2016

# Procedure

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## Document control

Version	Date	Author/ Prin. Eng.	Summary of change
1.0	18 August 2015	Chris Leung	First issue as a Sydney Trains document, rebranded from previous RailCorp SMS-06-EN-0599 V1.2
1.1	28 October 2016	Chris Leung	Updated DANGER Tag example and references.  Clarified options for entering details for describing work location and time.  Updated references from EOC / Electrical Operating Centre to ICON.

## Summary of changes from previous version

Summary of change	Section
<i>Updated DANGER Tag example</i>	4
<i>Where practicable for work location details, there options for WHVIs to enter "as per WHVI" and for 1500V Authoritys to enter "as per Authority"</i>	4
<i>Entering "time" attached has the option "where practicable"</i>	4

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## 1. Purpose and scope

To describe the requirements and correct procedure for using Transport for NSW DANGER Tags relating to electrical equipment.



### **Warning**

*This document is concerned with Transport for NSW DANGER Tags ONLY.*

*DANGER Tags applied by another entity shall be dealt with as per the safety rules of that entity unless its removal is required due to an emergency condition where there is danger to life, a sustained fault, or a train operation irregularity and upon the direction of Infrastructure Control (ICON).*

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## 2. 'Danger Do Not Operate' tags (DANGER Tags)

'Danger Do Not Operate' tags (DANGER Tags) serve as a warning that the electrical equipment to which they are attached shall not be operated. DANGER Tags are placed for the safety of persons. They are used for electrical equipment rated at low voltage, 1500V DC or high voltage.



### **Warning**

*DANGER Tags shall not be interfered with or removed without the proper authority. (Refer Section 5)*

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When electrical equipment is being taken out of service or being worked on in a de-energised state, all devices providing the isolating breaks shall be secured in the open position and shall be DANGER Tagged to warn persons that the isolating devices shall not be operated or interfered with.

When an isolating device can also be operated by remote control, the remote control shall be rendered inoperative, and the means of ensuring that it remains inoperative DANGER Tagged.

DANGER Tags shall also be used when it is required to secure a switch in the closed position for the safety of personnel.

DANGER Tags shall also be used to prevent the inadvertent operation of any equipment that is out of service.

If a device is used to provide isolating breaks for more than one isolation at the same time, a separate DANGER Tag shall be used for each isolation for which the isolating break is required, and all associated remote controlling devices.

Where a facility exists to lock an isolating device, it shall be used.

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**NOTE**



*It may be necessary to apply some form of external adaptor or lockout device to the isolator to facilitate the attachment of the isolation-securing device or devices.*

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**Warning**

*No person shall operate an isolator or knowingly use equipment to which an isolation-securing device or DANGER Tag is attached.*

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**Warning**

*A DANGER Tag shall **not** be placed as a marker to indicate switches that are to be operated in the future.*

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## 2.1. Additional requirements for Low Voltage equipment

When the work is being done on Low Voltage equipment by Authorised Persons who are taking responsibility for their own safety and a LV Access Permit is not required, then a separate DANGER Tag shall be placed by each person.

When the work is being done on Low Voltage equipment by a work party supervised by an Authorised Person who is taking responsibility for the safety of the work party and a LV Access Permit is not required, then a separate DANGER Tag shall be placed by each supervising Authorised Person.

## 3. Attachment of DANGER Tags

### 3.1. General requirements

DANGER Tags shall be:

- affixed only after the device is in the required state, and
  - placed so that it cannot be removed other than deliberately, and
  - positioned so that it is obvious to any person who may attempt to operate the device, and
  - affixed to switch tabs, mesh screens or cubicle handles with a Special Lock, and
  - affixed to indoor control panels with either a Special Lock, an approved magnetic holder or with adhesive tape if that is impracticable.
- 



**Warning**

*Minimum Safe Approach Distances from exposed electrical equipment shall be maintained when placing DANGER Tags.*

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If it is impracticable or unsafe to attach a DANGER Tag directly to a device, the DANGER Tag shall be attached as close as practicable to the device to ensure that an operator will see it.

In a secured substation only, if a Special Lock is unavailable to attach the DANGER Tag, a cable tie or adhesive tape can be used as a short-term interim measure until the operator returns with a Special Lock.

Where it is necessary to attach additional DANGER Tags to an item of equipment that is already DANGER Tagged, subsequent DANGER Tags shall not obscure those tags already in place. For example: If two tags are attached with a single Special Lock, they should be placed at either side of the equipment attachment point on the padlock shackle.

### **3.2. Specific requirements**

In the case of withdrawable type 1500V DC circuit breakers, which are fully withdrawn, the DANGER Tag or other suitable warning notice shall be placed on the special barrier across the cubicle.

In the case of withdrawable type HV or LV circuit breakers, which are fully withdrawn, the DANGER Tag or other suitable warning notice shall be placed over locked circuit breakers cubicle door.

Where an air break switch provides the isolation, it shall also be locked with a Special Lock and DANGER Tagged.

Where isolation is made to a ground-mounted transformer, such as a voltage transformer, by removal of HV fuses, a DANGER Tag shall be attached by a Special Lock to the enclosure fence directly opposite the HV fuses where the operator stands with the insulated operating stick.

Isolations on poles affected by the operation of either:

- isolating links and fuses operated using a portable insulated operating stick, or
- the removal of jumpers,

shall be DANGER Tagged by hanging a Special Lock and DANGER Tag on the lowest pole step.

In the case of links in outdoor areas, the DANGER Tag shall be attached by a Special Lock to the barrier of the links or to the DANGER Tag attachment point below the link when provided.

In the case of links in indoor areas, the DANGER Tag shall be attached by a Special Lock to the metal cage directly underneath the link, or where bus and/or feeder links are installed in the ceiling over the circuit breaker the DANGER Tag shall be attached to the associated circuit breaker.



At some locations where Isolating and Rail Connecting Switch Pairs are installed, the top of the surge arrester is installed within the minimum SAD of 500mm from a tab which could be used to apply a Special Lock and DANGER Tag. The use of this tab for such a purpose is potentially unsafe. (This matter was addressed in ETN 07/03.) This type of tab shall not be used, regardless of the location of the surge arrester. Refer Figure 1 below. As it is essential to maintain the minimum SAD of 500mm, in such cases, the Special Lock and DANGER Tag shall be attached to the front barrier cage of the relevant switch.

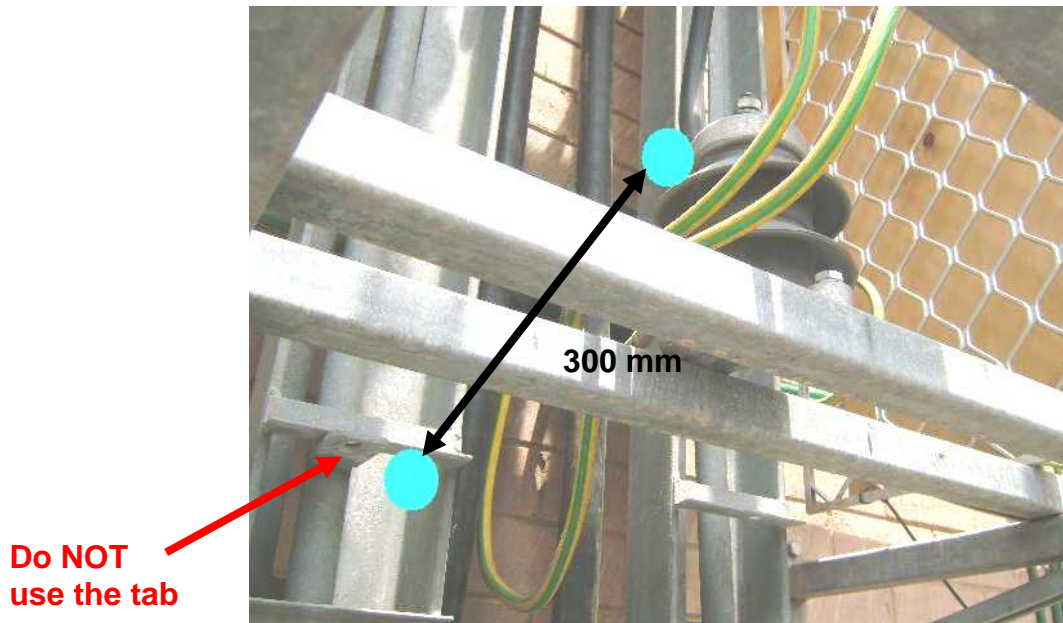


Figure 1 Example of non-complying SAD



**NOTE**

Refer to PR D 78104 Locking Systems for Electrical Equipment for details regarding Special Locks.

#### 4. Information to be included on a DANGER Tag



Figure 2 Example front and back of a 'blank' DANGER Tag (Stock Code: 001874965)

The DANGER Tag (typical one shown in Figure 2) when completed shall specify:

- according to the type of work and work location:
  - for work outside a substation, the WHVI, Authority, or Low Voltage Access Permit number when issued, or

- for work on negative connections outside the substation at which the DANGER Tag is being placed, the Substation Access Permit number, or
  - for work inside the substation at which the DANGER Tag is being placed, the Substation Access Permit number, or
  - for work inside a substation other than at the substation at which the DANGER Tag is being placed, the name of the Substation at which the work is being carried out and the Substation Access Permit number, or
  - for work when a WHVI, Authority, or Low Voltage Access Permit is not issued, enter N/A.
- who holds the WHVI, Authority or Permit, or N/A,
  - equipment identifier (description and number),
  - work location (include where practicable):
    - the Electrical Safe Work Area
    - for WHVIs enter "as per WHVI"
    - for 1500V Authoritys enter "as per Authority"
  - name of the person who attached the DANGER Tag,
  - date attached, and
  - time attached (include where practicable)

As the DANGER Tag contains important electrical safety information, it is essential to ensure that details shown shall not fade for the entire duration of DANGER Tagging, especially in an outdoor environment.

This can be achieved by:

- using a fine point permanent marker pen for entering details on the DANGER Tag, or adopting other appropriate measures (eg laminating) to ensure that the details remain legible, if the DANGER Tag is to be in place for an extended period.

## 5. Removal of a DANGER Tag

### 5.1. General

A Transport for NSW DANGER Tag shall be removed only on the direction from:

- ICON after the associated WHVI, or the associated Authority is cancelled, or
- The Authorised Person who is cancelling the Substation Access Permit, or Low Voltage Access Permit, or
- ICON, if the isolation is to be extended to allow further work to be undertaken.

### 5.2. Additional LV specific requirements

When a Low Voltage Access Permit has not been issued:

- (i) The DANGER Tag shall only be removed by the person who attached it, or

- (ii) The DANGER Tag shall only be removed by an Authorised Person who has completed the LV switching operations competency standard unit (CSU) (refer to PR D 78701) who shall ensure that it is safe to do so, or
- (iii) When the DANGER Tag is not removed by the person who attached it, the authority to remove it shall first be obtained from one of the following persons:
  - the person who affixed the DANGER Tag, or
  - the recognised relief of the person who affixed the DANGER Tag, or
  - the Controlling Officer of the person who affixed the DANGER Tag.

### 5.3. Additional 1500V DC specific requirements

A DANGER Tag shall be removed only on the direction from ICON if the DANGER Tag has been placed on:

- a Combined Isolating & Rail Connecting Switch (3 Position) that has been placed in the “OPEN” position as an intermediate step in preparation for operating the switch:
  - to the “TO RAIL” position or
  - to the “CLOSED” position and

then place a DANGER Tag on the switch

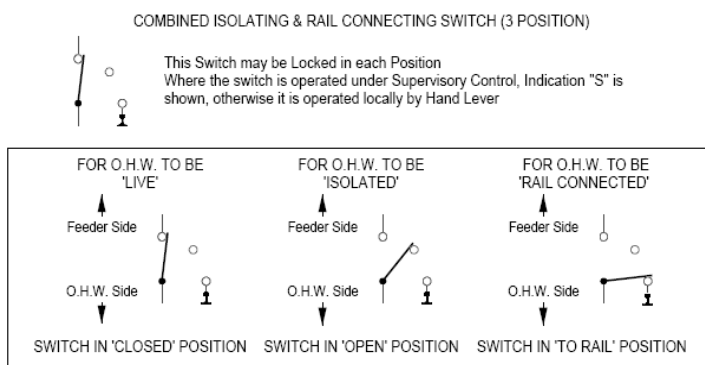
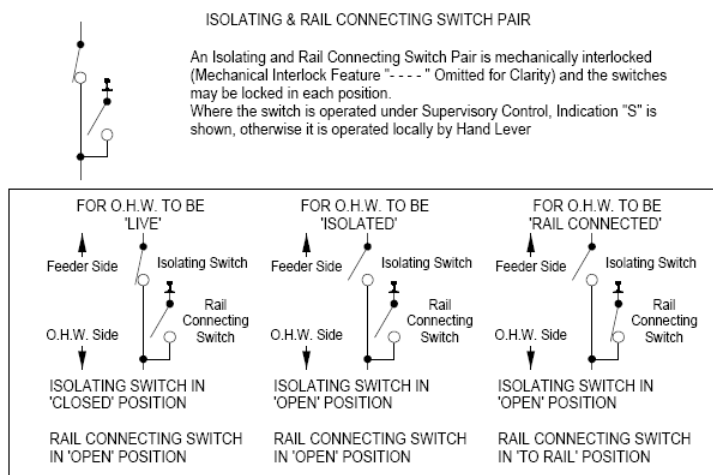


Figure 3 From DC Symbols Legend (EDMS EL 0120394 (GIS))

- an Isolating & Rail Connecting Switch Pair:
    - that has been placed in the “OPEN” position on the Isolating and Rail Connecting Switch to “To Rail” position on the Rail Connecting Switch or
    - from “To Rail” position on the Rail Connecting Switch, to the “OPEN” position on the Rail Connecting Switch; and
- then place a DANGER Tag on the “OPEN” Isolating Switch.



**Figure 4 From DC Symbols Legend (EDMS EL 0120394 (GIS))**



**Warning**

*When there is more than one DANGER Tag attached to a device, care shall be taken that only the correct DANGER Tag is removed.*

*Each and every Transport for NSW DANGER Tag to be removed is to be correctly identified by “linking” the WHVI, Authority or Permit Number on the Transport for NSW DANGER Tag to the WHVI, Authority or Permit Number on the cancelled WHVI, Authority or Permit.*

*ICON shall state to the person removing the Transport for NSW DANGER Tag, the WHVI or Authority number which is related to the particular Transport for NSW DANGER Tag to be removed.*

*DANGER Tags applied by another entity shall be dealt with as per the safety rules of that entity unless its removal is required due to an emergency condition where there is danger to life, a sustained fault, or a train operation irregularity and upon the direction from ICON.*

**6. References**

- AS/NZS 4836:2011 Safe working on or near low-voltage electrical installations and equipment
- PR D 78102 Electrical Hazards and Warnings
- PR D 78104 Locking Systems for Electrical Equipment
- PR D 78203 High Voltage Operating Procedures
- PR D 78305 1500 Volt Operating Procedures
- PR D 78401 Isolation and Energisation of Low Voltage Equipment
- PR D 78710 Working around Electrical Equipment
- PR D 78701 Personnel Certification – Electrical Authorisations

- WorkCover Code of Practice - Low Voltage Electrical Work 2007
- DC Symbols Legend (EDMS EL 0120394 (GIS))

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