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**Field Device Tool (FDT)-Schnittstellenspezifikation –
Teil 303-2: Integration von Kommunikationsprofilen –
Kommunikationsprofile (CP) 3/4, 3/5 und 3/6 nach IEC 61784
(IEC 62453-303-2:2009);
Englische Fassung EN 62453-303-2:2009**

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);
English version EN 62453-303-2:2009

Spécification des interfaces des outils des dispositifs de terrain (FDT) –
Partie 303-2: Intégration des profils de communication –
CEI 61784 CP 3/4, CP 3/5 et CP 3/6 (CEI 62453-303-2:2009);
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DKE Deutsche Kommission Elektrotechnik Elektronik Informationstechnik im DIN und VDE

Beginn der Gültigkeit

Die von CENELEC am 2009-08-01 angenommene EN 62453-303-2 gilt als DIN-Norm ab 2010-02-01.

Nationales Vorwort

Vorausgegangener Norm-Entwurf: E DIN IEC 62453-303-2:2008-02.

Für diese Norm ist das nationale Arbeitsgremium K 956 „Feldbus“ der DKE Deutsche Kommission Elektrotechnik Elektronik Informationstechnik im DIN und VDE (www.dke.de) zuständig.

Die enthaltene IEC-Publikation wurde vom SC 65E „System: engineering and management“ erarbeitet.

Das IEC-Komitee hat entschieden, dass der Inhalt dieser Publikation bis zu dem Datum (maintenance result date) unverändert bleiben soll, das auf der IEC-Website unter „<http://webstore.iec.ch>“ zu dieser Publikation angegeben ist. Zu diesem Zeitpunkt wird entsprechend der Entscheidung des Komitees die Publikation

- bestätigt,
- zurückgezogen,
- durch eine Folgeausgabe ersetzt oder
- geändert.

Diese Norm enthält eine Schnittstellenfestlegung für Entwickler von FDT-Programmbausteinen, um Datenzugriff und Programmablauf in einer Client-Server-Architektur zu entwerfen. Das vorliegende Schriftstück beschreibt die Integration des Profinet-I/O-Protokolls (DIN EN 61158-x-10) in die FDT-Spezifikationen nach DIN EN 62453-2.

Da sich die Benutzer der vorliegenden Norm der englischen Sprache als Fachsprache bedienen, wird die Englische Fassung der EN 62453-303-2 veröffentlicht. Für die meisten der verwendeten Begriffe existieren keine gebräuchlichen deutschen Benennungen, da sich die deutschen Anwender in der Regel ebenfalls der englischen Benennungen bedienen. Diese Norm steht nicht in unmittelbarem Zusammenhang mit Rechtsvorschriften und ist nicht als Sicherheitsnorm anzusehen.

Das Präsidium des DIN hat mit Präsidialbeschluss 1/2004 festgelegt, dass DIN-Normen, deren Inhalt sich auf internationale Arbeitsergebnisse der Informationsverarbeitung gründet, unter bestimmten Bedingungen allein in englischer Sprache veröffentlicht werden dürfen. Diese Bedingungen sind für die vorliegende Norm erfüllt.

Für den Fall einer undatierten Verweisung im normativen Text (Verweisung auf eine Norm ohne Angabe des Ausgabedatums und ohne Hinweis auf eine Abschnittsnummer, eine Tabelle, ein Bild usw.) bezieht sich die Verweisung auf die jeweils neueste gültige Ausgabe der in Bezug genommenen Norm.

Für den Fall einer datierten Verweisung im normativen Text bezieht sich die Verweisung immer auf die in Bezug genommene Ausgabe der Norm.

Der Zusammenhang der zitierten Normen mit den entsprechenden Deutschen Normen ergibt sich, soweit ein Zusammenhang besteht, grundsätzlich über die Nummer der entsprechenden IEC-Publikation. Beispiel: IEC 60068 ist als EN 60068 als Europäische Norm durch CENELEC übernommen und als DIN EN 60068 ins Deutsche Normenwerk aufgenommen.

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Part 303-2: Communication profile integration –
IEC 61784 CP 3/4, CP 3/5 and CP 3/6
(IEC 62453-303-2:2009)**

Spécification des interfaces des outils
des dispositifs de terrain (FDT) –
Partie 303-2: Intégration des profils
de communication –
CEI 61784 CP 3/4, CP 3/5 et CP 3/6
(CEI 62453-303-2:2009)

Field Device Tool
(FDT)-Schnittstellenspezifikation –
Teil 303-2: Integration von
Kommunikationsprofilen –
Kommunikationsprofile (CP) 3/4, 3/5 und 3/6
nach IEC 61784
(IEC 62453-303-2:2009)

This European Standard was approved by CENELEC on 2009-08-01. 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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, 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 and the United Kingdom.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: Avenue Marnix 17, B - 1000 Brussels

Foreword

The text of document 65E/128/FDIS, future edition 1 of IEC 62453-303-2, prepared by SC 65E, Devices and integration in enterprise systems, of IEC TC 65, Industrial-process measurement, control and automation, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 62453-303-2 on 2009-08-01.

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

The following dates were fixed:

- latest date by which the EN has to be implemented
at national level by publication of an identical
national standard or by endorsement (dop) 2010-05-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2012-08-01

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 62453-303-2:2009 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following note has to be added for the standard indicated:

IEC 61158 NOTE Harmonized in EN 61158 series (not modified).

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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.

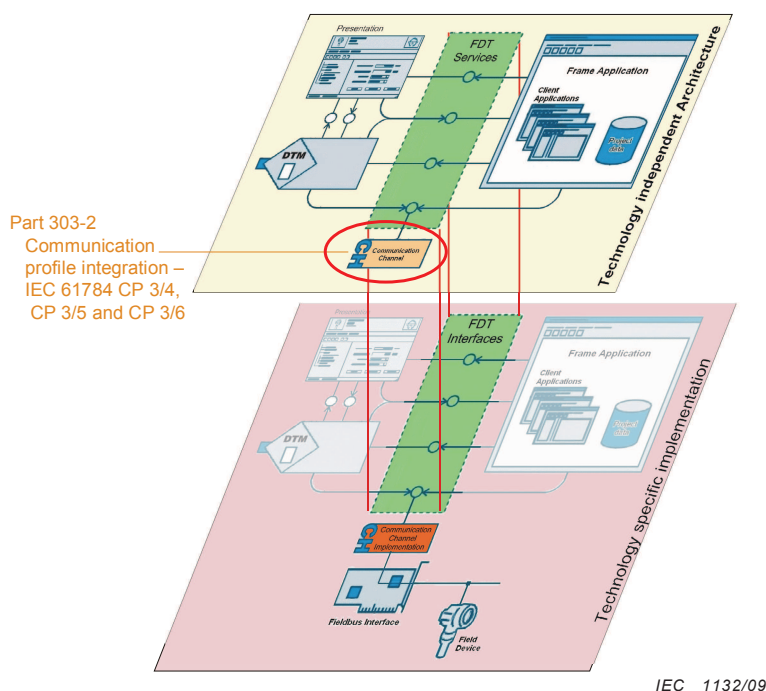


Figure 1 – Part 303-2 of the IEC 62453 series

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.

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-BB92-23B3F92FEB CD	'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
99C3617B-E59A-11DA-9023-0002B3ECDCBE	10BASEFXHD

PhysicalLayer element	Description
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
fdt:vendor	The attribute fdt:DtmDeviceType/VersionInformation/@vendor shall contain the VendorName according to CP 3/4, CP 3/5 and CP 3/6 specification.

Attribute	Description for use in IEC 61784 CP 3/4, CP 3/5 and CP 3/6
	GSDML XPath Expression: "/ISO15745Profile/ProfileBody/DeviceIdentity/@VendorName"
fdt:manufacturerId	The attribute fdt:DtmDeviceType/VersionInformation/@vendor shall contain the VendorName according to the CP 3/4, CP 3/5 and CP 3/6 specification. GSDML XPath Expression: "/ISO15745Profile/ProfileBody/DeviceIdentity/@VendorName"
fdt:deviceTypeInfoInformation	Path to the GSDML file. The attribute contains the full path including the file name. For IEC 61784 CP 3/4, CP 3/5 and CP 3/6 devices, it is mandatory to provide this attribute. Only a parent developed according to IEC 61784 CP 3/4, CP 3/5 and CP 3/6 Annex can handle GSDML information. Thus, it is not necessary to fill this attribute with the GSDML itself, if the parent is FDT 1.2 conformant. The deviceTypeInfoInformation attribute is of type string and shall be used with format shown in the example: Example: file:///c:/myDtm/myGsdFile.xml
fdt:deviceTypeInfoInformationPath	Shall not be used. The GSDML path information is already mandatory in the deviceTypeInfoInformation attribute
fdt:semanticId fdt:applicationDomain	The SemanticIDs follow the different device models that are defined for IEC 61784 CP 3/4, CP 3/5 and CP 3/6 devices. FDT currently supports following models: <ul style="list-style-type: none"> • Profinet IO • PROFIdrive PROFINET IO The applicationDomain is: FDT_PROFINET_IO The semanticId follows the access information of a communication request: The semanticId is: Api.Slot.Subslot.Index.ByteOffset.BitOffset.BitLength Api – Api number Slot – Slot number Subslot – Subslot number Index – Index number ByteOffset – Start byte within the Index BitOffset – Start bit within the Index (range 0-7) BitLength –Length of values in bit These values are numbers based on decimal format without leading '0'. PROFIdrive The applicationDomain is: FDT_PROFINET_PROFIDRIVE According to the PROFIdrive profile, a device (drive unit) may be composed by a number (1-many) of drive objects (DOs). The DOs may have different types. Each DO is uniquely identifiable and manages its own parameters. Each parameter can be uniquely identified by its number (PNU). Each DO has its own number space. A parameter may contain simple data or composed data (e.g. arrays). The data of the device are accessible via a parameter channel (normally Api 0x3A00, Subslot 1, Index 0xB02E and a slot number which is the DO number). The semanticId is: DOdo-id.PNUpnu do-id Drive Object ID pnu ParameterNumber do-id, pnu are based on decimal format without leading '0'