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## Mechanical Trainstop System Interface Requirements

#### Synopsis

This document defines the track / train interface requirements for mechanical trainstop systems.

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# Mechanical Trainstop System Interface Requirements

## Issue record

Issue	Date	Comments
One	February 2000	Original document.
Two	September 2012	Replaces issue one.
		This issue is post-filtering and now contains interface measures only.
		Amended requirements in 3.3.4 to permit combination of tripcock reset with uncoupling control.

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## Superseded documents

The following Railway Group document is superseded, either in whole or in part as indicated:

Superseded documents	Sections superseded	Date when sections are superseded
GE/RT8018 issue one Mechanical Trainstop Systems	All	01 December 2012

GE/RT8018 issue one Mechanical Trainstop Systems, ceases to be in force and is withdrawn as of 01 December 2012.

## Supply

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#### GE/RT8018

# **Mechanical Trainstop System Interface Requirements**

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# Mechanical Trainstop System Interface Requirements

# Part 1 Purpose and Introduction

### 1.1 Purpose

1.1.1 This document defines the track / train interface requirements for mechanical trainstop systems.

### 1.2 Introduction

### 1.2.1 Background

1.2.1.1 Mechanical trainstops are used as a train protection system on lines of the national rail network over which London Underground trains operate, and on a limited number of other lines of the national network primarily carrying a metrostyle passenger service.

### 1.2.2 Principles

1.2.2.1 The mechanical trainstop system operates on the principle of a mechanical interface between track-mounted trainstops and vehicle-mounted tripcocks. When the tripcock on the train is deflected by a raised trainstop arm, it automatically initiates an emergency brake application.

### 1.2.3 Related requirements in other documents

- 1.2.3.1 The following Railway Group Standard contains requirements that are relevant to the scope of this document:
  - GE/RT8106 Management of Safety Related Control, Command and Signalling (CCS) System Failures.

#### 1.2.4 Supporting documents

- 1.2.4.1 The following Rail Industry Guidance Note supports this Railway Group Standard:
  - GE/GN8618 Guidance on Mechanical Trainstop System Interface Requirements.

### **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 17 May 2012.
- 1.3.2 This document was authorised by RSSB on 29 June 2012.

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# Part 2 Track Subsystem Requirements

### 2.1 Criteria for provision of trainstop equipment

- 2.1.1 On lines where a mechanical trainstop system is the selected method of train protection, and which at 30 January 2000 were used by trains operated by London Underground Ltd, trainstops shall be provided:
  - a) At all stop signals.
  - b) At all signals which control access to a line fitted with trainstops, unless another suitable form of overrun protection is provided.
  - c) For speed control on the approach to all terminal and bay platforms.
- 2.1.2 On other lines where a mechanical trainstop system is the selected method of train protection, trainstops shall be provided:
  - a) At all main stop signals, except those which protect plain line only.
  - b) At all stop signals which control access to a line fitted with trainstops, unless another suitable form of overrun protection is provided.
  - c) For speed control on the approach to all terminal and bay platforms.
  - d) For speed control on the approach to a reduction in permissible speed where:
    - i) The permissible speed on the approach is 60 mph or more.

And

- ii) The reduction in speed is one third or more of the permissible speed on the approach.
- 2.1.3 On lines where a mechanical trainstop system is the selected method of train protection, trainstops shall also be provided at other locations where an assessment of the risks demonstrates it to be necessary.

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## 2.2 Trainstop interface parameters

- 2.2.1 Trainstops shall be fitted to the outside of the right-hand running rail as viewed in the direction to which they apply.
- 2.2.2 Trainstops shall comply with the parameters shown in Figure 1.



1. View is in the direction of travel of the tra

2. All dimensions are in millimetres.



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- 2.2.3 Trainstops associated with stop signals shall be positioned along the track as near as practicable to the longitudinal position of the signal, but not on the approach to the signal.
- 2.2.4 Trainstops provided for speed control applications shall be positioned and controlled to ensure that a brake application is initiated by the trainstop as soon as practicable after an overspeed condition has been detected.

### 2.3 Operation of trainstop equipment

- 2.3.1 Trainstop arms shall remain in the raised (effective) position at all times unless the criteria are met for moving to the lowered (ineffective) position.
- 2.3.2 The trainstop arm shall only move to the lowered (ineffective) position:
  - a) When the associated stop signal is ready to display a proceed aspect.
  - Or
  - b) In the case of a trainstop provided for speed control purposes, when sufficient time has elapsed so that the train is known to be travelling at or below the maximum acceptable speed.
  - Or
  - c) When a signalled movement authority is available for a train to pass the trainstop in the opposite direction to that for which the trainstop is provided.
- 2.3.3 The trainstop arm shall return to the raised position under any of the following circumstances:
  - a) As soon as the train has passed the trainstop.
  - Or
  - b) When the associated signal is replaced to danger ahead of the train.
  - Or
  - c) When there is a loss of power or control to the trainstop equipment.

### 2.4 Consistency between trainstop operation and signal aspects

2.4.1 A stop signal shall only display a proceed aspect when the trainstop arm associated with that signal is detected to be in the lowered position.

#### 2.5 Overlaps associated with mechanical trainstop systems

- 2.5.1 The overlap provided at a trainstop fitted signal shall be of sufficient length for a train travelling at the permissible speed (or the maximum attainable speed, where this is lower) to stop within the overlap after being tripped by the trainstop.
- 2.5.2 Where the maximum possible length of the overlap is not compatible with the permissible speed, additional trainstops shall be provided on the approach to the stop signal for speed control purposes so that the train is able to stop within the overlap after being tripped by any of the trainstops.

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## 2.6 Tripcock testing infrastructure equipment

- 2.6.1 The infrastructure manager, in consultation with the railway undertaking(s), shall determine where tripcock testing equipment is provided:
  - a) On trainstop fitted lines.

And

- b) On the approaches to trainstop fitted lines.
- 2.6.2 The consultation process to determine the location of tripcock testing equipment shall take account of the following:
  - The railway undertakings' processes for managing the integrity of tripcocks (for example, checks before entering service, maintenance arrangements, vehicle subsystems for proving the tripcock is correctly aligned and not isolated).
  - b) The volume and mix of traffic on the route.
  - c) The number of trainstops on the route.
  - d) The hazards associated with the particular locations where trainstops are provided.
  - e) The operational procedures for dealing with trains which fail to operate the tripcock tester.
- 2.6.3 Tripcock testers shall be independent of the operation of both the trainstop equipment and the vehicle subsystem.
- 2.6.4 A trackside indication shall be provided to advise the driver whether or not the tripcock test has been successful.
- 2.6.5 Each tripcock tester shall display the indications set out in Table 1.

Indication type	Indication	Meaning
Mechanical trainstop system	'TT'	Tripcock test not yet complete
	No indication	Tripcock test successful

#### **Table 1**Tripcock tester indications

- 2.6.6 The operation of the tripcock tester shall not cause the vehicle subsystem to change its state.
- 2.6.7 If operation of the tripcock tester includes a mechanical interface with the tripcock on the train, the force necessary to operate the tripcock tester shall be less than that required to activate the tripcock on the train.
- 2.6.8 The tripcock tester shall be compatible with the trainstop parameters set out in 2.2.2.

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## Part 3 Vehicle Subsystem Requirements

### 3.1 **Provision of tripcocks**

3.1.1 On a line where a mechanical trainstop system is provided, all trains using the route which are dependent on the mechanical trainstop system for train protection shall be fitted with tripcocks.

### 3.2 Interface parameters for tripcocks

- 3.2.1 Vehicles which come within the fitment criteria set out in 3.1 shall be fitted with a tripcock for each driving position.
- 3.2.2 Tripcocks shall be positioned:
  - a) Outside the right-hand running rail in the forward direction of travel.
  - b) So that the tripcock is activated as soon as practicable after the leading driving cab passes a trainstop.
  - c) So that the tripcock is fully deflected by a trainstop in its raised position but not in its lowered position.
- 3.2.3 The envelope for the location of tripcock equipment on vehicles is set out in GM/RT2149.

### 3.3 Interface with the train braking system and the driver

- 3.3.1 Operation of the tripcock shall initiate an emergency brake application, or, where available, an enhanced emergency brake application.
- 3.3.2 A visual indication that the mechanical trainstop system has initiated a brake application shall be displayed to the driver.
- 3.3.3 The emergency brake application, and the associated visual indication shall be maintained until:
  - a) The train speed is 5 mph or less.

And

- b) The tripcock has been reset using the tripcock reset device in the active cab.
- 3.3.4 The tripcock shall only be reset by operation of the tripcock reset device in the associated driving cab.
- 3.3.5 The tripcock reset device shall not be capable of performing any function other than that of resetting the tripcock subsystem, except that it is permissible to combine it with the uncoupling control on trains that operate only over lines fitted with continuous train detection using track circuits or axle counters.

#### 3.4 Isolation facilities

- 3.4.1 Facilities shall be provided to isolate the vehicle subsystem.
- 3.4.2 The isolation facilities shall not be capable of being operated from the driving position.
- 3.4.3 A visual indication that the equipment is isolated shall be displayed to the driver at the driving position.

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# Part 4 Operating Procedures for Trainstop Systems

## 4.1 Operational procedures

- 4.1.1 The infrastructure manager and railway undertakings shall agree, document and implement operational procedures that ensure that the mechanical trainstop system remains effective as a train protection system.
- 4.1.2 It is permissible to secure a trainstop in the lowered position either:
  - a) During engineering works.
  - Or
  - b) When emergency working arrangements are implemented.

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# Part 5 Application of this document

### 5.1 Application - infrastructure managers

### 5.1.1 Scope

- 5.1.1.1 The requirements of Part 2 and Part 4 of this document apply to all new infrastructure equipment provided as part of a mechanical trainstop system. The requirements only apply on lines where a mechanical trainstop system is the selected method of train protection.
- 5.1.1.2 It is permissible for the infrastructure manager to designate specific infrastructure projects, at an advanced stage of development when this document comes into force, for which compliance with the requirements of this document applicable to the design, construction and commissioning of new or altered infrastructure is not mandatory. When designating such projects, the infrastructure manager shall consider:
  - a) Its responsibilities under its current safety authorisation.
  - b) The stage reached by the project at the time this document comes into force (for example, approval in principle).
  - c) Whether compliance is necessary to ensure compatibility with other parts of the infrastructure.
  - d) Whether compliance is necessary to facilitate the safe working of the railway system having regard to changes to related requirements mandated on another infrastructure manager or a railway undertaking.
  - e) The economic impact of compliance, but subject to its current safety authorisation in relation to the infrastructure in question.
- 5.1.1.3 Where any designations are made for infrastructure projects, those projects shall continue to meet the equivalent requirements in the RGSs applying to the project before the designation.
- 5.1.1.4 Compliance with the requirements of this document relating to inspection, maintenance and in-service condition of infrastructure is mandatory, whether or not the infrastructure concerned is the subject of a designation, as set out above.
- 5.1.1.5 Action to bring existing mechanical trainstop equipment into compliance with the requirements of this document is not required.

### 5.1.2 Exclusions from scope

5.1.2.1 There are no exclusions from the scope specified in 5.1.1 for infrastructure managers.

#### 5.1.3 General compliance date for infrastructure managers

- 5.1.3.1 This Railway Group Standard comes into force and is to be complied with from 01 December 2012.
- 5.1.3.2 After the compliance date, or the date by which compliance is achieved, if earlier, infrastructure managers are to maintain compliance with the requirements set out in this Railway Group Standard. Where it is considered not reasonably practicable to comply with the requirements, permission to comply with a specified alternative should be sought in accordance with the Railway Group Standards Code.

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### 5.1.4 Exceptions to general compliance date

5.1.4.1 There are no exceptions to the general compliance date specified in 5.1.3 for infrastructure managers.

### 5.2 Application - railway undertakings

### 5.2.1 Scope

- 5.2.1.1 The requirements of Part 3 and Part 4 of this document apply to all work that affects the provision or modification of mechanical trainstop equipment on vehicles. The requirements only apply to vehicles operating on lines where a mechanical trainstop system is the selected method of train protection.
- 5.2.1.2 Action to bring existing mechanical trainstop equipment into compliance with the requirements of this document is not required.

### 5.2.2 Exclusions from scope

- 5.2.2.1 There are no exclusions from the scope specified in 5.2.1 for railway undertakings.
- 5.2.2.2 The requirements in this document are not applicable to vehicles that operate solely within possessions.

#### 5.2.3 General compliance date for railway undertakings

- 5.2.3.1 This Railway Group Standard comes into force and is to be complied with from 01 December 2012.
- 5.2.3.2 After the compliance date, or the date by which compliance is achieved, if earlier, railway undertakings are to maintain compliance with the requirements set out in this Railway Group Standard. Where it is considered not reasonably practicable to comply with the requirements, permission to comply with a specified alternative should be sought in accordance with the Railway Group Standards Code.

#### 5.2.4 Exceptions to general compliance date

5.2.4.1 There are no exceptions to the general compliance date specified in 5.2.3 for railway undertakings.

### 5.3 Health and safety responsibilities

5.3.1 Users of documents published by RSSB are reminded of the need to consider their own responsibilities to ensure health and safety at work and their own duties under health and safety legislation. RSSB does not warrant that compliance with all or any documents published by RSSB is sufficient in itself to ensure safe systems of work or operation or to satisfy such responsibilities or duties.

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## Definitions

### Raised (or effective) state (of trainstop)

The status of a trainstop such that it will initiate a brake application on a train passing the trainstop.

### Lowered (or ineffective) state (of trainstop)

The status of a trainstop such that it will not initiate a brake application on a train passing the trainstop.

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# References

The Catalogue of Railway Group Standards gives the current issue number and status of documents published by RSSB. This information is also available from <a href="http://www.rgsonline.co.uk">www.rgsonline.co.uk</a>.

RGSC 01	Railway Group Standards Code
RGSC 02	The Standards Manual

### Documents referenced in the text

Railway Group Standards	
GE/RT8106	Management of Safety Related Control, Command and Signalling (CCS) System Failures
GM/RT2149	Requirements for Defining and Maintaining the Size of Railway Vehicles
RSSB documents	
GE/GN8618	Guidance on Mechanical Trainstop System Interface Requirements