



# SLOVENSKI STANDARD

## SIST EN 13149-4:2005

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### Javni prevoz – Sistemi za časovno razporejanje in nadzor cestnih vozil – 4. del: Splošna aplikacijska pravila za prenosna vodila CANopen

Public transport - Road vehicle scheduling and control systems - Part 4: General application rules for CANopen transmission buses

Öffentlicher Verkehr - Planungs- und Steuerungssysteme für Straßenfahrzeuge - Teil 4: Allgemeine Anwendungsregeln für den CANopen Übertragungsmodus

Transports publics - Systemes d'ordonnement et de contrôle des véhicules routiers - Partie 4: Regles générales d'application des bus de transmission CANopen

Ta slovenski standard je istoveten z: EN 13149-4:2004

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#### **ICS:**

03.220.20	Cestni transport	Road transport
35.240.60	Uporabniške rešitve IT v transportu in trgovini	IT applications in transport and trade
43.040.15	Avtomobilska informatika. Vgrajeni računalniški sistemi	Car informatics. On board computer systems

**SIST EN 13149-4:2005**

**en**

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN 13149-4**

September 2004

ICS 35.240.60; 43.080.20; 45.060.01

Supersedes ENV 13149-4:2002

English version

**Public transport - Road vehicle scheduling and control systems -  
Part 4: General application rules for CANopen transmission  
buses**

Transports publics - Systèmes d'ordonnancement et de  
contrôles des véhicules routiers - Règles générales  
d'application des bus de transmission CANopen

Öffentlicher Verkehr - Planungs- und Steuerungssysteme  
für Straßenfahrzeuge - Teil 4: Allgemeine  
Anwendungsregeln für den CANopen Übertragungsmodus

This European Standard was approved by CEN on 21 June 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.

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## Foreword

This document (EN 13149:2004) 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 March 2005, and conflicting national standards shall be withdrawn at the latest by March 2005.

This document supersedes ENV 13149-4:2002.

This document is part of the following series of standards related to road vehicle scheduling and control systems:

EN 13149-1, *Public transport - Road vehicle scheduling and control systems - Part 1: WORLDFIP definition and application rules for onboard data transmission*

EN 13149-2, *Public transport - Road vehicle scheduling and control systems - Part 2: WORLDFIP cabling specifications*

prENV 13149-3, *Public transport - Road vehicle scheduling and control systems - Part 3: WORLDFIP message content*

EN 13149-4, *Public transport - Road vehicle scheduling and control systems - Part 4: General application rules for CANopen transmission busses*

EN 13149-5, *Public transport - Road vehicle scheduling and control systems - Part 5: CANopen cabling specifications*

prCEN/TS 13149-6, *Public transport - Road vehicle scheduling and control systems - Part 6: CAN message content*

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.

**EN 13149-4:2004 (E)****Introduction**

This document is part 4 of EN 13149, which gives rules for on-board data transmission systems.

This part 4 together with part 5 and part 6 describes a complete solution independent from part 1, part 2 and part 3.

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## 1 Scope

This document specifies the choice and the general application's rules of an onboard data transmission bus between the different equipment for service operations and monitoring of the fleet. This applies to equipment installed onboard buses, trolleybuses and tramways only as part of a bus fleet operation. It excludes tramways when they are operated as part of a train, subway or metro operation. This equipment includes operation aid systems, automatic passenger information systems, fare collection systems, etc.

The equipment directly related to the safety-related functioning of the vehicle (propulsion management, brake systems, door opening systems, etc.) is excluded from the scope of the present document and are dealt with in other standardisation bodies.

For the described application two bus systems are standardised. Part 1 to part 3 describes the WORLDFIP bus system and part 4 to part 6 describes the CANopen bus system. There is no ranking between the two bus systems.

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

Part 4 of this document specifies the CANopen-based network. This specification describes the general architecture in terms of hierarchical layers according to the ISO reference model for Open Systems Interconnection (OSI) specified in ISO 7498.

Part 5 of this document specifies in detail the connectors and the connector pin assignment and the cabling.

Part 6 of this document specifies in detail the application profiles for the virtual devices in public transport.

## 2 Normative references

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[5e0a38b59d5b/iso-en-13149-4:2005](https://standards.iteh.ai/catalog/standards/sist/7fad2942-0508-4da9-8b2a-5e0a38b59d5b/iso-en-13149-4:2005)

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 50325, *Industrial communications subsystem based on ISO 11898 (CAN) for controller-device interfaces*

EN 13149-5, *Public transport - Road vehicle scheduling and control systems - Part 5: CANopen cabling specifications*

prCEN/TS 13149-6, *Public transport - Road vehicle scheduling and control systems - Part 6: CAN message content*

## 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

### 3.1

#### CAN

Controller Area Network. Data link layer protocol for serial communication as specified in EN 50325

### 3.2

#### CANopen

application layer and the communication profile for CAN-based networks as specified in EN 50325-4

**EN 13149-4:2004 (E)****3.3****ECU**

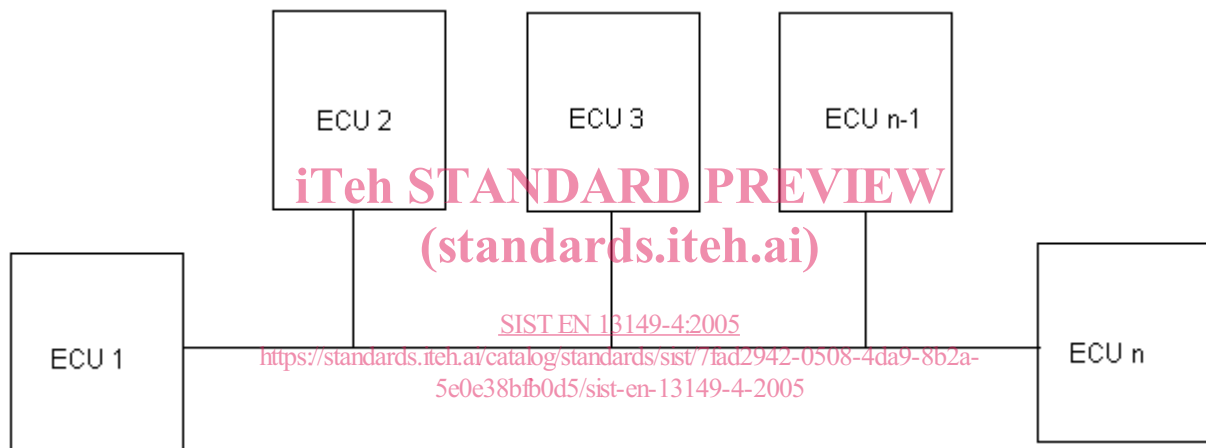
Electronic Control Unit

**4 Basic concepts****4.1 General**

The CANopen bus system was developed for different applications for automotive, industry and so on. For the application as defined in the scope, the valid particular documents (for example documents for temperature, vibration, EMC, etc.) for busses and tramways shall be taken into account.

**4.2 Topology**

The preferred wiring topology of the CANopen network is a single line structure with terminations on both sides of the network (see Figure 1). Detailed information on the network topology is given in EN 50325.

**Figure 1 — Preferred CAN topology****4.3 CANopen performance**

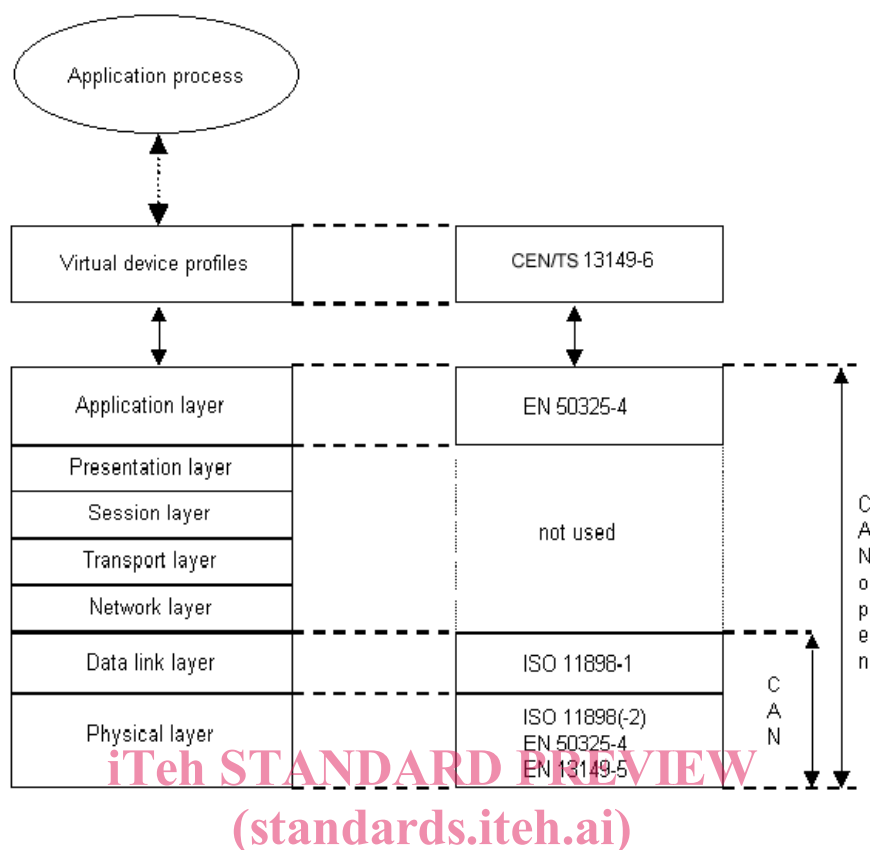
The CANopen-based network has the following properties:

- master/slave network management capability including boot-up message and node guarding or heartbeat;
- unconfirmed Process Data Object (PDO) transmission for real-time data;
- confirmed read/write access to all entries in the object dictionary by means of Service Data Objects (SDO);
- pre-defined master/slave identifier connection set;
- default PDO mapping for virtual devices.

**4.4 CANopen – OSI reference**

The relations between the OSI layer model, applied documents and the CANopen structure are shown in Figure 2.





**Figure 2 — Structure of the CANopen - ISO reference model**

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The used physical layer is compliant to EN 50325-4 describing the CAN high-speed transceiver, the bit timing as defined in EN 50325-4 (CANopen). 5e0e38bb0d5/sist-en-13149-4-2005

The data link layer is compliant to EN 50325.

Network, transport, session and presentation layers are not implemented (layer 3 through layer 6).

The application layer is specified in EN 50325-4.