

GE/RT8000/DC
Rule Book

Module DC

DC electrified lines

Issue 4

September 2015

Comes into force 05 December 2015



Conventions used in the Rule Book	Example
A black line in the margin indicates a change to that rule and is shown when published in the module for the first time.	
Green text in the margin indicates who is responsible for carrying out the rule.	driver
A white i in a blue box indicates that there is information provided at the bottom of the page.	
<div style="border: 2px solid red; padding: 5px;">A rule printed inside a red box is considered to be critical and is therefore emphasised in this way.</div>	

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For information regarding the Rule Book, contact:

enquirydesk@rssb.co.uk

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You will need this module if you carry out the duties of a:

- train driver
- guard
- shunter
- designated person (DP)
- signaller
- crossing keeper

in DC electrified areas.

Note: This module does not apply in the Merseyrail area or between Drayton Park and Moorgate. Network Rail publishes local instructions separately for these.

Section

1 **Definitions**

2 **Competence**

3 **Dangers of the system**

- 3.1 Treating the CRE as being live
- 3.2 Reporting damage, defects, snow fall and flood water

4 **Personal safety**

- 4.1 Precautions that must be taken
- 4.2 Moving materials or equipment
- 4.3 Attending to vehicles
- 4.4 Conducting train crew over DC lines

5 **Communicating with the ECO**

- 5.1 Directly or by another person
- 5.2 Identifying yourself and the location

6 **Emergency switch-off**

- 6.1 Immediate actions
- 6.2 Further actions
- 6.3 Using a short-circuiting bar
- 6.4 Detraining passengers
- 6.5 When the line stays open
- 6.6 Managing the emergency switch-off

Section

7 Rescuing a person from the CRE

8 Types of isolation

- 8.1** Planned isolation
- 8.2** Temporary isolation
- 8.3** Local isolation

9 Protecting isolated sidings where there is no local instruction

10 Track isolating switches and hook switches

11 Short circuits

- 11.1** Finding out the cause of a short circuit
- 11.2** Examining the conductor rail
- 11.3** When the cause of the short circuit has been removed

12 Moving electric trains between live and isolated sections

- 12.1** Moving an electric train towards an isolated section
- 12.2** Electric train entering or leaving an isolated section
- 12.3** Taking a possession around a train
- 12.4** Train entering a possession

1

Definitions

Emergency switch-off

An emergency switch-off is carried out by the electrical control operator (ECO) when it is essential to switch off the electrical supply immediately, when someone is in danger from live conductor rail equipment (CRE).

The ECO will switch off the electrical supply to:

- the electrical section affected
- the abutting electrical section either side.

Conductor rail permit

A permit that is signed and issued by the authorised person (AP) or engineering supervisor and given to a designated person (DP), who is to carry out work on or near to the CRE.

This permit states exactly what electrical equipment is isolated and on which, or near to which, it is safe for the specified work to begin.

If a conductor rail permit has been issued, it does not mean train movements have stopped.

2 Competence

*The people responsible: **all concerned***

You must not go on or near the line in an area with CRE unless your regular competence assessment also contains the track-safety rules that relate to lines electrified by the DC system as shown in this module.

**all
concerned**

Table A of the *Sectional Appendix* shows which lines are electrified by the DC system.

If new CRE is being installed, or an electrified area is being extended, the instructions in this module will not apply until the equipment has been declared live.

You will be told about this in an energisation warning notice.

If you are not sure whether the CRE is live, you must treat it as live and dangerous to life.

3

Dangers of the system

*The people responsible: **all concerned***

3.1 Treating the CRE as being live

**all
concerned**

CRE, shoe gear and under-floor mounted electrical equipment on trains are extremely dangerous. It may be fatal if you touch or go near any of them, or if you allow anything to touch or go near them.

Live CRE is dangerous to life. You must treat CRE as being live at all times unless one of the following applies.

- A conductor rail permit has been issued to the DP.
- The CRE has been isolated and an assurance has been received as shown in local isolation instructions.
- The ECO has given an assurance that the CRE has been switched off in an emergency.

You must not:

- touch or step on CRE
- step on guard boarding
- allow clothing, tools, equipment or any object you are carrying to touch CRE unless they are intended for this purpose
- step between the conductor rail and the adjacent running rail
- touch broken or displaced CRE
- touch the collector shoes on any train, whether or not the collector shoes are touching the conductor rail
- step into flood water which may be in contact with the CRE
- direct a jet of water or any other liquid onto the CRE.

You must treat cables running alongside and crossing under lines as being live. You must not interfere with these cables or their protective covers.

**all
concerned**

Traction return current passing through the running rail is not normally dangerous to life. However, you must not touch the running rail at the same time as touching any metalwork nearby that is not directly connected to the running rails.

You must not touch broken running rails or bridge the gap between them.

3.2 Reporting damage, defects, snow fall and flood water

You must immediately make sure the following are reported to the ECO:

**all
concerned**

- damage to cables, cable routes or connected equipment
- flashovers or electrical explosions seen or heard in any electrical equipment
- any leakage of oil from a cable or cable oil tank
- damage to a conductor rail
- burning, smoking or excessive flashing of conductor rails or cables connected to them
- a broken or parted rail or broken conductor rail
- a broken or defective bond
- a broken or defective insulator
- equipment or debris in contact with the conductor rail and running rail.

If the damage or defect will affect the safe operation of trains, you must first report this to the signaller.

**all
concerned**

If you become aware that the line is flooded above sleeper level, you must report this to the ECO in the quickest way possible. You must state the depth and extent of the flooding.

You must also report to the ECO any change to the extent of the flooding.

You must report either of the following to operations control:

- heavy snowfalls, or
- ice forming on the conductor rail surface which may cause difficulty operating electric trains.

4 Personal safety

The people responsible: all concerned, driver, guard

4.1 Precautions that must be taken

You must always take care when working close to the CRE. You must also take special care if you or anything you are using or carrying will be nearer than 300 mm (1 foot) to the CRE.

If you are applying a track-circuit operating clip, or a track-circuit operating device (T-COD), you must always apply it to the running rail furthest from the conductor rail first and then to the running rail nearest to the conductor rail.

When removing a track-circuit operating clip or a T-COD, you must remove it from the rail nearest to the conductor rail first and then from the rail furthest from the conductor rail.

If you have to place detonators, you must attach them to the running rail which is furthest from the conductor rail.

If the emergency services need to go on or near the line, the person in charge at the site must tell the officer in charge from each emergency service about the presence of the conductor rail and which parts have been switched off.

If you are to manually operate or secure points and the conductor rail is not gapped or protected by guard boarding next to the motor or blade to be secured, you must place a conductor rail shield over the conductor rail before starting work.

4.2 Moving materials or equipment

You should avoid carrying materials or equipment over the conductor rail. If you need to carry an object over a conductor rail, you must make sure that it does not come into contact with a live conductor rail.

You must not drag objects across, or drop them on, a conductor rail.

all
concerned

all
concerned

4.3 Attending to vehicles

**all
concerned**

If possible, you must work on the side away from the conductor rail when performing tasks such as:

- operating handbrakes
- coupling vehicles
- uncoupling vehicles
- passing beneath the buffer level of coupled vehicles
- going underneath vehicles.

If it is not possible to do this on the side away from the conductor rail, other than when operating handbrakes, you must first place a conductor rail shield cover over the conductor rail.

If a conductor rail shield is not available, or cannot be fitted, arrangements must be made for the electricity to be switched off.

You may examine a vehicle without first getting the electricity switched off as long as you do not touch the conductor rail or overhead trolley wires, or any electrical equipment connected to them.

However, if severe arcing has taken place, you must get the electricity switched off before carrying out the examination.

4.4 Conducting train crew over DC lines

**driver,
guard**

If you are conducting another person over a route with DC electrified lines, you must tell that person about the presence and danger of the conductor rails.

5

Communicating with the ECO

The people responsible: all concerned

5.1 Directly or by another person

You can contact the ECO, or you can ask another person, such as the signaller, to contact the ECO on your behalf.

all
concerned

If another person asks you to contact the ECO, you must make sure that you get the necessary information from that person before speaking to the ECO. You must also get any other information that the ECO asks for.

5.2 Identifying yourself and the location

When contacting the ECO, you must state:

- your name, job title and employer
- the line or lines concerned
- the location (for example, the nearest bridge, station, signal, block marker or other structure)
- the telephone number or radio call number (whichever you are using) so that the ECO can contact you if necessary.

all
concerned

If the ECO gives you a message identification number, you must state it each time you speak to the ECO.

6

Emergency switch-off

*The people responsible: **all concerned, driver, guard, signaller, PICEE***

Note: An emergency switch-off of the CRE does not mean that train running has been stopped.

6.1 Immediate actions

6.1.1 Types of incident

**all
concerned**

You must immediately contact the ECO (or arrange for this to be done) if you become aware of:

- a derailment
- a lineside fire
- a fire on a vehicle or train
- a person in contact with or in danger of coming into contact with the CRE
- an incident or other emergency requiring, or likely to require, the electricity supply to be switched off
- an emergency evacuation of passengers from a train.

If you receive a message from another person about an emergency, you must pass on this information to the ECO.

6.1.2 Reporting the emergency

When you contact the ECO, you must first say **'This is an emergency call'**.

all
concerned

You must tell the ECO:

- the reason why you want the electricity to be switched off
- whether any person is in danger from live CRE
- whether short-circuiting bars have been applied
- whether the emergency services are waiting to give assistance.

If you are not at the site, you must relay information from the ECO to the site and from the site to the ECO.

6.1.3 Additional instructions for train crew

If it is necessary to protect an obstruction on a line other than the one your train is travelling on as shown in section 43 of module TW1 *Preparation and movement of trains*, you must do this before asking for the electricity to be switched off.

driver,
guard

6.1.4 Additional instructions for signallers

If you become aware of an emergency, you must carry out the appropriate train signalling regulations before asking for the electricity to be switched off.

signaller

6.1.5 If you cannot contact the ECO

If you cannot contact the ECO direct or through another person, a competent person may apply an approved short-circuiting bar to the section of conductor rail concerned as shown in section 6.3 of this module.

all
concerned

6.2 Further actions

**all
concerned**

You must stay in contact with the ECO, or if you have reported the incident through another person, stay in contact with that person until you have been assured that:

- the electricity has been switched off, or
- other arrangements have been made.

If the ECO agrees to the emergency switch-off, the ECO will decide who will be regarded as the person in charge of electrical emergency (PICEE).

If you are the person passing on this information on behalf of someone else, you must stay in contact with the ECO until an assurance has been given that one of these arrangements has been put in place.

6.3 Using a short-circuiting bar

**all
concerned**

If it is not possible to use other ways to get the electricity switched off in an emergency, you may apply a short-circuiting bar but only if you are competent to do so and one of the following applies:

- a person is in danger through contact with the CRE
- passengers are alighting from a train which has been stopped by failure or accident
- a short circuit on a train cannot be isolated and there is severe arcing
- it is shown in a train operating company's instructions to train crew.

You must not use a short-circuiting bar where there is a guard board between the conductor rail and the adjacent running rail or a yellow plastic shroud is fitted to the underside of the conductor rail.

Before you use a short-circuiting bar, you must make sure there is no conductor-rail section gap between where you apply it and the section of conductor rail you need to be switched off.

**all
concerned**

You must consider any other portions of conductor rail to be live until the ECO gives an assurance they have been switched off.

Once you have applied the short-circuiting bar, you must leave it in position until it is no longer needed.

You must tell the ECO as soon as you have used a short-circuiting bar and give the exact location where it was applied.

You must get permission from the ECO before you remove a short-circuiting bar and then tell the ECO when you have removed it.

6.4 Detraining passengers

If it is necessary to evacuate passengers from a train as shown in module M1 *Dealing with a train accident or train evacuation*, the electricity must be switched off as shown below.

**all
concerned**

a) Emergency evacuation

In an emergency the electricity should be switched off, as shown in section 6.1 of this module, on any line where passengers may walk.

b) Controlled evacuation

Before a controlled evacuation takes place, a temporary isolation must be taken on any line where passengers may walk.

6.5 When the line stays open

signaller

When a line has been blocked to DC electric trains but is open for other trains, you must either:

- make sure any approaching train is not fitted with collector shoes
- get an assurance from the driver that the collector shoes are raised and are secured in this position.

If a train has stopped within the area of the emergency switch-off, before allowing it to proceed you must:

- make sure the train is not fitted with collector shoes, or
- get an assurance from the driver that the collector shoes are raised and are secured in this position.

6.6 Managing the emergency switch-off

PICEE

If you are appointed by the ECO as the PICEE, the ECO will tell you the limits of the emergency switch-off.

You must identify yourself to anyone arriving on site.

If the emergency services are called to site, you must tell the officer in charge from each emergency service about the presence of the CRE and which parts have been switched off.

The ECO will tell you before shortening the area of the emergency switch-off. You must tell everyone at the site about the new limits.

If passengers are to get out of a train which is not at a platform, you must make sure that all passengers are kept clear of the CRE.

If you hand over the responsibility of the emergency switch-off to someone else, you must tell the ECO immediately. You must give the name, job title and employer of the person taking over from you.

PICEE

If you take over the responsibility of the emergency switch-off, you must immediately confirm the arrangements with the ECO.

As soon as the emergency is over and the affected section can be re-energised, you must:

- warn everyone involved that the electricity is about to be switched on
- make sure everyone is clear of the CRE
- remove any short-circuiting bars or other materials used during the emergency switch-off and place them clear of the CRE.

You must then tell the ECO that the emergency is over and wait for further instructions.

If the emergency will go on for a long time or it is necessary for work to be carried out on or close to CRE, a planned or temporary isolation must be taken as shown in Network Rail company instructions.

When the planned or temporary isolation has been taken, the ECO will tell you that you are no longer required to carry out any further duties as the PICEE.

7

Rescuing a person from the CRE

*The people responsible: **all concerned***

all concerned

If it is necessary to rescue a person from live CRE, you must make sure that everyone is kept clear of the CRE until you, or another person in direct contact with the ECO, has been told that the electricity has been switched off as shown in section 6 of this module.

If it is not possible to get the electricity switched off immediately, you can try to rescue a person from live CRE as long as:

- you cover your hands with something which is dry and will not conduct electricity
- you stand on dry non-conducting material
- you do not use any metal objects.

If you cannot do this, you must only try to move the person using dry insulating material.

8

Types of isolation

The people responsible: all concerned, DP

Note: Isolation of the traction current does not mean that train running has been stopped.

8.1 Planned isolation

You must not allow work that requires an isolation to start until you have received a conductor rail permit (CRP).

DP

You must explain the limits of the isolation and any hazards or conditions specified on the CRP to anyone you are responsible for, before allowing them to start work.

You must keep the CRP until your group has finished working. You must then immediately return it to the person who issued it.

You must immediately tell the AP if you have lost your CRP. The AP will arrange to issue you with another CRP, endorsed 'Duplicate'.

If another DP is to take over from you before the work is completed, you must explain the limits of the isolation to the new DP. You must then give your CRP to the new DP.

If you are the new DP, you must make sure that you understand the limits of the isolation before taking the CRP.

If when your work is complete, you find that you have lost your CRP, you must tell the AP. You must carry out a visual inspection with the AP to make sure that all personnel and materials are clear of the CRE.

8.2 Temporary isolation

all
concerned

These isolations must be granted as shown in Network Rail instructions and only to a person who has been trained in those instructions.

8.3 Local isolation

all
concerned

A local isolation can only be taken where a local isolation instruction has been issued.

9

Protecting isolated sidings where there is no local instruction

*The person responsible: **signaller***

The person in charge of a siding possession (PICOS) must arrange for points to be placed and kept in position to prevent trains entering the area to be isolated. The points must be protected against movement by:

- the signaller or operator using reminder appliances if worked from a signal box, ground frame or shunt panel
- securing them if they are hand points.

You must place and keep any points leading to the siding to be isolated in a position to prevent trains entering the siding. You must use appropriate reminder appliances.

You must then make an entry in the Train Register.

signaller

10

Track isolating switches and hook switches

*The people responsible: **all concerned***

all concerned

You may only operate a track isolating switch or hook switch if you are competent to do so and have the authority of the ECO.

The ECO will give instructions to the person operating track isolating switches or hook switches on whether they are to be opened or closed and the order in which they are to be operated.

You must immediately tell the ECO when you have operated any switches.

You must replace the white sleeve to a normally open hook switch when restoring it to its normal position to prevent it from being operated accidentally.

You must keep a track isolating switch enclosed and locked to stop unauthorised interference. You must fit a caution notice to a normally open track isolating switch to prevent it being operated accidentally.

11

Short circuits

*The people responsible: **all concerned, driver, signaller***

11.1 Finding out the cause of a short circuit

The ECO will tell you if it is not possible to restore the electricity supply following a short circuit. You must then agree what arrangements are to be made to find out what has caused the short circuit.

signaller

This must include arrangements to examine any train in the electrical section. Unless you are sure that the fault is with a train, you must also make arrangements for the section of line to be examined.

11.2 Examining the conductor rail

You must treat the conductor rail as being live at all times when it is being examined as the ECO may continue to try to restore the electricity supply.

all concerned

If you see an object that is causing or is likely to be causing the short circuit, you must not try to remove it until the ECO tells you it is safe to do so.

You must not enter a tunnel until you have told the ECO that you are about to do so. You must tell the ECO immediately you have left the tunnel. When you are in the tunnel, the ECO will not try to restore the electricity supply.

11.3 When the cause of the short circuit has been removed

signaller

You must tell the driver of each train to proceed at caution over the location of the short circuit, until you have been told by a competent person that it is safe for normal working to be resumed.

driver

You must proceed at caution over any portion of line where the signaller tells you that there has been a short circuit.

12

Moving electric trains between live and isolated sections

The people responsible: driver, person authorising the movement, signaller

12.1 Moving an electric train towards an isolated section

You must be sure that the approach to the isolated section is protected by a possession limit board (PLB) and three detonators, 20 metres (approximately 20 yards) apart before you allow an electric train, including a train hauled by a dual-powered locomotive on electric power, to:

- pass the signal or block marker protecting an isolated section
- make an unsignalled movement towards an isolated section.

These movements must be driven from the leading cab. The movement must not be propelled.

signaller

driver

12.2 Electric train entering or leaving an isolated section

Before authorising the movement of a train that has collector shoes to enter or leave an isolated section, you must get confirmation from the driver that all collector shoes are secured in the raised position clear of the conductor rail.

Before you move a train that has collector shoes to or from an isolated section, you must make sure all collector shoes are secured in the raised position clear of any conductor rail.

person
authorising
the
movement

driver

12.3 Taking a possession around a train

signaller

If a possession is to be taken around a train that has collector shoes, you must not grant the possession until you have told the driver to secure the collector shoes in the raised position and the driver has told you that this has been done.

12.4 Train entering a possession

signaller

Before authorising a movement to proceed towards the detonator protection, or the points at an intermediate point leading to a possession in which the electricity has been isolated, you must get confirmation from the driver that all collector shoes are raised and are secured clear of any conductor rail.

If you do not know if the train has collector shoes, you must ask the driver.

driver

When the signaller tells you to do so, you must visually check that all collector shoes are secured in the raised position. You must then tell the signaller that you have done this.

You must keep the collector shoes in the raised position while you are in the possession.

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communication**

172

