

INTERNATIONAL STANDARD



Field device integration (FDI®) –
Part 1: Overview

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FIELD DEVICE INTEGRATION (FDI®) –

Part 1: Overview

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as “IEC Publication(s)”). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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IEC 62769-1 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 an International Standard.

This third edition cancels and replaces the second edition published in 2021. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) added references to Part 6-100 and Part 6-200 (technology mapping for .NET and HTML5);
- b) updated Subclause 8.3.1: major version, minor version and revision shall be written as two-digit numbers;
- c) added reference to new Part 8 and FDI[®] OPC UA Server Facet.

The text of this International Standard is based on the following documents:

Draft	Report on voting
65E/854/CDV	65E/927/RVC

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 International Standard 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 62769 series, published under the general title *Field device integration (FDI[®])*, 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 "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

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INTRODUCTION

The IEC 62769 series has the general title *Field Device Integration (FDI)* and the following parts:

- Part 1: Overview
- Part 2: FDI Client
- Part 3: FDI Server
- Part 4: FDI Packages
- Part 5: FDI Information Model
- Part 6: FDI Technology Mapping
- Part 7: FDI Communication Devices
- Part 100: Profiles — Generic Protocol Extensions
- Part 101-1: Profiles — Foundation Fieldbus H1
- Part 101-2: Profiles — Foundation Fieldbus HSE
- Part 103-1: Profiles — PROFIBUS
- Part 103-4: Profiles — PROFINET
- Part 109-1: Profiles — HART and WirelessHART
- Part 115-2: Profiles — Protocol-specific Definitions for Modbus RTU
- Part 150-1: Profiles — ISA 100.11a

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FIELD DEVICE INTEGRATION (FDI®) –

Part 1: Overview

1 Scope

This part of IEC 62769 describes the concepts and overview of the Field Device Integration (FDI®¹) specifications. The detailed motivation for the creation of this technology is also described (see 4.1). Reading this document is helpful to understand the other parts of this multi-part standard.

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.

IEC 61804 (all parts), *Devices and integration in enterprise systems – Function Blocks (FB) for process control and Electronic Device Description Language (EDDL)*

IEC 61804-3, *Devices and integration in enterprise systems – Function blocks (FB) for process control and electronic device description language (EDDL) – Part 3: EDDL syntax and semantics*

IEC 61804-4, *Devices and integration in enterprise systems – Function blocks (FB) for process control and electronic device description language (EDDL) – Part 4: EDD interpretation*

IEC 62453 (all parts), *Field device tool (FDT) interface specification*

IEC 62541 (all parts), *OPC Unified Architecture*

IEC TR 62541-1, *OPC Unified Architecture – Part 1: Overview and concepts*

IEC 62541-3, *OPC Unified Architecture – Part 3: Address Space Model*

IEC 62541-4, *OPC Unified Architecture – Part 4: Services*

IEC 62541-5, *OPC Unified Architecture – Part 5: Information Model*

IEC 62541-100, *OPC Unified Architecture – Part 100: Device Interface*

IEC 62769-2, *Field Device Integration (FDI®) – Part 2: Client*

¹ FDI® is a registered trademark of the non-profit organization Fieldbus Foundation, 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 does not require use of the trade name. Use of the trade name requires permission of the trade name holder.

IEC 62769-3, *Field Device Integration (FDI®) – Part 3: Server*

IEC 62769-4:2023, *Field Device Integration (FDI®) – Part 4: FDI® Packages*

IEC 62769-5:2023, *Field Device Integration (FDI®) – Part 5: FDI® Information Model*

IEC 62769-6:2023, *Field Device Integration (FDI®) – Part 6: FDI® Technology Mappings*

IEC 62769-7, *Field Device Integration (FDI®) – Part 7: Communication Devices*

IEC 62769-8, *Field Device Integration (FDI®) – Part 8: EDDL to OPC-UA Mapping*

ISO/IEC 11578, *Information technology – Open Systems Interconnection – Remote Procedure Call (RPC)*

3 Terms, definitions, abbreviated terms and ~~conventions~~ acronyms

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC TR 62541-1, IEC 62541-3, IEC 62541-4, IEC 62541-5, IEC 62541-100 and the following apply.

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

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

3.1.1

Field Device Integration

FDI®

Device Integration and Device Management Technology, combining base concepts and technology aspects of the Electronic Device Description Language (EDDL) according to IEC 61804 series and Field Device Tool (FDT®) according to IEC 62453 series, as well as in IEC 62541-1 (OPC UA)

Note 1 to entry: The combination of those different proven technologies ensures a secure life-cycle and the ability to address all challenges of Device Integration and Device Management in a scalable manner.

3.1.2

Action

procedure that requires collaboration between an FDI® Client and an FDI® Server

3.1.3

Business Logic

descriptive element of an FDI® Package that specifies the device specific behaviour and/or mapping logic for a Nested Communication

3.1.4

Business Logic Interface

interface through which Business Logic is integrated with the Information Model

3.1.5

Communication Device

physical device that provides access to networks and devices

Note 1 to entry: Gateways and routers are examples of Communication Devices.

3.1.6**Connection Point**

~~logical representation of a connection of a communication end point to a communication network~~

3.1.6**Device Access Services**

set of services through which a User Interface Plug-in accesses the Information Model of an FDI® Server

3.1.7**Device Definition**

required element of an FDI® Package that provides the core definition of a device

3.1.8**Device Instance**

representation of a specific device in the Information Model of an FDI® Server

3.1.9**Device Tool**

standalone application that contains both an FDI® Client and an FDI® Server

3.1.11**Device Topology**

~~arrangement of communication networks and devices that forms a network~~

3.1.10**Device Type**

representation of a type of device in the Information Model of an FDI® Server

3.1.11**FDI® Client**

software component that uses the Information Model, interprets User Interface Descriptions, and hosts User Interface Plug-ins

3.1.12**FDI® Communication Server**

OPC UA server that is used by an FDI® Server to access non-native networks

3.1.13**FDI® Package**

collection of components that provide all the information necessary to integrate a type of device into a system

3.1.14**FDI® Server**

software component that implements the Information Model, executes Business Logic, and communicates with device via Native Communication and/or Nested Communication

3.1.15**FDI® Technology Version**

version number that identifies to a specific revision of the overall FDI® technology

3.1.16**Hosting Services**

set of services through which a User Interface Plug-in interacts with an FDI® Client

3.1.17**Information Model**

set of objects, variables, and methods exposed by an FDI[®] Server

3.1.18**Modular Device**

device that is composed of one or more subdevices

3.1.19**Native Communication**

communication with devices that are an integral part of the system

3.1.20**Nested Communication**

communication with devices through a series of Communication Devices

~~**3.1.23**~~~~**Offline Data**~~

~~device information maintained by an FDI Server that is stored in an FDI Server-specific database~~

~~**3.1.24**~~~~**Online Data**~~

~~device information maintained by an FDI Server that is retrieved from a physical device~~

3.1.21**User Interface Services****UI Services**

set of services through which a User Interface Plug-in accesses the operating system

3.1.22**platform User Interface Services**

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platform UI Services

user interface services provided natively by the operating system

3.1.23**User Interface Description****UID**

descriptive element of an FDI[®] Package that is used by an FDI[®] Client to render user interface

3.1.24**UID interpreter****User Interface Description interpreter**

software component in an FDI[®] Client that renders User Interface Descriptions and invokes Actions

3.1.25**User Interface Plug-in****UIP**

executable element of an FDI[®] Package that is executed by an FDI[®] Client

3.1.26**UIP Services****User Interface Plug-in Services**

set of services through which an FDI[®] Client interacts with a User Interface Plug-in

3.2 IEC TR 62541-1 terms (OPC UA)

For the purposes of this document, the following terms and definitions given in IEC TR 62541-1 apply.

AddressSpace
Attribute
Client
Method
Node
NodeClass
Notification
Object
ObjectType
Reference
ReferenceType
Server
Service Set
Session
Subscription
Variable

3.3 IEC 62541-3 (OPC UA) terms

For the purposes of this document, the following terms and definitions given in IEC 62541-3 (OPC UA) apply.

Aggregates
ArrayDimensions
AuditEvent
AuditUpdateMethodEvent
BrowseName
ByteString
DataType
DataVariable
Folder
HasComponent
HasProperty
HasSubType
HasTypeDefinition
ModellingRule
NodeId
Property
UserAccessLevel
UserExecutable
Value
ValueRank

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3.4 IEC 62541-4 (OPC UA) terms

For the purposes of this document, the following terms and definitions given in IEC 62541-4 (OPC UA) apply.

AddReferences
Browse
BrowseNext
Call
CreateSession
NodeManagement
Read
Request Header
Response Header
StatusCode
TranslateBrowsePathsToNodeIds
UserIdentityToken
Write

3.5 IEC 62541-5 (OPC UA) terms

For the purposes of this document, the following terms and definitions given in IEC 62541-5 apply.

BaseObjectType
PropertyType

3.6 IEC 62541-100 (OPC UA for Devices) terms

For the purposes of this document, the following terms and definitions given in IEC 62541-100 apply.

Block
Device
DeviceType
Parameter

3.7 Abbreviated terms and acronyms

DTM	Device Type Manager
EDD	Electronic Device Description
EDDL	Electronic Device Description Language
FB	Function blocks
FDI [®]	Field Device Integration
FDT ^{®2}	Field Device Tool (see IEC 62453 series)
GUI	Graphical User Interface
n/a	Not applicable

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