IEC TS 62453-53-31

Edition 1.0 2025-03

TECHNICAL SPECIFICATION

Field Device Tool (FDT) Interface Specification –
Part 53-31: Communication implementation for CLI and HTML – IEC 61784 CP 3/1 and CP 3/2

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FIELD DEVICE TOOL (FDT) INTERFACE SPECIFICATION –

Part 53-31: Communication implementation for CLI and HTML – IEC 61784 CP 3/1 and CP 3/2

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IEC TS 62453-53-31 has been prepared by subcommittee 65E: Devices and integration in enterprise systems, of IEC technical committee 65: Industrial-process measurement, control and automation. It is a Technical Specification.

The text of this Technical Specification is based on the following documents:

Draft	Report on voting
65E/1110/DTS	65E/1161/RVDTS

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this Technical Specification is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

A list of all parts in the IEC 62453 series, published 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 document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

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INTRODUCTION

This part of IEC 62453 is an interface specification for developers of Field Device Tool (FDT) 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 Device Type Manager (DTM), 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 kind of fieldbuses and thus meets the requirements for integrating different kinds of devices into heterogeneous control systems.

Figure 1 shows how this part of the IEC 62453-53-xy series is aligned in the structure of the IEC 62453 series.

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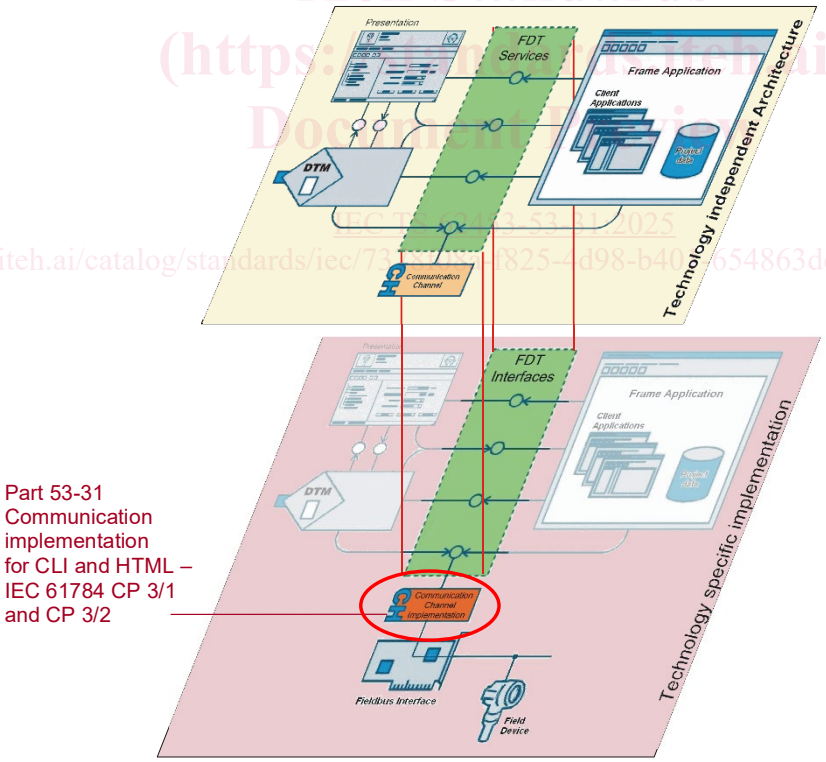

Figure 1 – Relation of IEC TS 62453-53-31 to the IEC 62453 series

FIELD DEVICE TOOL (FDT) INTERFACE SPECIFICATION –

Part 53-31: Communication implementation for CLI and HTML – IEC 61784 CP 3/1 and CP 3/2

1 Scope

This part of the IEC 62453-53-xy series, which is a Technical Specification, provides information for integrating the PROFIBUS[1] technology into the CLI-based implementation of FDT interface specification (IEC TS 62453-43).

This document specifies implementation of communication and other services based on IEC 62453-303-1.

This document neither contains the FDT specification nor modifies it.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

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IEC 61158 (all parts), *Industrial communication networks – Fieldbus specifications*

IEC 61784 (all parts), *Industrial communication networks – Profiles*

IEC 62453-1, *Field device tool (FDT) interface specification – Part 1: Overview and guidance*

IEC 62453-2, *Field device tool (FDT) interface specification – Part 2: Concepts and detailed description*

IEC TS 62453-43, *Field device tool (FDT) interface specification – Part 43: Object model integration profile – CLI and HTML*

IEC 62453-303-1, *Field device tool (FDT) interface specification – Part 303-1: Communication profile integration – IEC 61784 CP 3/1 and CP 3/2*

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[1] PROFIBUS™ is a trade name of the non-profit organization PROFIBUS Nutzerorganisation e.V. (PNO). 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 document does not require use of the registered logos for PROFIBUS™. Use of the registered logos for PROFIBUS™ requires permission of PNO.

3 Terms, definitions, abbreviated terms and conventions

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 62453-1, IEC 62453-2, IEC TS 62453-43, and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

3.1.1
bus interface module
module of a field device that provides the connection to the fieldbus

3.1.2
CP 3/1
Communication profile of PROFIBUS DP, featuring asynchronous transmission, RS-485 (ANSI TIA/EIA RS-485-A), optional RS-485-IS, plastic fiber, glass multi mode fiber or glass single mode fiber and PCF fiber

3.1.3
CP 3/2
Communication profile of PROFIBUS PA, featuring synchronous transmission, Manchester coded, Bus Powered (MBP), optional intrinsically safe (MBP-IS) and lower power (MBP-LP)

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3.1.4
Master Class 1
master with control capability

Note 1 to entry: In a DP-V0 environment, depending on the situation, the underlying master device may have either Master Class 1 (DPM1) functionality or Master Class 2 (DPM2) functionality. A Class 1 master can write output data to a device and control data exchange.

3.1.5
Master Class 2
master without control capability

Note 1 to entry: In a DP-V0 environment, depending on the situation, the underlying master device may have either Master Class 1 (DPM1) functionality or Master Class 2 (DPM2) functionality. A Class 2 master can only read the output data.

3.2 Abbreviated terms

ANSI	American National Standards Institute (http://www.ansi.org)
BIM	Bus Interface Module
CFG	Configuration data used during initialization of PROFIBUS slave device
DCS	Distributed Control System
DP	Decentralized Peripherals
EIA	Electronic Industries Alliance
FDL	Fieldbus Data Link layer
FMA	Fieldbus Management layer
FMS	Fieldbus Message Specification
GSD	General Station Description
MBP	Manchester coded Bus Powered
PND	PROFIBUS Network Data
I&M	Identification and maintenance functions
PA	Process Automation
PCF	Polymer Clad Fibre
PROFIBUS	Process FieldBus
RS	Radio Sector / Recommended Standard
TIA	Telecommunications Industry Association
UML	Unified Modeling Language

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3.3 Conventions

3.3.1 Data names and references to datatypes

The conventions for naming and referencing of datatypes are explained in IEC TS 62453-43.

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3.3.2 Further conventions

Further conventions are:

Convention	Indicates
<MethodName>	Angle brackets are used to indicate a reference to an asynchronous method.

3.3.3 Use of UML

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

4 Bus category

IEC 61784 CP 3/1 and IEC 61784 CP 3/2 protocols are identified in the attribute ProtocolId of the BusCategory element by the identifiers, as specified in IEC 62453-303-1.

The supported PhysicalLayer are identified by the Identifier values as specified in IEC 62453-303-1.

The supported DataLinkLayer are identified by the Identifier values as specified in IEC 62453-303-1.

5 Access to instance, device and process data

5.1 General

The minimum set of data provided by a DTM shall be:

- All device parameters of the Physical Block and Out value of the Function Blocks shall be exposed via the data interfaces (PROFIBUS PA devices).
- All process values available for the device shall be modelled as ProcessData including the ranges and scaling if applicable.
- All network configuration related parameters shall be exposed in NetworkData (see Clause 8).

5.2 IO signals provided by DTM

A DTM shall provide IO signal information for the device using the IProcessData interface. The IO signals describe datatype and address parameters of process data as detailed in Clause 10.

5.3 Data interfaces

5.3.1 General

Via the interfaces IDeviceData and IInstanceData all device specific parameters shall be exposed.

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5.3.2 Mapping of PROFIBUS datatypes to FDT datatypes

PROFIBUS uses datatypes as specified in the IEC 61158 series for the transmission on the fieldbus. The FDT interfaces IDeviceData and IInstanceData use .NET datatypes, while PLC applications use datatypes defined in IEC 61131-3. Hence a mapping between these three type systems is defined in Table 1.

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Table 1 – Mapping of datatypes

PROFIBUS datatype	FDT datatype	IEC 61131 datatype
Bit information		
Boolean	BooleanValue	BOOL
Unsigned8	BinaryBitArrayValue[8]	BYTE
Unsigned16	BinaryBitArrayValue[16]	WORD
Unsigned32	BinaryBitArrayValue[32]	DWORD
Numeric information with and without sign		
Integer8	SignedByteValue	SINT
Integer16	IntValue	INT
Integer32	LongValue	DINT
Unsigned8	ByteValue	USINT
Unsigned16	UIntValue	UINT
Unsigned32	ULongValue	UDINT
Float32	FloatValue	REAL
Float64	DoubleValue	LREAL
Printable characters (e.g. text)		
Visible String	StringValue	STRING
Unicode String	StringValue	WSTRING