IEC 62769-100

Edition 2.0   2023-04
REDLINE VERSION

INTERNATIONAL STANDARD

colour
inside

Field device integration (FDI®) –
Part 100: Profiles – Generic Protocols

IEC 62769-100:2023-04 RLV(en)

About the IEC
The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications
The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

IEC publications search - webstore.iec.ch/advsearchform
The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee, …). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished
Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

IEC Customer Service Centre - webstore.iec.ch/csc
If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: sales@iec.ch.

IEC Products & Services Portal - products.iec.ch
Discover our powerful search engine and read freely all the publications previews. With a subscription you will always have access to up to date content tailored to your needs.

Electropedia - www.electropedia.org
The world's leading online dictionary on electrotechnology, containing more than 22 300 terminological entries in English and French, with equivalent terms in 19 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IEC 62769-100:2023
https://standards.iteh.ai/catalog/standards/iec/ce29326d-6658-40f7-84f8-c6dd225f81d2/iec-62769-100-2023

![IEC logo]

IEC 62769-100

INTERNATIONAL STANDARD

colour
inside

Field device integration (FDI®) –
Part 100: Profiles – Generic Protocols

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

Warning! Make sure that you obtained this publication from an authorized distributor.

® Registered trademark of the International Electrotechnical Commission

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

FIELD DEVICE INTEGRATION (FDI®) –

Part 100: Profiles – Generic Protocols

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.

2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.

3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.

4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.

5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.

6) All users should ensure that they have the latest edition of this publication.

7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.

8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.

9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

This redline version of the official IEC Standard allows the user to identify the changes made to the previous edition IEC 62769-100:2020. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

IEC 62769-100 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 second edition cancels and replaces the first edition published in 2020. This edition constitutes a technical revision.

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

a) added ExtendedDeviceRevision implementing the FDI® Version scheme and the method ScanExtended.

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

Draft	Report on voting
65E/865/CDV	65E/922/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.

IMPORTANT – The "colour inside" logo on the cover page of this document indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

FIELD DEVICE INTEGRATION (FDI®) –

Part 100: Profiles – Generic Protocols

1 Scope

This part of IEC 62769 specifies an FDI®[1] profile of IEC 62769 for Generic Protocols. That means that all interfaces are defined and a host can add support for more protocols without changing its implementation. Nevertheless, there are some protocol specific definitions (PSD) that need to be specified per protocol using this profile. Annex C specifies what PSD need to be defined per protocol so that FDI® Device Packages, FDI® Communication Packages for Gateways and FDI® Communication Servers, FDI® Communication Server, Gateways and Devices supporting such a protocol can work together in a host not aware about this specific protocol.

NOTE   A host not using FDI® Communication Server but a proprietary mechanism for communication ~~defines~~ needs to define its own means to deal with this profile to support several protocols without changing its implementation. This is specific to the proprietary way how the communication driver is bound to the host.

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 62541-100:2015, *OPC Unified Architecture – Part 100:* ~~OPC UA for Devices~~ *Device Interface*

IEC 62769-1*, Field Device Integration (FDI®) – Part 1: Overview*

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

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

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

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

_____

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

IEC 62769-151-1, *Field Device Integration (FDI®) – Part 151-1: Profiles – OPC UA*

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 61804 series, IEC 62541-100, IEC 62769-2, IEC 62769-3, IEC 62769-4, IEC 62769-5, and IEC 62769-7 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

3.2 Abbreviated terms and acronyms

EDD	Electronic Device Description
EDDL	Electronic Device Description Language (see IEC 61804 series)
FDI~~TM~~®	Field Device Integration ~~TM~~[2]
FCG	FieldComm Group
PSD	Protocol-specific definitions
XML	Extensible markup language (see ~~FCG TS62769-100, Edition 1.1, Field Device Integration – Part 100: Profiles – Generic Protocols, available at https://fieldcommgroup.org)~~ REC-xml-20081126)

4 Conventions

4.1 EDDL syntax

This part of IEC 62769 specifies content for the EDD component that is part of FDI® Communication Packages. The specification content using EDDL syntax uses the font `Courier New`. The EDDL syntax is used for method signature, variable, data structure and component declarations.

4.2 XML syntax

XML syntax examples use font `Courier New`. The XML syntax is used to describe XML document schema.

Example: `<xs:simpleType name="ExampleType">`

4.3 Capitalizations

~~The IEC 62769 series uses capitalized terms to emphasize that these terms have an FDI-specific meaning.~~

_____

[2] ~~Field Device Integration (FDI) is the trademark of a product supplied by FieldComm Group. This information is given for the convenience of users of this document and does not constitute an endorsement by IEC of the product named. Equivalent products may be used if they can be shown to lead to the same results.~~

Some of these terms using an ~~initialism~~ acronym as a prefix for example

- FDI® Client, or
- FDI® Server.

Some of these terms are compound terms such as:

- Communication Servers, or
- Profile Package.

Parameter names or attributes are concatenated to a single term, where the original terms start in this term with a capital letter such as:

- ProtocolSupportFile, or
- ProtocolType.

Parameter names or attributes can also be constructed by using an underscore character to concatenate two or more terms such as:

- DEVICE_REV, or
- DEVICE_MODEL.

5 Profile for Generic Protocols

5.1 General

This profile document to the FDI® specification in IEC 62769 specifies the protocol specifics needed for FDI® Packages describing Communication Servers, Gateways and Devices.

~~For Communication Servers, this document defines protocol specifics as these need to be considered in the Information Model hosted by the Communication Servers.~~

This document also defines protocol specifics for Communication Servers as these need to be considered in the Communication Servers hosted Information Model.

Annex B defines the XML schema for Direct Access Services.

5.2 Catalog profile

5.2.1 Protocol support file

5.2.1.1 FDI® Device Package

Protocol specific attachments are mentioned in the Package Catalog as defined in IEC 62769-5. As this document defines a profile generically suitable for many protocols, it does not define requirements for any protocol specific attachments. However, it does also not prevent the usage of protocol specific attachments. The PSD~~s (see Annex C)~~ define the requirements on the need of ProtocolSupportFiles for a specific protocol. However, the configuration of a device using an FDI® Device Package shall not require the usage of a protocol specific attachment. Table 1 specifies the parameters of the ProtocolSupportFile in the FDI® Device Package in case one or many are provided.

Table 1 – ProtocolSupportFile for FDI® Device Packages

Parameter	Description
Content Type	text/plain
Root Namespace	empty
Source Relationship	http://FDI-cooperation.com/2010/relationship/attachment-protocol
Filename	Not defined

5.2.1.2   FDI® Communication Packages

The same rules as for FDI® Device Packages apply.

5.2.2   CommunicationProfile definition

IEC 62769-4 defines a CommunicationProfileT string for the Catalog XML schema. The string is protocol specific and defined as ProfileIdentifier in the PSD (see Annex C).

5.2.3   Profile device

A Profile Package shall provide the catalog values for profile devices, enabling the FDI® Server to leverage a generic device description, if a specific one is not available. The definitions in Table 2 focus on catalog content that is vendor independent.

Table 2 – Catalog values for profile devices

Element	Attribute	Content
PackageType	—	Profile
Manufacturer	—	Empty
DeviceModel	—	The format of the DeviceModel is protocol specific and details on the format are defined in the PSD (see Annex C). In order to assign a scan result with a Profile Package, the ProfileId of the scan result shall be mapped to the DeviceModel of the Profile Package.

5.2.4   Protocol version information

IEC 62769-4 defines an element type named InterfaceT for the Catalog XML schema. The element type InterfaceT contains an element named Version which is supposed to provide version information about the applied communication protocol profile. The value shall follow the IEC 62769-4 defined version information schema defined in the element type VersionT. The PSD (see Annex C) define the mapping of versions of a specific protocol to this field.

5.3   Associating a Package with a device

5.3.1   Device type identification mapping

The purpose of device type identification mapping is to enable FDI® Host systems to compare the scan result against the topology representation in the Information Model. FDI® Host systems shall also be enabled to determine the FDI® Device Package that fits for a device entry contained in the scan result. This will enable the user of an FDI® Host system to synchronize the Information Model with the actual installation.

The Communication Server implemented scan service (defined in 5.6.1.7) provides the scan result through an XML document (the schema is defined in Clause A.5).

The Gateway implemented scan service (defined in 5.6.2.7) provides the scan result by means of the Information Model that contains data structures created from EDD content as specified in 5.6.2.7.

Common for both ways of presenting the scan result is that scan results contain device type identification and device instance identification.

FDI® Host systems comparing the actual network topology configuration against the topology representation in the Information Model shall be enabled to handle the following situations:

a) The physical Device instance identified at a specific device address is not logically present in the Information Model (as Instance): Enable the FDI® Host system to find the appropriate FDI® Device Package according to the device catalog information.

b) The physical Device instance identified by the device address is logically present in the Information Model (as Instance): Enable the FDI® Host system to compare device type information presented in scan result (see the identification in Clause A.5) and the device type specific information of the Instance present in the Information Model.

The FDI® Device Package contains device type identification information that can be compared to scan result based on the Catalog Schema in IEC 62769-4 defining the XML (simple) element types "DeviceModel" and "Manufacturer". Both types are used in the (complex) element types "Protocol" and "RegDeviceType".

As a result of the FDI® Package deployment, the FDI® Package information is then present in the Information Model as the specified FunctionalGroup Identification containing SerialNumber and Tag (see 5.4.3).

The mapping between different device identification data sources is described in Table 3. Since scan results provided by the Communication Server or Gateway can convey data that is produced by the device (firmware), the device type identification mapping shall be supported by providing corresponding data in the FDI® Device Package contained Catalog and Information Model.

Table 3 – Device identification information mapping

FDI® Device Package	Information Model	Communication Server provided scan result	Gateway provided scan result
Catalog specified type Manufacturer	FunctionalGroup: Identification Browse Name: Manufacturer	Element (path): ConnectionPoint/Identification Attribute: Manufacturer	COLLECTION ConnectionPoint. Identification: Manufacturer
Catalog specified type DeviceModel	FunctionalGroup: Identification Browse Name: DeviceModel	Element (path): ConnectionPoint/Identification Attribute: DeviceModel	COLLECTION ConnectionPoint. Identification. DeviceModel

Since not all protocols that are intended to be used with this profile for Generic Protocols might support a mandatory discovery mechanism allowing to identify the type of device (Manufacturer and DeviceModel), the scan results provide the capability to exclude the identification of the device and only provide the address. In that case, some host-specific mechanisms ~~can~~ might be used to assign the desired FDI® package to the device, e.g., by user interaction.

Since some protocols ~~do~~ might not even have mandatory capabilities to identify if there is a device at all for a specific protocol address hosts should provide the capability ~~for~~ that some users ~~to~~ can add devices by manually specifying address information.

5.3.2 Device type revision mapping

IEC 62769-4 envisions a concept that allows to determine the compatibility between an FDI® Device Package and a Device. IEC 62769-4 specifies a life cycle management process bearing on a single version information provided for the entire device. This is captured in the DeviceRevision (see Table 4). The DeviceRevision might be available as single number or as a string. Mapping of version information is protocol-specific and needs to be defined in the PSD (see Annex C).

Table 4 – Device revision information mapping

FDI® Device Package	Information Model	Communication Server provided scan result	Gateway provided scan result
Catalog specified type ListOfSupportedDeviceRevisions	FunctionalGroup: Identification Browse Name: DeviceRevision	Element (path): ConnectionPoint/Identification Attribute: DeviceRevision	COLLECTION ConnectionPoint. Identification. DeviceRevision

5.4 Information Model mapping

5.4.1 ProtocolType definition

In Table 5, a subtype of ProtocolType is defined to identify network communication using this profile.

Table 5 – Protocol type GenericProtocol

Attribute	Value				
BrowseName	GenericProtocol				
IsAbstract	False				
References	**NodeClass**	**BrowseName**	**DataType**	**TypeDefinition**	**ModellingRule**
Subtype of the ProtocolType defined in IEC 62541-100.					
HasProperty	Variable	ProtocolIdentifier	String	PropertyType	Mandatory

The mandatory Variable ProtocolIdentifier defines which concrete protocol is represented using the GenericProtocol type. It shall match the ProtocolIdentifier defined for the CommunicationProfile in 5.2.2. The string is protocol specific and defined as ProfileIdentifier in the PSD (see Annex C).

5.4.2 DeviceType mapping

Each device type inherits the properties of DeviceType. The mapping of the inherited properties from DeviceType is defined in Table 6. Note that only the attributes defined in Annex C and therefore expected by each generic protocol are used. Specific protocols can might provide for example a SoftwareRevsion but since this is not accessible for the host, this profile does not make use of it.

Table 6 – Inherited DeviceType property mapping

Property	Generic Protocol Mapping
SerialNumber	SerialNumber (see Annex C)
RevisionCounter	-1 (not defined)
Manufacturer	String taken from FDI® package catalog (ManufacturerName from PackageT)