

SLOVENSKI STANDARD

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01-junij-2008

Nadomešča:

SIST EN 61158-4:2004

Industrijska komunikacijska omrežja - Specifikacije za procesna vodila - 4-3. del: Specifikacija protokola na nivoju podatkovnih povezav - Elementi tipa 3 (IEC 61158-4-3:2007)

Industrial communication networks - Fieldbus specifications -- Part 4-3: Data-link layer protocol specification - Type 3 elements

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Industrielle Kommunikationsnetze - Feldbusse - Teil 4-3: Protokollspezifikation des Data Link Layer (Sicherheitsschicht) - Typ 3-Elemente

SIST EN 61158-4-3:2008

Réseaux de communication industriels - Spécifications des bus de terrain - Partie 4-3: Spécification des protocoles des couches de liaison de données - Eléments de type 3

Ta slovenski standard je istoveten z: EN 61158-4-3:2008

ICS:

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35.100.20	Podatkovni povezovalni sloj	Data link layer
35.110	Omreževanje	Networking

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EUROPEAN STANDARD
NORME EUROPÉENNE
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EN 61158-4-3

February 2008

ICS 35.100.20; 25.040.40

Partially supersedes EN 61158-4:2004

English version

**Industrial communication networks -
Fieldbus specifications -
Part 4-3: Data-link layer protocol specification -
Type 3 elements
(IEC 61158-4-3:2007)**

Réseaux de communication industriels -
Spécifications des bus de terrain -
Partie 4-3: Spécification des protocoles
des couches de liaison de données -
Éléments de type 3
(CEI 61158-4-3:2007)

Industrielle Kommunikationsnetze -
Feldbusse -
Teil 4-3: Protokollspezifikation des
Data Link Layer (Sicherheitsschicht) -
Typ 3-Elemente
(IEC 61158-4-3:2007)

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This European Standard was approved by CENELEC on 2008-02-01. CENELEC 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 CENELEC 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 CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

The text of document 65C/474/FDIS, future edition 1 of IEC 61158-4-3, prepared by SC 65C, Industrial networks, of IEC TC 65, Industrial-process measurement, control and automation, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61158-4-3 on 2008-02-01.

This and the other parts of the EN 61158-4 series supersede EN 61158-4:2004.

With respect to EN 61158-4:2004 the following changes were made:

- deletion of Type 6 fieldbus, and the placeholder for a Type 5 fieldbus data-link layer, for lack of market relevance;
- addition of new fieldbus types;
- partition into multiple parts numbered 4-1, 4-2, ..., 4-19.

The following dates were fixed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2008-11-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2011-02-01

NOTE Use of some of the associated protocol types is restricted by their intellectual-property-right holders. In all cases, the commitment to limited release of intellectual-property-rights made by the holders of those rights permits a particular data-link layer protocol type to be used with physical layer and application layer protocols in type combinations as specified explicitly in the EN 61784 series. Use of the various protocol types in other combinations may require permission from their respective intellectual-property-right holders.

IEC and CENELEC draw attention to the fact that it is claimed that compliance with this standard may involve the use of patents as follows, where the [xx] notation indicates the holder of the patent right:

Type 3 and possibly other types:

DE 36 43 979 C2	[S]	Deterministisches Zugriffsverfahren nach dem Tokenprinzip für eine Datenübertragung
DE 36 43 979 A1	[S]	Deterministisches Zugriffsverfahren nach dem Tokenprinzip für eine Datenübertragung

IEC and CENELEC take no position concerning the evidence, validity and scope of these patent rights.

The holders of these patent rights have assured IEC that they are willing to negotiate licences under reasonable and non-discriminatory terms and conditions with applicants throughout the world. In this respect, the statement of the holders of these patent rights are registered with IEC. Information may be obtained from:

[S]: SIEMENS AG
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Siemensallee 84
D-76181 Karlsruhe
Germany

Attention is drawn to the possibility that some of the elements of this standard may be the subject of patent rights other than those identified above. IEC and CENELEC shall not be held responsible for identifying any or all such patent rights.

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61158-4-3:2007 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60870-5-1	NOTE Harmonized as EN 60870-5-1:1993 (not modified).
IEC 61158-5-3	NOTE Harmonized as EN 61158-5-3:2008 (not modified).
IEC 61158-6-3	NOTE Harmonized as EN 61158-6-3:2008 (not modified).
IEC 61784-1	NOTE Harmonized as EN 61784-1:2008 (not modified).
IEC 61784-2	NOTE Harmonized as EN 61784-2:2008 (not modified).
ISO 9314-2	NOTE Harmonized as EN 29314-2:1993 (not modified).

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Annex ZA (normative)

Normative references to international publications with their corresponding European publications

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.

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 61158-2	2007	Industrial communication networks - Fieldbus specifications - Part 2: Physical layer specification and service definition	EN 61158-2	2008
IEC 61158-3-3	- ¹⁾	Industrial communication networks - Fieldbus specifications - Part 3-3: Data-link layer service definition - Type 3 elements	EN 61158-3-3	2008 ²⁾
ISO/IEC 2022	- ¹⁾	Information technology - Character code structure and extension techniques	-	-
ISO/IEC 7498-1	- ¹⁾	Information technology - Open Systems Interconnection - Basic Reference Model: The Basic Model	EN ISO/IEC 7498-1	1995 ²⁾
ISO/IEC 7498-3	- ¹⁾	Information technology - Open Systems Interconnection - Basic Reference Model: Naming and addressing	-	-
ISO/IEC 10731	- ¹⁾	Information technology - Open Systems Interconnection - Basic reference model - Conventions for the definition of OSI services	-	-
ISO 1177	- ¹⁾	Information processing - Character structure for start/stop and synchronous character- oriented transmission	-	-

¹⁾ Undated reference.

²⁾ Valid edition at date of issue.



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Edition 1.0 2007-12

INTERNATIONAL STANDARD

**Industrial communication networks – Fieldbus specifications –
Part 4-3: Data-link layer protocol specification – Type 3 elements**

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CONTENTS

FOREWORD.....	6
INTRODUCTION.....	8
1 Scope.....	9
1.1 General.....	9
1.2 Specifications.....	9
1.3 Procedures.....	9
1.4 Applicability.....	9
1.5 Conformance.....	10
2 Normative references.....	10
3 Terms, definitions, symbols and abbreviations.....	10
3.1 Reference model terms and definitions.....	10
3.2 Service convention terms and definitions.....	12
3.3 Common terms and definitions.....	13
3.4 Additional Type 3 definitions.....	15
3.5 Common symbols and abbreviations.....	17
3.6 Type 3 symbols and abbreviations.....	18
4 Common DL-protocol elements.....	22
4.1 Frame check sequence.....	22
5 Overview of the DL-protocol.....	24
5.1 General.....	24
5.2 Overview of the medium access control and transmission protocol.....	25
5.3 Transmission modes and DL-entity.....	26
5.4 Service assumed from the PHL.....	31
5.5 Operational elements.....	34
5.6 Cycle and system reaction times.....	50
6 General structure and encoding of DLPDUs, and related elements of procedure.....	53
6.1 DLPDU granularity.....	53
6.2 Length octet (LE, LEr).....	54
6.3 Address octet.....	55
6.4 Control octet (FC).....	57
6.5 DLPDU content error detection.....	61
6.6 DATA_UNIT.....	62
6.7 Error control procedures.....	62
7 DLPDU-specific structure, encoding and elements of procedure.....	64
7.1 DLPDUs of fixed length with no data field.....	64
7.2 DLPDUs of fixed length with data field.....	65
7.3 DLPDUs with variable data field length.....	67
7.4 Token DLPDU.....	68
7.5 ASP DLPDU.....	69
7.6 SYNCH DLPDU.....	69
7.7 Time Event (TE) DLPDU.....	69
7.8 Clock Value (CV) DLPDU.....	69
7.9 Transmission procedures.....	70
8 Other DLE elements of procedure.....	73
8.1 DL-entity initialization.....	73
8.2 States of the media access control of the DL-entity.....	73

8.3 Clock synchronization protocol	79
Annex A (normative) – DL-Protocol state machines	84
A.1 Overall structure	84
A.2 Variation of state machines in different devices	85
A.3 DL Data Resource	86
A.4 FLC / DLM	91
A.5 MAC	115
A.6 SRU	143
Annex B (informative) – Type 3 (synchronous): exemplary FCS implementations	161
Annex C (informative) – Type 3: Exemplary token procedure and message transfer periods	163
C.1 Procedure of token passing	163
C.2 Examples for token passing procedure	164
C.3 Examples for message transfer periods – asynchronous transmission	169
C.4 Examples for message transfer periods – synchronous transmission	170
Bibliography	171
Figure 1 – Relationships of DLSAPs, DLSAP-addresses and group DL-addresses	14
Figure 2 – Logical token-passing ring	27
Figure 3 – PhL data service for asynchronous transmission	31
Figure 4 – Idle time T_{ID1}	37
Figure 5 – Idle time T_{ID2} (SDN, CS)	37
Figure 6 – Idle time T_{ID2} (MSRD)	38
Figure 7 – Slot time T_{SL1}	38
Figure 8 – Slot time T_{SL2}	39
Figure 9 – Slot time T_{SL1}	44
Figure 10 – Slot time T_{SL2}	44
Figure 11 – Token transfer period	50
Figure 12 – Message transfer period	51
Figure 13 – UART character	53
Figure 14 – Octet structure	54
Figure 15 – Length octet coding	54
Figure 16 – Address octet coding	55
Figure 17 – DAE/SAE octet in the DLPDU	56
Figure 18 – Address extension octet	56
Figure 19 – FC octet coding for send/request DLPDUs	57
Figure 20 – FC octet coding for acknowledgement or response DLPDUs	58
Figure 21 – FCS octet coding	61
Figure 22 – Data field	62
Figure 23 – Ident user data	62
Figure 24 – DLPDUs of fixed length with no data field	64
Figure 25 – DLPDUs of fixed length with no data field	65
Figure 26 – DLPDUs of fixed length with data field	66
Figure 27 – DLPDUs of fixed length with data field	66

Figure 28 – DLPDUs with variable data field length.....	67
Figure 29 – DLPDUs with variable data field length.....	68
Figure 30 – Token DLPDU	68
Figure 31 – Token DLPDU	69
Figure 32 – Send/request DLPDU of fixed length with no data	70
Figure 33 – Token DLPDU and send/request DLPDU of fixed length with data.....	70
Figure 34 – Send/request DLPDU with variable data field length.....	71
Figure 35 – Send/request DLPDU of fixed length with no data	71
Figure 36 – Token DLPDU and send/request DLPDU of fixed length with data.....	72
Figure 37 – Send/request DLPDU with variable data field length.....	72
Figure 38 – DL-state-diagram	74
Figure 39 – Overview of clock synchronization.....	80
Figure 40 – Time master state machine	81
Figure 41 – Time receiver state machine	82
Figure 42 – Clock synchronization	83
Figure A.1 – Structuring of the protocol machines.....	85
Figure A.2 – Structure of the SRU Machine.....	144
Figure B.1 – Example of FCS generation for Type 3 (synchronous).....	161
Figure B.2 – Example of FCS syndrome checking on reception for Type 3 (synchronous).....	161
Figure C.1 – Derivation of the token holding time (T_{TH}).....	164
Figure C.2 – No usage of token holding time (T_{TH}).....	165
Figure C.3 – Usage of token holding time (T_{TH}) for message transfer (equivalence between T_{TH} of each Master station).....	166
Figure C.4 – Usage of token holding time (T_{TH}) in different working load situations	168
Table 1 – FCS length, polynomials and constants by Type 3 synchronous	23
Table 2 – Characteristic features of the fieldbus data-link protocol.....	25
Table 3 – Transmission function code	59
Table 4 – FCB, FCV in responder	61
Table 5 – Operating parameters	73
Table A.1 – Assignment of state machines.....	86
Table A.2 – Data resource	87
Table A.3 – Primitives issued by DL-User to FLC.....	91
Table A.4 – Primitives issued by FLC to DL-User.....	91
Table A.5 – Primitives issued by DL-User to DLM	93
Table A.6 – Primitives issued by DLM to DL-User	94
Table A.7 – Parameters used with primitives exchanged between DL-User and FLC.....	94
Table A.8 – Parameters used with primitives exchanged between DL-User and DLM.....	95
Table A.9 – FLC/DLM state table	96
Table A.10 – FLC / DLM function table.....	109
Table A.11 – Primitives issued by DLM to MAC.....	116
Table A.12 – Primitives issued by MAC to DLM.....	116

Table A.13 – Parameters used with primitives exchanged between DLM and MAC	116
Table A.14 – Local MAC variables	117
Table A.15 – MAC state table	117
Table A.16 – MAC function table.....	139
Table A.17 – Primitives issued by DLM to SRC	145
Table A.18 – Primitives issued by SRC to DLM.....	146
Table A.19 – Primitives issued by MAC to SRC.....	146
Table A.20 – Primitives issued by SRC to MAC.....	146
Table A.21 – Parameters used with primitives exchanged between MAC and SRC	147
Table A.22 – FC structure	147
Table A.23 – Local variables of SRC.....	147
Table A.24 – SRC state table.....	148
Table A.25 – SRC functions	160

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SIST EN 61158-4-3:2008

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**INDUSTRIAL COMMUNICATION NETWORKS –
 FIELDBUS SPECIFICATIONS –**
Part 4-3: Data-link layer protocol specification – Type 3 elements

FOREWORD

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NOTE Use of some of the associated protocol types is restricted by their intellectual-property-right holders. In all cases, the commitment to limited release of intellectual-property-rights made by the holders of those rights permits a particular data-link layer protocol type to be used with physical layer and application layer protocols in Type combinations as specified explicitly in the IEC 61784 series. Use of the various protocol types in other combinations may require permission from their respective intellectual-property-right holders.

IEC draws attention to the fact that it is claimed that compliance with this standard may involve the use of patents as follows, where the [xx] notation indicates the holder of the patent right:

Type 3 and possibly other types:

DE 36 43 979 C2	[SI]	Deterministisches Zugriffsverfahren nach dem Tokenprinzip für eine Datenübertragung
DE 36 43 979 A1	[SI]	Deterministisches Zugriffsverfahren nach dem Tokenprinzip für eine Datenübertragung

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 Ludwig Winkel
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 D-76181 Karlsruhe
 Germany

Attention is drawn to the possibility that some of the elements of this standard may be the subject of patent rights other than those identified above. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 61158-4-3 has been prepared by subcommittee 65C: Industrial networks, of IEC technical committee 65: Industrial-process measurement, control and automation.

This first edition and its companion parts of the IEC 61158-4 subseries cancel and replace IEC 61158-4:2003. This edition of this part constitutes an editorial revision.

This edition of IEC 61158-4 includes the following significant changes from the previous edition:

- a) deletion of the former Type 6 fieldbus, and the placeholder for a Type 5 fieldbus data link layer, for lack of market relevance;
- b) addition of new types of fieldbuses;
- c) division of this part into multiple parts numbered -4-1, -4-2, ..., -4-19.

The text of this standard is based on the following documents:

FDIS	Report on voting
65C/474/FDIS	65C/485/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with ISO/IEC Directives, Part 2.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result date indicated on the IEC web site under <http://webstore.iec.ch> in the data related to the specific publication. At this date, the publication will be:

- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

NOTE The revision of this standard will be synchronized with the other parts of the IEC 61158 series.

The list of all the parts of the IEC 61158 series, under the general title *Industrial communication networks – Fieldbus specifications*, can be found on the IEC web site.

INTRODUCTION

This part of IEC 61158 is one of a series produced to facilitate the interconnection of automation system components. It is related to other standards in the set as defined by the “three-layer” fieldbus reference model described in IEC/TR 61158-1.

The data-link protocol provides the data-link service by making use of the services available from the physical layer. The primary aim of this standard is to provide a set of rules for communication expressed in terms of the procedures to be carried out by peer data-link entities (DLEs) at the time of communication. These rules for communication are intended to provide a sound basis for development in order to serve a variety of purposes:

- a) as a guide for implementors and designers;
- b) for use in the testing and procurement of equipment;
- c) as part of an agreement for the admittance of systems into the open systems environment;
- d) as a refinement to the understanding of time-critical communications within OSI.

This standard is concerned, in particular, with the communication and interworking of sensors, effectors and other automation devices. By using this standard together with other standards positioned within the OSI or fieldbus reference models, otherwise incompatible systems may work together in any combination.

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INDUSTRIAL COMMUNICATION NETWORKS – FIELD BUS SPECIFICATIONS –

Part 4-3: Data-link layer protocol specification – Type 3 elements

1 Scope

1.1 General

The data-link layer provides basic time-critical messaging communications between devices in an automation environment.

This protocol provides communication opportunities to a pre-selected “master” subset of data-link entities in a cyclic asynchronous manner, sequentially to each of those data-link entities. Other data-link entities communicate only as permitted and delegated by those master data-link entities.

For a given master, its communications with other data-link entities can be cyclic, or acyclic with prioritized access, or a combination of the two.

This protocol provides a means of sharing the available communication resources in a fair manner. There are provisions for time synchronization and for isochronous operation.

1.2 Specifications

This standard specifies

- a) procedures for the timely transfer of data and control information from one data-link user entity to a peer user entity, and among the data-link entities forming the distributed data-link service provider;
- b) the structure of the fieldbus DLPDUs used for the transfer of data and control information by the protocol of this standard, and their representation as physical interface data units.

1.3 Procedures

The procedures are defined in terms of

- a) the interactions between peer DL-entities (DLEs) through the exchange of fieldbus DLPDUs;
- b) the interactions between a DL-service (DLS) provider and a DLS-user in the same system through the exchange of DLS primitives;
- c) the interactions between a DLS-provider and a Ph-service provider in the same system through the exchange of Ph-service primitives.

1.4 Applicability

These procedures are applicable to instances of communication between systems which support time-critical communications services within the data-link layer of the OSI or fieldbus reference models, and which require the ability to interconnect in an open systems interconnection environment.

Profiles provide a simple multi-attribute means of summarizing an implementation's capabilities, and thus its applicability to various time-critical communications needs.