SLOVENSKI STANDARD
SIST EN 61158-4-21:2012

01-julij-2012

Industrijska komunikacijska omrežja - Specifikacije za procesna vodila - 4-21. del: Specifikacija protokola na nivoju podatkovnih povezav - Elementi tipa 21 (IEC 61158-4-21:2010)

Industrial communication networks - Fieldbus specifications - Part 4-21: Data-link layer protocol specification - Type 21 elements (IEC 61158-4-21:2010)

Industrielle Kommunikationsnetze - Feldbusse - Teil 4-21: Protokollspezifikation des Data Link Layer (Sicherungsschicht) - Typ 21-Elemente (IEC 61158-4-21:2010)

Réseaux de communication industriels - Spécifications des bus de terrain - Partie 4-21: Spécification du protocole de la couche de liaison de données - Eléments de Type 21 (CEI 61158-4-21:2010)

Ta slovenski standard je istoveten z: EN 61158-4-21:2012

ICS:

25.040.40	Merjenje in krmiljenje industrijskih postopkov	Industrial process measurement and control
35.100.20	Podatkovni povezovalni sloj	Data link layer
35.110	Omreževanje	Networking

SIST EN 61158-4-21:2012   **en**

iTeh STANDARD PREVIEW
(standards.iteh.ai)

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 61158-4-21

May 2012

ICS 25.040.40; 35.100.20; 35.110

English version

Industrial communication networks -
Fieldbus specifications -
Part 4-21: Data-link layer protocol specification -
Type 21 elements
(IEC 61158-4-21:2010)

Réseaux de communication industriels -
Spécifications des bus de terrain -
Partie 4-21: Spécification du protocole de
la couche de liaison de données -
Eléments de Type 21
(CEI 61158-4-21:2010)

Industrielle Kommunikationsnetze -
Feldbusse -
Teil 4-21: Protokollspezifikation des Data
Link Layer (Sicherungsschicht) -
Typ 21-Elemente
(IEC 61158-4-21:2010)

iTeh STANDARD PREVIEW
(standards.iteh.ai)

This European Standard was approved by CENELEC on 2012-03-28. 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 CEN-CENELEC Management Centre 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 CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, 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, Turkey and the United Kingdom.

CENELEC

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

Management Centre: Avenue Marnix 17, B - 1000 Brussels

Ref. No. EN 61158-4-21:2012 E

EN 61158-4-21:2012   - 2 -

Foreword

The text of document 65C/605/FDIS, future edition 1 of IEC 61158-4-21, 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 approved by CENELEC as EN 61158-4-21:2012.

The following dates are fixed:

• latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2012-12-28
• latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2015-03-28

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

Endorsement notice

The text of the International Standard IEC 61158-4-21:2010 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/TR 61158-1:2010   NOTE   Harmonized as CLC/TR 61158-1:2010 (not modified).

IEC 61158-2:2010   NOTE   Harmonized as EN 61158-2:2010 (not modified).

IEC 61158-5-21:2010   NOTE   Harmonized as EN 61158-5-21:2012 (not modified).

IEC 61158-6-21:2010   NOTE   Harmonized as EN 61158-6-21:2012 (not modified).

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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.

Publication	Year	Title	EN/HD	Year
IEC 61158-3-21	2010	Industrial communication networks - Fieldbus specifications - Part 3-21: Data-link layer service definition - Type 21 elements	EN 61158-3-21	2012
ISO/IEC 7498-1	-	Information technology - Open Systems Interconnection - Basic Reference Model: The Basic Model	-	-
ISO/IEC 7498-3	-	Information technology - Open Systems Interconnection - Basic Reference Model: Naming and addressing	-	-
ISO/IEC 8802-3	2000	Information technology - Telecommunications and information exchange between systems - Local and metropolitan area networks - Specific requirements - Part 3: Carrier sense multiple access with collision detection (CSMA/CD) access method and physical layer specifications	-	-
ISO/IEC 10731	1994	Information technology - Open Systems Interconnection - Basic reference model - Conventions for the definition of OSI services	-	-

iTeh STANDARD PREVIEW
(standards.iteh.ai)

IEC 61158-4-21

Edition 1.0   2010-08

INTERNATIONAL STANDARD

**Industrial communication networks – Fieldbus specifications –
Part 4-21: Data-link layer protocol specification – Type 21 elements**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

PRICE CODE   **XD**

ICS 25.04.40; 35.100.20; 35.110   ISBN 978-2-88912-091-8

® Registered trademark of the International Electrotechnical Commission

CONTENTS

61158-4-21 © IEC:2010(E)   – 3 –

Table 23 – Device count 32

Table 24 – Topology change count 32

Table 25 – Last topology change time..32

Table 26 – RNMP device UID 32

Table 27 – RNMS device UID 33

Table 28 – LNM device UID for R-port1 33

Table 29 – LNM device UID for R-port2 33

Table 30 – Network flags 34

Table 31 – Variables and counter to support managing path information 35

Table 32 – Hop count for R-port1 direction...36

Table 33 – Hop count for R-port2 direction...36

Table 34 – Preferred R-port 36

Table 35 – Destination R-port 36

Table 36 – In net count 37

Table 37 – In net time..37

Table 38 – Out net count 38

Table 39 – Out net time 38

Table 40 – Version and Length...41

Table 41 – Destination DL–entity identifier 41

Table 42 – Source DL–entity identifier 42

Table 43 – Frame control 43

Table 44 – Extension 45

Table 45 – Destination service access point...46

Table 46 – source service access point..46

Table 47 – DT DLPDU parameters 49

Table 48 – Primitives exchanged between DLS-user and DLE to send a DT DLPDU 51

Table 49 – Primitives exchanged between DLS-user and DLEs to receive a DT DLPDU 51

Table 50 – SPDT DLPDU Parameters 52

Table 51 – Primitive exchanged between DLS-User and DLEs to send an SPDT
DLPDU 53

Table 52 – Primitives exchanged between DLS-user and DLEs to receive an SPDT
DLPDU 53

Table 53 – NCM_LA DLPDU parameters..54

Table 54 – NCM_AT DLPDU parameters 55

Table 55 – NCM_LS DLPDU parameters..56

Table 56 – NCM_RS DLPDU parameters 57

Table 57 – NCM_AR DLPDU parameters 58

Table 58 – Primitives exchanged between DLPM and DLS-user...60

Table 59 – Parameters exchanged between DLPM and DLS-user 61

Table 60 – Primitives exchanged between DLPM and DLM 62

Table 61 – Parameters used with primitives exchanged between DLPM and DLM.................63

Table 62 – DLPM state table..64

Table 63 – DLPM functions table 68

Table 64 – Primitives exchanged between DLM and DLS-user...70

61158-4-21 © IEC:2010(E)   – 5 –

iTeh STANDARD PREVIEW
(standards.iteh.ai)

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

INDUSTRIAL COMMUNICATION NETWORKS – FIELDBUS SPECIFICATIONS –

Part 4-21: Data-link layer protocol specification – Type 21 elements

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.

2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.

3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.

4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.

5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.

6) All users should ensure that they have the latest edition of this publication.

7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.

8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.

International Standard IEC 61158-4-21:2010 has been prepared by subcommittee 65C: Industrial networks, of IEC technical committee 65: Industrial-process measurement, control and automation.

This standard cancels and replaces IEC/PAS 62573 published in 2008. This first edition constitutes a technical revision.

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

FDIS	Report on voting
65C/605/FDIS	65C/619/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.

61158-4-21 © IEC:2010(E)   – 7 –

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

The committee has decided that the contents of this publication will remain unchanged until the stability 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.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

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.

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 profile parts. Use of the various protocol types in other combinations may require permission of their respective intellectual-property-right holders.

The International Electrotechnical Commission (IEC) draws attention to the fact that it is claimed that compliance with this document may involve the use of patents concerning Type 21 elements and possibly other types given in subclause 4.1, 4.2 and 7.3 as follows:

KR 0789444   [LS]   A communication packet processing apparatus and method for ring topology ethernet network capable of preventing permanent packet looping

KR 0732510   [LS]   Network system

KR 0870670   [LS]   Method for determining a Ring Manager Node

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

The holder of these patent rights has assured the IEC that he/she is willing to negotiate licences either free of charge or under reasonable and non-discriminatory terms and conditions with applicants throughout the world. In this respect, the statement of the holder of these patent rights is registered with IEC. Information may be obtained from:

[LS]:   LS Industrial Systems Co., Ltd.
            LS Tower 1026-6
            Hogye-dong, Dongan-gu,
            Anyang-si, Gyeonggi-do 431-848
            Republic of Korea

Attention is drawn to the possibility that some of the elements of this document 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.

61158-4-21 © IEC:2010(E)   – 9 –

ISO (www.iso.org/patents) and IEC (http://www.iec.ch/tctools/patent_decl.htm) maintain on-line data bases of patents relevant to their standards. Users are encouraged to consult the data bases for the most up to date information concerning patents.

iTeh STANDARD PREVIEW
(standards.iteh.ai)