SLOVENSKI STANDARD
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Oprema za vzdrževalna dela zimske službe in službe za vzdrževanje cest - Zajem in prenos podatkov - 1. del: Zajem podatkov v vozilu

Winter and road service area maintenance equipments - Data acquisition and transmission - Part 1: In vehicle data acquisition

Winterdienst- und Straßenbetriebsdienstausstattung - Datenerfassung und -übertragung - Teil 1: Datenerfassung im Fahrzeug

Matériels de viabilité hivernale et d'entretien des dépendances routières - Acquisition et transmission des données - Partie 1: Acquisition des données véhiculaires

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ICS:

35.240.60	Uporabniške rešitve IT v transportu in trgovini	IT applications in transport and trade
43.160	Vozila za posebne namene	Special purpose vehicles

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This draft amendment is submitted to CEN members for unique acceptance procedure. It has been drawn up by the Technical Committee CEN/TC 337.

This draft amendment A1, if approved, will modify the European Standard EN 15430-1:2007. If this draft becomes an amendment, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for inclusion of this amendment into the relevant national standard without any alteration.

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Foreword

This document (EN 15430-1:2007/FprA1:2010) has been prepared by CEN/TC 337/WG 3 "Interface between tools and vehicle", the secretariat of which is held by UNI-CUNA, under the direction of Technical Committee CEN/TC 337 "Winter maintenance and road service area maintenance equipment", the secretariat of which is held by AFNOR.

This document is currently submitted to the Unique Acceptance Procedure.

1 Modification to Clause 2, Normative references

Add at the beginning of the clause the following standard paragraph:

"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."

2 Modification to Clause 3, Terms and abbreviations

Add the following abbreviation under CRC-16 reference:

"CRC-32 Cyclic Redundancy Code with 32 bits".

3 Modification to 4.2.3, Communication protocol

Delete the existing text in 4.2.3 until Figure 3 and replace it with the following:

"*Transmission of a record.*

In this definition a message to be communicated consists of one record. Records are terminated by CR+LF (a record is one line of text). In general, a message is sent by the sender (e.g. the “Data transmission handler” of a spreader) and received by the receiver (e.g. the Board-computer). After power up, communication is always started by the vehicle/equipment “Data transmission handler” sending its first message (this is the time synchronisation record). Refer to Figure 4 for flow charts of the sender and receiver algorithms.

The receiver will check the validity of a message by testing if the CRC-16 value corresponds to the data in the message received. If the data is valid, the receiver sends an ACK. The sender can now send a new message. If the data is invalid, the receiver sends a NAK. Then, the sender will try to send the same message again for a maximum of 2 times. If the message still fails, the message is considered to be lost. Preferably, a notification is given to the user (operator) that data has been lost by the sender and/or the receiver.

Remark: The receiver sends an ACK or a NAK as a single character without other data. The ACK or NAK refers to the latest message sent by the sender. To avoid record synchronisation problems between sender and receiver, the sender must ignore any ACK or NAK received during the transmission of a message until the last byte is sent (EOT character). Also, the receiver is not allowed to send an ACK or NAK during the reception of a message until the last byte is received (EOT character).

Remark: Numerical values have to be transmitted with ASCII characters in decimal code.

Calculation of the CRC-16 value.

The CRC value is calculated according to the CCITT definition. The CRC value is calculated over all record bytes, starting with the record code, ending with CR+LF. The polynomial used is $x^{16} + x^{12} + x^5 + x^0 = 11021_h$ (i.e. XOR mask 1021_h) and initial value $FFFF_h$.

Remark: The value is written in ASCII characters in hexadecimal code with capitals (0..9,A..F).

Calculation of the CRC-32 value.

The CRC-32 value is calculated according to the CCITT definition. The CRC-32 value is calculated over all record bytes, starting with the record code, ending with CR+LF. The polynomial used is $x^{32} + x^{26} + x^{23} + x^{22} + x^{16} + x^{12} + x^{11} + x^{10} + x^8 + x^7 + x^5 + x^4 + x^2 + x + 1$

Remark: The value is written in ASCII characters in hexadecimal code with capitals (0..9,A..F).

Sender without receiving options for handshaking.

For old vehicle/equipment “Data transmission handlers”, it may be impossible to receive data. In this case the sender cannot respond to an ACK or NAK, i.e. there is no handshaking feature. Hence, the sender will send a new message. This may cause in the result that data gets lost, e.g. in case the Board-computer was not started up yet or if transmission failed. It is up to the user to handle this problem (for example to connect power supply such that power-up is always at the same time for sender and transmitter).

Synchronisation of communication.

To synchronise communication between sender and receiver, a message always starts with an SOH and ends with an EOT. If the receiver is not synchronised yet but the sender is already transmitting a message (e.g. when the Board-computer starts up while the spreader “Data transmission handler” is sending), all data before the first SOH will be ignored. If the receiver is synchronised but detects an SOH before an EOT, the previous, unfinished message is ignored.

Time synchronisation between sender and receiver.

In general, the sender system time and the receiver system time are not equal. To synchronise messages to the system clock of the receiver, a time synchronisation record is introduced. This Time Sync record (refer to 5.5.1) contains the actual system time of the sender at the start of record transmission (with a maximum error of $\pm$ 0,5 s). The receiver must record its system time at the moment of reception of a message. In case of the reception of a Time Sync record, the receiver can calculate the difference between its own system clock and the system clock of the sender. Now, the receiver can time-synchronise every message received from the sender and thereby synchronise this data to other data generated by other sources. The board computer must contain a real time clock which runs even if the board computer has no power. The electronic system on the vehicle/equipment must have a real time clock which runs even when this system has no power, or, a software clock must be implemented made which starts at date 1-1-2000 and time 00:00:00 and is updated every second.

A Time Sync record, is sent by the sender:

— as the first message starting the communication;

— after 10 s if the receiver does not respond to a message with an ACK or a NAK; after a successful transmission of this record, the latest message before the time synchronisation record is transmitted again;

— if the system clock of the sender is adjusted, reset or set to any value which would cause a jump in time.

Loss of data.

Data will get lost in case of:

— a “Data transmission handler” without handshaking feature which is sending while reliable communication is not possible;

— an overflow of the buffer-memory;

— 2 unsuccessful retransmissions after a NAK.

In case the “Data transmission handler” supports handshaking, it is mandatory sending the header record as the first record of a report (note: the Time Sync record is not part of the report). i.e. the header record may not get lost.

Example of a message is shown in graphical form:

Start (1 byte)	Data (codes + values, “;” separated) (x bytes)	CR+LF (2 bytes)	CRC-16 (2 bytes)	End (1 byte)
SOH	1;10;1602048;0461021;5;Abc;Equip1;;;	CR LF	66D9	EOT

ASCII characters in hexadecimal notation:

01	31 3B 31 30 3B 31 36 30 32 30 34 38 3B 30 34 36 31 30 32 31 3B 35 3B 41 62 63 3B 45 71 75 69 70 31 3B 3B 3B	0D 0A	36 36 44 39	04

"

4 Modification to Clause 5, Definitions of variables, records and report

After Table 1 and before 5.2 “Variables types” *add the following sub-clause:*

"

5.2 Data integrity check

There are at least two methods required to assure integrity:

a) Data have to be checked for manipulation of the contents themselves.

b) Data have to be checked for completeness: Data have to be checked against any deletion of any parts of them.

In the present standard these two requirements lead to the following methods of covering:

— **Data manipulation** (a) is checked by CRC.

— **Data deletion** (b) is checked by including the previously calculated CRC value into the new CRC value.

In order to ensure data integrity two CRC variables (CRC_REC and CRC_STREAM) are defined for each record and generated by the board computer. CRC_REC contains the CRC-32 value calculated over all the data contents of the record itself and CRC_STREAM contains the CRC-32 value calculated over the CRC_STREAM of the preceding record and the current CRC_REC value. CRC_REC and CRC_STREAM are both optional and are not available in the **Time synchronisation record** (record code 0), **Standard header record** (record code 1) and **Standard footer record** (record code 2) (see 5.5)."

5 Modification to 5.3, Variable types (former 5.2)

After Table 4 and before 5.4 “Recommended SLOTs for variables definitions” *add the following part:*

"Example of BASIC_TIME and BASIC_DATE format:

BASIC_TIME

EXAMPLE 16:02:12 (hh:mm:ss).

As the seconds are to be stated in quarters of a second these have to be written as 48. Combined value 16 | 02 | 48. Because the maximum of the last value can be 239 (59,75 seconds * 4) 3 characters are reserved for this value.

Combined value of BASIC_TIME = 16|02|048 = 1602048.

BASIC_DATE

EXAMPLE 11-10-2006 (October 11th 2006).

The day value has to be stated in quarters. The time is 16:02, being in the third quarter of the day, so the total value is 11,5 (= 46 quarters). Because the maximum of this value can be 127 (31,75 days * 4) 3 characters are reserved for this value.

The month value is 10.

The year value has to be stated in years since 1985: 2006-1985 = 21.

Combined value of BASIC_DATE = 046|10|12 = 0461012."

6 Modification to 5.5.2, General variables (former 5.4.2)

Replace Table 6 with the following table:

"

No	Name	Description	BASIC data format or SLOT
1	Version	Protocol version number. A positive value indicates a released version. A negative value means that the version with its absolute value is not released yet. Before the very first release the version number will be 0.	STRING_10
2	SysTime	Time (local time or system time of the equipment under consideration)	BASIC_TIME
3	SysDate	Date (local date or system date of the equipment under consideration)	BASIC_DATE
4	Source	Data generation source. Refer to (Table 1 – Application or equipement types)	UNSIGNED CHAR
5	ManufID	Manufacturer identification.	STRING_20
6	EquipID	Vehicle / equipment identification. In order to insure the identification of every single equipments, it is a mandatory that the EquipID must include the manufactures serial identification code.	STRING_20
7	DriverID	Driver identification.	STRING_40
8	Driver2ID	2nd driver identification.	STRING_40
9	RunHrs	Total of hours the system has run (time that control system is switched on); (can start at any value at power-up, can overrun, can be reset when counters are reset)	SAEtm09