

BRITISH RAILWAYS BOARD

SPECIFICATION No 1928

FOR

SOLID STATE INTERLOCKING DATA LINK ISOLATING TRANSFORMER

FOREWORD

The information contained in this document is confidential and must not be used other than for the purpose for which this specification was released.

This specification supersedes all previous issues. It is issued by:-

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REFERENCES

Reference in this specification is made to: -

British Railways Drawings

None as yet.

British Railways Specifications

1900 General Specification for Solid State Interlocking Equipment

1932 Twin data link type polyethylene insulated and polyethylene sheathed cable for railway signalling.

967 Environmental conditions for railway signalling apparatus

924A Air cooled power transformers for railway signalling

The latest issue of all specifications and British Standards shall apply unless otherwise stated.

Other Specifications

BS 9720 Custom Built Transformers and Inductors of Assessed Quality.

1. GENERAL

- 1.1 Within the Solid State Interlocking System, the interlocking is directly linked to electronic trackside interface equipment by means of a baseband data highway. Information is transmitted over the baseband data highway (the data link) in the form of discrete messages of fixed format, at 10 kbaud with Manchester 2 coding. Message packets are of length 3.9ms, at intervals of 4ms to 30ms, measured from the start of the packets. The data link signal amplitude is 5V peak-peak maximum, and the cable nominal characteristic impedance is 100 Ohms.
- 1.2 In a.c. electrified areas, SSI communication cables running parallel to the track are subject to transversely induced voltages. The level of voltage induced is proportional to the length of parallelism and proximity to the interfering source. The C.C.I.T.T. place a maximum limit on the levels that may be induced in order to protect personnel. These limits are
 - a) 60 V r.m.s. under normal running conditions
 - b) 430 V r.m.s. under traction fault conditions
- 1.3 In order to satisfy these limits on the data link of an SSI scheme, it is necessary to insert isolating transformers periodically to provide a rejection of induced common mode interference.
- 1.4 The maximum length of a data link section without data link repeaters is 10 km, and it is anticipated such a link could require a maximum of 5 isolating transformer.
- 1.5 The design and construction should, where appropriate, conform to BR 924A.
- 1.6 The transformer will be used for isolating sections of cable to BR 1932. The data communications carried by this cable should not be affected by the maximum normal level of induced voltage under traction fault conditions.
- 1.7 Manufacturers shall ensure that the equipment complies with relevant parts of the Health and Safety at Work Act, 1974.
- 1.8 All units supplied to this Specification shall have a minimum service life of 25 years.

2. ELECTRICAL REQUIREMENTS

- 2.1 The transformer shall have two windings separated by an earthed screen. The turns ratio of the transformer shall be nominally 1:1. The lower limit shall be 0.95:1, and the upper limit 1.05:1.
- 2.2 The optimum value of winding inductance is 200 mH. The minimum value of winding inductance shall be 150 mH. The winding leakage inductance shall be 1.0 mH maximum.
- 2.3 The resistance per winding shall be 5 Ohms maximum.
- 2.4 The self resonant frequency of the transformer shall be not less than 50 kHz.