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Guidance on Ground Frames and Shunters' Releases
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Guidance on Ground Frames and Shunters' Releases

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This Rail Industry Guidance Note does not supersede any other Railway Group documents.

Supply

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Guidance on Ground Frames and Shunters' Releases

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Guidance on Ground Frames and Shunters' Releases

Part 1 Introduction

1.1 Purpose of this document

This document gives guidance on interpreting the requirements of Railway Group Standard GK/RT0077 issue one Ground Frames and Shunters' Releases. It does not constitute a recommended method of meeting any set of mandatory requirements.

All requirements in GK/RT0077 are reproduced in the sections that follow. Guidance is provided as a series of sequentially numbered clauses prefixed 'GN' immediately below the text to which it relates. Where there is no guidance given, this is stated.

Specific responsibilities and compliance requirements are laid down in the Railway Group Standard itself.

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1.3 Approval and authorisation of this document

The content of this document was approved by:

Control Command and Signalling (CCS) Standards Committee on 08 April 2010 and reconfirmed on 13 June 2013.

This document was authorised by RSSB on 29 July 2013.

Guidance on Ground Frames and Shunters' Releases

Part 1 Purpose and Introduction

1.1 Purpose

1.1.1 This document mandates requirements for:

- a) Ground frames, where control of a part of the railway infrastructure may be transferred between a signaller and a ground frame operator, who may be an employee of a railway undertaking, and
- b) Shunters' releases, where co-operation is required between the signaller and railway undertaking personnel to allow movements into and out of infrastructure controlled by a railway undertaking.

1.2 Introduction

1.2.1 Background

1.2.1.1 This document applies to:

- a) Ground frames, and
- b) Shunters' releases.

1.2.1.2 This document does not include requirements for emergency panels, standby control centres or gate boxes, which are the responsibility of the infrastructure manager.

1.2.1.3 GK/RT0036 sets out the requirements for controlling the transition between lineside signalling conforming to Railway Group Standards and other methods of train control where delegated control may also apply.

1.2.2 Related requirements in other documents

1.2.2.1 The following Railway Group Standards contain requirements that are relevant to the scope of this document:

GE/RT8000	The Rule Book
GE/RT8270	Assessment of Compatibility of Rolling Stock and Infrastructure
GK/RT0036	Transitions Between Signalling Systems
GK/RT0045	Lineside Signals, Indicators and layout of Signals
GK/RT0055	Block Systems Interface Requirements
GO/RT3215	Requirements for the Weekly Operating Notice, Periodical Operating Notice and Sectional Appendix

1.2.2.2 Where co-operation is required by this document between the infrastructure manager and the railway undertakings in the design of new facilities such as ground frames, ground switch panels and shunters' releases, the process for co-operation is set out in GE/RT8270 Assessment of Compatibility of Rolling Stock and Infrastructure.

1.2.3 Supporting documents

1.2.3.1 The following Railway Group documents support this Railway Group Standard:
GK/GN0677 Guidance on Ground Frames and Shunters' Releases

GN1 There is no guidance associated with Part 1.

Guidance on Ground Frames and Shunters' Releases

Part 2 Guidance on Requirements for Ground Frames and Shunters' Releases

- GN2 The requirements for ground frames are based on the following principles and assumptions:
- a) The ground frame release function provides the secure means of transferring responsibility for controlling specific infrastructure between the infrastructure manager and the railway undertaking, so that potentially conflicting operations are prevented
 - b) Transfer of responsibility for controlling specific infrastructure between the infrastructure manager and the railway undertaking only takes place when both parties co-operate by operating the ground frame release control
 - c) The functional design of each ground frame and its associated infrastructure is compatible with local operation of specific moveable infrastructure and the requirement for the railway undertaking to control local shunting movements.
- GN3 The functional design of each shunter's release should be compatible with the requirement for the signaller and shunter to co-operatively control movement authorities across the boundary between a part of the railway controlled by Network Rail and a part of the railway controlled by a different infrastructure manager.

2.1 Compatibility requirements for ground frames and shunters' releases

- 2.1.1 Before any new or changed infrastructure or rolling stock (including lineside and/or on-board control, command and signalling equipment) is brought into use, it is necessary to check that it is compatible with the infrastructure and rolling stock assets and operations on the routes on which it is to be used.
- 2.1.2 GE/RT8270 sets out the requirements and responsibilities for the assessment of compatibility between rolling stock and infrastructure assets, including control, command and signalling equipment and their operations. It sets out the arrangements by which the assessment of compatibility is undertaken and identifies those responsible for managing that assessment.
- 2.1.3 This document GK/RT0077 mandates the specific requirements for the assessment of compatibility for ground frames and shunters' releases.

- GN4 The generic process to be used for assessing operational compatibility between railway infrastructure and rolling stock is set out in GE/RT8270.

- GN5 The assessment of compatibility should include participation from all parties affected by the proposed signalling arrangements.

- 2.1.4 The assessment shall check that the provision of the ground frame or shunter's release is compatible with:
- a) The required documented operations, and
 - b) The access requirements.

- GN6 The assessment should check that the provision of a ground frame or shunter's release is an appropriate solution for dealing with the traffic envisaged at that location.

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- GN7 When a ground frame is proposed, the assessment should check:
- a) That control and indication facilities are compatible with the operations the infrastructure is to be used for, and
 - b) The arrangement for operator access to the ground frame, both from trains using the ground frame and also from an access point, where appropriate. Safe walking routes and security should be taken into account.
- GN8 A ground frame may not be appropriate where either:
- a) The expected traffic levels are high, unless the resultant work load on a signaller would be too high if the infrastructure were directly controlled, and / or
 - b) Train detection, when used, is unreliable owing to the very light use of the local infrastructure, and the consequence of train detection failure prevents operation of the ground frame.
- GN9 The assessment should check that provision of a shunter's release as a method of control for access into or out of a depot or sidings is compatible with the operation of trains into and out of that facility. The following options are available:
- a) A separate release for each movement authority, and / or
 - b) A release that permits multiple movement authorities. This will be the required option should train movements take place when staff are not on duty.
- GN10 An assessment of risk should be undertaken to ensure that, if a multiple movement option is to be used, there are sufficient measures in place to ensure, as far as practicable, this can be done safely.

2.1.5	The assessment shall check that the method of ground frame release is compatible with the block system.
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- GN11 There are two distinct methods of releasing a ground frame:
- a) Direct electrical release from the signal box (see 2.2.1), which is typically used on lines where the movement authority does not involve the handover of a token or one-train staff
 - b) Indirect release using a token or key (see 2.2.2 and 2.2.3).
- GN12 The method chosen should be compatible and consistent with the block system in use, so that operational requirements are kept as simple as possible. For example:
- a) A ground frame on a track circuit block line should use a direct electrical release, because the movement authority does not require the issue of a token or key, and
 - b) A ground frame on a single line operated using the electric token block system may be released indirectly, which is consistent with the issue of a single line token.
- GN13 Where the block system does not include a token or staff, either direct or indirect release may be provided, taking account of consistency of operation.

2.1.6	The assessment shall check that the ground frame or shunter's release functionality is compatible with: a) The required train movements, and b) The operational risk.
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- GN14 Incompatibility could be a causal factor leading to an operational incident. The operational risk being considered is whether provision of a ground frame or shunter's release will permit the train service (both the booked passing train service and those trains booked to use the ground frame or sidings controlled by the shunter's release) to run safely and without restriction.
- GN15 The following options for the shunter's release should be considered:
- a) Release operated either for every train or for multiple trains, and
 - b) Release acting upon either signalled routes or points.
- GN16 The assessment should check that:
- a) The requirement to operate the shunter's release is compatible with the availability of authorised staff, and
 - b) The release functionality is compatible with the requirement to operate trains over the infrastructure boundary.
- GN17 The assessment should take account of signaller and shunter workload.

- 2.1.7 On lines worked by electric token block, no signaller token block, no signaller token block – remote or one-train system with staff (see also GK/RT0055), the assessment shall check that the method of issuing and returning the token at ground frames which have shutting-in facilities is compatible with ground frame operations, including either:
- a) Provision of intermediate token instruments at the ground frame, or
 - b) Local operating instructions.

- GN18 Because the movement authority includes a token or one-train staff, a method is required to exchange the token or one-train staff at the ground frame.
- GN19 The assessment should check that arrangements for exchanging the token or staff at the ground frame is compatible with the requirement:
- a) To check that the single line is clear when a train is shut in, and
 - b) To obtain a movement authority when a train is to leave the ground frame.
- GN20 There are two possible options for normalising the block controls:
- a) By the provision of an intermediate token instrument at the ground frame, or
 - b) If practical, requiring the electric token or staff to be returned to the nearest signal box or token station, in accordance with local instructions. If train detection is not provided, the operator of the ground frame should ensure that the single line is clear before returning the token or staff to a signal box or an intermediate instrument.
- GN21 Shutting-in facilities are not permitted for ground frames on lines worked by the 'one-train without staff' system, because only one train is permitted on the single line at a time and the block system requires the train to complete its movement through the section before the section can be proved clear.

- 2.1.8 The assessment shall check that the signalling system is configured to prevent insertion of a ground frame key into the wrong release instrument or mechanical lock.

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- GN22 Except on lines worked by radio electronic token block (RETB), where a ground frame is indirectly released, the key, token or one-train staff should be uniquely configured for the ground frame it is intended to release. This is to prevent operation of a ground frame for which a key or token has not been released.
- GN23 On RETB lines, a single key should be common to the whole area worked using the RETB system, in order to reduce the number of keys attached to the CDU key.

2.1.9 The assessment shall check that the provision of signals worked from the ground frame is compatible with the train movements required on the running lines and into sidings.

- GN24 Where a ground frame is provided, shunting movement authorities are issued by the ground frame operator.
- GN25 If hand-signalling is compatible with the movements required, it is permissible not to provide signals.
- GN26 The decision to provide signals operated from ground frames should take account of the required train movements and any hand-signalling arrangements at the same location. Inconsistency of operations using signals and hand-signals may be the causal factor in an operational incident.
- GN27 Where access to a running line is provided through a ground frame worked connection, a signal shall be provided which shall be slotted from the controlling signal box unless the release conditions on the ground frame are such that a signal will provide no additional movement authority information beyond the release condition.

2.1.10 Where non-block signals on running lines are used to protect the ground frame, the assessment shall check that the ground frame operating instructions include a requirement to clear the signals before the release is normalised.

- GN28 Non-block signals (where provided) are not interlocked with the block system or train detection system. They should only display the ON aspect after the ground frame has been released by the ground frame operator and, provided that the interlocking of the ground frame is correct, they should display the OFF aspect before the ground frame release control is normalised when the ground frame points are normal.
- GN29 Where provided, a non-block signal should only be controlled to display the ON aspect after the ground frame has been released by the ground frame operator.
- GN30 Failure to display a non-block signal OFF aspect after the ground frame has been normalised would mean that a subsequent train passing through the block section would be required to stop at the ground frame unnecessarily.

2.1.11 The assessment shall check that the communication facilities between the signal box and the ground frame are compatible with the requirement for:

- a) Operating the ground frame release, and
- b) Safely controlling train movements.

- GN31 Voice communication facilities are provided so that the ground frame operator can contact the signaller to operate the ground frame release.

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GN32 Whilst this should include a telephone at the ground frame, consideration should be given to additional facilities so that:

- a) The signaller can contact the ground frame operator when not at the ground frame, and
- b) The ground frame operator or shunter can contact the signaller more easily in an emergency.

2.1.12 The assessment shall check that the train detection systems provided at ground frames are compatible with:

- a) The maximum train lengths that will use the ground frame, and
- b) The train movements required, including shunting where vehicles may be left on the running line.

GN33 In some cases, a train detection system is provided at the ground frame. The train detection system may be used:

- a) To prove that a train is at the ground frame before the release can be given, and
- b) To prove that the line is clear after the train has been shut-in at the ground frame.

GN34 If the train is too long for the train detection sections, this may prevent the release being given to the ground frame and hence cause delay and add to the risk of errors being made in the operation of the ground frame.

GN35 Where train detection is provided on the infrastructure inside the ground frame, this too should be compatible with those train operations within the ground frame's area of control.

2.1.13 The assessment shall check that the ground frame control system is compatible with the requirement for ground frame operators to control the infrastructure.

GN36 This checks that sufficient and appropriate operating control facilities are provided for the ground frame operator, taking into account the infrastructure and operating requirements at that location.

GN37 Ground frames may be provided using either lever frames or ground switch panels.

GN38 In deciding what type of control facilities should be provided, the following should be considered:

- a) The method of obtaining the release, and
- b) The number of signals and points that are to be controlled.

2.1.14 The assessment shall check that the ground frame indications are compatible with the requirements for the operator to:

- a) Observe the operation of the infrastructure being controlled
- b) Determine the position and completeness of the train where this cannot be directly observed
- c) Correctly operate the ground frame controls.

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- GN39 Indications enable the ground frame operator to control and observe train movements and confirm correct operation of the infrastructure. Where this can be done by direct observation, indications may not be required.

2.2 Release of ground frames

2.2.1 Electrical release of ground frames from the signal box

- 2.2.1.1 The ground frame shall only be released when all of the following conditions are satisfied:
- a) The ground frame release control is operated at the signal box
 - b) All protecting stop signals are displaying the 'ON' aspect
 - c) All conflicting signal routes are locked normal
 - d) The signal or block section containing the ground frame is known to be either:
 - i) Clear, including the overlap, or
 - ii) Occupied by a stationary train at the ground frame.

- GN40 This prevents the ground frame from being operated until:
- a) The signaller has operated the ground frame release control
 - b) The signalling system is in a state that is compatible with the local operation of the infrastructure using the ground frame
 - c) The train is in the required position for ground frame operation.

- GN41 If the ground frame is either on a track circuit block line, tokenless block line or within station limits, the release should include the appropriate train detection controls.

- GN42 If the ground frame is on a line worked by absolute block:
- a) Protecting signals should be 'ON'
 - b) The ground frame should be released by the signal box controlling the entrance to the block section
 - c) Where the ground frame forms a mid-section crossover there are two ways that this can be dealt with, either:
 - i) The signal boxes controlling the entrance to the section should each have a release for the ground frame. The interlocking at the ground frame would require both releases before the points can be operated, or
 - ii) Each signal box controlling the block section should have a release; one release would provide a release on the other signal boxes ground frame release lever, the second signal box will then provide the release to the ground frame
 - d) The block controls should include the following release conditions, either:
 - i) The block section proved clear, including any overlap and the block indicator at 'LINE CLEAR', or
 - ii) The train detected as stationary at the ground frame and the block indicator at 'TRAIN ON LINE'.

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- GN43** If the ground frame is on a line worked by tokenless block:
- a) Protecting signals should be 'ON', and
 - b) The block controls should include the following release conditions, either:
 - i) The block section proved clear, including any overlap and the block indicator at 'TRAIN ACCEPTED', or
 - ii) The train detected as stationary at the ground frame and the block indicator at 'TRAIN IN SECTION'.

- 2.2.1.2** The ground frame shall only be normalised when all of the following conditions are satisfied:
- a) The infrastructure controlled from the ground frame is detected to be in the required position, and
 - b) The ground frame release controls have been normalised at the signal box and the ground frame.

- GN44** This prevents the ground frame from being normalised until:
- a) The ground frame operator has operated the ground frame release control, and
 - b) The ground frame and its associated infrastructure is in a state that is compatible with the normal operation of the railway from the signal box.

- 2.2.1.3** Where there is a shutting-in facility, a train detection system shall be provided at the ground frame, which shall extend from between the following limits:
- a) The maximum train length plus 100 m on the approach side of the ground frame points or associated clearance point
 - b) To either:
 - i) The clearance point of the ground frame facing points, or
 - ii) 200 m beyond the switch toes of the ground frame trailing points.
- 2.2.1.4** The train detection systems shall be indicated in the controlling signal box.

Diagram illustrating a single-track railway section with a sidings. The main track is shown with a train (represented by a red rectangle) and a release lever (represented by a red rectangle) at the end. The sidings are shown above the main track. A control point (CP) is marked on the main track. The distance from the end of the train to the CP is labeled "Maximum train length + 100m". The release lever is labeled "Release Lever No 1". The sidings are labeled "Sidings". The control point is labeled "CP". The diagram also shows a green line representing the track and a black line representing the ground.

Diagram illustrating a single-track railway section. The track is shown with a red signal and a green section labeled "Maximum train length + 100 metres". A "Siding" is located above the track, with a "Release Lever No ①" and a "II" symbol. The track is divided into two sections: a green section and a 200 metres section. The green section is labeled "Maximum train length + 100 metres" and the 200 metres section is labeled "200 metres". The diagram also shows a "Siding" and a "Release Lever No ①" with a "II" symbol.

GN50	Where the ground frame points are trailing points, the train detection system is extended 200 m beyond the points, in order to detect when the train is present on the running line during ground frame operations. Where the ground frame points are facing points, the train detection system provided on the approach to the ground frame does this.
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- The token or one-train staff applicable to the single line section containing the ground frame
- A ground frame release key permanently attached to the applicable token or one-train staff

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- c) A ground frame key, normally kept in a suitable receptacle in the signal box, which is issued to the ground frame operator by the signaller at the controlling signal box.

- GN51 An indirect release prevents operation of the ground frame until the train at the ground frame is in possession of the movement authority associated with the ground frame.
- GN52 Where either a token or one-train staff forms part of the movement authority, then that device may incorporate a key which is used to mechanically release a ground frame within that single line section. Alternatively, a separate key may be permanently attached to the token or one-train staff. In both cases, the issue of the token or one-train staff should include the authority to operate the ground frame, subject to operational requirements.
- GN53 On a line that is worked by the one-train system without staff and where it is not appropriate to provide a direct electrical release, the ground frame should be released using a key which is retained at the local signal box, and only issued to train crew when a train requires to use the ground frame, subject to local instructions.

- 2.2.2.2 Where a ground frame key is provided on a line that is worked by the one-train system without staff, the key shall be:
- a) Permanently marked with the name of the ground frame to which it applies, and
 - b) Uniquely configured for the ground frames within the block section and the control area of the signal box associated with the ground frame.
- 2.2.2.3 The instruments and mechanical locks associated with the ground frame key shall prevent insertion of a key or other token belonging to an adjacent section.

- GN54 Because the signaller issues the key for a particular ground frame, the unique configuration of the ground frame locks, and keys prevent inadvertent operation of the wrong ground frame, which may arise due to operator error when either:
- a) There is more than one ground frame in the section, or
 - b) A key has been inadvertently carried over from an adjacent section.

- 2.2.2.4 The token, one-train staff or ground frame key shall be held captive in the ground frame release device at all times when the ground frame is in use.
- 2.2.2.5 Removal of the token, one-train staff or ground frame key from the ground frame release device shall require:
- a) The ground frame release control normal, and
 - b) Where detection is provided, the points detected normal.
- 2.2.2.6 Where there is a shutting-in facility on lines worked by the electric token block, no signaller token block or no signaller token block – remote system, one of the following methods of issuing and returning the token shall be provided, either:
- a) Using an auxiliary token instrument at the ground frame, or
 - b) In accordance with local operating instructions.