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INTERNATIONAL STANDARD

Field device tool (FDT) interface specification –
Part 303-2: Communication profile integration – IEC 61784 CP 3/4, CP 3/5 and CP 3/6

IEC 62453-303-2:2009(E)

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International Standard IEC 62453-303-2 has been prepared by subcommittee 65E: Devices and integration in enterprise systems, of IEC technical committee 65: Industrial-process measurement, control and automation.

This part, in conjunction with the other parts of the first edition of the IEC 62453 series cancels and replaces IEC/PAS 62453-1, IEC/PAS 62453-2, IEC/PAS 62453-3, IEC/PAS 62453-4 and IEC/PAS 62453-5 published in 2006, and constitutes a technical revision.

Each part of the IEC 62453-3xy series is intended to be read in conjunction with IEC 62453-2.

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

FDIS	Report on voting
65E/128/FDIS	65E/141/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 the ISO/IEC Directives, Part 2.

A list of all parts of the IEC 62453 series, under the general title *Field Device Tool (FDT) interface specification,* can be found on the IEC website.

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- withdrawn,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.

A bilingual version of this publication may be issued at a later date.

INTRODUCTION

This part of IEC 62453 is an interface specification for developers of FDT (Field Device Tool) components for function control and data access within a client/server architecture. The specification is a result of an analysis and design process to develop standard interfaces to facilitate the development of servers and clients by multiple vendors that need to interoperate seamlessly.

With the integration of fieldbusses into control systems, there are a few other tasks which need to be performed. In addition to fieldbus- and device-specific tools, there is a need to integrate these tools into higher-level system-wide planning- or engineering tools. In particular, for use in extensive and heterogeneous control systems, typically in the area of the process industry, the unambiguous definition of engineering interfaces that are easy to use for all those involved is of great importance.

A device-specific software component, called DTM (Device Type Manager), is supplied by the field device manufacturer with its device. The DTM is integrated into engineering tools via the FDT interfaces defined in this specification. The approach to integration is in general open for all kinds of fieldbusses and thus meets the requirements for integrating different kinds of devices into heterogeneous control systems.

Figure 1 shows how IEC 62453-303-2 is aligned in the structure of the IEC 62453 series.

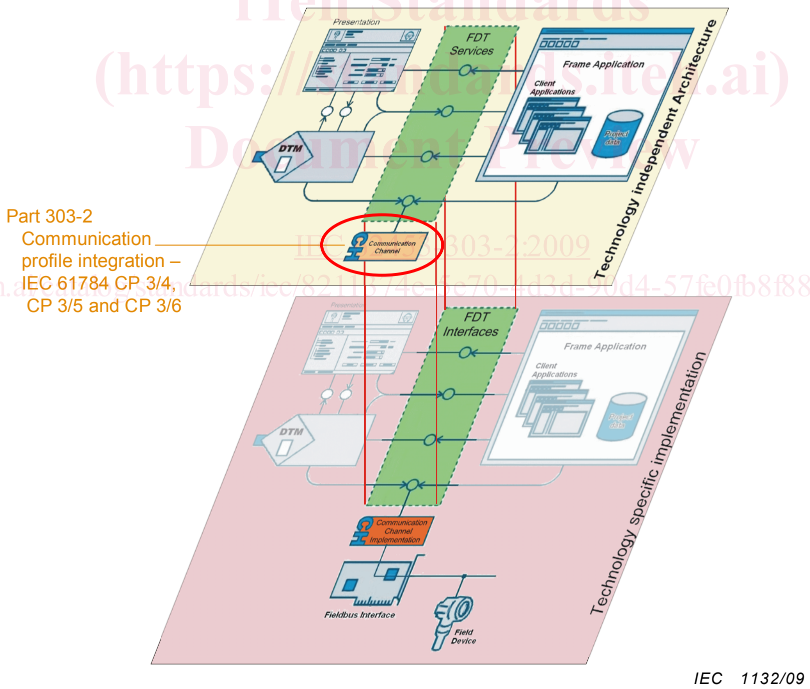

Figure 1 – Part 303-2 of the IEC 62453 series

FIELD DEVICE TOOL (FDT) INTERFACE SPECIFICATION –

Part 303-2: Communication profile integration – IEC 61784 CP 3/4, CP 3/5 and CP 3/6

1 Scope

Communication Profile 3/4, Communication Profile 3/5 and Communication Profile 3/6 (commonly known as PROFINET®[1] IO) define communication profiles based on IEC 61158-5-10 and IEC 61158-6-10. The basic profiles CP 3/4, CP 3/5, and CP 3/6 are defined in IEC 61784-2.

This part of IEC 62453 provides information for integrating the PROFINET® technology into the FDT interface (IEC 62453-2).

This part of the IEC 62453 specifies communication and other services.

This specification neither contains the FDT specification nor modifies it.

2 Normative references

The following referenced documents are indispensable for the application of this specification. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies

IEC 61158-5-10, *Industrial communication networks – Fieldbus specifications – Part 5-10: Application layer service definition – Type 10 elements*

IEC 61158-6-10, *Industrial communication networks – Fieldbus specifications – Part 6-10: Application layer protocol specification – Type 10 elements*

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

IEC 62453-1:2009, *Field Device Tool (FDT) interface specification – Part 1: Overview and guidance*

IEC 62453-2:2009, *Field Device Tool (FDT) interface specification – Part 2: Concepts and detailed description*

3 Terms, definitions, symbols, abbreviated terms and conventions

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 62453-1 and IEC 62453-2 apply.

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[1] PROFINET ® is the trademark of PROFIBUS Nutzerorganisation e.V. (PNO). PNO is a non-profit trade organization to support the fieldbus PROFIBUS. This information is given for the convenience of users of this International Standard and does not constitute an endorsement by IEC of the trademark holder or any of its products. Compliance to this profile does not require use of the registered trademark. Use of the trademark PROFIBUS and PROFINET requires permission of the trade name holder.

3.2 Abbreviated terms

For the purposes of this document, the abbreviations given in IEC 62453-1 and IEC 62453-2 and the following apply.

AR	Application Relation
DCP	Discovery and basic Configuration Protocol
GSDML	Generic Station Description Markup Language
IOCS	IO Consumer Status
IOPS	IO Provider Status
UML	Unified Modeling Language

3.3 Conventions

3.3.1 Data type names and references to data types

The conventions for naming and referencing of data types are explained in IEC 62453-2, Clause A.1

3.3.2 Vocabulary for requirements

The following expressions are used when specifying requirements.

Usage of “shall” or “mandatory”	No exceptions allowed.
Usage of “should” or “recommended”	Strong recommendation. It may make sense in special exceptional cases to differ from the described behaviour.
Usage of “can’ or “optional’	Function or behaviour may be provided, depending on defined conditions.

3.3.3 Use of UML

Figures in this document are using UML notation as defined in Annex A of IEC 62453-1.

4 Bus category

IEC 61784 CP 3/4, CP 3/5 and CP 3/6 protocols are identified in the protocolId element of the structured data type 'fdt:BusCategory' by the following unique identifier as defined in Table 1:

Table 1 – Protocol identifier

Identifier value	ProtocolId name	Description
DFC98364-DAB8-493B-BB92-23B3F92FEBCD	‘Profinet IO’	Support of IEC 61784 CP 3/4, CP 3/5 and CP 3/6 protocols

IEC 61784 CP 3/4, CP 3/5 and CP 3/6 use the following unique identifier for its physical layers.

Table 2 – Physical layer identifier

PhysicalLayer element	Description
99C36176-E59A-11DA-9023-0002B3ECDCBE	10BASET
99C36177-E59A-11DA-9023-0002B3ECDCBE	10BASETXHD
99C36178-E59A-11DA-9023-0002B3ECDCBE	10BASETXFD
99C36179-E59A-11DA-9023-0002B3ECDCBE	100BASETXHD
99C3617A-E59A-11DA-9023-0002B3ECDCBE	100BASETXFD

PhysicalLayer element	Description
99C3617B-E59A-11DA-9023-0002B3ECDCBE	10BASEFXHD
99C3617C-E59A-11DA-9023-0002B3ECDCBE	10BASEFXFD
99C3617D-E59A-11DA-9023-0002B3ECDCBE	1000BASEXHD
99C3617E-E59A-11DA-9023-0002B3ECDCBE	1000BASEXFD
99C3617F-E59A-11DA-9023-0002B3ECDCBE	1000BASELXHD
99C36180-E59A-11DA-9023-0002B3ECDCBE	1000BASELXFD
99C36181-E59A-11DA-9023-0002B3ECDCBE	1000BASESXHD
99C36182-E59A-11DA-9023-0002B3ECDCBE	1000BASESXFD
99C36183-E59A-11DA-9023-0002B3ECDCBE	1000BASETHD
99C36184-E59A-11DA-9023-0002B3ECDCBE	1000BASETFD
99C36185-E59A-11DA-9023-0002B3ECDCBE	10GigBASEFX

5 Access instance and device data

5.1 Process Channel objects provided by DTM

The minimum set of provided data should be:

- process values modeled as channel objects including the ranges and scaling.

5.2 DTM services to access instance and device data

The services InstanceItemList and DeviceItemList shall provide access to at least all mandatory parameters of CP 3/4, CP 3/5 and CP 3/6 devices.

6 Protocol specific behavior

Not applicable.

7 Protocol specific usage of general data types

The following table (Table 3) shows how general data types, defined in IEC 62453-2 within the namespace ‘fdt’, are used with CP 3/4, CP 3/5 and CP 3/6 devices.

Table 3 – Protocol specific usage of general data types

Attribute	Description for use in IEC 61784 CP 3/4, CP 3/5 and CP 3/6
fdt:address	For CP 3/4, CP 3/5 and CP 3/6 the address attribute is mandatory for the exposed parameters in the DTMs. The address string shall be constructed according to the rules of the FDT semanticId. That means the attribute ‘semanticId’ is always the same as the attribute ‘address’
fdt:protocolId	See Clause 4
fdt:physicalLayer	See Clause 4
fdt:deviceTypeId	The attribute “fdt:DtmDeviceType/@deviceTypeId” must contain the DeviceID according to the CP 3/4, CP 3/5 and CP 3/6 specification. The DeviceID shall be entered in decimal format, however, the value should be displayed as hex to the user. GSDML XPath Expression: “/ISO15745Profile/ProfileBody/DeviceIdentity/@DeviceID”
fdt:subDeviceType	Enter manufacturer specific value here