

(Minor changes to the previous edition are indicated by ◆ placed before the relevant paragraphs)

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1. Scope

This specification details the manufacturing requirements of the 10-core Cables used to connect items of trackside mounted signal equipment to the fixed lineside cable infrastructure.

These cables are classified as items of vital signalling equipment which means that they may be used to perform a critical safety function directly affecting the safe movement of trains. They have been designed to be ultra reliable items of equipment whose mechanical and electrical integrity will be relied on throughout an extended working life.

For the details of items covered by this specification see section 6 of this specification.

2. References

The text of this document cites other documents that provide information or guidance. These are listed in Attachment 1.

References to British Standards or standards in other standards systems shall be taken to include the words 'or equivalent'.

3. Abbreviations

The following abbreviations are used in this document (if from a published source this is indicated):

TTB Trackside Termination Box

4. Definitions

There are no terms used in this document which need defining.

5. Introduction

10-core cables are used to connect track mounted signal equipment (trainstops, point detector boxes, etc.) to the fixed lineside cable infrastructure. The cable used in the manufacture of the item is a special heavy duty cable produced for London Underground in accordance with specification SSL-SE-0330. The 10-core cable is required to lay on top off the ballast and to pass beneath the running and current rails and is therefore designed to be particularly rugged to withstand the harsh environment and physical treatment (being stepped on by track-workers) to which it is subjected.



The moulded ends of the 10-core cable are designed to allow easy site exchange of faulty cables to be made with no possibility of re-connecting them wrongly.

Various lengths of cable are required with various styles of connection moulded on the equipment end of the cable to match the design of the trackside equipment. Generally the attachment to the fixed cable infrastructure is made at a Trackside Termination Box.

Details of the configurations produced are given in section 6 of this specification.

The service life of this equipment is 15 years. The shelf life is 3 years.

6. Applicability

This specification applies to the following cable variants.

Item	Stores List No.	Cable Run End Drawing No.	Equipment End Drawing No.
22 - H.O.V.	10s10	CS32097	BS26886
33 - H.O.V.	10s13	CS32097	BS26886
12 - 6.T.W.	10s17	CS32097	CS50214
22 - 6.O.W.	10s12	CS32097	CS50214
33 - 6.O.W.	10s15	CS32097	CS50214
45 - 6.O.W.	10s114	CS32097	CS50214
6 - H.T.V.	10s18	CS32097	BS27008
12 - H.T.V.	10s96	CS32097	BS27008
6 - K.T.V.	10s19	CS32097	DS36704
12 - K.T.V.	10s76	CS32097	DS36704
6 - J.O.V.	10s28	CS32097	DS36663
22 - J.O.V.	10s20	CS32097	DS36663
33 - J.O.V.	10s21	CS32097	DS36663
12 - 4.T.W.	10s25	CS32864	BS27878
22 - 4.O.W.	10s26	CS32864	BS27878
33 - 4.O.W.	10s24	CS32864	BS27878
15 C.L.W.	10s31	CS32864	CS32157
22 C.L.W.	10s32	CS32864	CS32157
26 C.L.W.	10s33	CS32864	CS32157
33 C.L.W.	10s34	CS32864	CS32157
25 EXT.	10s30	CS32097	CS32097
36 EXT.	10s35	CS32097	CS32097
60 EXT.	10s36	CS32097	CS32097
22 CS.	10s46	CS32097	DS44145



Item	Stores List No.	Cable Run End Drawing No.	Equipment End Drawing No.
33 CS.	10s47	CS32097	DS44145
26 CL.MA(L)	10s72	CS32864	CS32157 item 1
26 CL.MA(R)	10s73	CS32864	CS32157 item 2
33 CL.MA(L)	10s74	CS32864	CS32157 item 1
33 CL.MA(R)	10s75	CS32864	CS32157 item 2
22 J.O.V.(FS)	10s91	CS32097	CS45928
33 J.O.V.(FS)	10s92	CS32097	CS45928

7. Critical functions

The critical functions of the cable are defined to be:-

Maintenance of core to core insulation: The cable used in the design of the harness is a special purpose multi-core cable which has each insulated conductor covered with a braided screen. This design feature is included to prevent core to core short circuits.

The ability of the item to meet the critical functions listed above throughout its life depends on many factors, not all of which are immediately obvious to people not familiar with all aspects of the design, manufacture and use of the equipment. To ensure that the significance of certain of the detailed requirements is understood and complied with, a number of Critical Parameters or Settings have been designated throughout the text.

Attachment 2 to this Specification lists all the Critical Parameters or Settings [CPS], a reference to the section from which the requirement originates and provides a Criticality Rating of the importance of each CPS item.

The Criticality Rating is based on the severity of the consequence if there is a deviation of the subject parameter from the value specified. Numerical values have been assigned to various levels of the Criticality Rating (CR) according to the table below.

Criticality Rating (CR)	SAFETY RELATED CRITERIA	RELIABILITY RELATED CRITERIA
10	Life critical – sole dependence Occurrence of this deviation alone may lead to an incident causing death or injury.	

8	Life critical – shared dependence Occurrence of this deviation, together with a second deviation which is potentially latent (i.e. not self announcing), may lead to an incident causing death or injury.	
7	Life critical – contributory Occurrence of this deviation increases the probability of an event which may lead to an incident causing death or injury.	Service critical – sole dependence Occurrence of this deviation alone may lead directly to an incident causing major service delays, and indirectly to the danger of a life threatening incident through enforced use of manual rules for operating the railway.
6		Service critical – shared dependence Occurrence of this deviation, together with a second deviation which is potentially latent (i.e. not self-announcing), may lead directly to an incident causing major service delays, and indirectly to the danger of a life threatening incident through enforced use of manual rules for operating the railway.
5		Service critical – contributory Occurrence of this deviation, increases the probability of an event which may lead to major service delays, and indirectly to the danger of a life threatening incident through enforced use of manual rules for operating the railway.
1	Not life critical	Not service critical

The criticality rating provides a scale of the importance of achieving the specified parameter and therefore of the care needed in designing the process or processes that will lead to the parameter being achieved. The design of the process or processes that will lead to the parameter being met are the responsibility of the Contractor.

8. Performance parameters

8.1 Insulation resistance

The insulation resistance between cores and between each core and the screen, measured at 1000V DC, shall be at least 10 MΩ.

8.2 Continuity

Measured by the volt drop method, the resistance of each core and screen conductor shall be less than 0.1 Ω with a current of 1 Amp flowing in the circuit under test. The continuity shall be measured between the pins of the test connector used to connect the harness to the test equipment.