

DIN EN 62453-300

ICS 35.240.50; 35.160

Einsprüche bis 2014-07-23
Ersatzvermerk
siehe unten**Entwurf****Field Device Tool (FDT)-Schnittstellenspezifikation –
Teil 300: Integration von Kommunikationsprofilen –
Kommunikationsprofilfamilie (CPF) x nach IEC 61784
(IEC 65E/336/CDV:2013);
Englische Fassung FprEN 62453-30x:2013**

Field Device Tool (FDT) Interface Specification –
Part 300: Communication Profile Integration –
IEC 61784 CPF x
(IEC 65E/336/CDV:2013);
English version FprEN 62453-30x:2013

Anwendungswarnvermerk

Dieser Norm-Entwurf mit Erscheinungsdatum 2014-05-23 wird der Öffentlichkeit zur Prüfung und Stellungnahme vorgelegt.

Weil die beabsichtigte Norm von der vorliegenden Fassung abweichen kann, ist die Anwendung dieses Entwurfes besonders zu vereinbaren.

Stellungnahmen werden erbeten

- vorzugsweise online im Norm-Entwurfs-Portal des DIN unter www.entwuerfe.din.de bzw. für Norm-Entwürfe der DKE auch im Norm-Entwurfs-Portal der DKE unter www.entwuerfe.normenbibliothek.de, sofern dort wiedergegeben;
- oder als Datei per E-Mail an dke@din.de möglichst in Form einer Tabelle. Die Vorlage dieser Tabelle kann im Internet unter www.din.de/stellungnahme oder für Stellungnahmen zu Norm-Entwürfen der DKE unter www.dke.de/stellungnahme abgerufen werden;
- oder in Papierform an die DKE Deutsche Kommission Elektrotechnik Elektronik Informationstechnik im DIN und VDE (Hausanschrift: Stresemannallee 15, 60596 Frankfurt am Main).

Die Empfänger dieses Norm-Entwurfs werden gebeten, mit ihren Kommentaren jegliche relevanten Patentrechte, die sie kennen, mitzuteilen und unterstützende Dokumentationen zur Verfügung zu stellen.

Ersatzvermerk

Vorgesehen als Ersatz für DIN EN 62453-301:2010-02, DIN EN 62453-302:2010-02, DIN EN 62453-303-1:2010-02, DIN EN 62453-303-2:2010-02, DIN EN 62453-309:2010-02 und DIN EN 62453-315:2010-02

Gesamtumfang 99 Seiten

DKE Deutsche Kommission Elektrotechnik Elektronik Informationstechnik im DIN und VDE

Nationales Vorwort

Die Englische Fassung des europäischen Dokuments FprEN 62453-30x:2013 „Field Device Tool (FDT)-Schnittstellenspezifikation – Teil 300: Integration von Kommunikationsprofilen – Kommunikationsprofilfamilie (CPF) x nach IEC 61784“ (Entwurf in der Umfrage) ist unverändert in diesen Norm-Entwurf übernommen worden.

Die Internationale Elektrotechnische Kommission (IEC) und das Europäische Komitee für Elektrotechnische Normung (CENELEC) haben vereinbart, dass ein auf IEC-Ebene erarbeiteter Entwurf für eine Internationale Norm zeitgleich (parallel) bei IEC und CENELEC zur Umfrage (CDV-Stadium) und Abstimmung als FDIS (en: Final Draft International Standard) bzw. Schluss-Entwurf für eine Europäische Norm gestellt wird, um eine Beschleunigung und Straffung der Normungsarbeit zu erreichen. Dem entsprechend ist das internationale Dokument IEC 65E/336/CDV:2013 „Field Device Tool (FDT) Interface Specification – Part 300: Communication Profile Integration – IEC 61784 CPF x“ unverändert in den Entwurf FprEN 62453-30x:2013 übernommen worden.

Das internationale Dokument wurde vom SC 65E „Devices and integration in enterprise systems“ der Internationalen Elektrotechnischen Kommission (IEC) erarbeitet.

Bei der Abstimmung zu dem Europäischen Schluss-Entwurf bei CENELEC und dem Internationalen Schluss-Entwurf bei IEC [Final Draft International Standard (FDIS)] sind jeweils nur „JA/NEIN“-Entscheidungen möglich, wobei „NEIN“-Entscheidungen fundiert begründet werden müssen. Dokumente, die bei CENELEC als Europäische Norm angenommen und ratifiziert werden, sind unverändert als Deutsche Normen zu übernehmen.

Für dieses Dokument ist das nationale Arbeitsgremium K 956 „Feldbus“ der DKE Deutsche Kommission Elektrotechnik Elektronik Informationstechnik im DIN und VDE (www.dke.de) zuständig.

Für den Fall einer undatierten Verweisung im normativen Text (Verweisung auf eine Norm ohne Angabe des Ausgabedatums und ohne Hinweis auf eine Abschnittsnummer, eine Tabelle, ein Bild usw.) bezieht sich die Verweisung auf die jeweils neueste gültige Ausgabe der in Bezug genommenen Norm.

Für den Fall einer datierten Verweisung im normativen Text bezieht sich die Verweisung immer auf die in Bezug genommene Ausgabe der Norm.

Der Zusammenhang der zitierten Normen mit den entsprechenden Deutschen Normen ergibt sich, soweit ein Zusammenhang besteht, grundsätzlich über die Nummer der entsprechenden IEC-Publikation. Beispiel: IEC 60068 ist als EN 60068 als Europäische Norm durch CENELEC übernommen und als DIN EN 60068 ins Deutsche Normenwerk aufgenommen.

Das Präsidium des DIN hat mit Präsidialbeschluss 1/2004 festgelegt, dass DIN-Normen, deren Inhalt sich auf internationale Arbeitsergebnisse der Informationsverarbeitung gründet, unter bestimmten Bedingungen allein in englischer Sprache veröffentlicht werden dürfen. Diese Bedingungen sind für den vorliegenden Normentwurf erfüllt.

Da sich die Benutzer des vorliegenden Normentwurfs der englischen Sprache als Fachsprache bedienen, wird die Englische Fassung der E DIN EN 62453-300 veröffentlicht. Zu deren Abschnitt 3, der die Begriffe festlegt, wurde eine Übersetzung angefertigt und als Nationaler Anhang NA des vorliegenden Normentwurfs hinzugefügt. Für die meisten der verwendeten Begriffe existieren keine gebräuchlichen deutschen Benennungen, da sich die deutschen Anwender in der Regel ebenfalls der englischen Benennungen bedienen. Diese Norm steht nicht in unmittelbarem Zusammenhang mit Rechtsvorschriften und ist nicht als Sicherheitsnorm anzusehen.

Es ist vorgesehen, auch bei den entsprechenden zukünftigen Deutschen Normen auf die deutsche Sprachfassung zu verzichten und diese in der englischsprachigen Fassung zu veröffentlichen.

Das Original-Dokument enthält Bilder in Farbe, die in der Papierversion in einer Graustufen-Darstellung wiedergegeben werden. Elektronische Versionen dieses Dokuments enthalten die Bilder in der originalen Farbdarstellung.

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Änderungen

Gegenüber DIN EN 62453-301:2010-02, DIN EN 62453-302:2010-02, DIN EN 62453-303-1:2010-02, DIN EN 62453-303-2:2010-02, DIN EN 62453-309:2010-02 und DIN EN 62453-315:2010-02 wurden folgende Änderungen vorgenommen:

- a) Überarbeitung der Protokollteile in IEC 62453-301, IEC 62453-302, IEC 62453-303-1, IEC 62453-303-2, IEC 62453-309 und IEC 62453-315.

Nationaler Anhang NA (informativ)

Teil IEC 62453-303-2/A1

1.1 Begriffe

Ersetze den Abschnitt mit dem folgenden Text:

Für die Anwendung dieses Dokuments gelten die Begriffe nach IEC 62453-1, IEC 62453-2 und die folgenden Begriffe.

1.1.1

IO-Controller

(en: **IO Controller**)

Steuergerät, welches als Client für verschiedene IO-Geräte (Feldgeräte) dient

1.1.2

IO-Gerät

(en: **IO Device**)

Feldgerät, welches als Server für den IO-Betrieb dient

1.1.3

IO-Supervisor

(en: **IO supervisor**)

Engineering-Gerät, welches die Inbetriebsetzung und die Diagnose eines IO-Systems verwaltet

This CDV contains the following parts of the series:

IEC 62453-301 Ed1 A1

IEC 62453-302 Ed2

IEC 62453-303-1 Ed1 A1

IEC 62453-303-2 Ed1 A1

IEC 62453-309 Ed1 Ed2

IEC 62453-315 Ed1 A1

FOREWORD

This amendment has been prepared by subcommittee 65E: Devices and integration in enterprise systems, of IEC technical committee 65: Industrial-process measurement, control and automation.

The text of this amendment is based on the following documents:

FDIS	Report on voting
XX/XX/FDIS	XX/XX/RVD

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

The committee has decided that the contents of this amendment and the base publication will remain unchanged until the stability date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

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

The National Committees are requested to note that for this publication the stability date is 2018.

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

24

INTRODUCTION

25 The first edition of IEC 62453-301 was published in 2009. This amendment is intended to add
26 needed requirements for supporting the new technology as defined by IEC 62453-42 as well
27 as providing clarifications.

28 **3 Bus category**

29 *After Table 3, add the following content.*

30 FF protocols are using the following unique identifiers in physicalLayer members within
31 PhysicalLayer data type (Table 3a for H1):

32

Table 3a – Physical layer identifiers for H1

Identifier value	Name	Description
0D8FB517-1D8D-4455-9CE1-1B4A5DD4A0D2	FF H1	FOUNDATION Fieldbus™ H1 physical layer, as described in "FF 816 - 31.25 kbit/s Physical Layer"

33

34

35

36 Table 3b defines which DataLinkLayer shall be used in combination with the BusCategory
37 values defined in Table 3.

38

Table 3b – DataLink Layer Identifiers

Identifier value	Name	Description
63D4C62E-91A9-4904-BCFC-3D3479C2EBAD	FDL	FF - 822 H1 Data Link Protocol and FF – 821 H1 Data Link Services

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40

41	CONTENTS	
42	FOREWORD.....	2
43	INTRODUCTION.....	4
44	1 Scope.....	5
45	2 Normative references	5
46	3 Terms, definitions, symbols, abbreviated terms and conventions	6
47	3.1 Terms and definitions.....	6
48	3.2 Symbols and abbreviated terms	6
49	3.3 Conventions.....	6
50	3.3.1 Data type names and references to data types	6
51	3.3.2 Vocabulary for requirements	6
52	4 Bus category	7
53	5 Access to instance and device data	8
54	6 Protocol specific behavior.....	8
55	7 Protocol specific usage of general data types	9
56	8 Protocol specific common data types	9
57	9 Network management data types.....	13
58	9.1 General.....	13
59	9.2 Node address	13
60	9.3 Scanner/master – Bus parameter set (CIP)	13
61	10 Communication data types	21
62	11 Channel parameter data types	23
63	12 Device identification	26
64	12.1 Device type identification data types	26
65	12.2 Topology scan data types	27
66	12.3 Scan identification data types	27
67	12.4 Device type identification data types	28
68	Annex A (informative) Implementation hints	30
69	A.1 Addressing in CompoNet DTMs	30
70	A.2 Displaying addresses of CompoNet DTMs	31
71	A.3 Handling of Config1 and Config2 elements in EtherNet/IP	31
72		
73	Figure 1 – Part 302 of the IEC 62453 series	4
74	Figure A.1 – Examples of DTM naming for CompoNet.....	31
75		
76		
77	Table 1 – Protocol identifiers	7
78	Table 2 – Physical layer identifiers for DeviceNet	7
79	Table 3 – Physical layer identifiers for ControlNet.....	7
80	Table 4 – Physical layer identifiers for Ethernet/IP	7
81	Table 5 – Physical layer identifiers for CompoNet	8
82	Table 6 – Data link layer identifiers	8
83	Table 7 – Protocol specific usage of general data types.....	9

84	Table 8 – Simple protocol specific common data types	10
85	Table 9 – Structured protocol specific common data types	11
86	Table 10 – Simple fieldbus configuration data types	13
87	Table 11 – Structured fieldbus configuration data types	15
88	Table 12 – Simple communication data types	21
89	Table 13 – Structured communication data types	22
90	Table 14 – Simple channel parameter data types	24
91	Table 15 – Structured channel parameter data types	25
92	Table 16 – Identification data types with protocol specific mapping	26
93	Table 17 – Simple identification data types with protocol independent semantics	27
94	Table 18 – Structured identification data types with protocol independent semantics	27
95	Table 19 – Simple scan identification data types	27
96	Table 20 – Structured scan identification data types	28
97	Table 21 – Structured device type identification data types	28
98	Table A.1 – CompoNet relationship between Device Category, Node Address, MAC ID	30
99		

INTERNATIONAL ELECTROTECHNICAL COMMISSION

FIELD DEVICE TOOL (FDT) INTERFACE SPECIFICATION –

**Part 302: Communication profile integration –
IEC 61784 CPF 2**

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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International Standard IEC 62453-302 has been prepared by subcommittee 65E: Devices and integration in enterprise systems, of IEC technical committee 65: Industrial-process measurement, control and automation.

This part cancels and replaces IEC/IS 62453-302 published in 2009, and constitutes a technical revision. The main changes are provided in order to provide improved support for Ethernet IP and to support introduction of the technology according to IEC 62453-42.

Each part of the IEC 62453-3xy series is intended to be read in conjunction with IEC 62453-2.

152 The text of this standard is based on the following documents:

FDIS	Report on voting
65E/126/FDIS	65E/139/RVD

153

154 Full information on the voting for the approval of this standard can be found in the report on
155 voting indicated in the above table.

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

157 A list of all parts of the IEC 62453 series, under the general title *Field Device Tool (FDT)*
158 *interface specification*, can be found on the IEC website.

159 The committee has decided that the contents of this publication will remain unchanged until
160 the maintenance result date indicated on the IEC web site under "<http://webstore.iec.ch>" in
161 the data related to the specific publication. At this date, the publication will be

- 162 • reconfirmed,
163 • withdrawn,
164 • replaced by a revised edition, or
165 • amended.

166

167 The National Committees are requested to note that for this publication the stability date
168 is 2018.

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

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INTRODUCTION

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

Figure 1 shows how IEC 62453-302 is aligned in the structure of the IEC 62453 series.

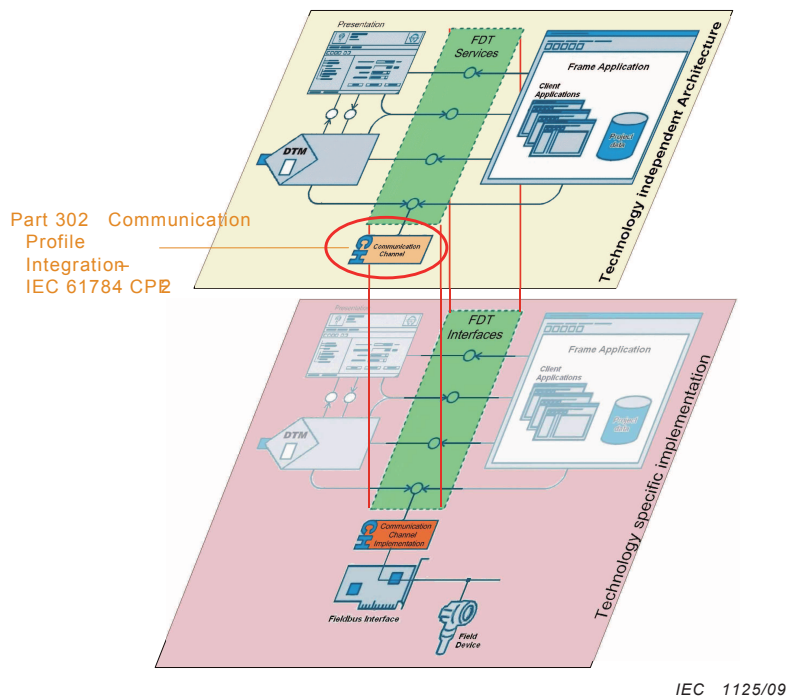


Figure 1 – Part 302 of the IEC 62453 series

FIELD DEVICE TOOL (FDT) INTERFACE SPECIFICATION –

Part 302: Communication profile integration –
IEC 61784 CPF 2**1 Scope**

Communication Profile Family 2 (commonly known as CIP™¹) defines communication profiles based on IEC 61158-2 Type 2, IEC 61158-3-2, IEC 61158-4-2, IEC 61158-5-2, IEC 61158-6-2, and IEC 62026-3. The basic profiles CP 2/1 (ControlNet™²), CP 2/2 (EtherNet/IP™³), and CP 2/3 (DeviceNet™¹) are defined in IEC 61784-1 and IEC 61784-2. An additional communication profile (CompoNet™¹), also based on CIP™, is defined in [14].

This part of IEC 62453 provides information for integrating the CIP™ technology into the FDT interface specification (IEC 62453-2).

This part of IEC 62453 specifies communication and other services.

This specification neither contains the FDT specification nor modifies it.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 61158-2, *Industrial communication networks – Fieldbus specifications – Part 2: Physical layer specification and service definition*

IEC 61158-3-2, *Industrial communication networks – Fieldbus specifications – Part 3-2: Data-link layer service definition – Type 2 elements*

IEC 61158-4-2, *Industrial communication networks – Fieldbus specifications – Part 4-2: Data-link layer protocol specification – Type 2 elements*

IEC 61158-5-2:2007, *Industrial communication networks – Fieldbus specifications – Part 5-2: Application layer service definition – Type 2 elements*

¹ CIP™ (Common Industrial Protocol), DeviceNet™ and CompoNet™ are trade names of Open DeviceNet Vendor Association, Inc (ODVA). 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 standard does not require use of the trade names CIP™, DeviceNet™ or CompoNet™. Use of the trade names CIP™, DeviceNet™ or CompoNet™ requires permission of Open DeviceNet Vendor Association, Inc.

² ControlNet™ is a trade name of ControlNet International, Ltd. 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 to this profile does not require use of the trade name ControlNet™. Use of the trade name ControlNet™ requires permission of ControlNet International, Ltd.

³ EtherNet/IP™ is a trade name of ControlNet International, Ltd. and Open DeviceNet Vendor Association, 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 to this profile does not require use of the trade name EtherNet/IP™. Use of the trade name EtherNet/IP™ requires permission of either ControlNet International, Ltd. or Open DeviceNet Vendor Association, Inc.

- 226 IEC 61158-6-2:2007, *Industrial communication networks – Fieldbus specifications – Part 6-2:*
227 *Application layer protocol specification – Type 2 elements*
- 228 IEC 61784-1, *Industrial communication networks – Profiles – Part 1: Fieldbus profiles*
- 229 IEC 61784-2, *Industrial communication networks – Profiles – Part 2: Additional fieldbus*
230 *profiles for real-time networks based on ISO/IEC 8802-3*
- 231 IEC 61784-3-2:2007, *Industrial communication networks – Profiles – Part 3-2: Functional*
232 *safety fieldbuses – Additional specifications for CPF 2*
- 233 IEC 62026-3, *Low-voltage switchgear and controlgear – Controller-device interfaces (CDIs) –*
234 *Part 3: DeviceNet*
- 235 IEC 62453-1:-4, *Field Device Tool (FDT) interface specification – Part 1: Overview and*
236 *guidance*
- 237 IEC 62453-2:-4, *Field Device Tool (FDT) interface specification – Part 2: Concepts and*
238 *detailed description*
- 239 ISO/IEC 19501:2005, *Information technology – Open Distributed Processing – Unified*
240 *Modeling Language (UML) Version 1.4.2*
- 241 ISO 15745-2:2003, *Industrial automation systems and integration – Open systems application*
242 *integration framework – Part 2: Reference description for ISO 11898-based control systems*
- 243 ISO 15745-3:2003, *Industrial automation systems and integration – Open systems application*
244 *integration framework – Part 3: Reference description for IEC 61158-based control systems*

245 **3 Terms, definitions, symbols, abbreviated terms and conventions**

246 **3.1 Terms and definitions**

247 For the purposes of this document, the terms and definitions given in IEC 62453-1 and
248 IEC 62453-2 apply.

249 **3.2 Symbols and abbreviated terms**

250 For the purposes of this document, the symbols and abbreviations given in IEC 62453-1,
251 IEC 62453-2 and the following apply.

CIP™ Common Industrial Protocol

EDS Electronic Data Sheet [ISO 15745]

252

253 **3.3 Conventions**

254 **3.3.1 Data type names and references to data types**

255 The conventions for naming and referencing of data types are explained in IEC 62453-2
256 Clause A.1

257 **3.3.2 Vocabulary for requirements**

258 The following expressions are used when specifying requirements.

⁴ To be published concurrently with this standard.

Usage of “shall” or “mandatory”

No exceptions allowed.

Usage of “should” or “recommended”

Strong recommendation. It may make sense in special exceptional cases to differ from the described behavior.

Usage of “can” or “optional”

Function or behavior may be provided, depending on defined conditions.

4 Bus category

IEC 61784 CPF 2 protocol is identified in the protocolId element of the structured data type 'fdt:BusCategory' by the following unique identifiers, as specified in Table 1.

Table 1 – Protocol identifiers

Identifier value	ProtocolId name	Description
19B91472-EDB9-4e8c-BB61-516EEC79C1C0	'CIP DeviceNet'	Support for CP 2/3 (DeviceNet)
6CD80F51-019D-4e60-AEAC-B10144943B4B	'CIP EthernetIP'	Support for CP 2/2 (EtherNet/IP)
C290CE23-62EA-478c-97F2-97EFEC602E05	'CIP ControlNet'	Support for CP 2/1 (ControlNet)
089BB2BC-B75A-11DB-8314-0800200C9A66	'CIP CompoNet'	Support for CompoNet

Table 2 shows the identifiers for physical layer that can be used for DeviceNet.

Table 2 – Physical layer identifiers for DeviceNet

Identifier value	Description
23E6EFA5-B1DA-11E2-9D9C-005056C00008	Standard DeviceNet

Table 3 shows the identifiers for physical layer that can be used for ControlNet.

Table 3 – Physical layer identifiers for ControlNet

Identifier value	Description
30F4EF13-B1DA-11E2-9D9C-005056C00008	ControlNet Coaxial Medium
30F4EF14-B1DA-11E2-9D9C-005056C00008	ControlNet Fiber Medium
30F4EF15-B1DA-11E2-9D9C-005056C00008	ControlNet Network Access Port (NAP)

Table 3 shows the identifiers for physical layer that can be used for Ethernet/IP.

Table 4 – Physical layer identifiers for Ethernet/IP

Identifier value	Description
307dd808-c010-11db-90e7-0002b3ecdcb	10BASET
307dd809-c010-11db-90e7-0002b3ecdcb	10BASETXHD
307dd80a-c010-11db-90e7-0002b3ecdcb	10BASETXFD
307dd80b-c010-11db-90e7-0002b3ecdcb	10BASEFLHD
307dd80c-c010-11db-90e7-0002b3ecdcb	10BASEFLFD
307dd80d-c010-11db-90e7-0002b3ecdcb	10BASEFXHD
307dd80e-c010-11db-90e7-0002b3ecdcb	10BASEFXFD
307dd80f-c010-11db-90e7-0002b3ecdcb	100BASETXHD
307dd810-c010-11db-90e7-0002b3ecdcb	100BASETXFD

Identifier value	Description
307dd811-c010-11db-90e7-0002b3ecdcb	100BASEFXHD
307dd812-c010-11db-90e7-0002b3ecdcb	100BASEFXFD
307dd813-c010-11db-90e7-0002b3ecdcb	100BASELX10
307dd814-c010-11db-90e7-0002b3ecdcb	100BASEPX10
307dd815-c010-11db-90e7-0002b3ecdcb	1000BASEXHD
307dd816-c010-11db-90e7-0002b3ecdcb	1000BASEXFD
307dd817-c010-11db-90e7-0002b3ecdcb	1000BASELXHD
307dd818-c010-11db-90e7-0002b3ecdcb	1000BASELXFD
307dd819-c010-11db-90e7-0002b3ecdcb	1000BASESXHD
307dd81a-c010-11db-90e7-0002b3ecdcb	1000BASESXFD
307dd81b-c010-11db-90e7-0002b3ecdcb	1000BASETHD
307dd81c-c010-11db-90e7-0002b3ecdcb	1000BASETFD
307dd81d-c010-11db-90e7-0002b3ecdcb	10GigBASEFX

Table 5 shows the identifiers for physical layer that can be used for CompoNet.

Table 5 – Physical layer identifiers for CompoNet

Identifier value	Description
475B2CB0-B1DA-11E2-9D9C-005056C00008	Standard CompoNet
475B2CAF-B1DA-11E2-9D9C-005056C00008	CompoNet IP67 Cable

Table 6 shows the identifiers for data link layer.

Table 6 – Data link layer identifiers

Identifier value	Description
5B1EDEF7-B1CC-11E2-9D9C-005056C00008	DeviceNet (CAN - CSMA/NBA)
5B1EDEF8-B1CC-11E2-9D9C-005056C00008	ControlNet (CTDMA)
5B1EDEF9-B1CC-11E2-9D9C-005056C00008	EtherNet/IP (CSMA/CD)
5B1EDEFa-B1CC-11E2-9D9C-005056C00008	CompoNet (TDMA)

5 Access to instance and device data

The services InstanceDataInformation and DeviceDataInformation shall provide access at least to all parameters defined in the Params section of the EDS.

6 Protocol specific behavior

IEC 61784 CPF 2 protocol has specific requirements related to configuration of fieldbus masters.

It is very important to keep both data provider and consumer synchronized. Therefore data provider shall be informed if the provided data has been modified. For instance, in case the provided data is modified by the scanner/master DTM, then the slave/adaptor DTM shall be provided with the new data set.

NOTE For a description of data exchange between DTMs, see 6.3 of IEC 62453-2 (Configuration of fieldbus master or communication scheduler).

7 Protocol specific usage of general data types

Table 7 shows how general data types, defined in IEC 62453-2 within the namespace 'fdt', are used with IEC 61784 CPF 2 devices.

According to IEC 62453-2, at least one set of semantic information (one per supported fieldbus protocol) shall be provided for each accessible data object, using the 'SemanticInformation' general data type. The corresponding data type 'applicationDomain' shall have the value "FDT_CIP" and the data type 'semanticId' shall have an appropriate value, as specified in Table 7).

Table 7 – Protocol specific usage of general data types

Data type	Description for use
fdt:address	The "address" data type is not mandatory for the exposed parameters in the DTMs. But if the address will be used, the string shall be constructed according to the rules of the semanticId. That means the data type "semanticId" is always the same as the data type "address"
fdt:protocolId	See Clause 4.
fdt:deviceTypeId	As defined in Identity object (see 6.2.1.2.2 of IEC 61158-5-2)
fdt:deviceTypeInfo	A CIP DTM shall provide the path to the device specific EDS file with this data type. For DTM certification, the path to the certified EDS file shall be provided here. NOTE The EDS information is accessible via • IDtmParameter::GetParameters() • IDtmInformation::GetInformation()
fdt:deviceTypeInfoPath	Path to the EDS file which is also provided via the attribute 'deviceTypeInfo' The attribute contains full path to the EDS file including the file name in URL notation. For CIP devices, it is mandatory to provide information for this data type. This attribute is specific to FDT 1.2.1(see IEC 62453-2 and [8]), therefore it shall not be provided if DTM is running in FDT 1.2 (see [7]) based Frame Applications
fdt:manufacturerId	As defined in Identity object (see 6.2.1.2.2 of IEC 61158-5-2)
fdt:semanticId fdt:applicationDomain	The applicationDomain is: FDT_CIP. The data that is contained in the objects are addressable via classId, instanceId and attributeId. This data may be variables or composed blocks of data. The semanticId is directly based on the CIP address information: The semanticId is: CLASSxx.INSTANCEyy.ATTRIBUTEzz xx classId yy instanceId zz attributeId xx, yy, zz are based on decimal format without leading '0'. Since 'ATTRIBUTE' is conditional in CIP in certain cases, it can be left out. In this case, the semanticId is: CLASSxx.INSTANCEyy
fdt:tag	CIP assembly, parameter name or name of a I/O connection (in the context of channel data)

8 Protocol specific common data types

Table 8 and Table 9 specify the protocol specific common data types, which are used in the definition of other data types.

304 The data types described in this clause are defined for following namespace:
 305 Namespace: cip

306 **Table 8 – Simple protocol specific common data types**

Data type	Definition	Description
attributeld	USINT	CIP attribute identifier
bitOffset	UDINT	Bit offset of a parameter in an assembly
cipStatus	UINT	cipStatus represents the Status (attribute 5) of the Identity object. See 6.2.1.2.2 of IEC 61158-5-2
classId	UINT	CIP class identifier
constValue	UDINT	Represents the constant value used in the data type Constant
dataType	enumeration (byte float double int unsigned enumerator bitEnumerator index ascii password bitString hexString date time dateAndTime duration binary structured dtmSpecific)	Defines the different enumerations of the CIP data types
deviceType	UINT	Represents the DeviceType (attribute 2) of the Identity object. See 6.2.1.2.2 of IEC 61158-5-2
ePath	ARRAY OF USINT	CIP EPATH, see 4.1.9 of IEC 61158-6-2
extendedIdentifier	STRING	Represents the address of the CIP device in the CIPNodeID if the address used on this CIP network is a name or IP-address. The extendedIdentifier shall be used for CompoNet networks to cover the CompoNet MAC ID. See also shortIdentifier
instanceId	UINT	CIP object instance identifier
majorRevision	USINT	Represents the Major Revision (attribute 4.1) of the Identity object. See 6.2.1.2.2 of IEC 61158-5-2
minorRevision	USINT	Represents the Minor Revision (attribute 4.2) of the Identity object. See 6.2.1.2.2 of IEC 61158-5-2
portNumber	UINT	Represents the portnumber within a CIP bridging or routing device to route a message to another segment
productCode	UINT	Represents the Product code (attribute 3) of the Identity object. See 6.2.1.2.2 of IEC 61158-5-2
productName	STRING	Represents the Product name (attribute 7) of the Identity object. See 6.2.1.2.2 of IEC 61158-5-2
serialNumber	ARRAY OF USINT	Represents the Serialnumber (attribute 6) of the Identity object. See 6.2.1.2.2 of IEC 61158-5-2. If the serialNumber is not known because of offline configuration then a 0 should be returned
serviceCode	USINT	CIP service code. This is a function, or method, supported by a CIP object or attribute
serviceName	STRING	CIP service name. This is a function, or method, supported by a CIP object or attribute. This attribute provides additional human readable information about the related service code
shortIdentifier	USINT	Represents the address of the CIP device in the CIPNodeID if the address used on this CIP-network is a simple address. See also extendedIdentifier
symbolicAddress	STRING	Represents a name of a component inside the device

Data type	Definition	Description
vendorID	UINT	Represents the Vendor ID (attribute 1) of the Identity object. See 6.2.1.2.2 of IEC 61158-5-2

307

308

Table 9 – Structured protocol specific common data types

Data type	Definition			Description
	Elementary data type	Usage	Multiplicity	
CIPDevice	STRUCT			Specifies a CIP device. CIPDevice contains manufacturer and device information (the Identity Object), which is present in every CIP node
	cipStatus	M	[1..1]	
	CIPPath	M	[1..1]	
	CIPDeviceIdentity	M	[1..1]	
CIPDeviceIdentity	STRUCT			Represents the static part of the Identity object of the CIP device. See 6.2.1.2.2 of IEC 61158-5-2
	vendorID	M	[1..1]	
	deviceType	M	[1..1]	
	productCode	M	[1..1]	
	majorRevision	M	[1..1]	
	minorRevision	M	[1..1]	
	serialNumber	M	[1..1]	
	productName	M	[1..1]	
CIPNodeID	STRUCT			Identifier used to identify a particular node (device) on a CIP network, e.g. CIP MAC (Media Access Control) ID (1 byte) for DeviceNet and ControlNet; IP address for EtherNet/IP. Since the size differs from protocol to protocol, structure is used which contains 2 attributes: extended identifier (n bytes string) and short identifier (1 byte unsigned integer) and only one of them shall be used
	choice of	M	[1..1]	
	ExtendedIdentifier	S	[1..1]	
	ShortIdentifier	S	[1..1]	
CIPObjectAddress	STRUCT			CIP object address as CIPObjectID, CIPSymbolicAddress or HexAddress
	choice of	M	[1..1]	
	CIPObjectID	S	[1..1]	
	CIPSymbolicAddress	S	[1..1]	
	HexAddress	S	[1..1]	

Data type	Definition			Description
	Elementary data type	Usage	Multiplicity	
CIPObjectId	STRUCT			The CIP classId, instanceId and (conditional) attributeId 'address' information for a CIP object and attribute. If used in a Process Channel this is likely to be either an Assembly object or a Parameter object
	classId	M	[1..1]	
	instanceId	M	[1..1]	
	attributeId	O	[0..1]	
CIPPath	STRUCT			The full 'address' of the CIP node (device). In general this consists of the Node ID stored in the CIPNodeID element. The RoutingPath element is used to transfer additional routing information that can be used by the CIP FDT communication component
	RoutingPath	O	[0..1]	
	CIPNodeID	M	[1..1]	
CIPSymbolicAddress	STRUCT			classId, instanceId and attributeId does not necessarily be known, a symbolic address could also be used. CIPSymbolicAddress, HexAddress or CIPObjectId could be used for DataExchangeRequest
	symbolicAddress	M	[1..1]	
Constant	STRUCT			A constant value
	constValue	M	[1..1]	
ExtendedIdentifier	STRUCT			See attribute extendedIdentifier
	extendedIdentifier	M	[1..1]	
HexAddress	STRUCT			CIP object address as ePath
	ePath	O	[0..1]	
LinkAddress	STRUCT			Represents the CIPNodeID within a Segment
	CIPNodeID	M	[1..1]	
ParameterReference	STRUCT			Reference to a description of a parameter
	fdt:idref	M	[1..1]	
	bitOffset	O	[0..1]	
ReservedBits	STRUCT			Used wherever reserved bits are needed
RoutingPath	STRUCT			Any additional CIP network routing information, which can be understood by the Communication Channel
	Segment	M	[1..1]	
Segment	STRUCT			Represents the path a message shall follow to reach the addressed CIP device
	portNumber	M	[1..1]	
	LinkAddress	M	[1..1]	
	Segment	O	[0..1]	
Service	STRUCT			CIP service identified by serviceCode and serviceName. CIP service code is a function, or method, supported by a CIP object or attribute
	serviceCode	M	[1..1]	
	serviceName	O	[0..1]	

Data type	Definition			Description
	Elementary data type	Usage	Multiplicity	
ShortIdentifier	STRUCT			See attribute shortIdentifier
	shortIdentifier	M	[1..1]	

309

310 **9 Network management data types**311 **9.1 General**

312 The data types specified in this clause are used at following services:

- 313 • NetworkManagementInfoRead service;
- 314 • NetworkManagementInfoWrite service.

315 **9.2 Node address**

316 The CIPNodeID will be stored in the busAddress element of the fdt:DeviceAddress data type.

317 This is not used for CompoNet because the master has a fixed address – since this is a

318 mandatory element, the recommendation is to use the value “0”.

319 **9.3 Scanner/master – Bus parameter set (CIP)**

320 Information is sent to the CIP scanner/master within the UserDefinedBus element of the

321 NetworkInfo data type, using the data types specified in Table 10 and Table 11. This

322 information shall be set to configure the scan list of scanner/master.

323 The data types described in this clause are defined for following namespace:

324 Namespace: cippar

325 **Table 10 – Simple fieldbus configuration data types**

Data type	Definition	Description
async	USINT	See Table 7-2.3 of [13]. This is a CIP Safety exclusive field. Only applies to producing connections. Field should be empty for consuming connections. Used to calculate Network Reaction Time
base	UINT	Scaling parameters. See A.4.1.4.6 of ISO 15745-2
class0	BOOL	See Table A.25 of ISO 15745-3
class1	BOOL	
class2	BOOL	
class3	BOOL	
class4	BOOL	
class5	BOOL	
class6	BOOL	
compoNetDeviceCategory	USINT	Defines the different categories of CompoNet devices. See [14], Chapter 7-4
compoNetIOLength	UINT	See [14], Chapter 7-5
compoNetIOLengthUnit	USINT	
connectionId	STRING	Uniquely identifies the connection within the DTM.
connectionNameString	STRING	See Table A.24 of ISO 15745-3
connectionTypeMulticast	BOOL	See Table A.26 of ISO 15745-3

Data type	Definition	Description
connectionTypeNULL	BOOL	
connectionTypePoint2Point	BOOL	
consumedConnectionSize	UINT	Maximum number bytes received across this connection
defaultConnection	BOOL	Indicates whether the CIPConnection is default or not
defaultSafetyConnections	USINT	See Table 7-2.2 of [13]. Instance Number
defaultValue	STRING	Represents the value of the attribute when in offline state
div	UINT	Scaling parameters. See A.4.1.4.6 of ISO 15745-2
expectedPacketRate	UINT	Scanner determines this parameter. There might be some reason that the slave provides this parameter to the master
fixedSizeSupported	BOOL	See Table A.26 of ISO 15745-3
helpString	STRING	See Table A.24 of ISO 15745-3
inhibitTime	UINT	Optional for COS, for other connection types it is not valid. Scanner determines this parameter. There might be some reason that the slave provides this parameter to the master
maxCIPConnections	UINT	Communication capacity, See Chapter 7-3.6.11.7 of [9]
maxConsumerNumber	USINT	See Table 7-2.3 of [13]. This is a CIP Safety exclusive field. When safety devices wish to define multi-cast connections and need to restrict the maximum number of consumers to a value less than the default maximum of 15, this field can define the product limit. If this field is empty, the SNCT shall always use the default value of 15 for the maximum number of multi-cast connections. This field can be left empty for single-cast connections
maxEMConnections	UINT	Communication capacity. See Chapter 7-3.6.11.7 of [9]
maxIOConnections	UINT	
maxSafetyConnections	USINT	See Table 7-2.2 of [13]. Optional
maxSafetyInputCnxns	USINT	
maxSafetyOutputCnxns	USINT	
multiplier	UINT	
offset	INT	Scaling parameters. See A.4.1.4.6 of ISO 15745-2
precision	UINT	
priorityHigh	BOOL	
priorityLow	BOOL	
priorityScheduled	BOOL	See Table A.26 of ISO 15745-3
priorityUrgent (ENIPV1.2)	BOOL	
producedConnectionSize	UINT	
realTimeTransferFormat	USINT	
rpi	UDINT	See Table A.24 of ISO 15745-3
minRpi (ENIP V1.2)	UDINT	Minimum Packet interval required by the device
maxRpi (ENIP V1.2)	UDINT	Maximum Packet Intervall supported by the device
scId	ARRAY OF USINT	Safety Configuration Identifier. See 6.6.5.17 of IEC 61784-3-2
server	BOOL	See Table A.25 of ISO 15745-3
transportTypeExclusiveOwner	BOOL	
transportTypeInputOnly	BOOL	
transportTypeListenOnly	BOOL	
transportTypeRedundantOwner	BOOL	
triggerApplication	BOOL	

Data type	Definition	Description
triggerChangeOfState	BOOL	
triggerCyclic	BOOL	
unId	ARRAY OF USINT	See 6.6.5.18 of IEC 61784-3-2
variableSizeSupported	BOOL	See Table A.26 of ISO 15745-3

326

Table 11 – Structured fieldbus configuration data types

Data type	Definition			Description
	Elementary data types	Usage	Multiplicity	
AssemblyMemberDefinition	STRUCT			Represents all members of an assembly
	fdt:id	O	[0..1]	
	fdt:tag	M	[1..1]	
	fdt:descriptor	O	[0..1]	
	cip:dataType	M	[1..1]	
	defaultValue	O	[0..1]	
	Scaling	O	[0..1]	
	cip:CIPObjectAddress	O	[0..1]	
	fdt:BitEnumeratorEntries	O	[0..1]	
	fdt:EnumeratorEntries	O	[0..1]	
	fdt:Unit	O	[0..1]	
	fdt:Ranges	O	[0..1]	
	fdt:SubstituteValue	O	[0..1]	
	fdt:StructuredElements	O	[0..1]	
AssemblyMemberDefinitions	STRUCT			See AssemblyMember definition
	AssemblyMemberDefinition	O	[0..*]	
BitStrobeConnection	STRUCT			Represents the Bitstrobe IO connection
	MasterSlaveConnection	M	[1..1]	
Capacity	STRUCT			Communication capacity, See Chapter 7-3.6.11.7 of [9]
	MaxCIPConnections	O	[0..1]	
	MaxIOConnections	O	[0..1]	
	MaxEMConnections	O	[0..1]	

Data type	Definition			Description
	Elementary data types	Us ag e	Multi plicity	
CIPConnection	STRUCT			Defines one supported CIP connection Contains attributes, see Table A.24 of ISO 15745-3 For safety devices, see Chapter 7-2.2.4.3, Table 7-2-3 of [13]
	connectionId	M	[1..1]	
	connectionNameString	M	[1..1]	
	helpString	M	[1..1]	
	cip:ePath	M	[1..1]	
	defaultConnection	O	[0..1]	
	Config1	O	[0..1]	
	Config2	O	[0..1]	
	TriggerAndTransport	M	[1..1]	
	Originator2TargetParameters	M	[1..1]	
	Target2OriginatorParameters	M	[1..1]	
CIPNode	STRUCT			Represents all connection information of the device
	fdt:readAccess	O	[0..1]	
	fdt:writeAccess	O	[0..1]	
	fdtpar:configurationData	O	[0..1]	
	sclId	O	[0..1]	
	unId	O	[0..1]	
	cip:CIPDeviceIdentity	M	[1..1]	
	cip:CIPNodeID	M	[1..1]	
	PossibleConnections	M	[1..1]	
	CurrentConnections	M	[1..1]	
	AssemblyMemberDefinitions	O	[0..1]	
CompoNetIO	STRUCT			Defines the IO of a CompoNet device. See [14], Chapter 7-2
	CompoNetInputInfo	O	[0..1]	
	CompoNetOutputInfo	O	[0..1]	
	compoNetDeviceCategory	M	[1..1]	
CompoNetInputInfo	STRUCT			Represents the Inputs of the CompoNet device
	CompoNetIOInfo	M	[1..1]	
CompoNetIOInfo	STRUCT			Represents the Inputs or Outputs of the CompoNet device
	compoNetIOLengthUnit	M	[1..1]	
	compoNetIOLength	M	[1..1]	
CompoNetOutputInfo	STRUCT			Represents the Outputs of the CompoNet device
	CompoNetIOInfo	M	[1..1]	

Data type	Definition			Description
	Elementary data types	Usage	Multiplicity	
Config	STRUCT			Contains elements Size and Format
	Size	O	[0..1]	
	Format	O	[0..1]	
Config1	STRUCT			See Table A.24 of ISO 15745-3
	Config	M	[1..1]	
Config2	STRUCT			See Table A.24 of ISO 15745-3
	Config	M	[1..1]	
ConnectionParameters	STRUCT			Represents the Connection Parameters keyword of the Connection Manager Section of an EDS-file. See A.4.1.4.9 of ISO 15745-3
	FixedSizeSupported	O	[0..1]	
	VariableSizeSupported	O	[0..1]	
	RealTimeTransferFormat	O	[0..1]	
	ConnectionTypeNULL	O	[0..1]	
	ConnectionTypeMulticast	O	[0..1]	
	ConnectionTypePoint2Point	O	[0..1]	
	PriorityLow	O	[0..1]	
	PriorityHigh	O	[0..1]	
	PriorityScheduled	O	[0..1]	
	PriorityUrgent	O	[0..1]	
	cip:ReservedBits	O	[0..1]	
ConsumedAssemblyReference	STRUCT			Gives CIPObjectAddress of the data consumed on this IO connection To reference what is the I/O assembly attached to this connection to allow the scanner to understand the members of the consumed assembly
	cip:CIPObjectAddress	M	[1..1]	
COSConnection	STRUCT			Represents the COS IO connection. It is mutual exclusive with the Cyclic IO connection
	MasterSlaveConnection	M	[1..1]	
CurrentConnections	STRUCT			Represents all default connections of this device.
	CIPConnection	O	[0..*]	
	MasterSlaveConnectionSet	O	[0..1]	
	CompoNetIO	O	[0..1]	
CyclicConnection	STRUCT			CyclicConnection Represents the Cyclic IO connection. It is mutual exclusive with the COS IO connection
	MasterSlaveConnection	M	[1..1]	

Data type	Definition			Description
	Elementary data types	Usage	Multiplicity	
Format	STRUCT			See Table A.24 of ISO 15745-3
	choice of	M	[1..1]	
	cip:ParameterReference	S	[1..1]	
	fdt:ChannelReference	S	[1..1]	
MasterSlaveConnection	STRUCT			Defines one supported MasterSlave connection
	producedConnectionSize	M	[1..1]	
	consumedConnectionSize	M	[1..1]	
	expectedPacketRate	O	[0..1]	
	inhibitTime	O	[0..1]	
	ConsumedAssemblyReference	O	[0..1]	
	ProducedAssemblyReference	O	[0..1]	
MasterSlaveConnectionSet	STRUCT			Zero or more MasterSlaveConnection. MasterSlaveConnection elements can be combined according to the CIP specification (see IEC 62026-3). This element shall be provided for DeviceNet. If device does not support I/O connections through the MasterSlave connection set, this list shall be empty
	PolledIOConnection	O	[0..1]	
	BitStrobeConnection	O	[0..1]	
	choice of	O	[0..1]	
	COSConnection	S	[1..1]	
	CyclicConnection	S	[1..1]	
	MulticastPollingConnection	O	[0..1]	
MulticastPollingConnection	STRUCT			Represents the Multicast Polled IO connection
	MasterSlaveConnection	M	[1..1]	
Originator2TargetParameters	STRUCT			Originator to target connection parameters. See Table A.24 of ISO 15745-3
	rpi	O	[0..1]	
	minRpi (ENIP V1.2)	O	[0..1]	
	maxRpi (ENIP V1.2)	O	[0..1]	
	ConnectionParameters	M	[1..1]	
	choice of	M	[1..*]	
	Size	S	[1..1]	
	Format	S	[1..1]	
PolledIOConnection	STRUCT			Represents the Polled IO connection
	MasterSlaveConnection	M	[1..1]	

Data type	Definition			Description
	Elementary data types	Us ag e	Multi plicity	
PossibleConnections	STRUCT			Represents all possible connections that can be made to this device
	maxSafetyConnections	O	[0..1]	
	maxSafetyInputCnxns	O	[0..1]	
	maxSafetyOutputCnxns	O	[0..1]	
	defaultSafetyConnections	O	[0..1]	
	Capacity	O	[0..1]	
	CIPConnection	O	[0..*]	
	PolledIOConnection	O	[0..1]	
	BitStrobeConnection	O	[0..1]	
	COSConnection	O	[0..1]	
	CyclicConnection	O	[0..1]	
	MulticastPollingConnection	O	[0..1]	
	SafetyInputConnection	O	[0..*]	
	SafetyOutputConnection	O	[0..*]	
	CompoNetIO	O	[0..1]	
ProducedAssemblyReference	STRUCT			Gives CIPObjectAddress of the data produced on this IO connection To reference what is the I/O assembly attached to this connection to allow the scanner to understand the members of the produced assembly
	cip:CIPObjectAddress	M	[1..1]	
Target2OriginatorParameters	STRUCT			Target to originator connection parameters. See Table A.24 of ISO 15745-3
	rpi	O	[0..1]	
	minRpi (ENIP V1.2)	O	[0..1]	
	maxRpi (ENIP V1.2)	O	[0..1]	
	ConnectionParameters	M	[1..1]	
	choice of	M	[1..*]	
	Size	S	[1..1]	
	Format	S	[1..1]	
TransportTypeExclusiveOwner	STRUCT			See transportTypeExclusiveOwner
	transportTypeExclusiveOwner	M	[1..1]	
TransportTypeInputOnly	STRUCT			See transportTypeInputOnly
	transportTypeInputOnly	M	[1..1]	
TransportTypeListenOnly	STRUCT			See transportTypeListenOnly
	transportTypeListenOnly	M	[1..1]	
TransportTypeRedundantOwner	STRUCT			See transportTypeRedundantOwner
	transportTypeRedundantOwner	M	[1..1]	

Data type	Definition			Description
	Elementary data types	Usage	Multiplicity	
TriggerAndTransport	STRUCT			Represents the Trigger and Transport keyword of the Connection Manager Section of an EDS-file. See A.4.1.4.9 of ISO 15745-3
	class0	O	[0..1]	
	class1	O	[0..1]	
	class2	O	[0..1]	
	class3	O	[0..1]	
	class4	O	[0..1]	
	class5	O	[0..1]	
	class6	O	[0..1]	
	triggerCyclic	O	[0..1]	
	triggerChangeOfState	O	[0..1]	
	triggerApplication	O	[0..1]	
	server	O	[0..1]	
	choice of	M	[1..1]	
	TransportTypeListenOnly	S	[1..1]	
	TransportTypeInputOnly	S	[1..1]	
	TransportTypeExclusiveOwner	S	[1..1]	
	TransportTypeRedundantOwner	S	[1..1]	
	cip:ReservedBits	O	[0..1]	
SafetyInputConnection	STRUCT			Defines one supported CIP Safety Input connection
	async	M	[1..1]	
	maxConsumerNumber	O	[0..1]	
	CIPConnection	M	[1..1]	
SafetyOutputConnection	STRUCT			Defines one supported CIP Safety Output connection
	maxConsumerNumber	O	[0..1]	
	CIPConnection	M	[1..1]	
Scaling	STRUCT			Scaling of a parameter. See A.4.1.4.6 of ISO 15745-2
	offset	M	[1..1]	
	base	M	[1..1]	
	multiplier	M	[1..1]	
	div	M	[1..1]	
	precision	O	[0..1]	
Size	STRUCT			See Table A.24 of ISO 15745-3
	choice of	M	[1..1]	
	cip:Constant	S	[1..1]	
	cip:ParameterReference	S	[1..1]	

Data type	Definition			Description
	Elementary data types	Usage	Multiplicity	
UserDefinedBus	STRUCT			Represents the CIP protocol specific part of NetworkInfo
	CIPNode	M	[1..1]	

327

328 **10 Communication data types**

329 The data types specified in this clause are used with the following services:

- 330 • Connect service
- 331 • Transaction service
- 332 • Disconnect service
- 333 • Abort service
- 334 • Sequence service.

335 The service arguments contain the address information and the communication data

336 (explained in Table 12 and Table 13).

337 The data types described in this clause are defined for the following namespace.

338 Namespace: fdtcipcomm

339 **Table 12 – Simple communication data types**

Data type	Definition	Description
communicationReference	UUID	Mandatory internal FDT value which uniquely identifies a connection to a device. It is allocated by the Communication Channel during the ConnectRequest. The value is used by subsequent communication calls up to and including DisconnectRequest or Abort
delayTime	UDINT	Delay time in [ms] between two communication calls
extendedStatusCode	ARRAY OF USINT	CIP extended status code further elaborates upon the CIP status code and may be present in an Error Response message from a CIP object. (CIP range: 0-255 words) (DeviceNet: 1 byte) This information is formatted as a hex string to cover the CIP extended status codes. This information is protocol specific
sequenceTime	UDINT	Period of time in [ms] for the whole sequence
statusCode	USINT	CIP status code, which is present in the General Status Code field of a Response message from a CIP object. For DeviceNet, this is provided only in error cases

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341

Table 13 – Structured communication data types

Data type	Definition			Description
	Elementary data type	Usage	Multiplicity	
Abort	STRUCT			Describes the abort. An abort cancels all outstanding requests and closes the connection
	communicationReference	M	[1..1]	
ConnectRequest	STRUCT			Element used with ConnectRequest call to identify the CIP node (device) with which a communication connection should be established
	cip:CIPPath	M	[1..1]	
ConnectResponse	STRUCT			Element used with the ConnectResponse call used to convey a unique value - the communicationReference - which should be used in subsequent calls on this communication connection. ConnectResponse contains the CIPDevice element as defined in DTMCIIPDataTypeSchema.xml, which is used to acknowledge that the connection to the requested nodeID is actually established
	communicationReference	M	[1..1]	
	cip:CIPDevice	M	[1..1]	
DataExchangeRequest	STRUCT			Element used with the TransactionRequest call to describe the communication request to a particular object within the CIP node (the CIP node is associated with the connection identified by the connectionReference). The object address is specified using the CIPObjectAddress element. The service to perform is specified using the Service element. If data is required by the service it is stored in the fdt:CommunicationData element
	communicationReference	M	[1..1]	
	cip:serviceCode	M	[1..1]	
	cip:CIPObjectAddress	M	[1..1]	
	fdt:CommunicationData	O	[0..1]	
DataExchangeResponse	STRUCT			Element used with the TransactionResponse call to return the result of a TransactionRequest. Depending on the network, result codes are returned in the ServiceResponse
	communicationReference	M	[1..1]	
	ServiceResponse	M	[1..1]	
	fdt:CommunicationData	O	[0..1]	
DisconnectRequest	STRUCT			Element used with the DisconnectRequest call to identify the connection, which should be terminated
	communicationReference	M	[1..1]	

Data type	Definition			Description
	Elementary data type	Usage	Multiplicity	
DisconnectResponse	STRUCT			Element used with DisconnectResponse to indicate that the connection identified by the communicationReference has been terminated
	communicationReference	M	[1..1]	
SequenceBegin	STRUCT			Describes the sequence begin
	sequenceTime	O	[0..1]	
	delayTime	O	[0..1]	
	communicationReference	M	[1..1]	
SequenceEnd	STRUCT			Describes the sequence end
	communicationReference	M	[1..1]	
SequenceStart	STRUCT			Describes the sequence start
	communicationReference	M	[1..1]	
ServiceResponse	STRUCT			CIP service response and status codes. All error codes are described in 4.1.11 of IEC 61158-6-2
	cip:serviceCode	M	[1..1]	
	statusCode	M	[1..1]	
	extendedStatusCode	O	[0..1]	

11 Channel parameter data types

The data types specified in this clause are used with the following services:

- ReadChannelData service;
- WriteChannelData service.

Channels in a DTM can be used to represent the “Process values” available on that device. These are sometimes called Process Channels. A process control system (i.e. some external system which monitors values on a device) can query each of the DTM’s channels for its channel parameters. The channel parameter schema describes the process values so that an external system can use the information to access and interpret the values from the device during normal device runtime. The external system might not use FDT to access the values.

Information about the available channels (if there are any) is included in the information returned from the GetChannels service call.

Data types used by the services ReadChannelData and WriteChannelData are specified in Table 14 and Table 15.

These data types can be used by a DTM (e.g. slave/adaptor device’s DTM) to describe its I/O assemblies – data format and constituent Params (providing similar information to that found in the [IO_Info]/[Variant_IO_Info]/[Connection Manager], [Assembly] and [Params] sections of an EDS file) – and by a master/scanner device’s DTM to describe the objects used to access a shadow of the slave device’s I/O data. The Process Channel of the master DTM also refers to the child DTM and the Process Channel of the child DTM, which describes the assembly data layout within the master device.