IEC PAS 62953

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PUBLICLY AVAILABLE SPECIFICATION

PRE-STANDARD

Industrial communication networks – Fieldbus specifications – ADS-net

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INDUSTRIAL COMMUNICATION NETWORKS – FIELDBUS SPECIFICATIONS AND PROFILES – ADS-NET

FOREWORD

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IEC PAS 62953 has been processed by subcommittee 65C: Industrial networks, of IEC technical committee 65: Industrial-process measurement, control and automation.

The text of this PAS is based on the following document:	This PAS was approved for publication by the P-members of the committee concerned as indicated in the following document
Draft PAS	**Report on voting**
65C/787/PAS	65C/799/RVD

Following publication of this PAS, which is a pre-standard publication, the technical committee or subcommittee concerned may transform it into an International Standard.

This PAS shall remain valid for an initial maximum period of 3 years starting from the publication date. The validity may be extended for a single period up to a maximum of 3 years, at the end of which it shall be published as another type of normative document, or shall be withdrawn.

INTRODUCTION

This PAS contains the ADS-net fieldbus specifications and profiles (Communication profile CP 20/1 ADS-net/μΣNETWORK-1000, CP 20/2 ADS-net/NX) for inclusion in the IEC 61158 series as well as IEC 61784-2.

The intention is to make this technical content available immediately, while a corresponding new work item proposal (NP) has been launched. If the NP is accepted, this contents will be included in the next editions of the IEC 61158 series and of IEC 61784-2.

This PAS contains the relevant ADS-net (Type 25) elements for the DL and AL services and protocols and information with references to:

– IEC 61158-1:2014

– IEC 61158-2:2014

– IEC 61784-2:2014

The present IEC PAS is structured in the same way as the IEC 61158 series and IEC 61784-2:

– IEC PAS 62953-3-25 is intended to become a future IEC 61158-3-25;

– IEC PAS 62953-4-25 is intended to become a future IEC 61158-4-25;

– IEC PAS 62953-5-25 is intended to become a future IEC 61158-5-25;

– IEC PAS 62953-6-25 is intended to become a future IEC 61158-6-25;

– IEC PAS 62953-2 is intended to be merged into a revised version of IEC 61784-2:2014.

INCLUDED SUBPARTS

Industrial communication networks – Fieldbus specifications – Part 3-25: Data-link layer service definition – Type 25 elements

Industrial communication networks – Fieldbus specifications – Part 4-25: Data-link layer protocol specification – Type 25 elements

Industrial communication networks – Fieldbus specifications – Part 5-25: Application layer service definition – Type 25 elements

Industrial communication networks – Fieldbus specifications – Part 6-25: Application layer protocol specification – Type 25 elements

CPF20 input for IEC 61784-2: Industrial communication networks – Profiles – Part 2: Additional fieldbus profiles for real-time networks based on ISO/IEC 8802-3

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INDUSTRIAL COMMUNICATION NETWORKS – FIELDBUS SPECIFICATIONS –

Part 3-25: Data-link layer service definition – Type 25 elements

1 Scope

1.1 General

This part of IEC PAS 62953 provides common elements for basic time-critical messaging communications between devices in an automation environment. 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 service provided by the Type 25 fieldbus 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 which they take; and

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

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

- the Type 25 fieldbus application layer at the boundary between the application and data-link layers of the fieldbus reference model;
- systems management at the boundary between the data-link layer and systems management of the fieldbus reference model.

1.2 Specifications

The principal objective of this standard is to specify the characteristics of conceptual data-link layer services suitable for time-critical communications, and thus 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 specification may be used as the basis for formal DL-Programming-Interfaces. Nevertheless, it is not a formal programming interface, and any such interface will need to address implementation issues not covered by this specification, including

a) the sizes and octet ordering of various multi-octet service parameters, and

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

1.3 Conformance

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

There is no conformance of equipment to this data-link layer service definition standard. Instead, conformance is achieved through implementation of the corresponding data-link protocol that fulfills the Type 25 data-link layer services defined in this standard.

2 Normative references

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.

IEC PAS 62953-4-25, *Industrial communication networks – Fieldbus specifications – Part 4-25: Data-link layer protocol specification – Type 25 elements*

IEC PAS 62953-5-25, *Industrial communication networks – Fieldbus specifications – Part 5-25: Application layer service definition – Type 25 elements*

IEC PAS 62953-6-25, *Industrial communication networks – Fieldbus specifications – Part 6-25: Application layer protocol specification – Type 25 elements*

ISO/IEC 10731, *Information technology – Open Systems Interconnection – Basic Reference Model – Conventions for the definition of OSI services*

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, *Information technology – Open Systems Interconnection – Basic Reference Model – Conventions for the definition of OSI services*

3 Terms, definitions, symbols and abbreviations

For the purposes of this document, the following terms, definitions, symbols, abbreviations and conventions apply.

3.1 Reference model terms and definitions

This standard is based in part on the concepts developed in ISO/IEC 7498-1 and ISO/IEC 7498-3, and makes use of the following terms defined therein:

3.1.1 DL-address **[ISO/IEC 7498-3]**

3.1.2 DL-address-mapping **[ISO/IEC 7498-1]**

3.1.3 called-DL-address **[ISO/IEC 7498-3]**

3.1.4 calling-DL-address **[ISO/IEC 7498-3]**

3.1.5 centralized multi-end-point-connection **[ISO/IEC 7498-1]**

3.1.6 DL-connection **[ISO/IEC 7498-1]**

3.1.7 DL-connection-end-point **[ISO/IEC 7498-1]**

3.1.8 DL-connection-end-point-identifier **[ISO/IEC 7498-1]**

3.1.9 DL-connection-mode transmission **[ISO/IEC 7498-1]**

3.1.10 DL-connectionless-mode transmission **[ISO/IEC 7498-1]**

3.1.11 correspondent (N)-entities **[ISO/IEC 7498-1]**

correspondent DL-entities (N=2)

correspondent Ph-entities (N=1)

3.1.12 DL-duplex-transmission **[ISO/IEC 7498-1]**

3.1.13 (N)-entity **[ISO/IEC 7498-1]**

DL-entity (N=2)

Ph-entity (N=1)

3.1.14 DL-facility **[ISO/IEC 7498-1]**

3.1.15 flow control **[ISO/IEC 7498-1]**

3.1.16 (N)-layer **[ISO/IEC 7498-1]**

DL-layer (N=2)

Ph-layer (N=1)

3.1.17 layer-management **[ISO/IEC 7498-1]**

3.1.18 DL-local-view **[ISO/IEC 7498-3]**

3.1.19 DL-name **[ISO/IEC 7498-3]**

3.1.20 naming-(addressing)-domain **[ISO/IEC 7498-3]**

3.1.21 peer-entities **[ISO/IEC 7498-1]**

3.1.22 primitive name **[ISO/IEC 7498-3]**

3.1.23 DL-protocol **[ISO/IEC 7498-1]**

3.1.24 DL-protocol-connection-identifier **[ISO/IEC 7498-1]**

3.1.25 DL-protocol-data-unit **[ISO/IEC 7498-1]**

3.1.26 DL-relay **[ISO/IEC 7498-1]**

3.1.27 reset **[ISO/IEC 7498-1]**

3.1.28 responding-DL-address **[ISO/IEC 7498-3]**

3.1.29 routing **[ISO/IEC 7498-1]**

3.1.30 segmenting **[ISO/IEC 7498-1]**

3.1.31 (N)-service **[ISO/IEC 7498-1]**

DL-service (N=2)
Ph-service (N=1)

3.1.32 (N)-service-access-point **[ISO/IEC 7498-1]**

DL-service-access-point (N=2)
Ph-service-access-point (N=1)

3.1.33 DL-service-access-point-address **[ISO/IEC 7498-3]**

3.1.34 DL-service-connection-identifier **[ISO/IEC 7498-1]**

3.1.35 DL-service-data-unit **[ISO/IEC 7498-1]**

3.1.36 DL-simplex-transmission **[ISO/IEC 7498-1]**

3.1.37 DL-subsystem **[ISO/IEC 7498-1]**

3.1.38 systems-management **[ISO/IEC 7498-1]**

3.1.39 DLS-user-data **[ISO/IEC 7498-1]**

3.2 Service convention terms and definitions

This standard also makes use of the following terms defined in ISO/IEC 10731 as they apply to the data-link layer:

3.2.1 acceptor

3.2.2 asymmetrical service

3.2.3 confirm (primitive);

requestor.deliver (primitive)