

Field device tool (FDT) interface specification —

Part 302: Communication profile integration —
IEC 61784 CPF 2

National foreword

This British Standard is the UK implementation of EN 62453-302:2009. It is identical to IEC 62453-302:2009.

The UK participation in its preparation was entrusted to Technical Committee AMT/7, Industrial communications: process measurement and control, including fieldbus.

A list of organizations represented on this committee can be obtained on request to its secretary.

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ISBN 978 0 580 62561 9

ICS 25.040.40; 35.100.05; 35.110

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This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 January 2010

Amendments issued since publication

Amd. No.	Date	Text affected
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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 62453-302

October 2009

ICS 25.040.40; 35.100.05; 35.110

English version

**Field device tool (FDT) interface specification -
Part 302: Communication profile integration -
IEC 61784 CPF 2
(IEC 62453-302:2009)**

Spécification des interfaces des outils
des dispositifs de terrain (FDT) -
Partie 302: Intégration des profils
de communication -
CEI 61784 CPF 2
(CEI 62453-302:2009)

Field Device Tool (FDT)-
Schnittstellenspezifikation -
Teil 302: Integration von
Kommunikationsprofilen -
Kommunikationsprofilfamilie (CPF) 2
nach IEC 61784
(IEC 62453-302:2009)

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

Central Secretariat: Avenue Marnix 17, B - 1000 Brussels

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Ref. No. EN 62453-302:2009 E

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Foreword

The text of document 65E/126/FDIS, future edition 1 of IEC 62453-302, 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 62453-302 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 62453-302:2009 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

- | | | |
|----------------------|------|---|
| [2] IEC 61131-3 | NOTE | Harmonized as EN 61131-3:2003 (not modified). |
| [4] IEC/TR 62453-41 | NOTE | Harmonized as CLC/TR 62453-41:2009 (not modified). |
| [5] IEC/TR 62453-502 | NOTE | Harmonized as CLC/TR 62453-502:2009 (not modified). |
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Annex ZA (normative)

Normative references to international publications with their corresponding European publications

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.

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 61158-2	— ¹⁾	Industrial communication networks - Fieldbus specifications - Part 2: Physical layer specification and service definition	EN 61158-2	2008 ²⁾
IEC 61158-3-2	— ¹⁾	Industrial communication networks - Fieldbus specifications - Part 3-2: Data-link layer service definition - Type 2 elements	EN 61158-3-2	2008 ²⁾
IEC 61158-4-2	— ¹⁾	Industrial communication networks - Fieldbus specifications - Part 4-2: Data-link layer protocol specification - Type 2 elements	EN 61158-4-2	2008 ²⁾
IEC 61158-5-2	2007	Industrial communication networks - Fieldbus specifications - Part 5-2: Application layer service definition - Type 2 elements	EN 61158-5-2	2008
IEC 61158-6-2	2007	Industrial communication networks - Fieldbus specifications - Part 6-2: Application layer protocol specification - Type 2 elements	EN 61158-6-2	2008
IEC 61784-1	— ¹⁾	Industrial communication networks - Profiles - Part 1: Fieldbus profiles	EN 61784-1	2008 ²⁾
IEC 61784-2	— ¹⁾	Industrial communication networks - Profiles - Part 2: Additional fieldbus profiles for real-time networks based on ISO/IEC 8802-3	EN 61784-2	2008 ²⁾
IEC 61784-3-2	2007	Industrial communication networks - Profiles - Part 3-2: Functional safety fieldbuses - Additional specifications for CPF 2	EN 61784-3-2	2008
IEC 62026-3	— ¹⁾	Low-voltage switchgear and controlgear - Controller-device interfaces (CDIs) - Part 3: DeviceNet	EN 62026-3	2009 ²⁾
IEC 62453-1	2009	Field device tool (FDT) interface specification - Part 1: Overview and guidance	EN 62453-1	2009
IEC 62453-2	2009	Field device tool (FDT) interface specification - Part 2: Concepts and detailed description	EN 62453-2	2009
ISO/IEC 19501	2005	Information technology - Open Distributed Processing - Unified Modeling Language (UML)	—	—

¹⁾ Undated reference.

²⁾ Valid edition at date of issue.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
ISO 15745-2	2003	Industrial automation systems and integration - – Open systems application integration framework - Part 2: Reference description for ISO 11898-based control systems		–
ISO 15745-3	2003	Industrial automation systems and integration - – Open systems application integration framework - Part 3: Reference description for IEC 61158-based control systems		–

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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 fieldbuses 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 fieldbuses and thus meets the requirements for integrating different kinds of devices into heterogeneous control systems.

Figure 1 shows how IEC 62453-302 is aligned in the structure of the IEC 62453 series.

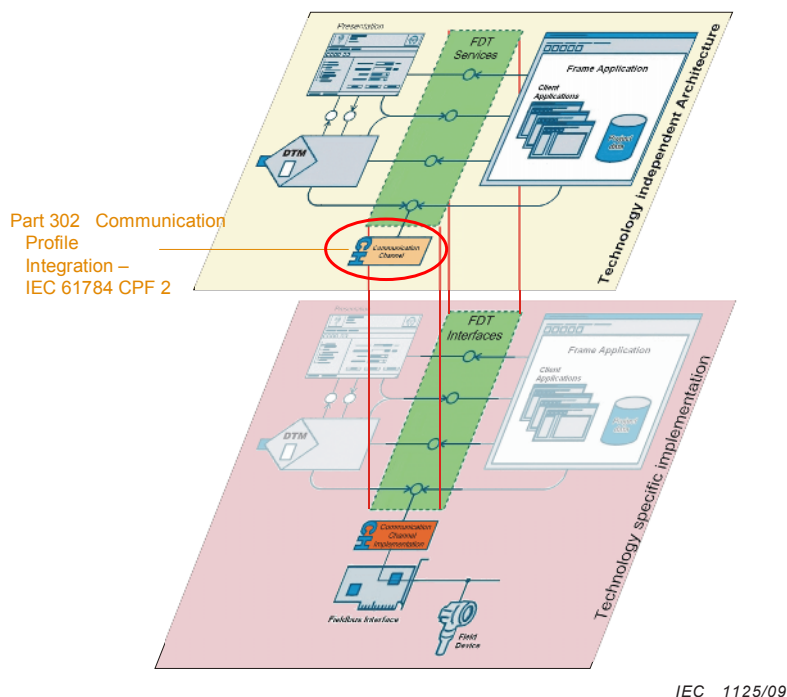


Figure 1 – Part 302 of the IEC 62453 series

FIELD DEVICE TOOL (FDT) INTERFACE SPECIFICATION –

Part 302: Communication profile integration – IEC 61784 CPF 2

1 Scope

Communication Profile Family 2 (commonly known as CIP™¹) defines communication profiles based on IEC 61158-2 Type 2, IEC 61158-3-2, IEC 61158-4-2, IEC 61158-5-2, IEC 61158-6-2, and IEC 62026-3. The basic profiles CP 2/1 (ControlNet™²), CP 2/2 (EtherNet/IP™³), and CP 2/3 (DeviceNet™¹) are defined in IEC 61784-1 and IEC 61784-2. An additional communication profile (CompoNet™¹), also based on CIP™, is defined in [14].

This part of IEC 62453 provides information for integrating the CIP™ technology into the FDT interface specification (IEC 62453-2).

This part of 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 document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 61158-2, *Industrial communication networks – Fieldbus specifications – Part 2: Physical layer specification and service definition*

IEC 61158-3-2, *Industrial communication networks – Fieldbus specifications – Part 3-2: Data-link layer service definition – Type 2 elements*

IEC 61158-4-2, *Industrial communication networks – Fieldbus specifications – Part 4-2: Data-link layer protocol specification – Type 2 elements*

IEC 61158-5-2:2007, *Industrial communication networks – Fieldbus specifications – Part 5-2: Application layer service definition – Type 2 elements*

¹ CIP™ (Common Industrial Protocol), DeviceNet™ and CompoNet™ are trade names of Open DeviceNet Vendor Association, Inc (ODVA). This information is given for the convenience of users of this document and does not constitute an endorsement by IEC of the trade name holder or any of its products. Compliance to this standard does not require use of the trade names CIP™, DeviceNet™ or CompoNet™. Use of the trade names CIP™, DeviceNet™ or CompoNet™ requires permission of Open DeviceNet Vendor Association, Inc.

² ControlNet™ is a trade name of ControlNet International, Ltd. This information is given for the convenience of users of this document 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 trade name ControlNet™. Use of the trade name ControlNet™ requires permission of ControlNet International, Ltd.

³ EtherNet/IP™ is a trade name of ControlNet International, Ltd. and Open DeviceNet Vendor Association, Inc. This information is given for the convenience of users of this document 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 trade name EtherNet/IP™. Use of the trade name EtherNet/IP™ requires permission of either ControlNet International, Ltd. or Open DeviceNet Vendor Association, Inc.

IEC 61158-6-2:2007, *Industrial communication networks – Fieldbus specifications – Part 6-2: Application layer protocol specification – Type 2 elements*

IEC 61784-1, *Industrial communication networks – Profiles – Part 1: Fieldbus profiles*

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

IEC 61784-3-2:2007, *Industrial communication networks – Profiles – Part 3-2: Functional safety fieldbuses – Additional specifications for CPF 2*

IEC 62026-3, *Low-voltage switchgear and controlgear – Controller-device interfaces (CDIs) – Part 3: DeviceNet*

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*

ISO/IEC 19501:2005, *Information technology – Open Distributed Processing – Unified Modeling Language (UML) Version 1.4.2*

ISO 15745-2:2003, *Industrial automation systems and integration – Open systems application integration framework – Part 2: Reference description for ISO 11898-based control systems*

ISO 15745-3:2003, *Industrial automation systems and integration – Open systems application integration framework – Part 3: Reference description for IEC 61158-based control systems*

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.

3.2 Symbols and abbreviated terms

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

CIP™	Common Industrial Protocol	
CP	Communication Profile	[IEC 61784-1]
CPF	Communication Profile Family	[IEC 61784-1]
EDS	Electronic Data Sheet	[ISO 15745]
UML	Unified Modelling Language	[ISO/IEC 19501]

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 behavior.
Usage of “can” or “optional”	Function or behavior may be provided, depending on defined conditions.

4 Bus category

IEC 61784 CPF 2 protocol is identified in the protocolId element of the structured data type 'fdt:BusCategory' by the following unique identifiers, as specified in Table 1.

Table 1 – Protocol identifiers

Identifier value	ProtocolId name	Description
19B91472-EDB9-4e8c-BB61-516EEC79C1C0	'CIP DeviceNet'	Support for CP 2/3 (DeviceNet)
6CD80F51-019D-4e60-AEAC-B10144943B4B	'CIP EthernetIP'	Support for CP 2/2 (EtherNet/IP)
C290CE23-62EA-478c-97F2-97EFEC602E05	'CIP ControlNet'	Support for CP 2/1 (ControlNet)
089BB2BC-B75A-11DB-8314-0800200C9A66	'CIP CompoNet'	Support for CompoNet

5 Access to instance and device data

The services InstanceDataInformation and DeviceDataInformation shall provide access at least to all parameters defined in the Params section of the EDS.

6 Protocol specific behavior

IEC 61784 CPF 2 protocol has specific requirements related to configuration of fieldbus masters.

It is very important to keep both data provider and consumer synchronized. Therefore data provider shall be informed if the provided data has been modified. For instance, in case the provided data is modified by the scanner/master DTM, then the slave/adaptor DTM shall be provided with the new data set.

NOTE For a description of data exchange between DTMs, see 6.3 of IEC 62453-2 (Configuration of fieldbus master or communication scheduler).

7 Protocol specific usage of general data types

Table 2 shows how general data types, defined in IEC 62453-2 within the namespace 'fdt', are used with IEC 61784 CPF 2 devices.

According to IEC 62453-2, at least one set of semantic information (one per supported fieldbus protocol) shall be provided for each accessible data object, using the 'SemanticInformation' general data type. The corresponding data type 'applicationDomain' shall have the value "FDT_CIP" and the data type 'semanticId' shall have an appropriate value, as specified in Table 2).