

SPECIFICATION NO. 1902AFORSOLID STATE INTERLOCKING LINESIDE SIGNAL MODULEFOREWORD

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

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REFERENCES

Reference in this specification is made to:-

British Railways Drawings

None as yet.

British Railways Specifications

- 966 Miniature Tractive Armature A.C. neutral line Relay (plug-in-type) for Railway Signalling purposes Appendix F7.
- 967 Environmental conditions for Railway Signalling Apparatus.
- 1900 General Specification for solid state interlocking equipment.
- 1990 Procedures for programming and checking PROM devices for vital systems.

Other Specifications

BS 381c British Standard Paint Colours

2007/0322r/1

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

1. GENERAL

- 1.1 Signal modules form the power interface between the serial data distribution system of a solid state interlocking and the lineside signalling devices which it controls. The modules also enable the input of track circuit state, filament failure and other signalling information to be made available to the central interlocking. The detailed structure, operation and connection configuration are contained in the handbook for the S.S.I. signal module, BR
- 1.2 This specification states the engineering requirements for a solid state interlocking module for the control of lineside signals.
- 1.3 The module shall meet all the requirements of B.R. Specification 1900 unless otherwise stated.

2. CONSTRUCTION

- 2.1 The module shall be constructed to meet the requirements of B.R. specification 1900 section 4.
- 2.2 The module shall meet the requirements of B.R. specification 967 category D.
- 2.3 The module shall be internally labelled in accordance with the following:-
 - (a) The P.C.B. assembly shall have all the component numbers and positions marked.
 - (b) The P.C.B. assembly shall carry the manufacturers name, module type, serial No. date of manufacture and modification state.
- 2.4 A nameplate to B.R. Specification 1900 section 4 shall be attached to the outside of the module.
- 2.5 The materials used and finish shall comply with BR Specification 1900 Clause 5. The modules shall be painted light aircraft grey to BS Specification 381c colour number 627.

3. ELECTRICAL REQUIREMENTS

- 3.1 The module shall contain all of the circuitry shown in the following drawings:-

GEC Drawings No.	OW 60420	Schematic
	OW 60414	Power Switching
	OW 60416	Multiplex & Interface
	IW 60170	Power Supply
	OW 60418	Processors

- 3.2 The use of unsoldered plug-in components shall be avoided except for the security fuse, CPU, PROM and Non Volatile RAM which shall be mounted using sockets approved by the Director of S. & T. Engineering.

(Cont'd)

- 3.3 The circuitry shall be so arranged that there is only one electrical common point between the power supplies for the logic circuits.
- 3.4 Special care shall be taken in the design of the printed circuit for the fused supply to ensure that this supply cannot be shorted to another supply track resulting in the processors supply being maintained after a security shutdown. Care must also be taken in the design of the input connections to prevent a short circuit between two tracks producing a false input.
- 3.5 The two EPROMS shall have been programmed to the requirements of B.R. Specification 1990 "Procedures for programming and checking PROM devices for vital systems".
- 3.6 External indications shall be provided as shown on drawing no 1902-A4-1.
- 3.7 The security fuse shall be in such a position that it is accessible for changing without dismantling the complete assembly. The NV RAM and EPROM should also be accessible in a similar manner if at all possible.

4. CONNECTORS

The module shall be connected to the Signalling devices and to the data link modules via a multiway connector. The standard connector shall be a 75 Way rectangular form. Further details of this connector and the pin allocation to be used are shown in Appendix one of this specification.

5. RELIABILITY

The module shall be designed to achieve a predicted nominal M.T.B.F. of 10 years. The contractor shall send details of the method of calculation used.

6. MODULE AND OUTPUT RATINGS

The maximum current rating of the module measured at the 110V input shall be 2.5 amps.

Each of the 8 available 110V outputs shall be rated at 150 watts. Signal devices taking a higher load than this shall be connected to the signal module via a relay to B.R. Specification No. 966 Appendix F7.

7. TYPE APPROVAL TESTS

The type approval testing shall be carried out as detailed in B.R. Specification 1900 section 8. The following type tests shall be applied to an example of the signal module:-

- Visual inspection (1)
- Performance test (1)
- Dry heat test
- Damp heat test
- Low temperature test
- Drip test

(Cont'd)

7. (Cont'd)

Drop test
Vibration test
Humidity cycling test
Insulation test
E.M.C. tests
Condensation test
Visual inspection (2)
Performance test (2)

8. SOAK TEST

Every module shall be subject to a 48 hour soak before the acceptance tests are carried out.

9. ACCEPTANCE TESTS

Details of the acceptance tests to be carried out on every module after manufacture are shown in Appendix two of this specification.

The Contractor shall submit a copy of their proposed test specification to the Engineer for his approval before acceptance tests are required to be carried out.

The Contractors test specification shall be paragraphed according to those laid out in Appendix 2 or a Cross Reference provided to facilitate checking of results.

SIGNAL MODULES
 TYPE E18607/1
 BR SPECIFICATION 1902 A
 SERIAL N°
 DATE

MODIFICATION STATE											
1	2	3	4	5	6	7	8	9	10	11	12

☐ POWER
☐ SYSTEM
☐ RX DATA
☐ OUTPUTS

Space for Manufacturers logo etc
 Manufacturers Type No.

200mm

16mm

92mm

LABEL FOR SIGNAL MODULE

SIGNAL MODULE CONNECTOR

The preferred connector shall be a 75-way rectangular type from the BICC-Vero Trident range.

The connector attached to the module shall be part no. TM75PR207-1. The free connector attached to the wiring loom within the equipment room shall be part no. TM75RR285-1, fitted with female shroud and extra large jack screws.

The connectors shall be polarised by the use of guide pins/sockets as shown in diagram one.

The connector pin out shall be as listed below. The pins, to be fitted to the connector attached to the module, shall be to part no. T3P20MC2L-LAU821. The sockets to be fitted to the free connector attached to the wiring loom, shall be to part no. T3P20FC2L-LAU800 except for those marked thus x, which shall be to part no. T3P20FWL-LAU800 (wire wrap).

All retaining bolts/nuts used to hold the connector to the module shall be provided with a suitable locknut or similar to prevent loosening of the connector in use.

Signal Module Connector pin out

<u>Pin No.</u>	<u>Description</u>
1 x	Processor A address line A0
2 x	" " " " A1
3 x	" " " " A2
4 x	" " " " A3
5 x	" " " " A4
7 x	" " " " A5
8 x	Modifier A
10 x	0 V A Coding
11 x	5 V A Coding
12 x	Processor B address line A0
13 x	" " " " A1
14 x	" " " " A2
15 x	" " " " A3
16 x	" " " " A4
17 x	" " " " A5
18 x	Modifier B
20 x	0 V B Coding
21 x	5 V B Coding
22	Data in A
23	Data in B RTN.
24	Input 0 NX
25	External contact detection source BX (BXE)
26	Not used
27	Input 1 BX
28	External contact detection source NX (NXE)
29	Input 2 NX
30	Data in B
31	Data out A
32	Input 3 BX
33	Data in A Ground
34	Input 4 NX
35	Not used
36	Internal contact detection source NX (NXI)
37	Input 5 BX
38	Data out B
39	Data out A RTN.