

INTERNATIONAL STANDARD

NORME INTERNATIONALE



**Field Device Integration (FDI®) –
Part 4: FDI Packages**

**Intégration des appareils de terrain (FDI®) –
Partie 4: Paquetages FDI**



THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2023 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de l'IEC ou du Comité national de l'IEC du pays du demandeur. Si vous avez des questions sur le copyright de l'IEC ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de l'IEC de votre pays de résidence.

IEC Secretariat
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

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 It also gives information on projects, replaced and withdrawn publications.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 preview. 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.

A propos de l'IEC

La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications IEC

Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

Recherche de publications IEC -

webstore.iec.ch/advsearchform

La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études, ...). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

IEC Just Published - webstore.iec.ch/justpublished

Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et une fois par mois par email.

Service Clients - webstore.iec.ch/csc

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: sales@iec.ch.

IEC Products & Services Portal - products.iec.ch

Découvrez notre puissant moteur de recherche et consultez gratuitement tous les aperçus des publications. Avec un abonnement, vous aurez toujours accès à un contenu à jour adapté à vos besoins.

Electropedia - www.electropedia.org

Le premier dictionnaire d'électrotechnologie en ligne au monde, avec plus de 22 300 articles terminologiques en anglais et en français, ainsi que les termes équivalents dans 19 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

INTERNATIONAL STANDARD

NORME INTERNATIONALE



**Field Device Integration (FDI®) –
Part 4: FDI Packages**

**Intégration des appareils de terrain (FDI®) –
Partie 4: Paquetages FDI**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 25.040.40; 35.100.05

ISBN 978-2-8322-6794-3

**Warning! Make sure that you obtained this publication from an authorized distributor.
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.**

CONTENTS

FOREWORD.....	8
1 Scope.....	10
2 Normative references	10
3 Terms, definitions, abbreviated terms and acronyms	11
3.1 Terms and definitions.....	11
3.2 Abbreviated terms and acronyms	12
3.3 Conventions.....	13
4 FDI® Package Model.....	13
4.1 Overview.....	13
4.2 FDI® Package Elements	14
4.2.1 Package Catalog	14
4.2.2 Package Feature Table.....	14
4.2.3 Feature Unit Conversion.....	15
4.2.4 Electronic Device Description	15
4.2.5 User Interface Plug-in.....	15
4.2.6 Attachment	17
4.3 FDI® Package Types	17
4.3.1 FDI® Device Package	17
4.3.2 FDI® Communication Package	18
4.3.3 FDI® UIP Package	18
4.3.4 FDI® Profile Package	19
5 FDI® Package implementation	20
5.1 Packaging technology.....	20
5.2 Use of Open Packaging Conventions	20
5.2.1 Unknown parts.....	20
5.2.2 Invalid parts.....	21
5.2.3 Unknown relationships.....	21
5.2.4 Interleaving.....	21
5.2.5 Core properties	21
5.2.6 Thumbnails.....	21
5.2.7 Digital Signatures	21
5.3 FDI® Package parts.....	21
5.3.1 Package Catalog	21
5.3.2 Package Feature Table.....	22
5.3.3 Electronic Device Description	23
5.3.4 User Interface Plug-in.....	23
5.3.5 Attachments	26
6 FDI® Package versioning	29
6.1 Version scheme	29
6.2 Versioned elements	29
6.3 Version hierarchy.....	30
6.4 UIP compatibility.....	31
7 Digital Signatures and FDI® Registration Certificates	32
7.1 Signed elements and certification documents.....	32
7.2 Signing mechanism.....	33
7.3 FDI® Package Originator, FDI® Registration Authority	34

7.4	FDI® Host behaviour	34
Annex A (normative)	File name conventions	35
A.1	Identification	35
A.2	FDI® Package filename convention	35
Annex B (informative)	FDI® Package creation	37
B.1	General.....	37
B.2	Tools and components	37
B.2.1	Overview	37
B.2.2	FDI® Reference Implementation/Common EDD Engine.....	37
B.2.3	FDI® Package IDE	37
B.2.4	FDI® Device Package Conformance Test Tool	37
B.3	Development.....	37
B.3.1	FDI® Package core development	37
B.3.2	User Interface Plug-in development.....	38
B.3.3	FDI® Package Attachment development.....	38
B.3.4	FDI® Package binding and packaging	38
B.3.5	Conformance Test	39
Annex C (informative)	FDI® Package deployment.....	40
C.1	General.....	40
C.2	Scenarios	40
C.2.1	FDI® Package deployment to PC based client/server systems	40
C.2.2	FDI® Package deployment to an FDI® standalone system	41
Annex D (informative)	Example.....	43
D.1	General.....	43
D.2	Open Packaging Conventions	43
D.2.1	Overview	43
D.2.2	Parts.....	43
D.2.3	Relationships.....	44
D.2.4	OPC Core features	44
D.2.5	OPC additional features.....	45
D.3	Creation and handling of FDI® Packages.....	46
D.4	FDI® Device Package example.....	46
D.4.1	Overview.....	46
D.4.2	User Interface Plug-in.....	51
D.4.3	EDD reference to UIP	53
D.4.4	FDI® Registration Certificate.....	54
Annex E (normative)	FDI® Package Catalog XML Schema.....	55
E.1	Target Namespace.....	55
E.2	Catalog	55
E.3	ClassificationIdT	55
E.4	CommunicationProfileT	55
E.5	CommunicationRoleT	55
E.6	CommunicationServerT	56
E.7	DeviceTypeT.....	56
E.8	FDIRegistrationCert	57
E.9	FDIRegistrationCertT	57
E.10	InterfaceT	58
E.11	ListOfCommunicationProfilesT	59

E.12	ListOfDeviceImagesT	59
E.13	ListOfDeviceTypesT	60
E.14	ListOfDocumentsT	60
E.15	ListOfInterfacesT	61
E.16	ListOfLocalizedStringsT	61
E.17	ListOfProtocolSupportFilesT	62
E.18	ListOfRegDeviceTypesT	62
E.19	ListOfRegistrationsT	62
E.20	ListOfSupportedDeviceRevisionsT	63
E.21	ListOfSupportedUipsT	63
E.22	ListOfUipVariantsT	64
E.23	LocalizedStringT	64
E.24	PackageT	64
E.25	PackageTypeT	65
E.26	PlatformT	66
E.27	RegDeviceTypeT	66
E.28	RegistrationT	67
E.29	RelationshipIdT	67
E.30	String256T	68
E.31	SupportedUipT	68
E.32	UipCatalog	68
E.33	UipStyleT	69
E.34	UipT	69
E.35	UipVariantT	70
E.36	UuidT	71
E.37	VersionSupportedT	71
E.38	VersionT	71
Annex F	(normative) Communication protocol specific profiles	72
Annex G	(informative) FDI® Package life cycle use cases	73
G.1	New device type	73
G.2	Replacement of device	73
G.3	Firmware enhancements	73
G.4	FDI® Package life-cycle policies	74
G.5	FDI® Package update	74
G.6	FDI® Package upgrade	74
G.7	FDI® Package replacement/exchange	74
G.8	FDI® Package uninstallation	75
Annex H	(normative) Health status Method	76
H.1	Background	76
H.2	Device health status model	76
H.3	Standard EDD Method signature	76
H.4	Performance considerations	77
Annex I	(normative) Modular devices	78
I.1	Concept	78
I.2	EDDL usage profile	78
I.3	Processing recommendations	79
I.3.1	Monolithic device with device variants	79
I.3.2	Remote IOs	79

1.3.3	How to identify the top level topology element	79
1.3.4	Packaging details example	79
Annex J (normative)	FDI® Communication Packages for FDI® Communication Server	81
J.1	General	81
J.2	Protocol Support File	81
J.3	CommunicationProfile definition	81
J.4	Profile Device	81
J.5	Protocol version information	81
J.6	Associating a Package with an FDI® Communication Server	81
J.7	Handling of Catalog elements	81
J.8	Example	81
Annex K (normative)	FDI® Profile for EDDs	83
K.1	Overview	83
K.2	Entry point to online handling	83
K.3	Entry point to offline handling	83
K.4	Non-interactive upload and download	83
K.5	Interactive download	83
K.6	Interactive upload	83
K.7	Initial data set	83
K.8	Method GetHealthStatus	84
K.9	Actions	84
K.9.1	Pre- and Post-Read Actions	84
K.9.2	Pre- and Post-Write Actions	84
K.9.3	Refresh Actions on Variables	84
K.9.4	Actions on BIT_ENUMERATION	84
K.10	Shared files	84
Annex L (normative)	FDI® Package Documentation Catalog Schema	85
L.1	Target namespace	85
L.2	ListOfDocumentMetadataT	85
L.3	DocumentMetadataT	85
Annex M (normative)	FDI® Package Feature Table Schema	87
M.1	Target namespace	87
M.2	FeatureTableT	87
M.3	Feature	87
M.4	FeatureProvidedByPackage	87
M.5	Unit Conversion	88
Bibliography	89
Figure 1	– FDI® architecture diagram	10
Figure 2	– FDI® Package Model	13
Figure 3	– Architectural mapping	14
Figure 4	– User Interface Plug-in Reference Model	16
Figure 5	– Multiple FDI® Packages referencing a common UIP	17
Figure 6	– FDI® Device Package	17
Figure 7	– FDI® Communication Package	18
Figure 8	– FDI® UIP Package	19
Figure 9	– FDI® Profile Package	19

Figure 10 – Device Function and Parameter sets (type and profile specific).....	20
Figure 11 – Catalog Element.....	22
Figure 12 – User Interface Plug-in	24
Figure 13 – UIP Catalog	25
Figure 14 – FDI® Registration Certificate	29
Figure 15 – Version hierarchy	30
Figure 16 – UIP version support concept	32
Figure 17 – FDI® Package signing	33
Figure B.1 – Tools used for FDI® Package development	38
Figure D.1 – Parts and relationships in a package	39
Figure D.2 – Creating an FDI® Package with the content files	46
Figure D.3 – FDI® Device Package example	47
Figure D.4 – User Interface Plug-in example (fancytrend.uip)	51
Figure I.1 – Modular device's package	78
Table 1 – UIP Platform Capabilities	16
Table 2 – Package Catalog part.....	22
Table 3 – Package Feature Table part	23
Table 4 – EDD part	23
Table 5 – User Interface Plug-in part	24
Table 6 – UIP Catalog part.....	26
Table 7 – UIP Variant part	26
Table 8 – Image part.....	27
Table 9 – Documentation part.....	27
Table 10 – Documentation Catalog part	27
Table 11 – Protocol Support File part.....	28
Table 12 – FDI® Registration Certificate part.....	28
Table 13 – Versioned elements	30
Table 14 – Influence on FDI® Package version.....	31
Table A.1 – FDI® Package Naming Convention	36
Table D.1 – Examples of standard MIME media types that can be used in FDI® Packages	45
Table D.2 – Examples of FDI®-custom MIME media types that can be used in FDI® Packages.....	45
Table E.1 – Enumerations of CommunicationRoleT.....	56
Table E.2 – Elements of CommunicationServerT	56
Table E.3 – Elements of DeviceTypeT	57
Table E.4 – Elements of FDIRegistrationCertT.....	58
Table E.5 – Elements of InterfaceT	59
Table E.6 – Elements of ListOfCommunicationProfilesT	59
Table E.7 – Elements of ListOfDeviceImagesT.....	60
Table E.8 – Elements of ListOfDeviceTypesT	60
Table E.9 – Elements of ListOfDocumentsT	61
Table E.10 – Elements of ListOfInterfacesT	61

Table E.11 – Elements of ListOfLocalizedStringsT	61
Table E.12 – Elements of ListOfProtocolSupportFilesT	62
Table E.13 – Elements of ListOfRegDeviceTypesT	62
Table E.14 – Elements of ListOfRegistrationsT	63
Table E.15 – Elements of ListOfSupportedDeviceRevisionsT	63
Table E.16 – Elements of ListOfSupportedUipsT	63
Table E.17 – Elements of ListOfUipVariantsT	64
Table E.18 – Attributes of LocalizedStringT	64
Table E.19 – Elements of PackageT	65
Table E.20 – Enumerations of PackageTypeT	65
Table E.21 – Enumerations of PlatformT	66
Table E.22 – Elements of RegDeviceTypeT	67
Table E.23 – Elements of RegistrationT	67
Table E.24 – Elements of SupportedUipT	68
Table E.25 – Enumerations of UipStyleT	69
Table E.26 – Elements of UipT	70
Table E.27 – Elements of UipVariantT	70
Table F.1 – Communication protocol interest groups (alphabetical order)	72
Table G.1 – Device replacement guidelines	73
Table G.2 – Firmware enhancement guidelines	74
Table H.1 – Health status state	76
Table J.1 – Catalog Mapping	81
Table J.2 – Handling of Catalog elements	81
Table L.1 – Elements of ListOfDocumentsMetadataT	85
Table L.2 – Enumerations of DocumentMetadataT	86

INTERNATIONAL ELECTROTECHNICAL COMMISSION

FIELD DEVICE INTEGRATION (FDI®) –**Part 4: FDI® Packages****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.

IEC 62769-4 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 DocumentClass to Package Schema, Description of Feature Table and Documentation Catalog, individual schemas for Feature Table and Package Documentation Catalog, schema for UnitConversion, interactive download to device, and Feature Unit Conversion;
- b) moved DocumentClass to Package Documentation Catalog Schema;
- c) updated Description of Feature Table updated XML schema for Feature Table.

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

Draft	Report on voting
65E/857/CDV	65E/914/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 4: FDI® Packages

1 Scope

This part of IEC 62769 specifies the FDI^{®1} Packages. The overall FDI[®] architecture is illustrated in Figure 1. The architectural components that are within the scope of this document have been highlighted in this figure.

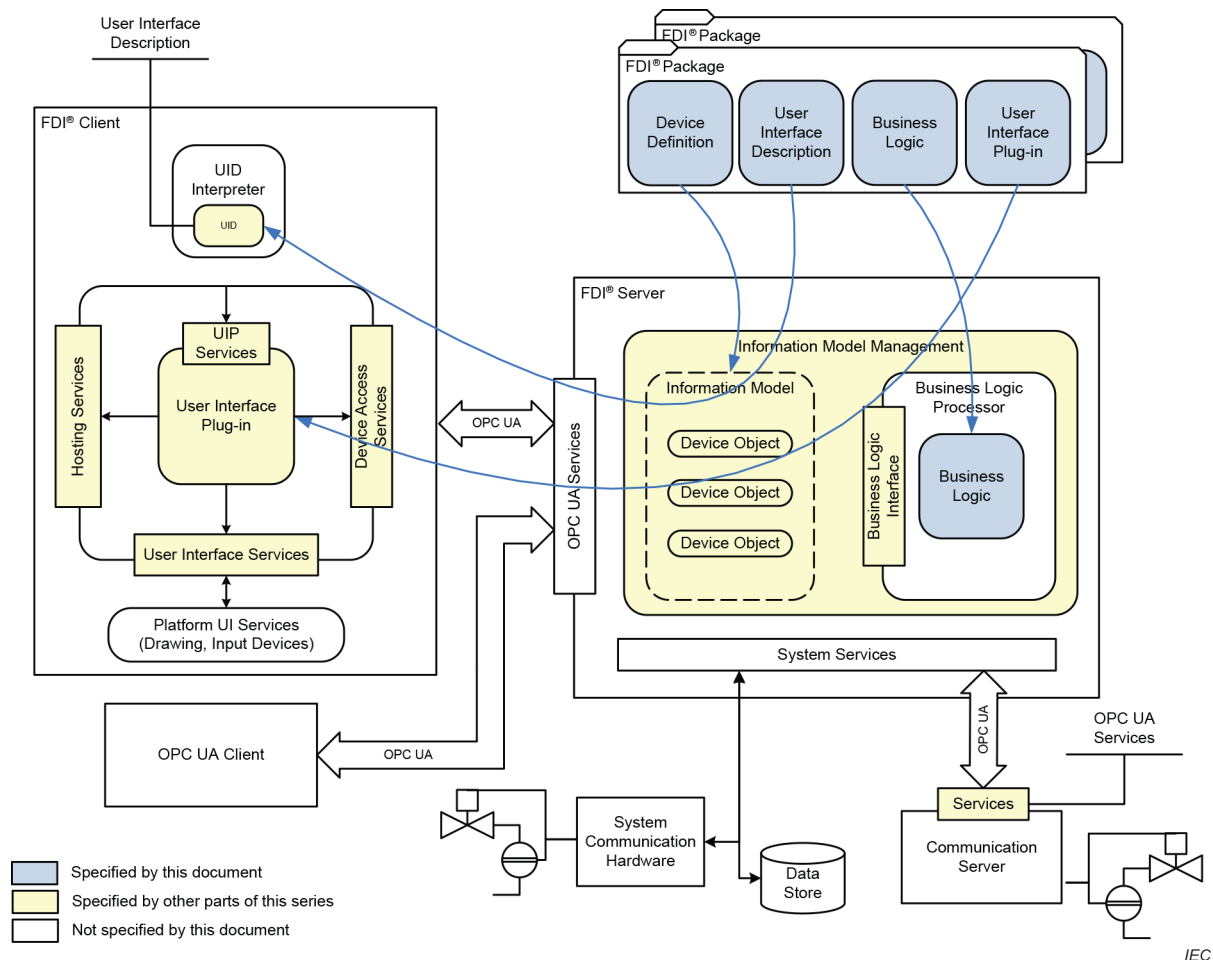


Figure 1 – FDI® architecture diagram

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.

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.