IEC 61158-6-5

Edition 1.0 2007-12

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Withdrawn

Industrial communication networks – Fieldbus specifications –
Part 6–5: Application layer protocol specification – Type 5 elements

iTeh Standards
(https://standards.iteh.ai)
Document Preview
IEC 61158-6-5:2007
https://standards.iteh.ai/catalog/standards/iec/6613853c-6514-467b-9562-3c190a73dd09/iec-61158-6-5-2007

Réseaux de communication industriels – Spécifications des bus de terrain –
Partie 6-5: Spécification des protocoles des couches d'application –
Éléments de Type 5

IEC 61158-6-5:2007-12(en-fr)

THIS PUBLICATION IS COPYRIGHT PROTECTED
Copyright © 2007 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de l'IEC ou du Comité national de l'IEC du pays du demandeur. Si vous avez des questions sur le copyright de l'IEC ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de l'IEC de votre pays de résidence.

IEC Central Office
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00
info@iec.ch
www.iec.ch

About the IEC
The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications
The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

IEC Catalogue - webstore.iec.ch/catalogue
The stand-alone application for consulting the entire bibliographical information on IEC International Standards, Technical Specifications, Technical Reports and other documents. Available for PC, Mac OS, Android Tablets and iPad.

IEC publications search - www.iec.ch/searchpub
The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee,…). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished
Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and also once a month by email.

Electropedia - www.electropedia.org
The world's leading online dictionary of electronic and electrical terms containing more than 30 000 terms and definitions in English and French, with equivalent terms in 14 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IEC Glossary - std.iec.ch/glossary
More than 55 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

IEC Customer Service Centre - webstore.iec.ch/csc
If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: csc@iec.ch.

A propos de l'IEC
La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications IEC
Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

Catalogue IEC - webstore.iec.ch/catalogue
Application autonome pour consulter tous les renseignements bibliographiques sur les Normes internationales, Spécifications techniques, Rapports techniques et autres documents de l'IEC. Disponible pour PC, Mac OS, tablettes Android et iPad.

Recherche de publications IEC - www.iec.ch/searchpub
La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études,…). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

IEC Just Published - webstore.iec.ch/justpublished
Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et aussi une fois par mois par email.

Electropedia - www.electropedia.org
Le premier dictionnaire en ligne de termes électroniques et électriques. Il contient plus de 30 000 termes et définitions en anglais et en français, ainsi que les termes équivalents dans 14 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

Glossaire IEC - std.iec.ch/glossary
Plus de 55 000 entrées terminologiques électrotechniques, en anglais et en français, extraites des articles Termes et Définitions des publications IEC parues depuis 2002. Plus certaines entrées antérieures extraites des publications des CE 37, 77, 86 et CISPR de l'IEC.

Service Clients - webstore.iec.ch/csc
Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: csc@iec.ch.

Withdrawn
(https://standards.iec.ch)

IEC 61158-6-5

Edition 1.0 2007-12

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Withdrawn

Industrial communication networks – Fieldbus specifications – Part 6–5: Application layer protocol specification – Type 5 elements

iTeh Standards
(https://standards.iteh.ai)
Document Preview
IEC 61158-6-5:2007
https://standards.iteh.ai/catalog/standards/iec/66f3853c-6514-467b-9562-3c190a73dd09/iec-61158-6-5-2007

Réseaux de communication industriels – Spécifications des bus de terrain – Partie 6-5: Spécification des protocoles des couches d'application – Éléments de Type 5

INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMMISSION ELECTROTECHNIQUE INTERNATIONALE

PRICE CODE
CODE PRIX XE

ICS 25.040.40; 35.100.70

ISBN 978-2-8322-1948-5

Warning! Make sure that you obtained this publication from an authorized distributor.
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.

® Registered trademark of the International Electrotechnical Commission
Marque déposée de la Commission Electrotechnique Internationale

CONTENTS

FOREWORD 7
INTRODUCTION 9
1 Scope 10
1.1 General 10
1.2 Specifications 11
1.3 Conformance 11
2 Normative references 11
3 Terms, definitions, symbols, abbreviations and conventions 11
3.1 Terms and definitions from other ISO/IEC standards 11
3.2 IEC/TR 61158-1 terms 12
3.3 Abbreviations and symbols 16
3.4 Conventions 17
3.5 Conventions used in state machines 17
4 Protocol 19
4.1 Overview 19
4.2 FAL syntax description 19
4.3 Transfer syntax 19
4.4 FAL protocol state machine structure 75
4.5 SMK state machine 75
4.6 VCR state machine 92
4.7 FAL service protocol machine (FSPM) 93
4.8 Application relationship protocol machines (ARPMs) 93
4.9 DLL mapping protocol machine (DMPM) 108
Bibliography 114

Figure 1 – State transition diagram for SMK 77
Figure 2 – State transition diagram of client / server ARPM 97
Figure 3 – State transition diagram of the publisher / subscriber ARPM 104
Figure 4 – State transition diagram of DMPM 110

Table 1 – Conventions used for state machines 17
Table 2 – Data types 20
Table 3 – Data types 20
Table 4 – APDU header format 21
Table 5 – FDA address use 22
Table 6 – FDA address header field APDUs sent by a client VCR endpoint 23
Table 7 – FDA address header field APDUs sent by a server VCR endpoint 24
Table 8 – FDA address header field APDUs sent by a publisher VCR endpoint 24
Table 9 – FDA address header field APDUs sent by a report source VCR endpoint 25
Table 10 – APDU trailer fields 25
Table 11 – Request APDU parameters 27
Table 12 – SMK FDA address values 29
Table 13 – SMK FDA address values 30

iTeh Standards
(https://standards.iteh.ai)
Document Preview
IEC 61158-6-5:2007
https://standards.iteh.ai/catalog/standards/iec/6d3853c-6514-467b-9562-3c190a73dd09/iec-61158-6-5-2007
Withdrawn

Table 14 – Request APDU parameters 31
Table 15 – SMK FDA address values for SM identify 32
Table 16 – SMK FDA address values for SMK set assignment info request APDUs 32
Table 17 – SMK clear address request APDU parameters 33
Table 18 – SMK FDA address values for SMK set assignment info request APDUs 33
Table 19 – SMK set assignment info request APDU parameters 34
Table 20 – SMK set assignment info response APDU parameters 35
Table 21 – SMK FDA address values for SMK device clear assignment Info APDUs 36
Table 22 – SMK clear assignment info request APDU parameters 36
Table 23 – SMK FDA address values for SMK device annunciation request APDUs 36
Table 24 – SMK device annunciation request APDU parameters 37
Table 25 – Initiate request APDU parameters 40
Table 26 – Initiate response APDU parameters 40
Table 27 – Abort request APDU parameters 40
Table 28 – Get response APDU parameters 41
Table 29 – Identify response APDU parameters 41
Table 30 – Get OD request APDU parameters 41
Table 31 – Get OD response APDU parameters 42
Table 32 – Initiate put OD request APDU parameters 42
Table 33 – Put OD request APDU parameters 42
Table 34 – Generic initiate download sequence request APDU parameters 43
Table 35 – Generic download segment request APDU parameters 44
Table 36 – Generic terminate download sequence request APDU parameters 44
Table 37 – Response APDU parameters 44
Table 38 – Initiate download sequence request APDU parameters 45
Table 39 – Download segment request APDU parameters 45
Table 40 – Download segment response APDU parameters 45
Table 41 – Terminate download sequence request APDU parameters 46
Table 42 – Initiate upload sequence request APDU parameters 46
Table 43 – Upload segment request APDU parameters 47
Table 44 – Upload segment response APDU parameters 47
Table 45 – Terminate upload sequence request APDU parameters 47
Table 46 – Request domain download request APDU parameters 48
Table 47 – Request domain upload request APDU parameters 48
Table 48 – Create program invocation request APDU parameters 49
Table 49 – Create program invocation response APDU parameters 49
Table 50 – Delete program invocation request APDU parameters 49
Table 51 – Start request APDU parameters 50
Table 52 – Stop request APDU parameters 50
Table 53 – Resume request APDU parameters 50
Table 54 – Reset request APDU parameters 51
Table 55 – Kill request APDU parameters 51
Table 56 – Read request APDU parameters 51

Withdrawn
IECNORM.COM : Click to view the full PDF of IEC 61158-6-5:2007
Withdrawn
IEC Standards
(https://standards.iteh.ai)
Document Preview
IEC 61158-6-5:2007
https://standards.iteh.ai/catalog/standards/sist/3c190a73dd09/iec-61158-6-5-2007

Table 57 – Read response APDU parameters 52
Table 58 – Read with subindex request APDU parameters 52
Table 59 – Read with subindex response APDU parameters 52
Table 60 – Write request APDU parameters 52
Table 61 – Write with subindex request APDU parameters 53
Table 62 – Define variable list request APDU parameters 53
Table 63 – Define variable list response APDU parameters 53
Table 64 – Delete variable list request APDU parameters 54
Table 65 – Information report request APDU parameters 54
Table 66 – Information report with subindex request APDU parameters 54
Table 67 – Information report on change request APDU parameters 55
Table 68 – Information report on change with subindex request APDU parameters 55
Table 69 – Event notification request APDU parameters 55
Table 70 – Alter event condition monitoring request APDU parameters 56
Table 71 – Acknowledge event notification request APDU parameters 56
Table 72 – LAN redundancy diagnostic message request APDU parameters 57
Table 73 – LAN redundancy get information response APDU parameters 59
Table 74 – LAN redundancy get statistics request APDU parameters 61
Table 75 – Object description header 63
Table 76 – Null object 63
Table 77 – Structure of the list of object descriptions 64
Table 78 – Structure of a load region in the S-OD 65
Table 79 – Structure of a function invocation in the DP-OD 66
Table 80 – Structure of an event in the S-OD 67
Table 81 – Structure of a data type in the ST-OD 67
Table 82 – Structure of a data type structure description in the ST-OD 68
Table 83 – Structure of a simple variable in the S-OD 68
Table 84 – Structure of an array in the S-OD 69
Table 85 – Structure of a record in the S-OD 70
Table 86 – Structure of a variable list in the DV-OD 71
Table 87 – Common error parameters 72
Table 88 – PI error parameters 72
Table 89 – OD error parameters 72
Table 90 – Error class and error code values 73
Table 91 – SMKPM service primitives 76
Table 92 – SMKPM states 77
Table 93 – SMKPM state table – initialization 78
Table 94 – SMKPM state table – receive transitions 78
Table 95 – SMKPM state table – internal events 83
Table 96 – HseRepeatTimerExpires () 84
Table 97 – RcvNewNetworkAddress (interface, address) 84
Table 98 – RcvMsg () 84
Table 99 – SntpSyncLost () 84

iTeh Standards
(https://standards.iteh.ai)
Document Preview
IEC 61158-6-5:2007
https://standards.iteh.ai/catalog/standards/sist/6f3e6514-467b-9562-3c190a73dd09/iec-61158-6-5-2007
Withdrawn

Table 100 – AddressToClear (sm_svc) 85
Table 101 – AssignmentInfo_Set () 85
Table 102 – ConfigurationSessionActive () 85
Table 103 – DeviceRedundancyState () 85
Table 104 – DevId_Match (sm_svc) 86
Table 105 – DuplicateQueryIdMatch (sm_svc) 86
Table 106 – DuplicatePdTagDetected () 86
Table 107 – FdaAddressType (sm_svc) 86
Table 108 – IsValid (sm_svc) 87
Table 109 – NetworkAddressChange (interface, address) 87
Table 110 – NumberOfAssignedAddresses () 87
Table 111 – OperationalRestore () 87
Table 112 – PdTag_Match (sm_svc) 87
Table 113 – PdTagDeviceIndex_Check (sm_svc) 88
Table 114 – Query_Match (sm_svc) 88
Table 115 – QueryType (sm_svc) 88
Table 116 – SmCacheEntry (sm_svc) 88
Table 117 – Clear_Address (interface_to_clear) 89
Table 118 – Clear_DuplicatePdTagFlag () 89
Table 119 – Get_AddlCode () 89
Table 120 – New_Address (interface, address) 89
Table 121 – Restart_HseRepeatTimer () 90
Table 122 – Restore_Defaults () 90
Table 123 – Send_SM_CommonErrorRsp (sm_service_type, svc_spec_params) 90
Table 124 – Send_SM_RegRspMessage (sm_svc) 90
Table 125 – Set_Assignment_Data (sm_svc) 90
Table 126 – Set_DuplicatePdTagFlag () 91
Table 127 – SvcType (sm_svc) 91
Table 128 – Additional code used by error class and code 91
Table 129 – Additional code parameter IDs 92
Table 130 – Primitives issued by FSPM to ARPM 94
Table 131 – Primitives issued by ARPM to FSPM 94
Table 132 – Parameters used with primitives exchanged between FSPM and ARPM 95
Table 133 – Client / Server ARPM states 97
Table 134 – Client / server ARPM state table – sender transitions 98
Table 135 – Client / server ARPM state table – receiver transitions 99
Table 136 – Primitives issued by FSPM to ARPM 101
Table 137 – Primitives issued by ARPM to FSPM 102
Table 138 – Parameters used with primitives exchanged between FSPM and ARPM 102
Table 139 – Publisher / subscriber ARPM states 103
Table 140 – MulticastARPM state table – sender transitions 104
Table 141 – MulticastARPM state table – receiver transitions 105
Table 142 – BuildFAL-ErrPDU() 105

Withdrawn
iTeh Standards
(https://standards.iteh.ai)
Document Preview
https://standards.iteh.ai/catalog/standards/sist/6e5b6f23-6514-467b-9562-3c190a73dd09/iec-61158-6-5-2007

Table 143 – BuildFAL-ReqRspPDU() 106
Table 144 – GetArepId() 106
Table 145 – ConfigurationArCheckOK() 106
Table 146 – FAL_Pdu_BufferSize() 106
Table 147 – FAL_Pdu_Confirmed() 106
Table 148 – FAL_Pdu_DuplicateMsg () 106
Table 149 – FAL_Pdu_GetVcrId() 107
Table 150 – FAL_Pdu_InactivityCloseTime() 107
Table 151 – FAL_Pdu_TransmitDelayTime() 107
Table 152 – FAL_Pdu_SvcType() 107
Table 153 – FAL_Pdu_RemoteAddress() 107
Table 154 – FAL_Pdu_TrailerFields() 107
Table 155 – FAL_Pdu_ServiceSpecificParameters() 108
Table 156 – FAL_Pdu_Valid() 108
Table 157 – MaxOutstandingReached() 108
Table 158 – StartInactivityCloseTimer() 108
Table 159 – Primitives issued by ARPM to DMPM 109
Table 160 – Primitives issued by DMPM to ARPM 109
Table 161 – Parameters used with primitives exchanged between ARPM and DMPM 109
Table 162 – Primitives exchanged between the socket model and DMPM 109
Table 163 – Parameters of DMPM/socket model primitives 110
Table 164 – DMPM state descriptions 110
Table 165 – DMPM state table – sender transitions 111
Table 166 – DMPM state table – receiver transitions 112
Table 167 – ConnectionOriented 112
Table 168 – GetBufferedData 112
Table 169 – GetConnectionId 112
Table 170 – LoadBuffer 113
Table 171 – RemainingBufferSizeCheck 113
Table 172 – StartTransmitDelayTimer 113

Withdrawn
iTeh Standards
(https://standards.iteh.ai)
Document Preview
IEC 61158-6-5:2007
https://standards.iteh.ai/catalog/standards/iec/66c3853c-6514-467b-9562-3c190a73dd09/iec-61158-6-5-2007

INTERNATIONAL ELECTROTECHNICAL COMMISSION

INDUSTRIAL COMMUNICATION NETWORKS – FIELDBUS SPECIFICATIONS –

Part 6–5: Application layer protocol specification – Type 5 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 provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with an IEC Publication.

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.

9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

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.

International standard IEC 61158-6-5 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 61158-6 subseries cancel and replace IEC 61158-6:2003. This edition of this part constitutes an editorial revision.

This edition of IEC 61158-6 includes the following significant changes from the previous edition:

Withdrawn
IECNORM.COM : Click to view the full PDF of IEC 61158-6-5:2007
https://standards.iteh.ai/catalog/standards/iec/61158-6-5-2007

a) deletion of the former Type 6 fieldbus for lack of market relevance;

b) addition of new types of fieldbuses;

c) partition of part 6 of the third edition into multiple parts numbered -6-2, -6-3, …

This bilingual version (2014-12) corresponds to the monolingual English version, published in 2007-12.

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

FDIS	Report on voting
65C/476/FDIS	65C/487/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 French version of this standard has not been voted upon.

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.

iTeh Standards
(https://standards.iteh.ai)
Document Preview
IEC 61158-6-5:2007
https://standards.iteh.ai/catalog/standards/iec/6d3853c-6514-467b-9562-3c190a73dd09/iec-61158-6-5-2007
Withdrawn

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 application protocol provides the application service by making use of the services available from the data-link or other immediately lower 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 application entities (AEs) 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:

- as a guide for implementors and designers;
- for use in the testing and procurement of equipment;
- as part of an agreement for the admittance of systems into the open systems environment;
- 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.

Withdrawn
iTeh Standards
(https://standards.iteh.ai)
Document Preview
IEC 61158-6-5:2007
https://standards.iteh.ai/catalog/standards/iec/6e3853c-6514-467b-9562-3c190a73dd09/iec-61158-6-5-2007

INDUSTRIAL COMMUNICATION NETWORKS – FIELDBUS SPECIFICATIONS –

Part 6–5: Application layer protocol specification – Type 5 elements

1 Scope

1.1 General

The fieldbus Application Layer (FAL) provides user programs with a means to access the fieldbus communication environment. In this respect, the FAL can be viewed as a “window between corresponding application programs.”

This standard provides common elements for basic time-critical and non-time-critical messaging communications between application programs in an automation environment and material specific to Type 5 fieldbus. The term “time-critical” is used to represent the presence of a time-window, within which one or more specified actions are required to be completed with some defined level of certainty. Failure to complete specified actions within the time window risks 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 behavior provided by the Type 5 fieldbus Application Layer in terms of

a) the abstract syntax defining the application layer protocol data units conveyed between communicating application entities,
b) the transfer syntax defining the application layer protocol data units conveyed between communicating application entities,
c) the application context state machine defining the application service behavior visible between communicating application entities; and
d) the application relationship state machines defining the communication behavior visible between communicating application entities; and.

The purpose of this standard is to define the protocol provided to

1) define the wire-representation of the service primitives defined in IEC 61158-5-5, and
2) define the externally visible behavior associated with their transfer.

This standard specifies the protocol of the Type 5 IEC fieldbus Application Layer, in conformance with the OSI Basic Reference Model (ISO/IEC 7498) and the OSI Application Layer Structure (ISO/IEC 9545).

FAL services and protocols are provided by FAL application-entities (AE) contained within the application processes. The FAL AE is composed of a set of object-oriented Application Service Elements (ASEs) and a Layer Management Entity (LME) that manages the AE. The ASEs provide communication services that operate on a set of related application process object (APO) classes. One of the FAL ASEs is a management ASE that provides a common set of services for the management of the instances of FAL classes.

Although these services specify, from the perspective of applications, how request and responses are issued and delivered, they do not include a specification of what the requesting and responding applications are to do with them. That is, the behavioral aspects of the applications are not specified; only a definition of what requests and responses they can send/receive is specified. This permits greater flexibility to the FAL users in standardizing

iTeh Standards (https://standards.iteh.ai) Document Preview
IEC 61158-6-5:2007
https://standards.iteh.ai/catalog/standards/sist/...-61158-6-5-2007
Withdrawn

such object behavior. In addition to these services, some supporting services are also defined in this standard to provide access to the FAL to control certain aspects of its operation.

1.2 Specifications

The principal objective of this standard is to specify the syntax and behavior of the application layer protocol that conveys the application layer services defined in IEC 61158-5-5.

A secondary objective is to provide migration paths from previously-existing industrial communications protocols. It is this latter objective which gives rise to the diversity of protocols standardized in IEC 61158-6.

1.3 Conformance

This standard does not specify individual implementations or products, nor does it constrain the implementations of application layer entities within industrial automation systems. Conformance is achieved through implementation of this application layer protocol specification.

2 Normative references

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.

IEC 61158-3-1, *Industrial communication networks – Fieldbus specifications – Part 3-1: Data-link layer service definition – Type 1 elements*

IEC 61158-4-1, *Industrial communication networks – Fieldbus specifications – Part 4-1: Data-link layer protocol specification – Type 1 elements*

IEC 61158-5-5, *Industrial communication networks – Fieldbus specifications – Part 5-5: Application layer service definition – Type 5 elements*

ISO/IEC 9545, *Information technology – Open Systems Interconnection – Application Layer structure*

ISO/IEC 7498-1, *Information technology – Open Systems Interconnection – Basic Reference Model — Part 1: The Basic Model*

ISO/IEC 8824, *Information technology – Open Systems Interconnection – Specification of Abstract Syntax Notation One (ASN.1)*

ISO/IEC 8825, *Information technology – ASN.1 encoding rules: Specification of Basic Encoding Rules (BER), Canonical Encoding Rules (CER) and Distinguished Encoding Rules (DER)*

3 Terms, definitions, symbols, abbreviations and conventions

For the purposes of this document, the following definitions apply.

3.1 Terms and definitions from other ISO/IEC standards

3.1.1 Terms and definitions from ISO/IEC 7498-1

a) abstract syntax
b) application entity

Withdrawn
IEC 61158-6-5:2007

c) application process
d) application protocol data unit
e) application service element
f) application entity invocation
g) application process invocation
h) application transaction
i) presentation context
j) real open system
k) transfer syntax

3.1.2 Terms and definitions from ISO/IEC 9545

a) application-association
b) application-context
c) application context name
d) application-entity-invocation
e) application-entity-type
f) application-process-invocation
g) application-process-type
h) application-service-element
i) application control service element

3.1.3 Terms and definitions from ISO/IEC 8824

a) object identifier
b) type
c) value
d) simple type
e) structured type
f) component type
g) tag
h) Boolean type
i) true
j) false
k) integer type
l) bitstring type
m) octetstring type
n) null type
o) sequence type
p) sequence of type
q) choice type
r) tagged type
s) any type
t) module
u) production

3.1.4 Terms and definitions from ISO/IEC 8825

a) encoding (of a data value)
b) data value
c) identifier octets (the singular form is used in this standard)
d) length octet(s) (both singular and plural forms are used in this standard)
e) contents octets

3.2 IEC/TR 61158-1 terms

The following IEC/TR 61158-1 terms apply.

3.2.1 application

function or data structure for which data is consumed or produced

Withdrawn
iTeh Standards
(https://standards.iteh.ai)
Document Preview
IEC 61158-6-5:2007
https://standards.iteh.ai/catalog/standards/iec/6e3853c-6514-467b-9562-3c190a73dd09/iec-61158-6-5-2007