

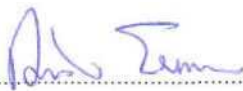
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Business Process Document

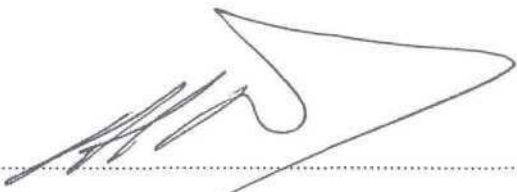
ERSE Mk.4 Product Specification

Endorsement & Authorisation

Endorsed by:

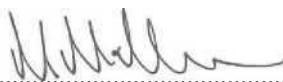


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Accepted for issue by:



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Issue record

Issue	Date	Comments
1	7 th October 2006	First Issue

Implementation

To be implemented from 7th October 2006.

Compliance

This Network Rail Product Specification is mandatory and must be complied with by system suppliers from 7th October 2006.

When this Product Specification is implemented, it is permissible for all projects, which have formally completed GRIP Level 4, to continue to comply with the Issue of any relevant Network Rail Standards current when GRIP Level 4 was reached and not to comply with requirements contained herein unless the Head of Signal Engineering has stipulated otherwise in the accompanying Briefing Note.

Where the Head of Signal Engineering has specified that projects will comply with the requirements, specific authority not to comply can be sought in the usual manner using the appropriate non-compliance authority processes described in Network Rail Standard, [NR/SP/STP/045](#) Managing the Process for Non-compliance Authority (formerly RT/LS/P/045).

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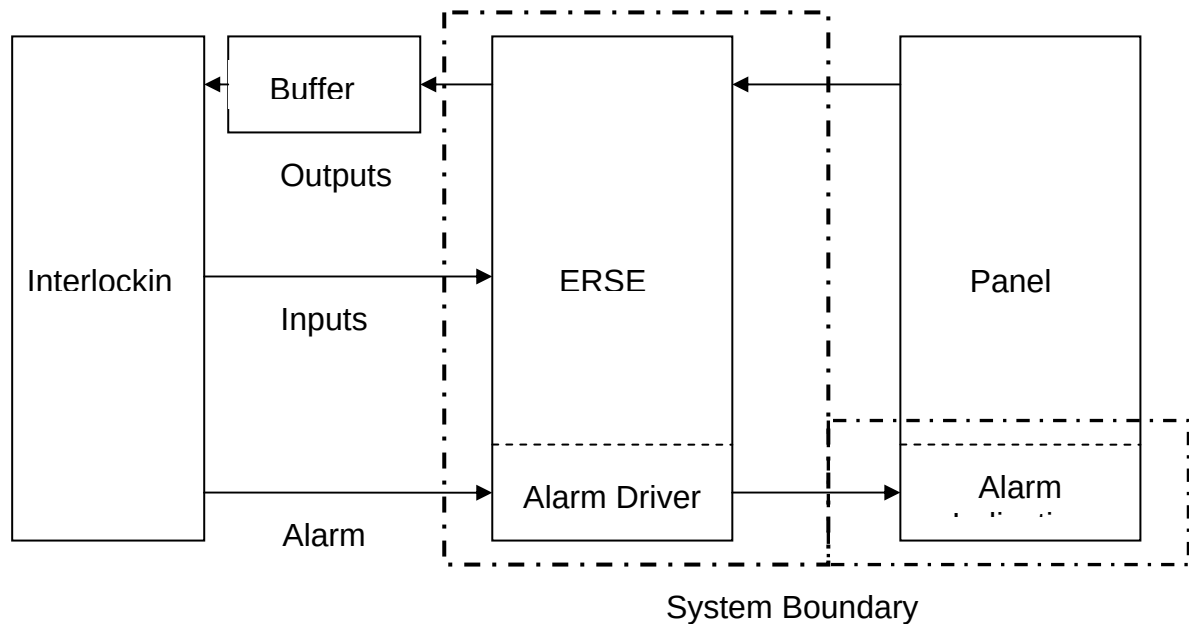
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1 Purpose

This product specification defines the physical and functional requirements for a modern replacement of ERSE (Electronic Route Selection Equipment).

2 Scope

The specified system shall be capable of replacing ERSE Mk.1, 2A and 2B systems as a form fit and functional equivalent. The system boundary is as follows:



3 Reference documentation

The following documents are referenced within this specification:

RT/SMS Test 149	Control Interface ERSE Mk 2A/2B Tests
ERSE Manual Issue 3	ERSE Mk.2A & 2B Systems Operations & Maintenance Manual
RT/E/S/10662	Process for the Introduction of New or Revised Maintenance Regimes for Signalling Assets

4 Definitions

ARS	Automated Route Setting
BORU	Buffer Output Relay Unit
Bypass	A facility enabling routes to be set from the panel without the intervention of the ERSE.
ERSE	Electronic Route Selection Equipment
EARU	ERSE Alarm Relay Unit
FM Card	An interface unit between the FM contact of the signallers' panel push buttons and the ERSE.
IPS	Individual Point Switch
LED	Light Emitting Diode
MTBF	Mean Time Between Failures
NX	Entrance and Exit buttons
N/R	Normal and Reverse position of points
NPR	Non Preferred Route
PCB	Printed Circuit Board
PBIR	Push Button Interlocking Ring
SIL	Safety Integrity Level
SMS	Signalling Maintenance Specification
FZ)	Outputs associated with the ERSE
GZ)	
NZ)	

5 Electronic Route Selection Equipment

5.1 Background

In 1978 a low cost interlocking was proposed whereby the non-vital relay functions were replaced by digital electronics. This allowed all of the PBIR to be replaced and a large proportion of the Signal NLR and RLR relays to be omitted. The result was a series of typical relay circuits known as Appendix B to the Southern Region free wired circuits. The Southern Region circuits formed the basis of the more recent BRS-SW67 series of typical circuits.

The electronic part of the interlocking was known as ERSE and was often small enough to be housed inside the rear of the Signallers' panel although the larger systems were cabinet mounted in the relay room.

The prototype ERSE was known as the Mk.1 and was installed at Brockenhurst in 1979. This is the only example of this model. All subsequent systems were the Mk.2 production models known as Mk.2A for small systems and Mk.2B for larger systems. Further details are contained in the Operations and Maintenance Manual.

In 1982 a Z80 microprocessor based version was developed known as ERSE Mk.3, however this version did not enter service and the development work ceased.

The following sections explain the technical and operational requirements for ERSE based control systems.

5.2 Method of Operation

The signallers' interface is a conventional entrance/exit (NX) panel with individual point switches, alarms and indications. However, although not apparent to the signaller, the sequence for setting a route is different to that for a typical BRS-SW67 free-wired interlocking.

When an entrance button is pressed it flashes and when a valid exit button is pressed for a route that is available, the route is set. However the sequence is that the points are called to required position by the ERSE first of all. At this stage there are no additional indications apart from the IPS point indications changing.

Once all of the relevant point lock relays (NLR and RLR) have operated and the associated anti-preselection relays (WZR) have de-energised, the ERSE then calls the signal lock relay circuit (signal RLR). The relay interlocking then verifies that the conditions for the route to set are correct and completes the route locking process, generates the panel white route lights and clears the signal.

In practice this all happens within 250ms and the signaller is unaware of the sequence.