

Railway Group Standard

GKRT0045

Issue Five

Date June 2016

Lineside Signals, Indicators and Layout of Signals

Synopsis

This document defines the configuration and layout of lineside signalling equipment that is used to convey information to infrastructure managers operating stations, and railway undertaking personnel.

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Issue record

Issue	Date	Comments
One	06 February 2010	Original document
Two	03 March 2012	Replaces issue one Small scale change amendment to GKRT0045 issue two necessitated by revision of 2.3.1.2 and 2.3.1.4 to permit the use of a bar of light or a line of five lunar white light points to display the indication of route Clauses 9.1.1, 9.1.2, 9.1.3, 9.1.4 and 9.1.5 relating to identity of signals and indicators were removed from GKRT0045 issue two as these were transferred to GKRT0009 issue four which was published in June 2011
Three	01 December 2012	Replaces issue two Small scale change amendment to clause 2.3.2.5c) to allow the use of the 'X' alphanumeric route indicator to additionally denote a movement along a bi-directional line in the opposite direction to the normal flow of traffic
Four	06 December 2014	Replaces issue three Revisions associated with the publication of GKRT0057 issue one and GKRT0058 issue one Withdrawal of requirements for passable stop signals that are not designated as intermediate block home signals
Five	04 June 2016	Replaces issue four Revisions associated with the publication of RIS-0737-CCS issue one

Revisions have not been marked by a vertical black line in this issue because the document has been revised throughout.

Superseded documents

The following Railway Group Standard is superseded, either in whole or in part as indicated:

Superseded documents	Sections superseded	Date when sections are superseded
GKRT0045, issue four, Lineside Signals, Indicators and Layout of Signals	2.1.2, 2.2.1, 2.2.2, 2.2.3.1 to 2.2.3.5, 2.2.4.2, 2.2.5, 2.2.8.1 to 2.2.8.3, 2.2.10, 3.1.4.2, 3.1.5.5, 4.1.3.5, 4.1.5.1, 4.1.8, 4.2.1.1, 4.2.1.3, 4.2.1.4, 5.1.3.1, 5.2.1.2, 5.2.6.3, 5.2.6.4, 5.2.6.5	04 June 2016

GKRT0045, issue four, Lineside Signals, Indicators and Layout of Signals, ceases to be in force and is withdrawn as of 04 June 2016.

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Supply

The authoritative version of this document is available at www.rssb.co.uk/railway-group-standards. Enquiries on this document can be forwarded to enquirydesk@rssb.co.uk.

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Part 1 Purpose and Introduction

1.1 Purpose

- 1.1.1 The purpose of this document is to specify the application of lineside signalling equipment that is used to convey information to infrastructure managers at stations and railway undertaking personnel. This document mandates the requirements for:
- a) The criteria for positioning signals within the layout.
 - b) The permitted type(s) of lineside signal and their application constraints.
 - c) The permitted sequences of signal aspects and indications displayed to drivers.
- 1.1.2 This document is applicable to areas where train movements are controlled using lineside signalling.
- 1.1.3 This document includes some requirements applicable to areas where train movements are controlled using European Train Control System (ETCS) Level 2 without lineside signals. Where this is the case, the particular applicability to ETCS is described in the applicable clause(s).

1.2 Introduction

1.2.1 Background

- 1.2.1.1 The operational meanings of signal aspects and indications are set out in Information Handbook RS/521.
- 1.2.1.2 The layout of signalling equipment is specified so that, when train movements take place, drivers are given sufficient and appropriate movement authority information.

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:
- | | |
|----------|--|
| GCRT5021 | Track System Requirements |
| GERT8000 | Rule Book |
| GERT8071 | Proceed-on-Sight Authorities |
| GERT8075 | AWS and TPWS Interface Requirements |
| GKRT0044 | Controls for Signalling a Train onto an Occupied Line |
| GKRT0057 | Lineside Signal and Indicator Product Design and Assessment Requirements] |
| GKRT0058 | Lineside Signal Aspect and Indication Requirements |
| GKRT0075 | Lineside Signal Spacing and Speed Signage |
| GORT3215 | Requirements for the Weekly Operating Notice, Periodical Operating Notice and Sectional Appendix |

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1.2.3 Supporting documents

- 1.2.3.1 The following Railway Group documents support this Railway Group Standard:
GKGN0645 Guidance on Lineside Signals, Indicators and Layout of Signals

1.3 Approval and authorisation of this document

- 1.3.1 The content of this document was approved by Control Command and Signalling (CCS) Standards Committee on 18 February 2016.
- 1.3.2 This document was authorised by RSSB on 29 April 2016.

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Part 2 Application of Lineside Signalling Equipment

2.1 Display of operational information using the signalling system

- 2.1.1 Signalled movement authorities shall be displayed only using the sequences of signal aspects and indications set out in this document.

2.2 Lineside signal and indicator configuration requirements

2.2.1 Co-acting signals (colour light signal and semaphore signal)

- 2.2.1.1 Colour light signal lights that are designed to flash shall flash in synchronism throughout the primary and co-acting signal heads when flashing aspects are displayed by co-acting signals.
- 2.2.1.2 Signals shall only display movement authorities towards co-acting signals when both the primary and co-acting signals are detected to be displaying the correct signal aspect, except when a failure of the second yellow light of a double yellow aspect in either the primary signal or co-acting signal results in one signal displaying a more restrictive single yellow aspect in error.

2.2.2 Position light signals

- 2.2.2.1 Independent position light signals that display the ON aspect using two yellow lights shall only be provided by exception and only as a direct replacement for an existing semaphore yellow shunting disc signal or existing yellow / white position light signal.

2.2.3 Train dispatch system indications

- 2.2.3.1 A self-restoring, secure control device shall be provided for train dispatchers to operate each close doors ('CD') and right away ('RA') indication.
- 2.2.3.2 The 'CD' indication shall be displayed only when the control device has been operated.
- 2.2.3.3 Where the movement authority is displayed by a lineside signalling system:
- a) The 'OFF' indication shall be displayed only when the associated signal is displaying a proceed aspect.
 - b) The 'RA' indication shall be displayed only when:
 - i) The associated signal is displaying a proceed aspect, and
 - ii) The associated control device has been operated.
- 2.2.3.4 In ERTMS areas:
- a) The 'OFF' indication shall be displayed only when a train has confirmed that it has received an in-cab movement authority to pass the node to which the OFF indicator applies.
 - b) The 'RA' indication shall be displayed only when:
 - i) The train has confirmed that it has received an in-cab movement authority to pass the node to which the right away indicator applies, and
 - ii) The associated control device has been operated.

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2.2.4 BU indicators

- 2.2.4.1 Where provided, barriers up (BU) indicators shall be positioned at a distance beyond the level crossing, so that the 'BU' indication is displayed before the front of the train that has passed over the level crossing passes the BU indicator.

2.2.5 Train Protection and Warning System (TPWS) indicators

- 2.2.5.1 Where a TPWS indication is associated with a points indicator and / or a level crossing indicator, the indications shall be consistently displayed in a logical sequence at each location along a line of route.

2.2.6 Stop boards

- 2.2.6.1 The wording displayed on each stop board shall be determined using the process for assessment of compatibility set out in GERT8270.

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Part 3 Layout of Signals: Requirements for Stop Signals

3.1 Provision of stop signals and signalling indicators

3.1.1 Position of stop signals

- 3.1.1.1 The signalling layout shall provide for all normal train movements.
- 3.1.1.2 Except for lines where movement authority information is conveyed using lineside operational signs (see GKRT0055), the signalling layout shall provide stop signals at the following locations:
- a) At the entrance and exit of every block section.
 - b) At the entrance to every signal section, including signal sections associated with station limits.
 - c) At the end or exit of every signal section, including signal sections associated with station limits.
 - d) Where signalling facilities are provided for trains to reverse direction, at the point of reversal.
 - e) On the approach to a ground frame (see GKRT0077).
 - f) On the approach to moveable infrastructure, except where a points indicator is provided instead of a signal.
 - g) On the approach to level crossings (see GKRT0192).
 - h) On the approach to areas protected by a signalling lockout system that is provided for use by railway undertaking personnel, and at the exit from such an area that is used by personnel working on the outside of trains (see GKRT0212).
 - i) Where there is a requirement to stop trains to protect against other identified hazards (for example, airport runways).
- 3.1.1.3 The requirements for positioning stop signals on electrified lines are set out in Appendix A.
- 3.1.1.4 Stop signals controlling movements through diverging junctions shall be positioned not more than 800 m from the first set of facing points, except where either:
- a) The facing points are operated from a ground frame.
 - b) The stop signal is positioned parallel with other stop signals, one of which is positioned within 800 m of a set of facing points and there are other factors that prevent the positioning of stop signals closer to the junction.
 - c) The facing points are always set in the same position for facing moves from the stop signal.
 - d) The facing points are secured out of use (see GCRT5021).
 - e) A distance temporarily greater than 800 m is associated with planned engineering stage-works, and details of the excess distance are published in accordance with GORT3215.

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- 3.1.1.5 Signals on parallel lines shall be positioned so that they are within 20 m of each other longitudinally.

3.1.2 Stop signal types, displayed signal aspects and movement authorities

- 3.1.2.1 Stop signals on running lines shall be main stop signals, except where the criteria for position light signals, semaphore shunting signals and points indicators allow these to be provided as an alternative.

- 3.1.2.2 Main stop signals shall only be provided using the following equipment types:

- a) Colour light signal.
- b) Semaphore main stop signal.
- c) Stop board.
- d) Buffer stop that is indicated to the driver.

- 3.1.2.3 Independent position light signals and semaphore shunting signals shall only be provided to display shunting movement authorities in either one of the following circumstances:

- a) From running lines into sidings.
- b) Wholly within sidings.
- c) From sidings onto running lines, except at locations where a colour light signal or semaphore stop signal is necessary to mitigate signal passed at danger (SPAD) risk or collision risk.
- d) Along running lines, except at locations where a main stop signal is necessary to mitigate SPAD risk or collision risk.

- 3.1.2.4 Before providing a position light signal or semaphore shunting signal to display shunting movement authorities onto or along running lines, the infrastructure manager and relevant railway undertaking(s) shall jointly assess the SPAD risk and collision risk associated with the planned train movements. Factors to be considered shall include (as appropriate):

- a) Visibility and sighting of the stop signal that defines the end of each shunting movement authority on the running line.
- b) The distance to the stop signal that defines the end of each shunting movement authority on the running line.
- c) The number and frequency of shunting movements from the signal that involves train movements onto running lines.
- d) The proportion of shunting movements from the signal that involve train movements onto the running line.
- e) The number and proportion of shunting movements from the signal into an occupied section on a passenger line.

- 3.1.2.5 Where an independent position light signal is provided within a main signal route in a facing direction, the following apply:

- a) The position light signal OFF aspect comprising two lunar white lights shall be displayed when the route is set from the main stop signal, and

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- b) The position light signal ON aspect shall only be displayed to a driver using a movement authority from the main stop signal if the signaller intentionally replaces the signal to danger in an emergency.

3.1.2.6 Where a semaphore shunting signal is provided within a main signal route in a facing direction:

- a) The OFF aspect shall be displayed when the route is set from the main stop signal, and
- b) The ON aspect shall only be displayed to a driver using a movement authority from the main stop signal if the signaller intentionally replaces the signal to danger in an emergency.

3.1.2.7 Stepping up or down to a calling-on class route is prohibited.

3.1.2.8 Stepping up or down to a shunt class route is prohibited.

3.1.2.9 Stepping up or down to a Proceed-on-Sight Authority (PoSA) class route is prohibited.

3.1.3 Designation of a stop signal as an 'intermediate block home' signal

3.1.3.1 A colour light stop signal or semaphore main stop signal shall only be designated an 'intermediate block home' signal if:

- a) The signal is located at the end of an additional block section that is controlled by one signal box and operated in accordance with the absolute block regulations, and
- b) The next signal section(s) does not incorporate any of the following:
 - i) Ground frame.
 - ii) Crossover, facing or trailing points.
 - iii) Moveable infrastructure (for example, a swing bridge).
 - iv) Manually controlled level crossing.
 - v) Automatic level crossing remotely monitored by the signaller.
 - vi) A directly opposing route or overlap that conflicts with the route or overlap.
 - vii) Any other hazard protected by the stop signal that, if passed at danger, could result in a collision or derailment.

3.1.4 Provision of point indicators

3.1.4.1 A points indicator shall be provided:

- a) On the approach to facing points unless a stop signal is used to display movement authorities through those points, and
- b) On the approach to trailing points, unless either:
 - i) A stop signal is used to display movement authorities through those points, or
 - ii) A train operated point mechanism is fitted to the trailing points.