

## **Guidance and requirements for the use of Substation Integral Disconnectors, V1.0**

### **1. Background**

Many of Network Rail's 25kV substations contain switchgear that has features that can be used today to provide Points of Isolation when implementing OLE isolations but that, historically, have not been used consistently around the network.

In order to make best and consistent use of the substation switchgear, improve safety and in readiness for improvements in the securing arrangements of isolations, it has been decided to update the Isolation Diagrams and Instructions for those parts of the network where the required substation switchgear functionality is available.

Requirements and guidance for the use of substation switchgear that has remotely operable disconnectors and earthing facilities is as follows.

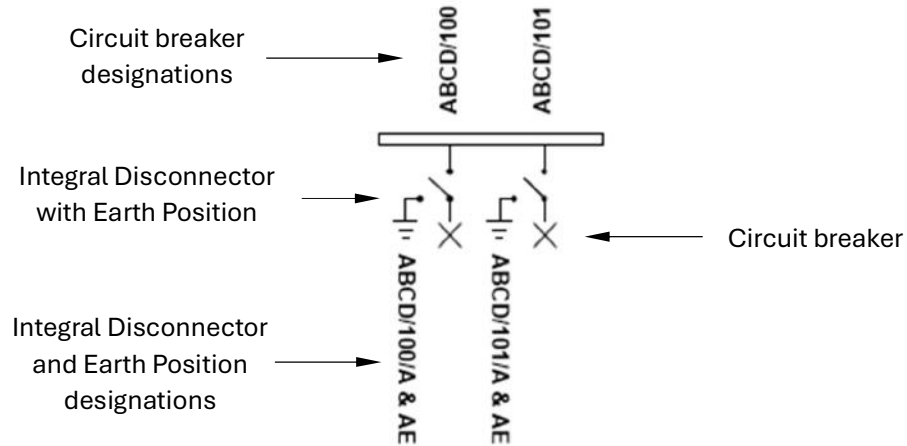
### **2. Overview and common requirements**

2.1 Where a traction substation has switchgear with remotely operable "integral"<sup>1</sup> disconnectors that can be used for OLE isolations, these integral disconnectors are identified on the Isolation Diagrams. The integral disconnectors are also listed separately in the Isolation Instructions when they are to be used to provide a Point of Isolation. Switchgear integral disconnectors that are not specifically used for OLE isolation purposes are not shown on the isolation diagrams.

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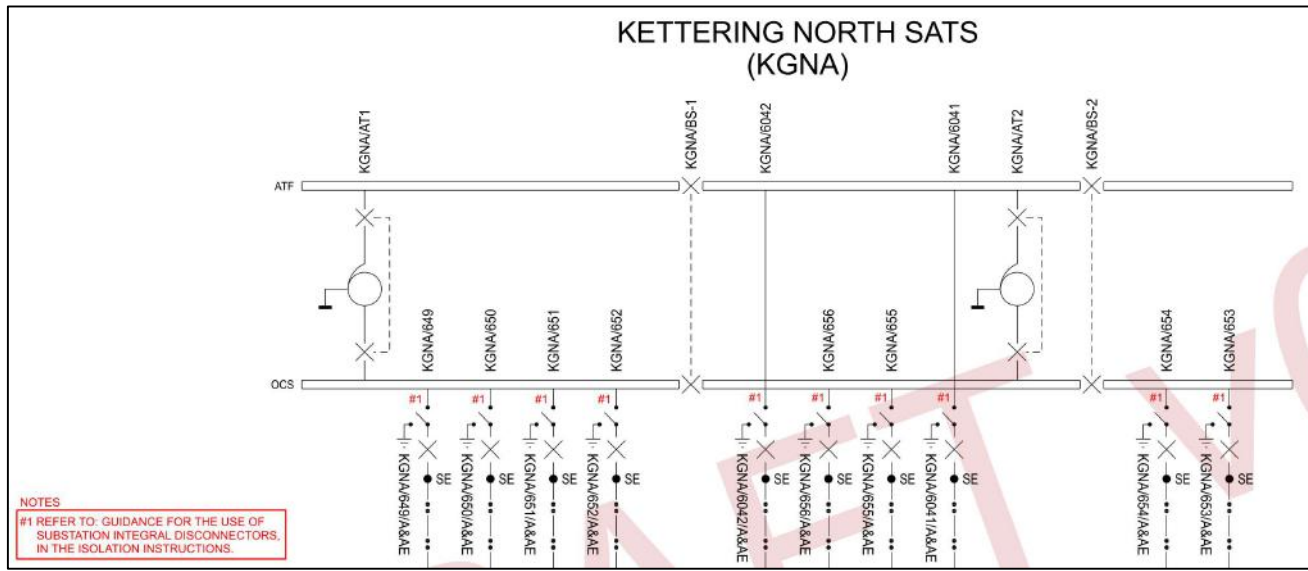
<sup>1</sup> Most substations with indoor switchgear have the disconnectors as an internal integrated component. However, there are some substations with switchgear that has physically separate devices that provide the required disconnector functionality. For this the purposes of this guidance, 'integral' applies to both these types of switchgear.

The figure below illustrates how the designation numbers are represented on the diagrams for the circuit breakers and an integral disconnector with an earth position.



**NOTE 1:** The isolation diagrams show a combined designation for the integral disconnector and earth position. In this example the individual designation number for one of the disconnectors is ABCD/100/A and the designation number for its corresponding earth position is ABCD/100/AE.

The figure below shows an extract of an isolation diagram showing the integral disconnectors and the associated note relating to this guidance.



2.2 Where implemented on a route section, an updated format of the isolation instructions now identifies Points of Isolation for each applicable electrical section and sub-section. For isolations that comprise a combination of electrical sections, only the Points of Isolation that separate the combined isolated sections from live equipment are applicable. The figure below shows an extract of the new format isolation instruction sheet.

Electrical Section or Sub-section	Lines Isolated	Limits of Isolation		Circuit Breaker / Disconnector (Switch)			Remarks
		From	To	Operate Remotely	Operate Manually	Point of Isolation	
<b>650 (Complete)</b>	<b>Down Slow</b> <b>Down Corby</b>	<u>Down Slow</u> SPC3/110/24	<u>Down Corby</u> SPC3/119/780	KGNA/650 KGNA/650/A HAAA/650 HAAA/650/A		HAAA/650/A KGNA/650/A <u>646C</u> 650A <u>650C</u> 654A	For this isolation, switch Nos. <u>646C</u> and <u>650C</u> MUST <u>650A</u> <u>654A</u> be in their normally open positions.
<b>650A</b>	<b>Down Slow</b>	SPC3/110/24	SPC3/113/464	KGNA/650 HAAA/650 HAAA/650/A	<u>650</u> 2	HAAA/650/A <u>646C</u> 650A <u>650</u> 2	For this isolation, switch No. <u>646C</u> MUST <u>650A</u> be in its normally open position.

Where the remarks column contains normally open or alternative feed lineside disconnector(s) which will be providing a point of isolation then these are now shown additionally within the Point of isolation column.

### 3. Instructions to Electrical Control Operators (ECOs)

- 3.1 Where remotely operable substation switchgear is to be used to effect an isolation and the Point of Isolation is a remotely operable integral disconnector, as set out in the Isolation Instructions, then Part 1 of the ECO's Form B shall quote the integral disconnector designation and the other devices providing Points of Isolation (subject to 3.6).
- 3.2 In accordance with 4.1 of Module 03 of the National Electrical Control Room Instructions, where a substation integral disconnector with an earth position is shown on the Isolation Diagrams, as depicted in section 2 above, the ECO shall apply the earth when the integral disconnector is used as a Point of Isolation.

**Note 2:** The ECO is required to confirm that the section is de-energised before closing the circuit breaker to apply the earth.

**Note 3:** This remotely operable earth will provide an extra earth to the isolated area, which provides additional safety mitigations, and will be in addition to normal earthing arrangements as set out in NR/L3/ELP/29987 or NR/L3/ELP/SAI25 (where deployed).

**Note 4:** There is no requirement for the ECO or Nominated Person (NP) to record this extra earth on Part 2 the Form B.

- 3.3 The application of the remotely operable integral earth(s) shall not be included as part of the exchange of details between the ECO and the NP when confirming the devices effecting the isolation in Part 1 of the Form B.
- 3.4 Where the Switching Details Form is not used, ECOs may use Part 1 of the Form B to record the application and removal of the remotely operable earths.
- 3.5 Where substation switchgear has remotely operable integral disconnecter and earthing facilities that are not used as part of routine isolations (in accordance with the Isolation Diagrams and Instructions), these integral devices shall continue to be used to apply an earth in the event of an Emergency Switch Off scenario.
- 3.6 Normally open or alternative feed lineside disconnecter(s) that are identified as providing a point of isolation shall NOT be recorded in Part 1 of the Form B as devices effecting the isolation.
- 3.7 In line with existing processes, there is no requirement for isolation staff to attend normally open or alternative feed lineside disconnecter(s) when they are identified as providing a point of isolation unless it is confirmed by the ECO that they are not in their normal position.
- 3.8 The requirements and guidance in 3.1 to 3.1 do not apply to the operation of SCADA controlled remotely operable earthing devices that are standalone or associated with remotely operable lineside disconnectors as part of a planned earthed isolation of part electrical sections.
- 3.9 However, SCADA controlled remotely operable earthing devices should continue to be used to apply an earth to the OLE as part of the response to an Emergency Switch Off in accordance with the Electrical Control Room Instructions.

#### **4. Instructions to Nominated Persons**

- 4.1 Where remotely operable substation switchgear is to be used to effect an isolation and the Point of Isolation is a remotely operable integral disconnecter, as set out in the Isolation Instructions, then Part 1 of the NP's Form B shall quote the integral disconnecter designation and the other devices providing Points of Isolation (subject to 4.3).
- 4.2 Earthing shall be in accordance with the requirements of NR/L3/ELP/29987 or NR/L3/ELP/SAI25 (where deployed). The application of a remotely operable earth using a substation switchgear integral device by the ECO is an extra earth that provides additional safety benefits but does not need to be recorded by the NP on any part of their copy of the Form B or the Isolation Details Form (IDF/ EIDF (in SAI25 areas)).
- 4.3 Where normally open or alternative feed lineside disconnectors are identified as providing a point of isolation then these shall NOT be recorded in Part 1 of the Form B as devices effecting the isolation.
- 4.4 In line with existing processes, there is no requirement for isolation staff to attend normally open or alternative feed lineside disconnectors are identified as providing a point of isolation these lineside disconnecter(s) unless informed by the ECO that they are not in their normal position.

#### **5. Instructions to ECOs and Nominated Persons**

- 5.1 When implementing an isolation, if there is a reason why the substation switchgear remotely operable integral disconnecter cannot be used as the Point of Isolation then, subject to the ECO receiving positive indication from the SCADA system, the circuit breaker associated with the integral disconnecter that has become unavailable should be used as the Point of Isolation instead.
- 5.2 In the unlikely event of an issue with the circuit breaker, a different circuit breaker/integral disconnecter or a lineside disconnecter<sup>2</sup> may be used as the Point of Isolation.
- 5.3 The ECO and the NP shall come to a clear and full understanding as to which device is to be used as the alternative Point of Isolation in lieu of the defective integral disconnecter.

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<sup>2</sup> Subject to the requirements of NR/L2/OHS/019 with respect to having a safe system of work to access the required lineside disconnecter.

5.4 In this scenario the ECO and NP shall record the agreed change of Point of Isolation on their respective copies of the Form B.

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