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Industriell processtyrning – Fältbuss – Del 4-7: Specifikation av protokoll i datalänksskiktet – Delar i fältbuss, Typ 7

*Industrial communication networks –
Fieldbus specifications –
Part 4-7: Data-link layer protocol specification –
Type 7 elements*

Som svensk standard gäller europastandarden EN 61158-4-7:2008. Den svenska standarden innehåller den officiella engelska språkversionen av EN 61158-4-7:2008.

Nationellt förord

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- **IEC 61158-4-7, First edition, 2007 - Industrial communication networks - Fieldbus specifications - Part 4-7: Data-link layer protocol specification - Type 7 elements**

utarbetad inom International Electrotechnical Commission, IEC.

Denna standard, och de andra delarna i serien SS-EN 61158-4, ersätter SS-EN 61158-4, utgåva 1, 2004.

Tidigare fastställd svensk standard SS-EN 61158-4, utgåva 1, 2004, gäller ej fr o m 2011-02-01.

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English version

**Industrial communication networks -
Fieldbus specifications -
Part 4-7: Data-link layer protocol specification -
Type 7 elements
(IEC 61158-4-7:2007)**

Réseaux de communication industriels -
Spécifications des bus de terrain -
Partie 4-7: Spécification des protocoles
des couches de liaison de données -
Éléments de type 7
(CEI 61158-4-7:2007)

Industrielle Kommunikationsnetze -
Feldbusse -
Teil 4-7: Protokollspezifikation des
Data Link Layer (Sicherheitsschicht) -
Typ 7-Elemente
(IEC 61158-4-7:2007)

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 61158-4-7, 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 61158-4-7 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.

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61158-4-7:2007 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 61131-2	NOTE Harmonized as EN 61131-2:2007 (not modified).
IEC 61131-3	NOTE Harmonized as EN 61131-3:2003 (not modified).
IEC 61158-5-7	NOTE Harmonized as EN 61158-5-7:2008 (not modified).
IEC 61158-6-7	NOTE Harmonized as EN 61158-6-7:2008 (not modified).
IEC 61784-1	NOTE Harmonized as EN 61784-1:2008 (not modified).
ISO/IEC 9646-1	NOTE Harmonized as EN ISO/IEC 9646-1:1996 (not modified).
ISO/IEC 9646-2	NOTE Harmonized as EN ISO/IEC 9646-2:1996 (not modified).

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 61158-3-7	- ¹⁾	Industrial communication networks - Fieldbus specifications - Part 3-7: Data-link layer service definition - Type 7 elements	EN 61158-3-7	2008 ²⁾
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	-	-

¹⁾ Undated reference.

²⁾ Valid edition at date of issue.

CONTENTS

INTRODUCTION.....	8
1 Scope.....	9
1.1 General.....	9
1.2 Specifications.....	9
1.3 Procedures.....	9
1.4 Applicability.....	9
1.5 Conformance.....	9
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.....	11
3.3 Other terms and definitions	12
3.4 Symbols and abbreviations.....	16
4 Overview of the DL-protocol	18
4.1 Overall description of medium allocation	18
4.2 Types of entities	20
4.3 Addressing	23
4.4 Flow control.....	29
4.5 Graphical representation	31
5 General structure and encoding of PhIDUs and DLPDUs and related elements of procedure.....	32
5.1 DLPDU formats and components.....	32
5.2 Description of each DLPDU component.....	32
5.3 PhIDU structure and encoding.....	36
5.4 Common DLPDU structure, encoding and elements of procedure	37
5.5 Valid DLPDU types.....	37
5.6 DLL timers.....	39
6 DLPDU-specific structure, encoding and element of procedure.....	43
6.1 General.....	43
6.2 Buffer read	43
6.3 Buffer write.....	44
6.4 Buffer transfer	44
6.5 Specified explicit request.....	45
6.6 Free explicit request.....	50
6.7 Messaging.....	53
6.8 Acknowledged messaging	58
6.9 Numbering of acknowledged messages	62
6.10 Behavior with mismatched parameters	64
7 DL-service elements of procedure, interfaces and conformance	66
7.1 General.....	66
7.2 Producer/consumer entity.....	67
7.3 Protocol elements by service.....	70
7.4 Bus arbitrator operation.....	77
7.5 Bridges.....	85
7.6 Interfaces	92

7.7 Conformance.....	94
Annex A (informative) Exemplary FCS implementation.....	97
Annex B (informative) Object modeling	99
B.1 Modeling of the IDENTIFIER object	99
B.2 Description of the IDENTIFIER object attributes	99
B.3 Modeling of the QUEUE object	103
B.4 Description of the QUEUE object attributes	103
B.5 Modeling of the BUFFER object.....	104
B.6 Description of the BUFFER object attributes.....	104
Annex C (informative) Topology of multi-segment DL-subnetwork.....	106
C.1 Introduction	106
C.2 Global specification	106
C.3 Local specification.....	107
C.4 Properties	107
C.5 Methods	107
Annex D (informative) Management of transmission errors	111
D.1 Transmission of RP_DAT_XX.....	111
D.2 Transmission of a free RP_RQ(1/2).....	111
D.3 Transmission of the specified RP_RQ1	112
D.4 Transmission of RP_MSG_NOACK.....	113
D.5 Transmission of RP_MSG_ACK.....	115
Bibliography.....	118
Figure 1 – Relationships of DLSAPs, DLSAP-addresses and group DL-addresses	13
Figure 2 – General description of medium allocation	19
Figure 3 – Internal structure of a producer/consumer entity.....	20
Figure 4 – Associated buffers and queues	22
Figure 5 – Internal structure of a bus arbitrator	23
Figure 6 – Polling BA Table	23
Figure 7 – Addressing scheme.....	24
Figure 8 – Address partitioning	26
Figure 9 – Structure of an individual physical address	27
Figure 10 – Structure of an individual logical address	27
Figure 11 – Structure of restricted physical group address.....	27
Figure 12 – Structure of a restricted logical group address	28
Figure 13 – Structure of a generalized group address.....	28
Figure 14 – Summary of address structure.....	29
Figure 15 – Example of an evaluation net	31
Figure 16 – Basic DLPDU structure.....	32
Figure 17 – DLPDU transmission / reception order.....	32
Figure 18 – Identifier DLPDU	38
Figure 19 – Variable response DLPDU.....	38
Figure 20 – Request response DLPDU.....	38
Figure 21 – Message response DLPDU.....	39
Figure 22 – Acknowledgement response DLPDU	39

Figure 23 – End of message transaction response DLPDU	39
Figure 24 – Buffer reading service interactions	44
Figure 25 – Buffer writing service interactions.....	44
Figure 26 – Buffer transfer service interactions	44
Figure 27 – Buffer transfer DLPDU sequence	45
Figure 28 – Interactions within the specified explicit request for buffer transfer service in the aperiodic window	46
Figure 29 – Interactions within the specified explicit request for buffer transfer service in the periodic window	47
Figure 30 – DLPDU sequence for an explicit request for a transfer	48
Figure 31 – Evaluation network for a buffer transfer specified explicit request with (RQ_INHIBITED = False)	49
Figure 32 – Evaluation network for a buffer transfer specified explicit request with (RQ_INHIBITED = True).....	49
Figure 33 – Diagram of interactions within the free explicit request for buffer transfer service	51
Figure 34 – Evaluation network for a free explicit request	52
Figure 35 – Diagram of interactions within the unacknowledged message transfer request service for an aperiodic transfer	55
Figure 36 – Diagram of interactions within the unacknowledged message transfer request service for a cyclical transfer	56
Figure 37 – DLPDU sequence for an aperiodic message transfer.....	57
Figure 38 – DLPDU sequence for a cyclical message transfer	58
Figure 39 – Diagram of interactions within the acknowledged message transfer request service for an aperiodic transfer	59
Figure 40 – Diagram of interactions within the acknowledged message transfer request service for a cyclical transfer.....	60
Figure 41 – DLPDU sequence for an aperiodic message transfer.....	61
Figure 42 – DLPDU sequence for a cyclical message transfer	62
Figure 43 – Evaluation network for message aperiodic transfer.....	65
Figure 44 – Evaluation network for message cyclic transfer	66
Figure 45 – Simplified states machine for a producer/consumer entity	67
Figure 46 – Active bus arbitrator's simplified state machine	83
Figure 47 – Typical bridge usage	85
Figure 48 – Architectural placement of bridges in OSI Basic Reference Model (ISO/IEC 7498)	85
Figure 49 – Representation of an extended link communication	86
Figure 50 – Evaluation network for reception of an RP_MSG_ACK DLPDU.....	91
Figure 51 – Evaluation network for reception of an RP_MSG_NOACK DLPDU.....	92
Figure A.1 – Example of FCS generation	97
Figure A.2 – Example of FCS syndrome checking on reception.....	97
Figure D.1 – Evaluation DL-subnetwork for transmission of RP_DAT_XX.....	111
Figure D.2 – Evaluation DL-subnetwork for transmission of a free RP_RQ(1/2).....	112
Figure D.3 – Evaluation DL-subnetwork for transmission of the specified RP_RQ1	113
Figure D.4 – Evaluation DL-subnetwork for transmission of RP_MSG_NOACK, first behavior	114

Figure D.5 – Evaluation DL-subnetwork for transmission of RP_MSG_NOACK, second behavior	115
Figure D.6 – Evaluation DL-subnetwork for transmission of RP_MSG_ACK, first behavior	116
Figure D.7 – Evaluation DL-subnetwork for transmission of RP_MSG_ACK, second behavior	117
Table 1 – Individual and group address encoding	26
Table 2 – DLPDU control-field coding	33
Table 3 – Correspondence between name and coding of 8 bits in the control field	34
Table 4 – FCS length, polynomial and expected residual	35
Table 5 – DL-Timers	41
Table 6 – Bus arbitrator state transition table	84
Table 7 – Bridge object description	87
Table 8 – Channel object description	88
Table 9 – Segment directory object description	89
Table 10 – Network directory object description	89
Table 11 – Service primitives by type	93
Table 12 – Conformance classes	96

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.

INDUSTRIAL COMMUNICATION NETWORKS – FIELDBUS SPECIFICATIONS –

Part 4-7: Data-link layer protocol specification – Type 7 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 all participating data-link entities

- a) in a synchronously-starting cyclic manner, according to a pre-established schedule, and
- b) in a cyclic or acyclic asynchronous manner, as requested each cycle by each of those data-link entities.

Thus this protocol can be characterized as one which provides cyclic and acyclic access asynchronously but with a synchronous restart of each cycle.

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.

1.5 Conformance

This standard also specifies conformance requirements for systems implementing these procedures. This part of this standard does not contain tests to demonstrate compliance with such requirements.