

Public transport - Road vehicle scheduling and control systems - Part 2: WORLDFIP cabling specifications

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specifications

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

<p>Käesolev Eesti standard EVS-EN 13149-2:2004 sisaldab Euroopa standardi EN 13149-2:2004 ingliskeelset teksti.</p> <p>Käesolev dokument on jõustatud 23.11.2004 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes.</p> <p>Standard on kättesaadav Eesti standardiorganisatsioonist.</p>	<p>This Estonian standard EVS-EN 13149-2:2004 consists of the English text of the European standard EN 13149-2:2004.</p> <p>This document is endorsed on 23.11.2004 with the notification being published in the official publication of the Estonian national standardisation organisation.</p> <p>The standard is available from Estonian standardisation organisation.</p>
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<p>Käsitlusala:</p> <p>This European Standard defines the cabling specifications for an onboard data transmission bus between the different parts of equipment for service operations and monitoring of the fleet. This European Standard is applicable to equipment installed onboard buses, trolley buses and tramways only as part of a bus fleet operation. This equipment include operations aid systems, automatic passenger information systems, fare collection systems, etc.</p>	<p>Scope:</p> <p>This European Standard defines the cabling specifications for an onboard data transmission bus between the different parts of equipment for service operations and monitoring of the fleet. This European Standard is applicable to equipment installed onboard buses, trolley buses and tramways only as part of a bus fleet operation. This equipment include operations aid systems, automatic passenger information systems, fare collection systems, etc.</p>
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Võtmesõnad:

English version

**Public transport - Road vehicle scheduling and control systems -
Part 2: WORLDIFIP cabling specifications**

Öffentlicher Verkehr - Planungs- und Steuerungssysteme
für Straßenfahrzeuge - Teil 2: WORLDIFIP Spezifikation für
die Vernetzung

This European Standard was approved by CEN on 1 April 2004.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: rue de Stassart, 36 B-1050 Brussels

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Foreword

This document (EN 13149-2:2004) has been prepared by Technical Committee CEN/TC 278, "Road Transport and Traffic Telematics", the secretariat of which is held by NEN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by February 2005, and conflicting national standards shall be withdrawn at the latest by February 2005.

This document supersedes ENV 13149-2:2000

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

1 Scope

This document defines the cabling specifications for an onboard data transmission bus between the different parts of equipment for service operations and monitoring of the fleet.

This document is applicable to equipment installed onboard buses, trolley buses and tramways only as part of a bus fleet operation. This equipment include operations aid systems, automatic passenger information systems, fare collection systems, etc.

Equipment directly related to the functioning of the vehicle (e.g. driver dashboard, engine management, brake systems, door opening systems) are excluded from the scope of this document and are dealt with in other standardisation bodies.

This document is not applicable to tramways operated as part of a train, subway or metro operation.

Two alternative transmission buses will be accepted. This document refers to one of them (known as WORLFIP and specified in EN 50170). A second set of standards will be published for the other solution (so called CAN). The selected bus system, between the two standardised alternatives, shall be subject to an agreement between each transport operating organisation and its equipment providers.

This document covers the link between equipment inside a single vehicle. Although it could be applied to multiple vehicles, this application is not explicitly covered by this document.

This document is the second part of a set of standards related to the onboard transmission bus, which will define the following aspects for each allowed transmission bus:

- choice of the bus and general application's rules (EN 13149-1)
- cabling specifications (EN 13149-2, this document)
- message content specifications (prCEN TS 13149-3, under development)

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 50170	<i>General purpose field communication system</i>
EN 61158-2:1994	<i>Fieldbus standard for use in industrial control systems; part 2: physical layer specification and service definition (IEC 61158-2:1993)</i>

3 Cabling specifications

3.1 General remarks

The principles for the coupling of devices to the data transmission bus focus upon the longer term objectives which are to achieve the least necessary number of variants, rather than to allow for the profusion of interim and migratory solutions which may occur initially. This is especially important for public transport road vehicles, which are generally equipped in different non-correlated stages (for example, first the fare collection system, then the radio and automatic location system some months or years later, etc.)

It is important to understand that electrical connections onto the bus have some impact upon the network performance, and that the practice is dependant upon the principles relevant to transmission lines rather than simple electrical power circuits.

Since one of the main objectives is to provide the minimum amount of cabling on vehicles the basic power concepts are also covered with flexibility to suit different circumstances.

3.2 Characteristic impedance

The main trunk circuit shall be a single pair twisted and shielded cable of nominal characteristic impedance of 150 Ohms at 1Mhz with overall braided shield. This shall not be connected in the form of a ring.

3.3 Polarity

The polarity of the signal conductors shall be maintained throughout the trunk:

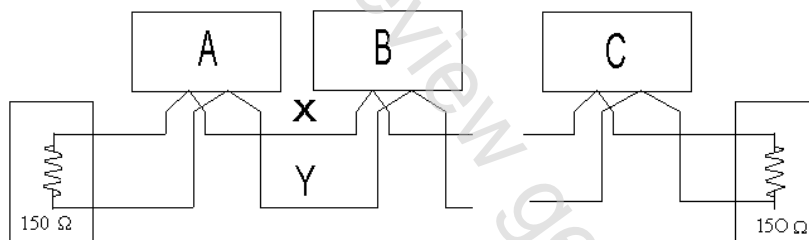
Pair 1	Wire 1 (White) -	Data +
	Wire 2 (Black) -	Data -

3.4 Signal conductors

The signal conductors shall not be used for powering any devices.

3.5 Connections between devices

The one pair cable can be run between devices in a daisy chain fashion but shall be terminated with a 150 Ω resistor at each end.



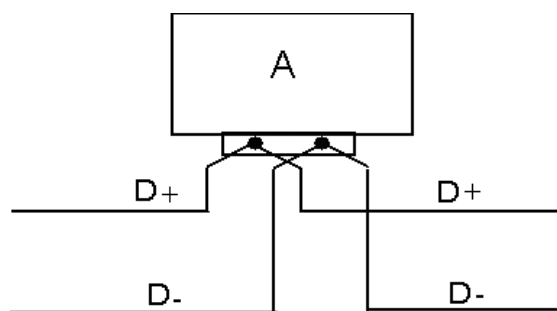
Key

A	device 1
B	device 2
C	device N
X	Data + White
Y	Data - Black

Figure 1 — Connection between devices

3.6 Connection/disconnection of a device

To avoid the disruption to the trunk continuity when a device is removed, the cable shall be joined on the trunk side of the device connector. This will allow removal of a device without causing a failure to the remaining network.



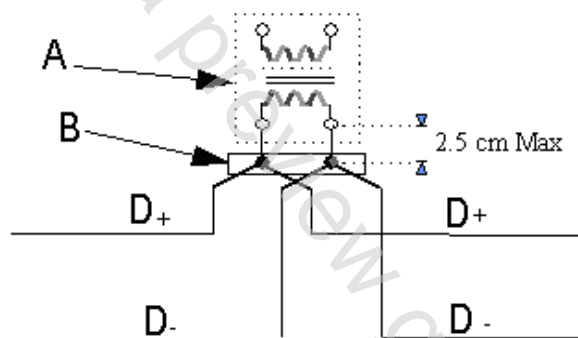
Key

A device 1
D data

Figure 2 — Connection/disconnection of a device

3.7 Spur length

To minimise the mismatch caused by a spur, the cable connection at the device shall be within 2,5 cm of the coupling transformer.



Key

A coupling transformer
B connector
D data

Figure 3 — Spur length

3.8 Connectors

Types of connectors are not mandatory but the following conventions are recommended:

Cable Side	-	Socket (receptacles)
Device Side	-	Plug (pins)

Four way connectors				Nine way connectors			
Terminal	1 a	Data +		Terminal	1	Screen	
	2 b	Data -			2		
	3 c	DC + ve			3		
	4 d	DC - ve			4		
					5		
					6	Data +	
					7	Data -	
					8	DC +	
					9	DC -	

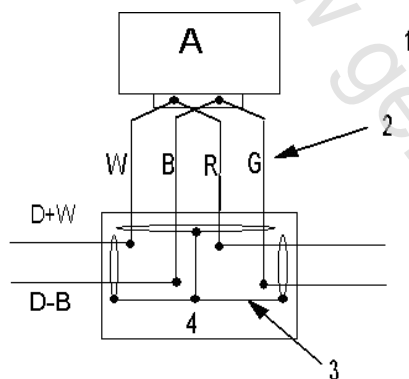
When a connection that breaks into the trunk circuit is required a tap connection can be provided. This could be provided using a two pair branch cable.

3.9 Branch cable polarity:

The polarity of the signal conductors shall be maintained.

Pair 1	Wire 1	White	Data +
	Wire 2	Black	Data -
Pair 2	Wire 1	Red	Data +
	Wire 2	Green	Data -

See additional tables in annex, A which refers to cables for up to six pairs for additional circuits.



Key

A	device 1
D+W	data+white
D-B	data-black
W	white
B	black
R	red
G	green
1	Data+
2	Branch cable
3	Drain wire connections to shields
4	Tap box

Figure 4 — Branch cable polarity