International Standard

ISO 11785

Radio frequency identification of animals — Technical concept

Identification des animaux par radiofréquence — Concept technique

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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

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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 second edition cancels and replaces the first edition (ISO 11785:1996), which has been technically revised. It also incorporates the Technical Corrigendum ISO 11785:1996/Cor. 1:2008.

The main changes are as follows.

— The annex integration of the installed base (former Annex A) has been removed. Subsequent annexes have been relabelled.

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Introduction

The technical concept of animal identification described is based upon the principle of radio-frequency identification (RFID). ISO 11785 is applicable in connection with ISO 11784 which describes the structure and the information content of the codes stored in the transponder.

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Radio frequency identification of animals — Technical concept

1 Scope

This document specifies how a transponder is activated and how the stored information is transferred to a transceiver.

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 11784, *Radio frequency identification of animals — Code structure*

ISO 24631-7, *Radiofrequency identification of animals — Part 7: Synchronization of ISO 11785 identification systems*

3 Terms and definitions

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

ISO and IEC maintain terminology 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
activation field
electromagnetic field transmitted by a transceiver to energize and/or activate a transponder

3.2
activation frequency
frequency of the activation field

3.4
bit rate
number of bits transmitted per second

3.5
differential bi-phase encoding
DBP
method of encoding in which data bit 0 is represented by a mid-bit transition, data bit 1 is represented by no transition, and there is always a transition in between two bits

3.6
encoding
one to one relationship between basic information elements and modulation patterns

3.7
error detection code
bits that contain information which can be used to detect errors

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3.8
frequency shift keying
FSK
binary information is superimposed onto a carrier electromagnetic field by shifting between discrete frequencies of the field

3.9
full duplex
method of information exchange in which the information is communicated while the transceiver transmits the activation field

3.10
half duplex
method of information exchange in which the information is communicated after the transceiver has stopped transmitting the activation field

3.11
header
bits transmitted before the useful information, uniquely identifying the start of a page, which may also be used for synchronization of the transponder and the transceiver

3.12
identification code
64 bits of the identification telegram which are specified in ISO 11784

3.13
identification telegram
total identification message (header, identification code, error detection code and trailer), possibly repeatedly transmitted by the transponder upon activation

3.14
mobile transceiver
transceiver that is not connected to other transceivers when these are in its vicinity to synchronize activation periods and pauses

3.15
modulation
method of superimposing information onto an electromagnetic field by means of varying a specific parameter of the field

3.16
non-return to zero encoding
NRZ
method of encoding in which data bit 1 is a high signal and data bit 0 is a low signal

3.17
page
coherent part of the communicated information

3.18
phase shift keying
PSK
binary information is superimposed onto a carrier electromagnetic field by introducing discrete phase shifts of the field

3.19
stationary transceiver
transceiver that is connected to other transceivers when these are in its vicinity to synchronize activation periods and pauses

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3.20
trailer
bits transmitted after the error detection code; the content of which is dependent upon the value of the flag for an additional data block which is specified in ISO 11784

3.21
transceiver
device used to communicate with a transponder

3.22
transponder
device which transmits its stored information when activated by a transceiver and may be able to store new information

4 Abbreviated terms

AM	amplitude modulation
BCC	block control character
CRC	cyclic redundancy check
DBP	differential bi-phase encoding
FDX	full duplex
FSK	frequency shift keying
HDX	half duplex
LSB	least significant bits
MSB	most significant bits
NRZ	non-return to zero encoding
PSK	phase shift keying
RFID	radio-frequency identification

5 Requirements

5.1 General

The system shall be defined in such a way that the FDX and HDX transponders can be read by one transceiver.

A stationary transceiver shall activate transponders using an activation field with an activation frequency of (134,2 ± 13,42 × 10^{-3}) kHz. The activation period shall be 50 ms. If an FDX signal is received during activation but is not validated, the activation period shall be extended until be identification telegram is validated, but not longer than 100 ms. Consecutively, there shall be a pause in the activation signal. If an HDX signal is received the pause shall last for 20 ms. If no HDX signal is detected within 3 ms after a 3 dB decay of the activation field, activation shall be resumed. For synchronization reasons, each tenth activation cycle shall have a fixed pattern of 50 ms activation and 20 ms pause (see Annex B). Synchronization of ISO 11785 identification systems shall be in accordance with ISO 24631-7.

A mobile transceiver shall be able to detect the presence of additional active transceivers through the reception of activation signals. If no activation signal is detected within 30 ms, the mobile transceiver is out of reach of other active transceivers and shall use the activation protocol defined above for a stationary

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