SLOVENSKI STANDARD
oSIST prEN IEC 62769-101-2:2018

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Vključitev procesne naprave (FDI) - 101-2. del: Profili - Procesno vodilo sklada HSE

Field Device Integration (FDI) - Part 101-2: Profiles - Foundation Fieldbus HSE

Feldgeräteintegration (FDI) - Teil 101-2: Profile - Foundation Fieldbus HSE

Intégration des appareils de terrain (FDI) - Partie 101-2: Profils - Foundation Fieldbus HSE

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COMMITTEE DRAFT FOR VOTE (CDV)

PROJECT NUMBER: **IEC 62769-101-2 ED2**	
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IEC SC 65E : DEVICES AND INTEGRATION IN ENTERPRISE SYSTEMS	
SECRETARIAT: United States of America	SECRETARY: Mr Donald (Bob) Lattimer
OF INTEREST TO THE FOLLOWING COMMITTEES:	PROPOSED HORIZONTAL STANDARD: ☐ Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.
FUNCTIONS CONCERNED: ☐ EMC ☐ ENVIRONMENT	☐ QUALITY ASSURANCE ☐ SAFETY
☒ SUBMITTED FOR CENELEC PARALLEL VOTING **Attention IEC-CENELEC parallel voting** The attention of IEC National Committees, members of CENELEC, is drawn to the fact that this Committee Draft for Vote (CDV) is submitted for parallel voting. The CENELEC members are invited to vote through the CENELEC online voting system.	☐ NOT SUBMITTED FOR CENELEC PARALLEL VOTING

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TITLE:

Field Device Integration (FDI) - Part 101-2: Profiles - Foundation Fieldbus HSE

PROPOSED STABILITY DATE: 2023

NOTE FROM TC/SC OFFICERS:

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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FIELD DEVICE INTEGRATION (FDI) –

Part 101-1: Profiles – Foundation Fieldbus HSE

FOREWORD

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International Standard IEC 62769-101-1 has been prepared by subcommittee 65E: Devices and integration in enterprise systems, of IEC technical committee 65: Industrial-process measurement, control and automation.

This second edition cancels and replaces the first edition published in 2015. This edition constitutes a technical revision.

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

a) support for generic protocol extension for faster adoption of other technologies;

b) support for Package Developers to build EDDs targeted for today's EDD bases system under a single development tool;

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

FDIS	Report on voting
65E/XX/FDIS	65E/XX/RVD

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

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.

The National Committees are requested to note that for this document the stability date is 2023.

THIS TEXT IS INCLUDED FOR THE INFORMATION OF THE NATIONAL COMMITTEES AND WILL BE DELETED AT THE PUBLICATION STAGE.

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FIELD DEVICE INTEGRATION (FDI) –

Part 101-1: Profiles – Foundation Fieldbus HSE

1 Scope

This part of IEC 62769 specifies the IEC 62769 profile for IEC 61784-1, CP 1/2 (FOUNDATION™ Fieldbus HSE)[1].

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 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*

FCG TS61804 (all parts), *Function blocks (FB) for process control and Electronic Device Description Language (EDDL)*

IEC 62541-100, *OPC Unified Architecture – Part 100: OPC UA for Devices*

IEC 62541-100, *OPC Unified Architecture – Part 100: OPC UA for Devices*

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: FDI Server*

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

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

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

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

IEC 62769-101-1, *Field Device Integration (FDI) – Part 101-1: Profiles – Foundation Fieldbus H1*

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 61784-1, IEC 61784-2, IEC 61804, IEC 62541-100, IEC 62769-2, IEC 62769-3, IEC 62769-4, IEC 62769-5, IEC 62769-6, IEC 62769-7 and IEC 62769-101-1 apply.

[1] FOUNDATION™ Fieldbus is the trade name of the non-profit consortium Fieldbus Foundation. This information is given for the convenience of users of this technical report 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.

3.2 Abbreviated terms

For the purposes of this document, the following abbreviations apply:

CFF	Common File format
CP	communication profile (see IEC 61784-1 or IEC 61784-2)
CPF	communication profile family (see IEC 61784-1 or IEC 61784-2)
EDD	Electronic Device Description (see IEC 61804 series)
FB	function block
IM	Information Model
SMIB	system management information base
VFD	virtual field device

3.3 Conventions

3.3.1 EDDL syntax

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

3.3.2 XML syntax

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

Example: `<xsd:simpleType name="Example">`

4 Profile for CP 1/2 (FOUNDATION™ HSE)

4.1 General

This profile annex specifies the protocol specifics needed for FDI Packages describing communication servers, gateways and devices.

4.2 Catalog profile

4.2.1 Protocol support file

4.2.1.1 Capability file

Each CP 1/2 FDI Device Package shall contain a capability file. The capability file part is described in Table 1.

Table 1 – Capability File part

Parameter	Description
Content Type	txt/plain
Root Namespace	Not applicable
Source Relationship	http://fdi-cooperation.com/2010/relationships/attachment-protocol
Filename	Use file extension .CFH

4.2.2 CommunicationProfile definition

IEC 62769-4 defines a CommunicationProfileT string type for the Catalog XML schema. Table 2 defines the CP 1/2 specific values for this string.

Table 2 – CommunicationProfile definition

CommunicationProfile	Description
foundation_hse	CP 1/2 device type

4.2.3 Profile device

Not supported in this standard.

4.2.4 Protocol version information

IEC 62769-4 defines an element type named InterfaceT for the Catalog XML Schema. Element type InterfaceT contains an element named Version which is supposed to provide version information about the applied communication protocol profile. The value follows the IEC 62769-4 defined version information schema defined in element type VersionT.

The major version part of VersionT shall be set to the ITK_VER parameter. The minor and builds parts shall be set to 0.

EXAMPLE For ITK_VER 5, the value for InterfaceT is 5.0.0.

4.3 Associating a Package with a CP 1/2 device

4.3.1 Device type identification mapping

CP 1/2 device types are uniquely identified by the parameters MANUFAC_ID, DEVICE_TYPE and DEV_REV found in the Resource Block of the function block VFD. These parameters are used to associate a given device instance to an FDI Device Package. These parameters are mapped to the FDI Device Package Catalog according to Table 3.

Table 3 – Device type catalog mapping

Catalog Element	CP Mapping
Manufacturer element of InterfaceT (IEC 62769-4)	MANUFAC_ID String format “0xdddd” where dddd is the MANUFAC_ID number in hexadecimal format.
DeviceModel element of InterfaceT String format “0xdddd” where dddd is the DEVICE_TYPE number in hexadecimal format. (IEC 62769-4)	DEVICE_TYPE String format “0xdddd” where dddd is the DEVICE_TYPE number in hexadecimal format.
DeviceRevision element ListOfSupportedDeviceRevisionsT (IEC 62769-4)	DEV_REV [a] String format “x.0.0” where x is the DEV_REV in decimal format (no leading zeros).
[a] Conditional: Shall be available if the device exposes a Function block VFD.	

4.3.2 Device type revision mapping

Each device type is identified per 4.3.1. A device may also include a parameter COMPATIBILITY_REV from the Resource Block. This parameter specifies the lowest device version (DEV_REV) that a new device can replace while maintaining compatibility with a prior FDI Device Package.

4.4 Information Model mapping

4.4.1 ProtocolType definition

Table 4 defines the ProtocolType used to identify CP 1/2 network communications.

Table 4 – ProtocolType Foundation_HSE definition

Attribute	Value				
BrowseName	Foundation_HSE				
IsAbstract	False				
References	**NodeClass**	**BrowseName**	**DataType**	**TypeDefinition**	**ModellingRule**
Inherits the properties of ProtocolType defined in IEC 62541-100.					

4.4.2 DeviceType mapping

Each device type inherits the properties of DeviceType. The mapping of the inherited properties from DeviceType is defined in Table 5.

Table 5 – Inherited DeviceType property mapping

Property	CP Mapping
SerialNumber	DEV_ID (System Management Information Base)
RevisionCounter	-1 (not defined)
Manufacturer	String obtained from FDI package catalog (ManufacturerName from PackageT)
Model	String obtained from FDI package catalog (Name of DeviceTypeT, which is a localized name)
DeviceManual	entry text string (not supported) [a]
DeviceRevision	DEV_REV (Resource Block) [b]
SoftwareRevision	SOFTWARE_REV (if available, otherwise empty string)
HardwareRevision	HARDWARE_REV (if available, otherwise empty string)
[a] Device manuals are exposed as attachments of the FDI Device Package. [b] Conditional: Shall be available if the device exposes a Function block VFD.	

4.4.3 FunctionalGroup Identification definition

As defined in IEC 62541-100, each device representation in the FDI Server hosted Information Model shall contain a protocol specific FunctionalGroup called Identification. This FunctionalGroup organizes variables found in the Resource Block of the device type instance. The FunctionalGroup Identification for CP 1/2 is defined in Table 6.

Table 6 – Identification parameters

BrowseName	VariableType	Optional/Mandatory
MANUFAC_ID	UInt32	Mandatory
DEV_TYPE	UInt16	Mandatory
DEV_REV	UInt8	Conditional [a]
HARDWARE_REV	String	Optional
SOFTWARE_REV	String	Optional
COMPATIBILITY_REV	UInt8	Optional
CAPABILITY_LEV	UInt8	Optional
ITK_VER	UInt16	Conditional [a]
SIF_ITK_VER	UInt16	Optional
FD_VER	UInt16	Optional
[a] Conditional: Shall be available if the device exposes a Function block VFD.		

4.4.4 BlockType property mapping

CP 1/2 device types are block-oriented according to IEC 62541-100. IEC 62769-5 specifies the mapping of EDDL BLOCK_A elements to block types and instances.

The BLOCK_A maps as a subtype of the topology element BlockType and inherits the properties as per IEC 62541-100. The mapping of the inherited properties of BlockType is specified in Table 7.

Table 7 – Inherited BlockType property mapping

Property	CP Mapping (Block's ParameterSet)
RevisionCounter	ST_REV
ActualMode	MODE_BLK.ACTUAL
PermittedMode	MODE_BLK.PERMITTED
NormalMode	MODE_BLK.NORMAL
TargetMode	MODE_BLK.TARGET

4.4.5 Mapping to Block ParameterSet

The ParameterSet is relative to each Block. The ParameterSet includes the CHARACTERISTICS records of the block that contains all the parameters found in the PARAMETERS, LOCAL_PARAMETERS and LIST_ITEMS.

The browse name of the parameters found in the PARAMETERS and LOCAL_PARAMETERS is the member name in the respective lists. For example, ST_REV is the browse name of the Static Revision parameter. LIST_ITEMS do not have member names; therefore, the browse name of each LIST in the LIST_ITEMS is the item name of the list.

4.5 Topology elements

4.5.1 ConnectionPoint definition

The ConnectionPoint type ConnectionPoint_Foundation_HSE shall be used to identify CP 1/2 network communication and is defined in Table 8. The ConnectionPoint_Foundation_HSE type is a sub type of the abstract type ConnectionPointType defined in IEC 62541-100.

The Address property can be an IPv4 or IPv6 address. For IPv4 addresses, the address shall be stored in the last 4 octets and all other octets shall be set to zero.

The OrdinalNumber property reflects the position of the VFD within the SMIB VFD list. For devices exposing multiple FB VFDs the OrdinalNumber property is mandatory to address the FB VFD. For devices with a single FB VFD the OrdinalNumber property can be omitted. Devices exposed as instances of type DeviceType define their Connection points as components. Hence Devices with multiple FB VFDs shall contain multiple Connection points, one per FB VFD.

Table 8 – ConnectionPointType ConnectionPoint_Foundation_HSE definition

Attribute	**Value**				
BrowseName	ConnectionPoint_Foundation_HSE				
IsAbstract	False				
References	**NodeClass**	**BrowseName**	**DataType**	**TypeDefinition**	**ModellingRule**
Inherits the properties of ConnectionPointType defined in IEC 62541-100.					
HasProperty	Variable	Address	Octet[16]	PropertyType	Mandatory
HasProperty	Variable	OrdinalNumber	Int32	PropertyType	Optional