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Tractors and machinery for agriculture and forestry — Serial control and communications data network —

Part 3: Application layer, transport layer and network layer

Tracteurs et matériels agricoles et forestiers — Réseaux de commande et de communication de données en série —

Partie 3: Couche d'application, couche transport et couche réseau

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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

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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 document 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 23, *Tractors and machinery for agriculture and forestry*, Subcommittee SC 19, *Agricultural electronics*.

This fifth edition cancels and replaces the fourth edition (ISO 11783-3:2018), which has been technically revised.

The main changes are as follows:

— term entries have been added in Clause 3;

— former Annex A has been deleted, and subsequent annexes have been relabelled;

— default priority has been replaced by assigned priority;

— transport protocol abort handling has been improved to unambiguously close a transport session;

— proprietary B PG has been added to data page one;

— length limit for Proprietary A and Proprietary A2 PGs have been removed;

— usage of 11-bit CAN IDs has been limited;

— a control function responding with a NACK when receiving unsupported PDU1 type messages has been made possible.

A list of all parts in the ISO 11783 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 ISO 11783 series specifies a communications system for agricultural equipment based on the ISO 11898-1 CAN protocol. The SAE J1939 series[1)], on which parts of ISO 11783 series are based, were developed jointly for use in truck and bus, construction, and agriculture applications. Joint documents have been completed to allow electronic units that meet the truck and bus SAE J1939 specifications to be used by agricultural and forestry equipment with minimal changes. General information on the ISO 11783 series can be found in ISO 11783-1.

The purpose of the ISO 11783 series is to provide an open, interconnected system for on-board electronic systems. It is intended to enable electronic control units (ECUs) to communicate with each other, providing a standardized system.

1) Society of automotive engineers.

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Tractors and machinery for agriculture and forestry — Serial control and communications data network —

Part 3:
Application layer, transport layer and network layer

1 Scope

This document specifies the open system interconnections (OSI) application layer, the transport, and the network layer, as well as the mapping to the controller area network (CAN) data link layer protocol as specified in ISO 11898-1. The application layer specifies messages, which are mapped to CAN CC data frames using the classic extended frame format (CEFF). For messages exceeding the length of the CEFF-formatted data frames, this document specifies transport layer and network layer protocols based on the SAE J1939-21 recommended practice.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

ISO 11783-1, *Tractors and machinery for agriculture and forestry — Serial control and communications data network — Part 1: General standard for mobile data communication*

ISO 11783-5, *Tractors and machinery for agriculture and forestry — Serial control and communications data network — Part 5: Network management*

ISO 11783-7, *Tractors and machinery for agriculture and forestry — Serial control and communications data network — Part 7: Implement messages application layer*

ISO 11898-1, *Road vehicles — Controller area network (CAN) — Part 1: Data link layer and physical coding sublayer*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 11783-1, ISO 11898-1 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
multi-packet message
message that does not fit into the data field of a single CAN data frame (i.e. messages with more than eight byte of parameters)

3.2
data transfer packet
packet that contains data which is part of a larger message communicated using either TP.DT or ETP.DT

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3.3
request to send
RTS
message used to gain approval to send a block of data

3.4
clear to send
CTS
message used to grant approval to a sender of a block of data

3.5
group function value
GFV
unsigned eight-bit number that identifies a unique parameter or sequence of parameters in a dedicated PG

Note 1 to entry: The values follow the recommendations for one-byte parameter given in ISO 11783-7.

3.6
extended group function value
EGFV
one-, two- or three-byte number that identifies a unique parameter or sequence of parameters in a dedicated PG

Note 1 to entry: The interpretation of the values is proprietary and defined by the manufacturer.

3.7
message
protocol entity of the application layer such as parameter groups (PG)

3.8
controller area network
CAN
serial communication technology covering the data link layer and the physical coding sublayer in accordance with ISO 11898-1 as well as the physical medium attachment (PMA) sublayer in accordance with ISO 11898-2

Note 1 to entry: There are three frame format types specified: CAN CC (classic), CAN FD (flexible data rate) and CAN XL (extended data field length). This document series uses only CAN CC frame formats.

Note 2 to entry: There are five PMA types specified: CAN HS (high-speed), CAN FD, CAN SIC (signal improvement capability), CAN SIC XL, and CAN FT (fault-tolerant). This document series uses only the CAN HS type.

3.9
source address
SA
number identifying the originator CF of a message

3.10
destination address
DA
number identifying the consumer CF of a message

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