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# INTERNATIONAL STANDARD

NORME INTERNATIONALE

Industrial communication networks - Fieldbus specifications - Part 6-3: Application layer protocol specification - Type 3 elements

Réseaux de communication industriels – Spécifications des bus de terrain – Partie 6-3: Spécification de protocole de la couche application – Eléments de Type 3



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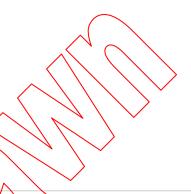
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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

## INDUSTRIAL COMMUNICATION NETWORKS – FIELDBUS SPECIFICATIONS –

## Part 6-3: Application layer protocol specification – Type 3 elements

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International Standard IEC 61158-6-3 has been prepared by subcommittee 65C: Industrial networks, of IEC technical committee 65: Industrial-process measurement, control and automation.

This second edition cancels and replaces the first edition published in 2007. This edition constitutes a technical revision.

The main changes with respect to the previous edition are listed below:

- corrections, in Table 10 and Table 48;
- clarification in 6.9.1.2;
- expired patents deleted and new patents disclosed.

This bilingual version published in 2012-07 corresponds to the English version published in 2010-08.

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

FDIS	Report on voting
65C/607/FDIS	65C/621/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.

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.rec.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- · withdrawn;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 2 The revision of this standard will be synchronized with the other parts of the IEC 61158 series.



## 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.

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 3 elements and possibly other types given in the normative elements of this standard.

The following patent rights for Type 3 have been announced by [SI]:

Publication	Title	
EP0604668-A1 (06.07.1994); EP0604668-B1 (18.02.1998)	Logical ring with monitoring of rotation time 010 ctanded shows a second show that the control of the control o	
EP0604669-A1 (06.07.1994); EP0604669-B1 (01.04.1998)	Bus system with monitoring of the activity state of participants	

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## INDUSTRIAL COMMUNICATION NETWORKS – FIELDBUS SPECIFICATIONS –

# Part 6-3: Application layer protocol specification – Type 3 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 3 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 3 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 computing 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

- a) define the wire-representation of the service primitives specified in IEC 61158-5-3, and
- b) define the externally visible behavior associated with their transfer.

This standard specifies the protocol of the Type 3 fieldbus application layer, in conformance with the OSI Basic Reference Model (ISO/IEC 7498-1) 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