



BR 1900
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General Specification for Solid State Inter-Locking Equipment

British Railways Board



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AMENDMENTS

Amd. No.	Date	Text Affected

British Railways Board

BRITISH RAILWAYS BOARD

SPECIFICATION NO. 1900

GENERAL SPECIFICATION FOR

SOLID STATE INTER-LOCKING EQUIPMENT

FOREWORD

This specification supersedes all previous issues and is issued by:-

British Railways Board,
Director of S. & T. Engineering,
Materials Management Group,
Room 1103,
Rail House,
CREWE,
Cheshire. CW2 6EA

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from whom further copies may be obtained.

Technical queries shall be referred to:-

The Director of Signal and Telecommunications Engineering,
Melbury House,
Melbury Terrace,
London. NW1 6JU

Telephone : BT (STD) 01-262 3232 Ext. 5744
BR (ETD) 015 5744

REFERENCES

Reference in this specification is made to:-

800	Train describer equipment
864 - 871	Telecommunication cables
872	Flame retardent compound insulated cables for railway signalling
873 - 891	Telecommunications cables
950	Design of Electronic equipment: General requirements to secure reliability
967	Environmental conditions for Railway signalling apparatus.
1990	Procedures for programming and checking PROM devises for vital systems.

Manufacturers Drawings

GEC/GS 1A56117 Issue

SS1 Maximum external dimensions
for trackside modules and
mounting standards within
apparatus cases

3A56118 Issue

SS1 Trackside modules front
panel layouts

OSK0452 Issue

SS1 Multiprocessor module -
proposed assembly

OSK0453 Issue

SS1 Panel processor module -
proposed assembly

- W.S. B42685/1 Issue - Gauging diagram Trackside Functional Modules.
- G14258/1 Issue - Outline details of modules for SS1.
- G14265 Issue - Multiprocessor module, proposed assembly.
- British Railway document. Manual of Quality assurance procedures.
- British Standard 381c Paint Colours
- British Standard 738 Definition for non ignitable and self extinguishing properties of solid electrical insulating materials
- 1701 Dusts used for industrial atmosphere tests.
- 2011 Climatic and durability testing of components for Telecomms and allied Electronics equipment.
- 2782 Methods of testing plastics.
- 4743 Specifications for safety requirements for electronic measuring apparatus.
- 5490 Specification for classification of degrees of protection provided by enclosures.

Where this specification requires reference to BR specification and manuals the latest issue shall apply unless specially stated.

N.B. Should differences exist between the referred specification and this specification, this specification takes precedence.

1. GENERAL

1.1 Introduction

This specification states the standards to be applied in the design, construction and testing of solid state interlocking and associated equipment.

1.2 Individual Specification

This specification covers only the general requirements for solid state interlocking equipment. Specific requirements for particular items of equipment will be covered by individual specifications which give such details as functional and performance requirements, input and output requirements, and behaviour under fault conditions, i.e. "fail-safe" characteristics.

Additional requirements in individual specifications take precedence over this specification should any differences exist.

1.3 Definitions

Solid state interlocking equipment shall mean electronic equipment for controlling and interlocking signals, points, track circuits and other items of railway signalling equipment and for transmitting safety data between a central control point and distributed lineside locations.

Associated equipment includes equipment for transmitting data between panel lamps and switches and the interlocking equipment, and test and monitoring equipment provided for maintenance purposes.

2. CONDITIONS OF OPERATION

2.1 Environment

All equipment must comply with the requirements of BR 967. The appropriate environmental category will be defined in the relevant individual specification.

2.2 Electromagnetic Environment

2.2.1 Interference Sources

The sources of electromagnetic interference against which the equipment must be protected are listed in Table 1.

The characteristics of electric traction systems are described in section 2.2.5 below.

The manufacturer will be expected to determine, from published data or otherwise, the relevant characteristics of the other interference sources.

2.2.2 Electromagnetic Compatibility

The equipment must be fully compatible with all the items listed in Table 2.

Further information concerning the characteristics of the items listed in Table 2 may be obtained from the Engineer on request.

Any modification to existing equipment, such as the addition of interference suppression components, is not generally acceptable, but this approach may be considered in certain cases.

Precautions must be taken to ensure that no malfunction of SSI equipment can result from the inadvertent operation of portable radio or radar equipment in very close proximity to SSI equipment or connecting cables.

2.2.3 Interference Coupling Paths

The interference coupling paths to be considered are as follows:-

- Power supply
- Input/output connections
- Data transmission lines
- Internal equipment wiring and printed circuit tracks

Power supply characteristics are detailed in section 2.3 below.

Input/output connections from apparatus cases will be made using non-screened, non-balanced signalling cable to BR. spec. 872, and may be up to 200 m in length in electric traction areas, and longer elsewhere.

Local data transmission links (up to 10 km) will employ screened, twisted-pair cables.

Long distance, point to point, data transmission will make use of balanced pairs or quads in telecommunications cables to BR Specs. 864 - 871, 873 - 891, or other agreed cables or links.

Data transmission between interlocking and signalman's panel will use twisted pair conductors.

The manufacturer shall draw attention to any precaution necessary in the wiring external to the equipment.

2.2.4 Effects of Interference

The effects of equipment or cable faults in aggravating the effects of interference must be taken into consideration.

It must not be possible for a wrong side failure to result from electromagnetic interference even under the most adverse conditions of equipment and cable faults.

In the absence of equipment or cable faults the equipment must operate correctly for all combinations of interference sources, with the following exceptions.

Temporary recoverable disturbances to equipment operation may occur in the presence of traction faults or lightning-induced voltages.

It is recognised that damage to equipment may be unavoidable in the event of a direct lightning strike.

In electric traction areas wiring faults may cause SSI circuitry to come into contact with the rails or metal structures bonded to the rails. In these circumstances correct operation is not required, but no damage should result under traction full-load conditions. Under traction short-circuit conditions damage may be unavoidable.