International Standard

ISO 17987-7

Road vehicles — Local Interconnect Network (LIN) —

Part 7: Electrical physical layer (EPL) conformance test specification

Véhicules routiers — Réseau Internet local (LIN) —

Partie 7: Spécification d'essai de conformité de la couche électrique physique (EPL)

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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This document was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 31, *Data communication*.

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This second edition cancels and replaces the first edition (ISO 17987-7:2016), which has been technically revised.

The main changes are as follows:

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- master and slave terms used for the LIN node types in ISO 17987:2016 (all parts) are replaced within this standard with inclusive language terms commander and responder. This also applies for abbreviations and file formats NCF and LDF;
- adoptions based on updates in the corresponding requirement document (ISO 17987-4);
- EPL–CT 35 and EPL–CT 93 withdrawn;
- Electrical parameters for ECU low supply operation voltage range considered in test cases;
- editorial updates and several statements improved to avoid ambiguities.

A list of all parts in the ISO 17987 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

The LIN protocol as proposed is an automotive focused low-speed universal asynchronous receiver transmitter (UART)-based network. Some of the key characteristics of the Local Interconnect Network (LIN) protocol are signal-based communication, schedule table-based frame transfer, commander/responder communication with error detection, node configuration and diagnostic service transportation.

The LIN protocol is for low-cost automotive control applications as, for example, door module and air condition systems. It serves as a communication infrastructure for low-speed control applications in vehicles by providing

— signal-based communication to exchange information between applications in different nodes,

— bitrate support from 1 kbit/s to 20 kbit/s,

— deterministic schedule table-based frame communication,

— network management that wakes up and puts the LIN cluster into sleep mode in a controlled manner,

— status management that provides error handling and error signalling,

— transport layer that allows large amount of data to be transported (such as diagnostic services),

— specification of how to handle diagnostic services,

— electrical physical layer specifications,

— node description language describing properties of responder nodes,

— network description file describing behaviour of communication, and

— application programming interface.

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The ISO 17987 series is based on the open systems interconnection (OSI) basic reference model as specified in ISO/IEC 7498–1 which structures communication systems into seven layers.

The OSI model structures data communication into seven layers called (top down) application layer (layer 7), presentation layer, session layer, transport layer, network layer, data link layer and physical layer (layer 1). A subset of these layers is used in the ISO 17987 series.

The ISO 17987 series distinguishes between the services provided by a layer to the layer above it and the protocol used by the layer to send a message between the peer entities of that layer. The reason for this distinction is to make the services, especially the application layer services and the transport layer services, reusable also for other types of networks than LIN. In this way, the protocol is hidden from the service user and it is possible to change the protocol if special system requirements demand it.

The ISO 17987 series provides all documents and references required to support the implementation of the requirements related to the following:

— ISO 17987–1: provides an overview of the ISO 17987 series and structure along with the use case definitions and a common set of resources (definitions, references) for use by all subsequent parts.

— ISO 17987–2: specifies the requirements related to the transport protocol and the network layer requirements to transport the PDU of a message between LIN nodes.

— ISO 17987–3: specifies the requirements for implementations of the LIN protocol on the logical level of abstraction. Hardware related properties are hidden in the defined constraints.

— ISO 17987–4: specifies the requirements for implementations of active hardware components which are necessary to interconnect the protocol implementation.

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