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Controls and Indications

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About This Standard

This Principle addresses the various types of operators' controls and indications used for controlling vital signalling systems and providing the essential signalling system status and ancillary system information to ensure the efficient and safe running of trains.

Document History

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List of Amendments –

ISSUE	DATE	CLAUSE	DESCRIPTION
1.1	01/09/2004		▪ Reformatting to ARTC Standard
1.2	14/03/2005	Disclaimer	▪ Minor editorial change ▪ Footer reformatted

Contents

16 Controls and Indications

16.1 Principle No.16.1 - Controls And Indications

16.1.1 Introduction

This Principle addresses the various types of operators' controls and indications used for controlling vital signalling systems and providing the essential signalling system status and ancillary system information to ensure the efficient and safe running of trains.

16.1.2 Controls

The type of controls described in Section 16 will generally be of the non-vital type. However in some cases the method of control will be considered to be a mixture of both non-vital and vital and in some cases the controls may be considered exclusively as vital.

These distinctions are of paramount importance when considering the nature of the control to be provided and the means by which it is to be implemented.

16.1.3 Indications

The type of indications described in Section 16 will generally be of the non-vital type. However care should be exercised when providing non-vital indications such that they complement the integrity of the fail safe design of the vital system so that the indications will fail to a predictable and non-contradictory state.

16.1.4 Control Panels

The term control panels (CP) will be used in Section 16 and shall be taken to mean any electromechanical man-machine interface using switches, push-pull buttons, and some form of illuminated track display either as a single integrated system or with separated control console and indicator diagram provided for the purpose of train control.

16.1.5 Operator Interface

The term operator interface (OI) will be used in Section 16 and shall be taken to mean any microprocessor based man-machine interface, typically any graphic user interface (GUI) using a keyboard, mouse or other device and any array of visual display units (VDUs) to form a workstation for the purpose of train control.

16.1.6 Train Control System

The term train control system (TCS) will be used in Section 16 and shall be taken to mean one or more microprocessor based operator interface stations with the processing capacity to handle route setting, automatic route setting, train tracking, train describing, train reporting, event logging and all similar functionality.

16.2 Principle No.16.2 - Vital Blocking Requirements And Application

16.2.1 Introduction

This Principle addresses the requirements for and the forms of and method by which vital blocking will be applied to signalling systems. It also discusses the types of controls and indications to be provided.

16.2.2 Vital Blocking - Definition

Vital blocking is the blocking of a specific section of track to signalled train movements by the initiation of a vitally secure operators control which prevents the setting of any controlled signal routes and hence the display of a proceed signal aspect into the blocked section.

16.2.3 Requirements For The Provision of Vital Blocking

Vital blocking shall be provided for all single line sections and on the main and loop lines at crossing loops worked under CTC track circuit block regulations and where the operation of the TCS is such that only a single control command will initiate a route call.

16.2.4 Method of Implementing Vital Blocking

Vital blocking shall be controlled using two entirely separate controls or commands.

Vital blocking shall be applied or cleared using two independent controls over a three position key locked switch as described herein or via an approved equivalent method. Refer to figure 1. Under normal circumstances this switch shall be maintained in the centre position to ensure that the blocking lock relay (BLR), which shall be a magnetically latched vital relay, is stable and electrically isolated and not subject to any type of electromagnetic interference (EMI) which could detach it.

If the key locked switch is unlocked and turned to the left then the BLR shall be de-energised provided all the routes leading into the section of track to be blocked are already normal.

The de-energising of the BLR either by legitimate controls or due to any failure condition, shall prevent any of the routes leading into the section of track to be blocked from being set.

The key locked switch should then be replaced to the centre position and the key removed and held by an authorised employee until the vital block is to be removed.

If the key locked switch is unlocked and turned to the right, then the BLR shall be operated instantly and the vital block shall be cleared.

The switch is to be spring loaded, returning to the centre position to prevent storage of a release or block command.

Two indications shall be displayed on the Control Panel.

If the BLR is in the operated position then no vital blocking shall be effective and a white “CLEAR” indication shall be given. Refer to figure 2.

If the BLR Is in the released position, then vital blocking shall be effective and a red “BLOCKED” indication shall be given. Refer to figure 2.

Vital blocking is to be only incorporated in signal controls within the interlocking (this could include an adjacent interlocking starting signal, if it were on the diagram and controlled, such as in Track Block working). Vital blocking is not to be included in single line or bidirectional section control circuits such as to affect in-section automatic signals. (Once a train has entered the section, a vital block then applied should protect the train in that section, but not restrict its progress or exit from the section).

In remotely controlled areas the vital section block should simultaneously operate both the blocks at the adjacent interlockings on the one section blocking command. Indications are to reflect the correct operation of equipment at both interlockings.

Operations procedures are to reflect the method of operation of vital blocks to permit block working of trains.

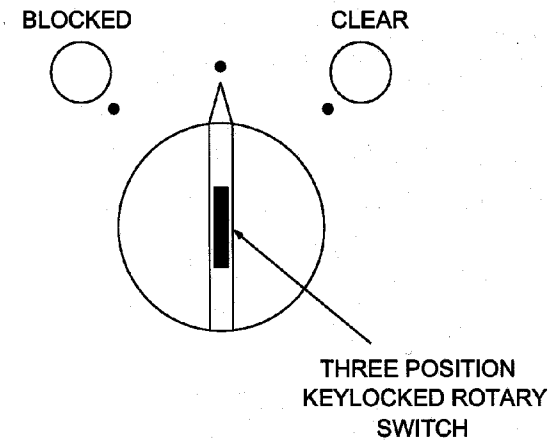

FIGURE 1

VITAL BLOCKING

PRINCIPLE N° 16.2

16.3 Principle No.16.3 - Non Vital Blocking

16.3.1 Introduction

This Principle addresses the requirements for and the types of non-vital (software) blocking which may be implemented on a train control system.

16.3.2 Non Vital Blocking - Definition

Non-vital (or software) blocking is the blocking of specific processing functionality within an OI or TCS to provide the equivalent of lever sleeves on conventional control panels. The result is to inhibit specific controls to call routes and points from being sent out to an interlocking or to impose restrictions within train control system processing to inhibit higher levels of processing, typically automatic route setting and train describer functions.

16.3.3 Requirements For Non Vital Blocking

Non-vital blocking shall be available on all TCS's and shall include some or all of the following functionality:

(I) signalling restrictions which can be placed on signalling functions such as signals, points, releasing switches and track circuits.

(II) track restrictions which can be placed on specific sections of line between two identifiable points.

(III) reminder notice restrictions placed on signals, points and releasing switches.