BS EN 61158-3-21:2012

BSI Standards Publication

Industrial communication networks — Fieldbus specifications

Part 3-21: Data-link layer service definition — Type 21 elements

bsi.

...making excellence a habit.™

This British Standard is the UK implementation of EN 61158-3-21:2012. It is identical to IEC 61158-3-21:2010. Together with BS EN 61158-4-21:2012, BS EN 61158-5-21:2012 and BS EN 61158-6-21:2012 it supersedes DD IEC/PAS 62573:2008 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee AMT/7, Industrial communications: process measurement and control, including fieldbus.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Published by BSI Standards Limited 2012

ISBN 978 0 580 71537 2

ICS 25.040.40; 35.100.20; 35.110

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 July 2012.

Amendments/corrigenda issued since publication

Date	Text affected

EUROPÄISCHE NORM

May 2012

ICS 25.040.40; 35.100.20; 35.110

English version

Industrial communication networks - Fieldbus specifications - Part 3-21: Data-link layer service definition - Type 21 elements
(IEC 61158-3-21:2010)

Réseaux de communication industriels - Spécifications des bus de terrain - Partie 3-21: Définition des services de couche liaison de données - Eléments de Type 21
(CEI 61158-3-21:2010)

Industrielle Kommunikationsnetze - Feldbusse - Teil 3-19: Dienstfestlegungen des Data Link Layer (Sicherungsschicht) - Typ 21-Elemente
(IEC 61158-3-21:2010)

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 61158-3-21:2012 E

Foreword

The text of document 65C/604/FDIS, future edition 1 of IEC 61158-3-21, 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 61158-3-21:2012.

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 61158-3-21:2010 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 61158-5-21:2010	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 61158-2	2010	Industrial communication networks - Fieldbus specifications - Part 2: Physical layer specification and service definition	EN 61158-2	2010
IEC 61158-4-21	2010	Industrial communication networks - Fieldbus specifications - Part 4-21: Data-link layer protocol specification - Type 21 elements	EN 61158-4-21	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	-	-

CONTENTS

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.

Throughout the set of fieldbus standards, the term “service” refers to the abstract capability provided by one layer of the OSI Basic Reference Model to the layer immediately above. Thus, the data-link layer service defined in this standard is a conceptual architectural service, independent of administrative and implementation divisions.

INDUSTRIAL COMMUNICATION NETWORKS – FIELDBUS SPECIFICATIONS –

Part 3-21: Data-link layer service definition – Type 21 elements

1 Scope

1.1 Overview

This part of IEC 61158 provides the common elements for basic time-critical messaging communications between devices in an automation environment. The term “time-critical” in this context means the prioritized full-duplex collision-free time-deterministic communication, of which one or more specified actions are required to be completed with some defined level of certainty. Failure to complete specified actions within the required time risks the failure of the applications requesting the actions, with attendant risk to equipment, plant, and possibly human life.

This standard defines in an abstract way the externally visible service provided by the Type 21 data-link layer in terms of:

a) the primitive actions and events of the service;

b) the parameters associated with each primitive action and event, and the form that they take; and

c) the interrelationships between these actions and events, and their valid sequences.

The purpose of this standard is to define the services provided to:

- The Type 21 application layer at the boundary between the application and DLLs of the fieldbus reference model;
- Systems management at the boundary between the DLL and the systems management of the fieldbus reference model.

1.2 Specifications

The principal objective of this standard is to specify the characteristics of conceptual DLL services suitable for time-critical communications, and to supplement the OSI Basic Reference Model in guiding the development of data link protocols for time-critical communications. A secondary objective is to provide migration paths from previously existing industrial communications protocols.

This standard may be used as the basis for formal data link programming interfaces. Nevertheless, it is not a formal programming interface, and any such interface will need to address implementation issues not covered by this standard, including:

a) The sizes and octet ordering of various multi-octet service parameters;

b) The correlation of paired primitives for request and confirm, or indication and response.

1.3 Conformance

This standard does not specify individual implementations or products, nor do they constrain the implementations of data-link entities within industrial automation systems.