

DIN EN 61800-7-301

ICS 29.160.30; 29.200

Ersatz für
DIN EN 61800-7-301:2008-11
Siehe Anwendungsbeginn

**Elektrische Leistungsantriebssysteme mit einstellbarer Drehzahl –
Teil 7-301: Generisches Interface und Nutzung von Profilen für
Leistungsantriebssysteme (PDS) –
Abbildung von Profil-Typ 1 auf Netzwerktechnologien
(IEC 61800-7-301:2015);
Englische Fassung EN 61800-7-301:2016**

Adjustable speed electrical power drive systems –
Part 7-301: Generic interface and use of profiles for power drive systems –
Mapping of profile type 1 to network technologies
(IEC 61800-7-301:2015);
English version EN 61800-7-301:2016

Entraînements électriques de puissance à vitesse variable –
Partie 7-301: Interface générique et utilisation de profils pour les entraînements
électriques de puissance –
Mise en correspondance du profil de type 1 avec les technologies de réseaux
(IEC 61800-7-301:2015);
Version anglaise EN 61800-7-301:2016

Gesamtumfang 172 Seiten

DKE Deutsche Kommission Elektrotechnik Elektronik Informationstechnik in DIN und VDE

Anwendungsbeginn

Anwendungsbeginn für die von CENELEC am 2015-12-25 angenommene Europäische Norm als DIN-Norm ist 2016-11-01.

Für DIN EN 61800-7-301:2008-11 besteht eine Übergangsfrist bis 2018-12-25.

Nationales Vorwort

Vorausgegangener Norm-Entwurf: E DIN EN 61800-7-301:2014-06.

Für dieses Dokument ist das nationale Arbeitsgremium K 226 „Ausrüstung von Starkstromgeräten und -anlagen mit elektronischen Betriebsmitteln“ der DKE Deutsche Kommission Elektrotechnik Elektronik Informationstechnik in DIN und VDE (www.dke.de) zuständig.

Die enthaltene IEC-Publikation wurde vom SC 22G „Adjustable speed electric drive systems incorporating semiconductor power converters“ erarbeitet.

Das IEC-Komitee hat entschieden, dass der Inhalt dieser Publikation bis zu dem Datum (stability date) unverändert bleiben soll, das auf der IEC-Website unter „<http://webstore.iec.ch>“ zu dieser Publikation angegeben ist. Zu diesem Zeitpunkt wird entsprechend der Entscheidung des Komitees die Publikation

- bestätigt,
- zurückgezogen,
- durch eine Folgeausgabe ersetzt oder
- geändert.

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

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

Der Zusammenhang der zitierten Dokumente mit den entsprechenden Deutschen Dokumenten 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 die vorliegende Norm erfüllt.

Da sich die Anwender der vorliegenden Norm der englischen Sprache als Fachsprache bedienen, wird die Englische Fassung der EN 61800-7-301 veröffentlicht. Zu deren Abschnitt 1, der den Anwendungsbereich festlegt, und Abschnitt 3, der die Begriffe festlegt, wurde eine Übersetzung angefertigt und als Nationaler Anhang NA der vorliegenden Norm hinzugefügt. Für einige 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.

Änderungen

Gegenüber DIN EN 61800-7-301:2008-11 wurden folgende Änderungen vorgenommen:

- a) Ergänzung der Abbildung von Profil-Typ 1 auf CC-Link IE Field Network in Abschnitt 6;
- b) Ergänzung der Abbildung von Profil-Typ 1 auf EPA in Abschnitt 7.

Frühere Ausgaben

DIN EN 61800-7-301: 2008-11

Nationaler Anhang NA (informativ)

Auszugsweise Übersetzung^{N1)}

1 Anwendungsbereich

Dieser Teil der IEC 61800 beschreibt die Abbildung von Profil-Typ 1 (CiA 402), der in IEC 61800-7-201 festgelegt ist, auf verschiedene Netzwerktechnologien.

Es ist nicht Zweck der in diesem Teil der IEC 61800-7 beschriebenen Funktionen, funktionale Sicherheit sicherzustellen. Dies erfordert zusätzliche Maßnahmen nach den maßgeblichen Normen, Vereinbarungen und Gesetzen.

- CANopen, siehe Abschnitt 5;
- CC-Link IE Field, siehe Abschnitt 6;
- EPA, siehe Abschnitt 7;
- EtherCAT, siehe Abschnitt 8;
- ETHERNET Powerlink, siehe Abschnitt 9.

3 Begriffe und Abkürzungen

3.1 Begriffe

Für die Anwendung dieses Dokuments gelten die folgenden Begriffe.

3.1.1

Istwert

(en: actual value)

Wert einer variablen Größe zu einem gegebenen Zeitpunkt

Anmerkung 1 zum Begriff: Der Istwert wird in diesem Dokument als Eingangsdatenwert des Programms zur Steuerung der Anwendung verwendet, um Variable des PDS (z. B. Rückführgrößen) zu überwachen.

[QUELLE: IEC 61800-7-1:2015, 3.3.1.1]

3.1.2

Anwendung

(en: application)

funktionales Element der Software, spezifisch für die Problemlösung bei industriellen Prozessen mit Messen und Regeln

Anmerkung 1 zum Begriff: Eine Anwendung kann über Ressourcen verteilt sein und kann mit anderen Anwendungen kommunizieren.

[QUELLE: IEC 61800-7-1:2015, 3.2.2]

3.1.3

Attribut

(en: attribute)

Eigenschaft oder Charakteristik einer Funktionseinheit

[QUELLE: IEC 61800-7-1:2015, 3.2.3]

^{N1)} Nationale Fußnote: Die Nummerierung aus IEC 61800-7-301:2015-11 wurde beibehalten

3.1.4

Klasse

(en: class)

Beschreibung einer Menge von Objekten, die dieselben Attribute, Operationen, Methoden, Beziehungen und dieselbe Semantik haben

[QUELLE: IEC 61800-7-1:2015, 3.2.5]

3.1.5

Befehle

(en: commands)

Menge an Befehlen von dem Programm zur Steuerung der Anwendung an das PDS, um das Verhalten des PDS oder der funktionalen Elemente des PDS zu steuern

Anmerkung 1 zum Begriff: Das Verhalten wird durch Zustände oder Betriebsarten wiedergegeben.

Anmerkung 2 zum Begriff: Die verschiedenen Befehle können jeweils durch ein Bit dargestellt werden.

[QUELLE: IEC 61800-7-1:2015, 3.3.1.3]

3.1.6

Kommunikations-Makrozyklus

(en: communication macrocycle)

Menge an Basiszyklen, die für eine konfigurierte Kommunikationsaktivität in einem Makro-Netzwerksegment benötigt wird

3.1.7

Konfigurationsdaten

(en: configuration data)

Daten zur Auswahl der funktionalen Einheiten, zur Zuweisung ihrer Position und zur Definition ihrer Verbindungen

3.1.8

Leiten

(en: control)

zweckmäßige Maßnahmen an oder in einem Prozess, um vorgegebene Ziele zu erreichen

[QUELLE: IEC 61800-7-1:2015, 3.2.6]

3.1.9

Steuergerät

(en: control device)

Baueinheit, die – innerhalb eines Moduls/einer Baugruppe oder eines Geräts – ein Anwendungsprogramm zur Steuerung des PDS enthält

[QUELLE: IEC 61800-7-1:2015, 3.2.7]

3.1.10

Datentyp

(en: data type)

Menge von Werten mit einer Menge zulässiger Operationen

[QUELLE: IEC 61800-7-1:2015, 3.2.8]

3.1.11

Gerät

Feldgerät

(en: device; field device)

<Funktionsbausteine> vernetzte unabhängige physische Einheit eines industriellen Automatisierungssystems, die fähig ist, spezifische Funktionen in einem speziellen Kontext auszuführen, und die durch ihre Schnittstellen abgegrenzt ist

[QUELLE: IEC 61800-7-1:2015, 3.2.9]

3.1.12**Geräteprofil**

(en: device profile)

Darstellung eines Geräts bezüglich seiner Parameter, Parametergruppen und seines Verhaltens gemäß eines Gerätemodells, das die Daten und das Verhalten des Geräts beschreibt, wie es durch ein Netzwerk gesehen wird, unabhängig von einer bestimmten Netzwerktechnologie

[QUELLE: IEC 61800-7-1:2015, 3.2.11]

3.1.13**Einheit**

(en: entity)

besondere Sache wie eine Person, ein Ort, ein Prozess, ein Objekt, ein Konzept, eine Zuordnung oder ein Ereignis

3.1.14**Rückführgröße**

(en: feedback variable)

variable Größe, die die Regelgröße abbildet und zum Vergleichsglied zurückgeführt wird

[QUELLE: IEC 61800-7-1:2015, 3.2.12]

3.1.15**funktionales Element**

(en: functional element)

Einheit von Software oder von Software, die mit Hardware kombiniert ist, fähig, eine festgelegte Funktion eines Geräts zu erfüllen

Anmerkung 1 zum Begriff: Ein funktionales Element hat eine Schnittstelle zu anderen funktionalen Elementen und Funktionen.

Anmerkung 2 zum Begriff: Ein funktionales Element kann aus einem oder mehreren Funktionsbausteinen, Objekten oder Parameterlisten erstellt werden.

[QUELLE: IEC 61800-7-1:2015, 3.2.13]

3.1.16**Eingangsdaten**

(en: input data)

Daten, die von einer externen Quelle in ein Gerät, eine Ressource oder ein funktionales Element übertragen werden

[QUELLE: IEC 61800-7-1:2015, 3.2.14]

3.1.17**Schnittstelle**

(en: interface)

Grenze zwischen zwei Einheiten, die durch funktionale Merkmale, Signalkenngrößen oder andere Merkmale als geeignet festgelegt ist

[QUELLE: IEC 61800-7-1:2015, 3.2.15]

3.1.18**Abbildung**

(en: mapping)

Menge an Werten, die eine festgelegte Entsprechung mit den Größen oder Werten einer anderen Menge aufweist

3.1.19**Nachricht**

(en: message)

geordnete Reihe von Oktetts zur Übermittlung von Informationen

3.1.20

Modell

(en: model)

mathematische oder physikalische Darstellung eines Systems oder Prozesses, die das System oder den Prozess aufgrund bekannter Gesetzmäßigkeiten, einer Identifikation oder getroffener Annahmen genügend genau abbildet

[QUELLE: IEC 61800-7-1:2015, 3.2.17]

3.1.21

Betriebsart

(en: operating mode)

Kennzeichnung von Art und Umfang, wie der Mensch als Bediener in eine Leiteinrichtung eingreift

[QUELLE: IEC 61800-7-1:2015, 3.2.18]

3.1.22

Verschiebung

(en: offset)

Anzahl an Oktetts ab einer gesondert festgelegten Position

3.1.23

Ausgabedaten

(en: output data)

Daten, die von einem Gerät, einer Ressource oder einem funktionalen Element kommen und von diesem/dieser zu externen Systemen übertragen werden

[QUELLE: IEC 61800-7-1:2015, 3.2.19]

3.1.24

Parameter

(en: parameter)

Datenelement, das Geräteinformationen darstellt, die aus einem Gerät gelesen oder in ein Gerät geschrieben werden können, z. B. durch ein Netzwerk oder ein lokales Bediengerät

Anmerkung 1 zum Begriff: Ein Parameter ist typischerweise durch einen Parameternamen, einen Datentyp und eine Zugriffsrichtung gekennzeichnet.

[QUELLE: IEC 61800-7-1:2015, 3.2.20]

3.1.25

Profil

(en: profile)

Darstellung einer PDS-Schnittstelle bezüglich ihrer Parameter, Parametergruppen und ihres Verhaltens nach einem Kommunikationsprofil und einem Geräteprofil

[QUELLE: IEC 61800-7-1:2015, 3.2.21, modifiziert – Anmerkung 1 zum Begriff wurde gestrichen.]

3.1.26

Sollwert

(en: set-point)

Wert oder Variable, der/die als Ausgabedaten von dem Programm zur Steuerung der Anwendung verwendet wird, um das PDS zu steuern

[QUELLE: IEC 61800-7-1:2015, 3.3.1.5]

3.1.27

Zustand

(en: status)

Menge an Informationen von dem PDS an das Programm zur Steuerung der Anwendung, die den Zustand oder die Betriebsart des PDS oder eines funktionalen Elements des PDS wiedergibt

Anmerkung 1 zum Begriff: Die verschiedenen Zustandsinformationen können jeweils mit einem Bit kodiert werden.

[QUELLE: IEC 61800-7-1:2015, 3.3.1.6]

3.1.28**Typ**

(en: type)

Hardware- oder Software-Element, das die gemeinsamen Attribute festlegt, die von allen Instanzen des Typs gemeinsam genutzt werden

[QUELLE: IEC 61800-7-1:2015, 3.2.23]

3.1.29**Variable**

(en: variable)

Software-Einheit, die jeweils verschiedene Werte zu einer Zeit annehmen kann

Anmerkung 1 zum Begriff: Die Werte sowohl einer Variablen als auch eines Parameters sind üblicherweise auf einen bestimmten Datentyp festgelegt.

[QUELLE: IEC 61800-7-1:2015, 3.2.25]

3.2 Abkürzungen

APDU	Anwendungsprotokolldateneinheit (en: application protocol data unit)
AREP	Endpunkt der Anwendungsbeziehung (en: application relationship end point)
ASE	Anwendungsdienstelement (en: application service element)
c	Konstante (en: constant)
CAN	controller area network
CiA	CAN in Automation
COB	Kommunikationsobjekt (en: communication object)
ECSME	Typ 14-Managementeinheit zur Kommunikationsplanung (en: Type 14 communication scheduling management entity)
EMCY	Notfall-Nachricht (en: emergency message)
EPA	Ethernet für die Anlagenautomatisierung (en: Ethernet for Plant Automation)
FAL	Feldbus-Anwendungsschicht (en: fieldbus application layer)
FCS	Blockprüfzeichenfolge (en: frame check sequence)
FRT	schnelle Echtzeit (en: fast real-time)
EM	(als Präfix) Typ 14-Management
FSA	Automatisierung mit Zustandsmaschine (en: finite state automaton)
ID	Kennzeichner (en: identifier)
IP	Internetprotokoll (en: internet protocol)
MOB	Managementobjektbasis (en: management object base)
NMT	Netzwerkmanagement (en: network management)
PDO	Prozessdatenobjekt (en: process data object)
PDS	Leistungsantriebssystem (en: power drive system)
PDU	Protokolldateneinheit (en: protocol data unit)
ro	nur Lesezugriff (en: read-only)
RPDO	Empfangs-Prozessdatenobjekt (en: receive process data object)
rw	Lese- und Schreibzugriff (en: read-write)
SDO	Servicedatenobjekt (en: service data object)
SYNC	Synchronisierungsnachricht (en: synchronization message)
TIME	Zeitnachricht (en: time message)

DIN EN 61800-7-301:2016-11

TPDO Übertragungs-Prozessdatenobjekt (en: transmit process data object)

wdc Watchdog-Zähler (en: watch dog counter)

English Version

Adjustable speed electrical power drive systems -
Part 7-301: Generic interface and use of profiles for power drive
systems - Mapping of profile type 1 to network technologies
(IEC 61800-7-301:2015)

Entraînements électriques de puissance à vitesse variable -
Partie 7-301: Interface générique et utilisation de profils
pour les entraînements électriques de puissance - Mise en
correspondance du profil de type 1 avec les technologies
de réseaux
(IEC 61800-7-301:2015)

Elektrische Leistungsantriebssysteme mit einstellbarer
Drehzahl - Teil 7-301: Generisches Interface und Nutzung
von Profilen für Leistungsantriebssysteme (PDS) -
Abbildung von Profil-Typ 1 auf Netzwerktechnologien
(IEC 61800-7-301:2015)

This European Standard was approved by CENELEC on 2015-12-25. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.



European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

European foreword

The text of document 22G/311/FDIS, future edition 2 of IEC 61800-7-301, prepared by SC 22G "Adjustable speed electric drive systems incorporating semiconductor power converters" of IEC/TC 22 "Power electronic systems and equipment" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 61800-7-301:2016.

The following dates are fixed:

- latest date by which the document has to be (dop) 2016-09-25
implemented at national level by
publication of an identical national
standard or by endorsement
- latest date by which the national (dow) 2018-12-25
standards conflicting with the
document have to be withdrawn

This document supersedes EN 61800-7-301:2008.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

Endorsement notice

The text of the International Standard IEC 61800-7-301:2015 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 61158 Series	NOTE	Harmonized as EN 61158 Series.
IEC 61499-1	NOTE	Harmonized as EN 61499-1.
IEC 61784-1	NOTE	Harmonized as EN 61784-1.
IEC 61784-2	NOTE	Harmonized as EN 61784-2.
IEC 61800 Series	NOTE	Harmonized as EN 61800 Series.
IEC 61800-7-1:2015	NOTE	Harmonized as EN 61800-7-1:2016 (not modified).
IEC 61800-7-202:2015	NOTE	Harmonized as EN 61800-7-202:2016 (not modified).
IEC 61800-7-203:2015	NOTE	Harmonized as EN 61800-7-203:2016 (not modified).
IEC 61800-7-204:2015	NOTE	Harmonized as EN 61800-7-204:2016 (not modified).
IEC 61800-7-302:2015	NOTE	Harmonized as EN 61800-7-302:2016 (not modified).
IEC 61800-7-303:2015	NOTE	Harmonized as EN 61800-7-303:2016 (not modified).
IEC 61800-7-304:2015	NOTE	Harmonized as EN 61800-7-304:2016 (not modified).
IEC 61915-1	NOTE	Harmonized as EN 61915-1.

CONTENTS

INTRODUCTION.....	11
1 Scope.....	15
2 Normative references	15
3 Terms, definitions and abbreviated terms	16
3.1 Terms and definitions	16
3.2 Abbreviated terms	19
4 General	20
5 Mapping to CANopen.....	20
5.1 Overview	20
5.2 Mapping of communication objects	20
5.3 Communication parameter objects.....	21
5.3.1 General	21
5.3.2 Object 1000 _h : Device type	21
5.3.3 Object 1029 _h : Error behavior.....	22
5.3.4 Object 67FF _h : Single device type	23
5.4 Emergency message	23
5.5 Communication fault events.....	23
5.6 Sets of pre-defined PDOs.....	23
5.6.1 General	23
5.6.2 PDO set for generic drive device	24
5.6.3 PDO set for frequency converter	57
5.6.4 PDO set for servo drive	71
5.6.5 PDO set for stepper motor.....	89
5.7 PDO mapping attributes	107
6 Mapping to CC-Link IE Field Network	111
6.1 Overview	111
6.2 Device model	111
6.3 Mapping of communication objects	111
6.3.1 General	111
6.3.2 The detailed mapping of communication objects	111
6.3.3 FAL syntax description.....	112
6.3.4 FAL transfer syntax.....	113
6.4 Communication parameter objects.....	118
6.4.1 General	118
6.4.2 Object 1000 _h : Device type	118
6.5 Sets of pre-defined PDOs.....	118
6.5.1 General	118
6.5.2 PDO set for generic drive device	118
6.6 PDO mapping attributes	121
7 Mapping to EPA.....	122
7.1 Overview	122
7.2 Device module	122
7.2.1 Overview	122

7.2.2	Additional definition for mapping to CiA 402	123
7.2.3	CiA 402 mapping module	125
7.2.4	FAL management object for CiA 402 mapping	126
7.3	PDOs mapping on cyclic PDU transmission	130
7.3.1	Overview	130
7.3.2	Configuration	131
7.3.3	Procedure of sending PDOs	133
7.3.4	Procedure of receiving PDOs	133
7.4	PDOs mapping on acyclic PDU transmission	134
7.4.1	General	134
7.4.2	FRTRead service	134
7.4.3	FRTWrite service	135
7.4.4	FRTRead service process	135
7.4.5	FRTWrite service process	136
7.5	Alarm mechanism	136
7.5.1	Overview	136
7.5.2	EventReport service.....	136
7.5.3	EventReportAcknowledge service	137
7.5.4	Event object	137
7.5.5	Alarm process.....	138
7.5.6	Error code	138
8	Mapping to EtherCAT	138
8.1	Overview	138
8.2	Mapping of communication objects	139
8.3	Communication parameter objects.....	139
8.3.1	General	139
8.3.2	Object 1000 _h : Device type	139
8.4	Sets of pre-defined PDOs.....	140
8.5	PDO mapping attributes	140
9	Mapping to ETHERNET Powerlink	140
9.1	Overview	140
9.2	Mapping of communication objects	140
9.3	Communication parameter objects.....	140
9.3.1	General	140
9.3.2	Object 1000 _h : Device type	141
9.3.3	Object 67FF _h : Single device type	141
9.4	Emergency information	141
9.5	Sets of pre-defined PDOs.....	141
9.5.1	General	141
9.5.2	PDO set for generic drive device	141
9.5.3	PDO set for frequency converter	148
9.5.4	PDO set for servo drive.....	152
9.5.5	PDO set for stepper motor	156
9.6	PDO mapping attributes	160
	Bibliography	161
	Annex ZA (normative) Normative references to international publications with their corresponding European publications.....	163

Figure 1 – Structure of IEC 61800-7	14
Figure 2 – Structure of EPA drive system	122
Figure 3 – CiA 402 mapping structure	125
Figure 4 – Format of Type 14 PDU for FRT application	131
Table 1 – List of used data types.....	21
Table 2 – Additional information field for generic PDO mapping	22
Table 3 – Additional information field for type-specific PDO mapping	22
Table 4 – Value definition	22
Table 5 – Object description.....	22
Table 6 – Entry description	23
Table 7 – Overview on RPDO.....	24
Table 8 – Overview on TPDO	24
Table 9 – Object description of communication parameters.....	25
Table 10 – Entry description of communication parameters.....	25
Table 11 – Object description of mapping parameters.....	26
Table 12 – Entry description of mapping parameters.....	26
Table 13 – Object description of communication parameters.....	27
Table 14 – Entry description of communication parameters.....	27
Table 15 – Object description of mapping parameters.....	28
Table 16 – Entry description of mapping parameters.....	28
Table 17 – Object description of communication parameters.....	29
Table 18 – Entry description of communication parameters.....	29
Table 19 – Object description of mapping parameters.....	30
Table 20 – Entry description of mapping parameters.....	30
Table 21 – Object description of communication parameters.....	31
Table 22 – Entry description of communication parameters.....	31
Table 23 – Object description of mapping parameters.....	32
Table 24 – Entry description of mapping parameters.....	32
Table 25 – Object description of communication parameters.....	33
Table 26 – Entry description of communication parameters.....	33
Table 27 – Object description of mapping parameters.....	34
Table 28 – Entry description of mapping parameters.....	34
Table 29 – Object description of communication parameters.....	35
Table 30 – Entry description of communication parameters.....	35
Table 31 – Object description of mapping parameters.....	36
Table 32 – Entry description of mapping parameters.....	36
Table 33 – Object description of communication parameters.....	37
Table 34 – Entry description of communication parameters.....	37
Table 35 – Object description of mapping parameters.....	38
Table 36 – Entry description of mapping parameters.....	38
Table 37 – Object description of communication parameters.....	39

Table 38 – Entry description of communication parameters.....	39
Table 39 – Object description of mapping parameters	40
Table 40 – Entry description of mapping parameters	40
Table 41 – Object description of communication parameters.....	41
Table 42 – Entry description of communication parameters.....	42
Table 43 – Object description of mapping parameters	43
Table 44 – Entry description of mapping parameters	43
Table 45 – Object description of communication parameters.....	44
Table 46 – Entry description of communication parameters.....	44
Table 47 – Object description of mapping parameters	45
Table 48 – Entry description of mapping parameters	45
Table 49 – Object description of communication parameters.....	46
Table 50 – Entry description of communication parameters.....	46
Table 51 – Object description of mapping parameters	47
Table 52 – Entry description of mapping parameters	47
Table 53 – Object description of communication parameters.....	48
Table 54 – Entry description of communication parameters.....	48
Table 55 – Object description of mapping parameters	49
Table 56 – Entry description of mapping parameters	49
Table 57 – Object description of communication parameters.....	50
Table 58 – Entry description of communication parameters.....	50
Table 59 – Object description of mapping parameters	51
Table 60 – Entry description of mapping parameters	52
Table 61 – Object description of communication parameters.....	53
Table 62 – Entry description of communication parameters.....	53
Table 63 – Object description of mapping parameters	54
Table 64 – Entry description of mapping parameters	54
Table 65 – Object description of communication parameters.....	55
Table 66 – Entry description of communication parameters.....	55
Table 67 – Object description of mapping parameters	56
Table 68 – Entry description of mapping parameters	56
Table 69 – Overview on RPDO	57
Table 70 – Overview on TPDO	57
Table 71 – Object description of communication parameters.....	57
Table 72 – Entry description of communication parameters.....	58
Table 73 – Object description of mapping parameters	58
Table 74 – Entry description of mapping parameters	59
Table 75 – Object description of communication parameters.....	60
Table 76 – Entry description of communication parameters.....	60
Table 77 – Object description of mapping parameters	61
Table 78 – Entry description of mapping parameters	61
Table 79 – Object description of communication parameters.....	62

Table 80 – Entry description of communication parameters.....	62
Table 81 – Object description of mapping parameters.....	63
Table 82 – Entry description of mapping parameters.....	63
Table 83 – Object description of communication parameters.....	64
Table 84 – Entry description of communication parameters.....	65
Table 85 – Object description of mapping parameters.....	66
Table 86 – Entry description of mapping parameters.....	66
Table 87 – Object description of communication parameters.....	67
Table 88 – Entry description of communication parameters.....	67
Table 89 – Object description of mapping parameters.....	68
Table 90 – Entry description of mapping parameters.....	68
Table 91 – Object description of communication parameters.....	69
Table 92 – Entry description of communication parameters.....	69
Table 93 – Object description of mapping parameters.....	70
Table 94 – Entry description of mapping parameters.....	70
Table 95 – Overview on RPDO.....	71
Table 96 – Overview on TPDO.....	71
Table 97 – Object description of communication parameters.....	71
Table 98 – Entry description of communication parameters.....	72
Table 99 – Object description of mapping parameters.....	72
Table 100 – Entry description of mapping parameters.....	73
Table 101 – Object description of communication parameters.....	73
Table 102 – Entry description of communication parameters.....	74
Table 103 – Object description of mapping parameters.....	74
Table 104 – Entry description of mapping parameters.....	75
Table 105 – Object description of communication parameters.....	76
Table 106 – Entry description of communication parameters.....	76
Table 107 – Object description of mapping parameters.....	77
Table 108 – Entry description of mapping parameters.....	77
Table 109 – Object description of communication parameters.....	78
Table 110 – Entry description of communication parameters.....	78
Table 111 – Object description of mapping parameters.....	79
Table 112 – Entry description of mapping parameters.....	79
Table 113 – Object description of communication parameters.....	80
Table 114 – Entry description of communication parameters.....	81
Table 115 – Object description of mapping parameters.....	82
Table 116 – Entry description of mapping parameters.....	82
Table 117 – Object description of communication parameters.....	83
Table 118 – Entry description of communication parameters.....	83
Table 119 – Object description of mapping parameters.....	84
Table 120 – Entry description of mapping parameters.....	84
Table 121 – Object description of communication parameters.....	85

Table 122 – Entry description of communication parameters.....	85
Table 123 – Object description of mapping parameters.....	86
Table 124 – Entry description of mapping parameters	86
Table 125 – Object description of communication parameters.....	87
Table 126 – Entry description of communication parameters.....	87
Table 127 – Object description of mapping parameters.....	88
Table 128 – Entry description of mapping parameters	88
Table 129 – Overview on RPDO.....	89
Table 130 – Overview on TPDO.....	89
Table 131 – Object description of communication parameters.....	89
Table 132 – Entry description of communication parameters.....	90
Table 133 – Object description of mapping parameters.....	90
Table 134 – Entry description of mapping parameters	91
Table 135 – Object description of communication parameters.....	91
Table 136 – Entry description of communication parameters.....	92
Table 137 – Object description of mapping parameters.....	92
Table 138 – Entry description of mapping parameters	93
Table 139 – Object description of communication parameters.....	94
Table 140 – Entry description of communication parameters.....	94
Table 141 – Object description of mapping parameters.....	95
Table 142 – Entry description of mapping parameters	95
Table 143 – Object description of communication parameters.....	96
Table 144 – Entry description of communication parameters.....	96
Table 145 – Object description of mapping parameters.....	97
Table 146 – Entry description of mapping parameters	97
Table 147 – Object description of communication parameters.....	98
Table 148 – Entry description of communication parameters.....	99
Table 149 – Object description of mapping parameters.....	100
Table 150 – Entry description of mapping parameters	100
Table 151 – Object description of communication parameters.....	101
Table 152 – Entry description of communication parameters.....	101
Table 153 – Object description of mapping parameters.....	102
Table 154 – Entry description of mapping parameters	102
Table 155 – Object description of communication parameters.....	103
Table 156 – Entry description of communication parameters.....	104
Table 157 – Object description of mapping parameters.....	105
Table 158 – Entry description of mapping parameters	105
Table 159 – Object description of communication parameters.....	106
Table 160 – Entry description of communication parameters.....	106
Table 161 – Object description of mapping parameters.....	107
Table 162 – Entry description of mapping parameters	107
Table 163 – PDO mapping attributes of CiA 402 objects	108

Table 164 – Object dictionary structure	111
Table 165 – FieldMotionSpecificTransient	114
Table 166 – command (dataType: 08 _h , dataSubType: 0002 _h)	114
Table 167 – subCommand type for each command type	114
Table 168 – Structure of setCycleTimeRequest	114
Table 169 – ctCycle	115
Table 170 – syCycle	116
Table 171 – Structure of setCycleTimeResponse	116
Table 172 – Result.....	117
Table 173 – Structure of readObjectRequest	117
Table 174 – Structure of readObjectResponse.....	117
Table 175 – Structure of writeObjectRequest.....	117
Table 176 – Structure of writeObjectResponse	117
Table 177 – List of used data types.....	118
Table 178 – Overview on object in RPDO	118
Table 179 – Overview on object in TPDO	119
Table 180 – Object description of mapping parameters.....	119
Table 181 – Entry description of mapping parameters.....	120
Table 182 – Object description of mapping parameters.....	121
Table 183 – Entry description of mapping parameters.....	121
Table 184 – List of used data types.....	122
Table 185 – Overview on RPDO.....	123
Table 186 – Overview on TPDO	123
Table 187 – Management object base	124
Table 188 – Definition of Type 14 FRT link object.....	131
Table 189 – Encoding of FRTRead request parameters	134
Table 190 – Encoding of FRTRead positive response parameters.....	134
Table 191 – Encoding of FRTRead negative response parameters.....	135
Table 192 – Encoding of FRTWrite request parameters	135
Table 193 – Encoding of FRTWrite positive response parameters.....	135
Table 194 – Encoding of FRTWrite negative response parameters.....	135
Table 195 – Encoding of EventReport parameters	137
Table 196 – Format of EventReport service for alarm	137
Table 197 – Encoding of EventReportAcknowledge parameters	137
Table 198 – Format of EventReportAcknowledge service for alarm	137
Table 199 – Event object assignment.....	138
Table 200 – Example of Event object header.....	138
Table 201 – Example of Event object	138
Table 202 – List of used data types.....	139
Table 203 – Additional information field for generic PDO mapping	140
Table 204 – List of used data types.....	141
Table 205 – Overview on objects in RPDO	142

Table 206 – Overview on objects in TPDO	142
Table 207 – Object description of communication parameters	142
Table 208 – Entry description of communication parameters	143
Table 209 – Object description of mapping parameters	143
Table 210 – Entry description of mapping parameters	144
Table 211 – Object description of communication parameters	145
Table 212 – Entry description of communication parameters	146
Table 213 – Object description of mapping parameters	146
Table 214 – Entry description of mapping parameters	147
Table 215 – Overview on objects in RPDO	148
Table 216 – Overview on objects in TPDO	148
Table 217 – Object description of communication parameters	149
Table 218 – Entry description of communication parameters	149
Table 219 – Object description of mapping parameters	149
Table 220 – Entry description of mapping parameters	150
Table 221 – Object description of communication parameters	150
Table 222 – Entry description of communication parameters	151
Table 223 – Object description of mapping parameters	151
Table 224 – Entry description of mapping parameters	152
Table 225 – Overview on objects in RPDO	152
Table 226 – Overview on objects in TPDO	153
Table 227 – Object description of communication parameters	153
Table 228 – Entry description of communication parameters	153
Table 229 – Object description of mapping parameters	154
Table 230 – Entry description of mapping parameters	154
Table 231 – Object description of communication parameters	155
Table 232 – Entry description of communication parameters	155
Table 233 – Object description of mapping parameters	155
Table 234 – Entry description of mapping parameters	156
Table 235 – Overview on objects in RPDO	156
Table 236 – Overview on objects in TPDO	157
Table 237 – Object description of communication parameters	157
Table 238 – Entry description of communication parameters	157
Table 239 – Object description of mapping parameters	158
Table 240 – Entry description of mapping parameters	158
Table 241 – Object description of communication parameters	159
Table 242 – Entry description of communication parameters	159
Table 243 – Object description of mapping parameters	159
Table 244 – Entry description of mapping parameters	160

INTRODUCTION

The IEC 61800 series is intended to provide a common set of specifications for adjustable speed electrical power drive systems.

IEC 61800-7 specifies profiles for power drive systems (PDS) and their mapping to existing communication systems by use of a generic interface model.

IEC 61800-7 describes a generic interface between control systems and power drive systems. This interface can be embedded in the control system. The control system itself can also be located in the drive (sometimes known as "smart drive" or "intelligent drive").

A variety of physical interfaces is available (analogue and digital inputs and outputs, serial and parallel interfaces, fieldbuses and networks). Profiles based on specific physical interfaces are already defined for some application areas (e.g. motion control) and some device classes (e.g. standard drives, positioner). The implementations of the associated drivers and application programming interface are proprietary and vary widely.

IEC 61800-7 defines a set of common drive control functions, parameters, and state machines or description of sequences of operation to be mapped to the drive profiles.

IEC 61800-7 provides a way to access functions and data of a drive that is independent of the used drive profile and communication interface. The objective is a common drive model with generic functions and objects suitable to be mapped on different communication interfaces. This makes it possible to provide common implementations of motion control (or velocity control or drive control applications) in controllers without any specific knowledge of the drive implementation.

There are several reasons to define a generic interface:

For a drive device manufacturer

- less effort to support system integrators;
- less effort to describe drive functions because of common terminology;
- the selection of drives does not depend on availability of specific support;

For a control device manufacturer

- no influence of bus technology;
- easy device integration;
- independent of a drive supplier;

For a system integrator

- less integration effort for devices;
- only one understandable way of modeling;
- independent of bus technology.

Much effort is needed to design a motion control application with several different drives and a specific control system. The tasks to implement the system software and to understand the functional description of the individual components may exhaust the project resources. In some cases, the drives do not share the same physical interface. Some control devices just support a single interface, which will not be supported by a specific drive. On the other hand, the functions and data structures are often specified with incompatibilities. This requires the system integrator to write special interfaces for the application software and this should not be his responsibility.

Some applications need device exchangeability or integration of new devices in an existing configuration. They are faced with different incompatible solutions. The efforts to adapt a solution to a drive profile and to manufacturer-specific extensions may be unacceptable. This will reduce the degree of freedom to select a device best suited for this application to the selection of the unit, which will be available for a specific physical interface and supported by the controller.

IEC 61800-7-1 is divided into a generic part and several annexes as shown in Figure 1. The drive profile types for CiA® 402¹, CIP Motion™², PROFIdrive³ and SERCOS®⁴ are mapped to the generic interface in the corresponding annex. The annexes have been submitted by open international network or fieldbus organizations, which are responsible for the content of the related annex and use of the related trade marks.

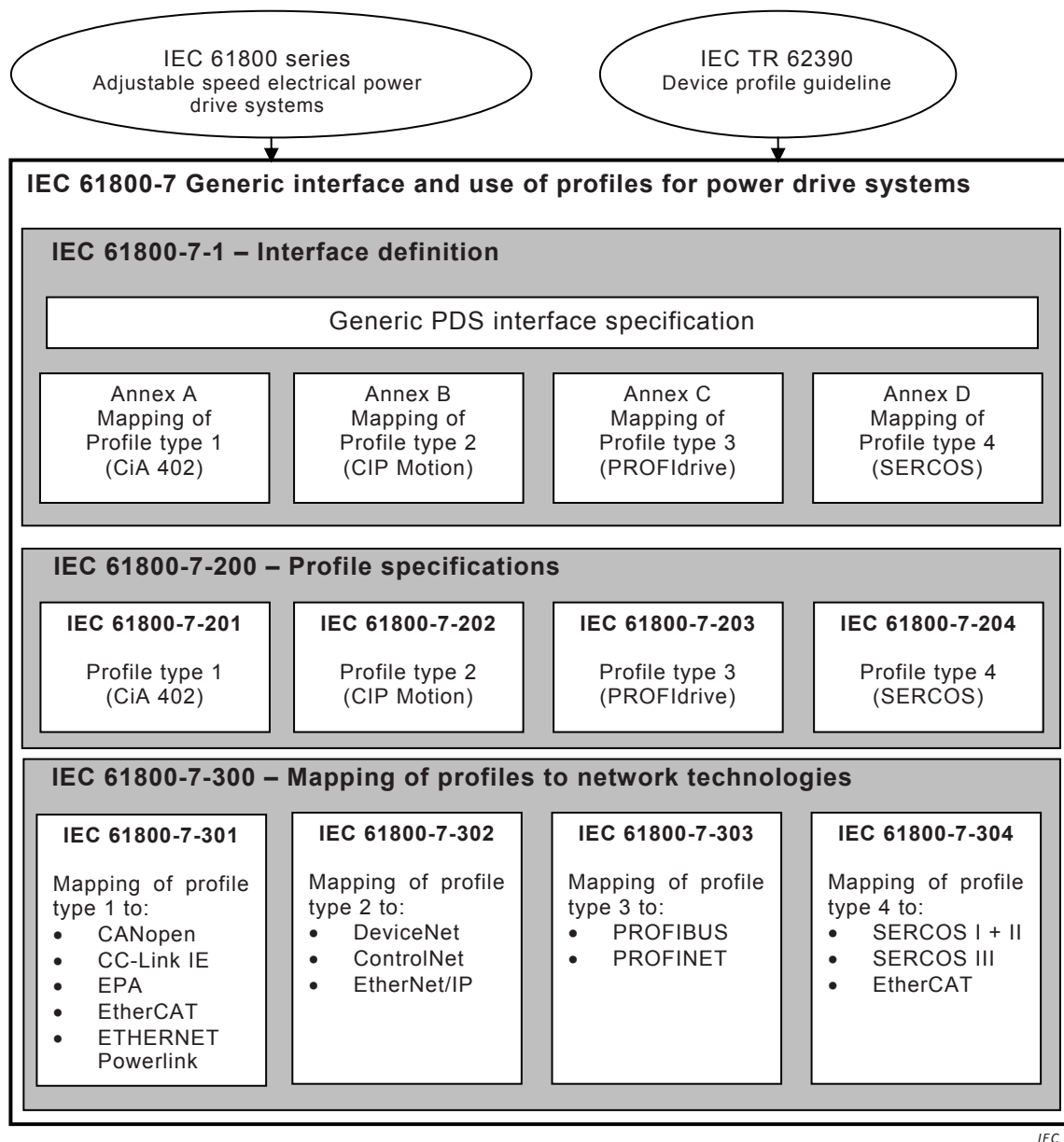
The different profile types 1, 2, 3, 4 are specified in IEC 61800-7-201, IEC 61800-7-202, IEC 61800-7-203 and IEC 61800-7-204.

This part of IEC 61800-7 specifies how the profile type 1 (CiA® 402) is mapped to the network technologies CANopen®⁵, CC-Link IE® Field Network⁶, EPA™⁷, EtherCAT®⁸ and Ethernet Powerlink™⁹.

-
- ¹ CiA® 402 is a registered trade mark of CAN in Automation e.V. (CiA). This information is given for the convenience of users of this International Standard and does not constitute an endorsement by IEC of the trade mark holder or any of its products. Compliance to this profile does not require use of the registered trade mark CiA® 402. Use of the registered trade mark CiA® 402 requires permission of CAN in Automation e.V. (CiA).
 - ² CIP Motion™ is a trade mark of ODVA, Inc. This information is given for the convenience of users of this International Standard and does not constitute an endorsement by IEC of the trade mark holder or any of its products. Compliance to this profile does not require use of the trade mark CIP Motion™. Use of the trade mark CIP Motion™ requires permission of ODVA, Inc.
 - ³ PROFIdrive is a trade name of PROFIBUS & PROFINET International. This information is given for the convenience of users of this International Standard and does not constitute an endorsement by IEC of the trade name holder or any of its products. Compliance to this profile does not require use of the trade name PROFIdrive. Use of the trade name PROFIdrive requires permission of PROFIBUS & PROFINET International.
 - ⁴ SERCOS® is a registered trade mark of SERCOS International e.V. This information is given for the convenience of users of this International Standard and does not constitute an endorsement by IEC of the trade mark holder or any of its products. Compliance to this profile does not require use of the registered trade mark SERCOS®. Use of the registered trade mark SERCOS® requires permission of the trade mark holder.
 - ⁵ CANopen® is a registered trade mark of CAN in Automation e.V. (CiA). This information is given for the convenience of users of this International Standard and does not constitute an endorsement by IEC of the trade mark holder or any of its products. Compliance to this profile does not require use of the registered trade mark CANopen®. CANopen® is an acronym for Controller Area Network *open* and is used to refer to EN 50325-4. Use of the registered trade mark CANopen® requires permission of CAN in Automation e.V. (CiA).
 - ⁶ CC-Link IE® Field Network is a registered trade mark of Mitsubishi Electric Corporation. This information is given for the convenience of users of this International Standard and does not constitute an endorsement by IEC of the trade mark holder or any of its products. Compliance to this profile does not require use of the registered trade mark CC-Link IE® Field Network. Use of the registered trade mark CC-Link IE® Field Network requires permission of Mitsubishi Electric Corporation.
 - ⁷ EPA™ is a trade mark of SUPCON Group Co. Ltd. This information is given for the convenience of users of this International Standard and does not constitute an endorsement by IEC of the trade mark holder or any of its products. Compliance to this profile does not require use of the trade mark EPA™. Use of the trade mark EPA™ requires permission of the trade mark holder.
 - ⁸ EtherCAT® is a registered trade mark of Beckhoff, Verl. This information is given for the convenience of users of this International Standard and does not constitute an endorsement by IEC of the trade mark holder or any of its products. Compliance to this profile does not require use of the registered trade mark EtherCAT®. Use of the registered trade mark requires permission of the trade mark holder.
 - ⁹ Ethernet Powerlink™ is a trade mark of Bernecker & Rainer Industrieelektronik Ges.m.b.H., control of trade mark is given to the non profit organization EPSG. This information is given for the convenience of users of this International Standard and does not constitute an endorsement by IEC of the trade mark holder or any of its products. Compliance to this profile does not require use of the trade mark Ethernet Powerlink™. Use of the trade mark requires permission of the trade mark holder.

IEC 61800-7-302, IEC 61800-7-303 and IEC 61800-7-304 specify how the profile types 2, 3 and 4 are mapped to different network technologies (such as EtherCAT®, DeviceNet™¹⁰, ControlNet™¹¹, EtherNet/IP™¹², PROFIBUS¹³, PROFINET¹⁴ and SERCOS®).

-
- ¹⁰ DeviceNet™ is a trade mark of ODVA, Inc. This information is given for the convenience of users of this International Standard and does not constitute an endorsement by IEC of the trade mark holder or any of its products. Compliance to this profile does not require use of the trade mark DeviceNet™. Use of the trade mark DeviceNet™ requires permission of ODVA, Inc.
- ¹¹ ControlNet™ is a trade mark of ODVA, Inc. This information is given for the convenience of users of this International Standard and does not constitute an endorsement by IEC of the trade mark holder or any of its products. Compliance to this profile does not require use of the trade mark ControlNet™. Use of the trade mark ControlNet™ requires permission of ODVA, Inc.
- ¹² EtherNet/IP™ is a trade mark of ODVA, Inc. This information is given for the convenience of users of this International Standard and does not constitute an endorsement by IEC of the trade mark holder or any of its products. Compliance to this profile does not require use of the trade mark EtherNet/IP™. Use of the trade mark EtherNet/IP™ requires permission of ODVA, Inc.
- ¹³ PROFIBUS is a trade name of PROFIBUS & PROFINET International. This information is given for the convenience of users of this International Standard and does not constitute an endorsement by IEC of the trade name holder or any of its products. Compliance to this profile does not require use of the trade name PROFIBUS. Use of the trade name PROFIBUS requires permission of PROFIBUS & PROFINET International.
- ¹⁴ PROFINET is a trade name of PROFIBUS & PROFINET International. This information is given for the convenience of users of this International Standard and does not constitute an endorsement by IEC of the trade name holder or any of its products. Compliance to this profile does not require use of the trade name PROFINET. Use of the trade name PROFINET requires permission of PROFIBUS & PROFINET International.



IEC

Figure 1 – Structure of IEC 61800-7

ADJUSTABLE SPEED ELECTRICAL POWER DRIVE SYSTEMS –

Part 7-301: Generic interface and use of profiles for power drive systems – Mapping of profile type 1 to network technologies

1 Scope

This part of IEC 61800 specifies the mapping of the profile type 1 (CiA 402) specified in IEC 61800-7-201 onto different network technologies.

The functions specified in this part of IEC 61800-7 are not intended to ensure functional safety. This requires additional measures according to the relevant standards, agreements and laws.

- CANopen, see Clause 5;
- CC-Link IE Field, see Clause 6;
- EPA, see Clause 7;
- EtherCAT, see Clause 8;
- ETHERNET Powerlink, see Clause 9;

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 61158-4-14, *Industrial communication networks – Fieldbus specifications – Part 4-14: Data-link layer protocol specification – Type 14 elements*

IEC 61158-5-12, *Industrial communication networks – Fieldbus specifications – Part 5-12: Application layer service definition – Type 12 elements*

IEC 61158-5-13, *Industrial communication networks – Fieldbus specifications – Part 5-13: Application layer service definition – Type 13 elements*

IEC 61158-5-14, *Industrial communication networks – Fieldbus specifications – Part 5-14: Application layer service definition – Type 14 elements*

IEC 61158-5-23, *Industrial communication networks – Fieldbus specifications – Part 5-23: Application layer service definition – Type 23 elements*

IEC 61158-6-12, *Industrial communication networks – Fieldbus specifications – Part 6-12: Application layer protocol specification – Type 12 elements*

IEC 61158-6-13, *Industrial communication networks – Fieldbus specifications – Part 6-13: Application layer protocol specification – Type 13 elements*

IEC 61158-6-14, *Industrial communication networks – Fieldbus specification – Part 6-14: Application layer protocol specification – Type 14 elements*

IEC 61158-6-23, *Industrial communication networks – Fieldbus specification – Part 6-23: Application layer protocol specification – Type 23 elements*

IEC 61800-7-201, *Adjustable speed electrical power drive systems – Part 7-201: Generic interface and use of profiles for power drive systems – Profile type 1 specification*

EN 50325-4, *Industrial communications subsystem based on ISO 11898 (CAN) for controller-device interfaces – Part 4: CANopen*

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1.1

actual value

value of a variable quantity at a given instant

Note 1 to entry: Actual value is used in this document as input data of the application control program to monitor variables of the PDS (e.g. feedback variables).

[SOURCE: IEC 61800-7-1:2015, 3.3.1.1]

3.1.2

application

software functional element specific to the solution of a problem in industrial-process measurement and control

Note 1 to entry: An application may be distributed among resources, and may communicate with other applications.

[SOURCE: IEC 61800-7-1:2015, 3.2.2]

3.1.3

attribute

property or characteristic of an entity

[SOURCE: IEC 61800-7-1:2015, 3.2.3]

3.1.4

class

description of a set of objects that share the same attributes, operations, methods, relationships, and semantics

[SOURCE: IEC 61800-7-1:2015, 3.2.5]

3.1.5

commands

set of commands from the application control program to the PDS to control the behavior of the PDS or functional elements of the PDS

Note 1 to entry: The behavior is reflected by states or operating modes.

Note 2 to entry: The different commands may be represented by one bit each.

[SOURCE: IEC 61800-7-1:2015, 3.3.1.3]

3.1.6

communication macrocycle

set of basic cycles needed for a configured communication activity in a macro network segment

3.1.7

configuration data

data for selecting functional units, assigning their location and defining their interconnections

3.1.8

control

purposeful action on or in a process to meet specified objectives

[SOURCE: IEC 61800-7-1:2015, 3.2.6]

3.1.9

control device

physical unit that contains – in a module/subassembly or device – an application program to control the PDS

[SOURCE: IEC 61800-7-1:2015, 3.2.7]

3.1.10

data type

set of values together with a set of permitted operations

[SOURCE: IEC 61800-7-1:2015, 3.2.8]

3.1.11

device

field device

<function blocks> networked independent physical entity of an industrial automation system capable of performing specified functions in a particular context and delimited by its interfaces

[SOURCE: IEC 61800-7-1:2015, 3.2.9]

3.1.12

device profile

representation of a device in terms of its parameters, parameter assemblies and behaviour according to a device model that describes the data and behaviour of the device as viewed through a network, independent from any network technology

[SOURCE: IEC 61800-7-1:2015, 3.2.11]

3.1.13

entity

particular thing, such as a person, place, process, object, concept, association, or event

3.1.14

feedback variable

variable quantity, which represents the controlled variable and is returned to the comparing element

[SOURCE: IEC 61800-7-1:2015, 3.2.12]

3.1.15

functional element

entity of software or software combined with hardware, capable of accomplishing a specified function of a device

Note 1 to entry: A functional element has an interface, associations to other functional elements and functions.

Note 2 to entry: A functional element can be made out of function block(s), object(s) or parameter list(s).

[SOURCE: IEC 61800-7-1:2015, 3.2.13]

3.1.16

input data

data transferred from an external source into a device, resource or functional element

[SOURCE: IEC 61800-7-1:2015, 3.2.14]

3.1.17

interface

shared boundary between two entities defined by functional characteristics, signal characteristics, or other characteristics as appropriate

[SOURCE: IEC 61800-7-1:2015, 3.2.15]

3.1.18

mapping

set of values having defined correspondence with the quantities or values of another set

3.1.19

message

ordered series of octets intended to convey information

3.1.20

model

mathematical or physical representation of a system or a process, based with sufficient precision upon known laws, identification or specified suppositions

[SOURCE: IEC 61800-7-1:2015, 3.2.17]

3.1.21

operating mode

characterization of the way and the extent to which the human operator intervenes in the control equipment

[SOURCE: IEC 61800-7-1:2015, 3.2.18]

3.1.22

offset

number of octets from a specially designed position

3.1.23

output data

data originating in a device, resource or functional element and transferred from them to external systems

[SOURCE: IEC 61800-7-1:2015, 3.2.19]

3.1.24

parameter

data element that represents device information that can be read from or written to a device, for example through the network or a local HMI

Note 1 to entry: A parameter is typically characterized by a parameter name, data type and access direction.

[SOURCE: IEC 61800-7-1:2015, 3.2.20]

3.1.25

profile

representation of a PDS interface in terms of its parameters, parameter assemblies and behavior according to a communication profile and a device profile

[SOURCE: IEC 61800-7-1:2015, 3.2.21, modified — Note 1 to entry is deleted]

3.1.26

set-point

value or variable used as output data of the application control program to control the PDS

[SOURCE: IEC 61800-7-1:2015, 3.3.1.5]

3.1.27

status

set of information from the PDS to the application control program reflecting the state or mode of the PDS or a functional element of the PDS

Note 1 to entry: The different status information may be coded with one bit each.

[SOURCE: IEC 61800-7-1:2015, 3.3.1.6]

3.1.28

type

hardware or software element which specifies the common attributes shared by all instances of the type

[SOURCE: IEC 61800-7-1:2015, 3.2.23]

3.1.29

variable

software entity that may take different values, one at a time

Note 1 to entry: The values of a variable as well as of a parameter are usually restricted to a certain data type.

[SOURCE: IEC 61800-7-1:2015, 3.2.25]

3.2 Abbreviated terms

APDU	application protocol data unit
AREP	application relationship end point
ASE	application service element
c	constant
CAN	controller area network
CiA	CAN in Automation
COB	communication object

ECSME	Type 14 communication scheduling management entity
EMCY	emergency message
EPA	Ethernet for Plant Automation
FAL	fieldbus application layer
FCS	frame check sequence
FRT	fast real-time
EM	(as a prefix) Type 14 management
FSA	finite state automaton
ID	identifier
IP	internet protocol
MOB	management object base
NMT	network management
PDO	process data object
PDS	power drive system
PDU	protocol data unit
ro	read-only
RPDO	receive process data object
rw	read-write
SDO	service data object
SYNC	synchronization message
TIME	time message
TPDO	transmit process data object
wdc	watch dog counter

4 General

The following clauses specify the mapping of the CiA 402 drive profile onto different communication technologies:

- CANopen, see Clause 5
- CC-Link IE, see Clause 6
- EPA, see Clause 7
- EtherCAT, see Clause 8
- ETHERNET Powerlink, see Clause 9

5 Mapping to CANopen

5.1 Overview

This clause specifies the mapping of the CiA 402 drive profile onto CANopen network. In particular, the process data object (PDO) communication and mapping parameters are defined. In addition, this part of the IEC 61800-7 series defines the PDO mapping attribute for all objects defined in the CiA 402 drive profile (see IEC 61800-7-201).

5.2 Mapping of communication objects

COBs for real-time data transmission shall be mapped to process data object messages (PDOs). COBs for configuration data transmission shall be mapped to service data object message(s) (SDO).

COBs for emergency information transmission shall be mapped to emergency messages (EMCY). COBs for network management commands shall be mapped to NMT messages. COB for network management state information may be mapped to heartbeat message or node guarding message. COB for synchronization may be mapped to sync message (SYNC). COB for system time distribution may be mapped to time message (TIME).

5.3 Communication parameter objects

5.3.1 General

The drive device shall implement the mandatory communication parameter objects as defined in EN 50325-4. The drive device may implement the optional communication parameter objects as defined in EN 50325-4.

The category and entry category attributes of an object indicate if the object shall be implemented (mandatory) or may be implemented (optional).

The object code and data type attributes are defined in detail in EN 50325-4. The data types used in Clause 5 are listed in Table 1. The data types used in the CiA 402 profile are defined in EN 50325-4. Therefore, no mapping is defined.

Table 1 – List of used data types

Data type	Reference
Unsigned8	EN 50325-4
Unsigned16	EN 50325-4
Unsigned32	EN 50325-4
Integer8	EN 50325-4
Integer16	EN 50325-4
Integer32	EN 50325-4
PDO compar	EN 50325-4
PDO mapping	EN 50325-4

In the entry description, the access attribute indicating if an application object is read only (ro), read/write (rw), or constant (c) is defined. Read only indicates that this shall not be written via the bus; read/write allows to read and to write this object; and constant means that this object is not changed.

The default value attribute defines the factory setting value of an object with access attribute of the value 'rw' or 'c'.

5.3.2 Object 1000_h: Device type

This object is defined in IEC 61800-7-201 and EN 50325-4. Drive devices shall support either the generic PDO mapping or the type-specific PDO mapping. For devices supporting the generic PDO mapping (bit 22 in the additional information field shall be 0), the definitions given in Table 2 shall apply. For devices supporting the type-specific PDO mapping (bit 22 in the additional information field shall be 1) the definitions given in Table 3 shall apply. In Table 2 and Table 3 the symbol “*” means manufacturer-specific.

Table 2 – Additional information field for generic PDO mapping

Device	Additional information															
	Mode bits								Type							
	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
Frequency converter	*	*	*	*	*	*	*	*	0	0	0	0	0	0	0	1
Servo drive	*	*	*	*	*	*	*	*	0	0	0	0	0	0	1	0
Stepper motor	*	*	*	*	*	*	*	*	0	0	0	0	0	1	0	0
Multiple device module	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Table 3 – Additional information field for type-specific PDO mapping

Device	Additional information															
	Mode bits								Type							
	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
Frequency converter	*	*	*	*	*	*	*	*	0	1	0	0	0	0	0	1
Servo drive	*	*	*	*	*	*	*	*	0	1	0	0	0	0	1	0
Stepper motor	*	*	*	*	*	*	*	*	0	1	0	0	0	1	0	0
Multiple device module	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

5.3.3 Object 1029_h: Error behavior

This object specifies to which NMT state the device shall be set (see EN 50325-4), when a communication error or a device-internal error is detected. The device-internal error shall be valid when the PDS FSA is in fault reaction active state (see IEC 61800-7-201).

Table 4 specifies the value definition, Table 5 specifies the object description, and Table 6 specifies the entry description.

Table 4 – Value definition

Value	Definition
00 _h	Enter NMT pre-operational state (only if current NMT state is operational)
01 _h	No NMT state change
02 _h	Enter NMT stopped state

Table 5 – Object description

Attribute	Value
Index	1029 _h
Name	Error behavior
Object code	Array
Data type	Unsigned8
Category	Optional

Table 6 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	c
PDO mapping	No
Value range	01 _h to 02 _h
Default value	Manufacturer-specific
Sub-index	01 _h
Description	Communication error
Entry category	Mandatory
Access	rw
PDO mapping	No
Value range	See Table 4
Default value	00 _h
Sub-index	02 _h
Description	Internal device error
Entry category	Optional
Access	rw
PDO mapping	No
Value range	See Table 4
Default value	01 _h

5.3.4 Object 67FF_h: Single device type

The object at index 67FF_h and multiples with an offset of 800_h shall define the type of each device within one drive unit and its functionality. The object structure shall be the same as defined in object 1000_h (for details, see EN-50325-4).

5.4 Emergency message

When the drive device detects internally a failure, it may transmit an emergency message as defined in EN 50325-4. The emergency message may use the error codes as defined in EN 50325-4 or in IEC 61800-7-201.

5.5 Communication fault events

These events are covered by IEC 61800-7-201 object 6007_h.

5.6 Sets of pre-defined PDOs

5.6.1 General

A drive device supporting more than one mode of operation may require more than one pre-defined PDO. Therefore several PDOs are pre-defined in respect to the different possible modes of operation for drive devices.

The PDO assignments defined hereafter shall be used for every axis of a multi-device module with an offset of 64. For example, the first PDO of the second axis gets the number 65. In this way, a drive device is able to support a maximum of 8 axes.

NOTE All PDOs of the second and following axes are disabled by default.

There are several sets of pre-defined PDOs. The PDO set for generic drive device is independent from the drive type. The PDO sets for specific drive devices are different for frequency converter, servo controller, and stepper motor.

All pre-defined RPDOs with transmission type of 255 shall immediately enter all mapped objects into the object dictionary.

All pre-defined TPDOs with transmission type of 255 shall be transmitted when entering the NMT operational state.

The PDO commpar and the PDO mapping record definitions, and the value definitions of the PDO communication and mapping parameters are defined in EN 50325-4.

In general all PDO communication objects defined in EN 50325-4 can be used. The following sections describe only the default values of the PDO objects.

5.6.2 PDO set for generic drive device

5.6.2.1 Overview and introduction

The PDO set for generic drive device pre-defines eight RPDOs (see Table 7) and seven TPDOs (see Table 8). The TPDOs with transmission type of 255 shall be triggered when any mapped object is changing. The RPDOs with transmission type 255 shall immediately update all mapped objects.

Table 7 – Overview on RPDO

PDO	Support	Description
1	Mandatory	Controls PDS FSA
2	Optional	Controls PDS FSA and modes of operation
3	Optional	Controls PDS FSA and target position (pp)
4	Optional	Controls PDS FSA and target velocity (pv)
5	Optional	Controls PDS FSA and target torque (tq)
6	Optional	Controls PDS FSA and nominal speed (vl)
7	Optional	Controls PDS FSA and digital outputs
8	Optional	Controls PDS FSA and mode of operation (broadcast PDO)
9 to 16	Reserved	
17 to 64	Optional	Manufacturer-specific

Table 8 – Overview on TPDO

PDO	Support	Description
1	Mandatory	Specifies PDS FSA status
2	Optional	Specifies PDS FSA status and current mode of operation
3	Optional	Specifies PDS FSA status and current position (pp)
4	Optional	Specifies PDS FSA status and current velocity (pv)
5	Optional	Specifies PDS FSA status and current torque (tq)
6	Optional	Specifies PDS FSA status and current speed (vl)
7	Optional	Specifies PDS FSA status and digital inputs
8 to 16	Reserved	
17 to 64	Optional	Manufacturer-specific

5.6.2.2 RPDO 1

Table 9 specifies the object description and Table 10 specifies the entry description of the PDO communication parameters.

Table 9 – Object description of communication parameters

Attribute	Value
Index	1400 _h
Name	Receive PDO1 parameter
Object code	Record
Data type	PDO commpar
Category	Mandatory

Table 10 – Entry description of communication parameters

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	c
PDO mapping	No
Value range	See EN 50325-4
Default value	Manufacturer-specific
Sub-index	01 _h
Description	COB-ID used by PDO
Entry category	Mandatory
Access	c or rw (if COB-ID is changeable)
PDO mapping	No
Value range	See EN 50325-4
Default value	0000 0200 _h + node-ID
Sub-index	02 _h
Description	Transmission type
Entry category	Mandatory
Access	c or rw (if PDO type change is supported)
PDO mapping	No
Value range	See EN 50325-4
Default value	255 _d
Sub-index	05 _h
Description	Event timer
Entry category	Optional
Access	rw
PDO mapping	No
Value range	See EN 50325-4
Default value	Manufacturer-specific

Table 11 specifies the object description and Table 12 specifies the entry description of the PDO mapping parameters.

Table 11 – Object description of mapping parameters

Attribute	Value
Index	1600 _h
Name	Receive PDO1 mapping
Object code	Record
Data type	PDO mapping
Category	Mandatory

Table 12 – Entry description of mapping parameters

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	c or rw (if variable mapping is supported)
PDO mapping	No
Value range	See EN 50325-4
Default value	01 _h
Sub-index	01 _h
Description	1st application object
Entry category	Mandatory
Access	c or rw (if variable mapping is supported)
PDO mapping	No
Value range	See EN 50325-4
Default value	6040 0010 _h
Sub-index	02 _h
Description	2nd application object
Entry category	Optional
Access	c or rw (if variable mapping is supported)
PDO mapping	No
Value range	See EN 50325-4
Default value	Manufacturer-specific
to	
Sub-index	40 _h
Description	64th application object
Entry category	Optional
Access	c or rw (if variable mapping is supported)
PDO mapping	No
Value range	See EN 50325-4
Default value	Manufacturer-specific

5.6.2.3 RPDO 2

Table 13 specifies the object description and Table 14 specifies the entry description of the PDO communication parameters.

Table 13 – Object description of communication parameters

Attribute	Value
Index	1401 _h
Name	Receive PDO2 parameter
Object code	Record
Data type	PDO commpar
Category	Optional

Table 14 – Entry description of communication parameters

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	c
PDO mapping	No
Value range	See EN 50325-4
Default value	Manufacturer-specific
Sub-index	01 _h
Description	COB-ID used by PDO
Entry category	Mandatory
Access	c or rw (if COB-ID is changeable)
PDO mapping	No
Value range	See EN 50325-4
Default value	(0000 0300 _h or 8000 0300 _h) + node-ID
Sub-index	02 _h
Description	Transmission type
Entry category	Mandatory
Access	c or rw (if PDO type change is supported)
PDO mapping	No
Value range	See EN 50325-4
Default value	255 _d
Sub-index	05 _h
Description	Event timer
Entry category	Optional
Access	rw
PDO mapping	No
Value range	See EN 50325-4
Default value	Manufacturer-specific

Table 15 specifies the object description and Table 16 specifies the entry description of the PDO mapping parameters.

Table 15 – Object description of mapping parameters

Attribute	Value
Index	1601 _h
Name	Receive PDO2 mapping
Object code	Record
Data type	PDO mapping
Category	Conditional, if 1401 _h is implemented

Table 16 – Entry description of mapping parameters

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	c or rw (if variable mapping is supported)
PDO mapping	No
Value range	See EN 50325-4
Default value	02 _h
Sub-index	01 _h
Description	1st application object
Entry category	Mandatory
Access	c or rw (if variable mapping is supported)
PDO mapping	No
Value range	See EN 50325-4
Default value	6040 0010 _h
Sub-index	02 _h
Description	2nd application object
Entry category	Mandatory
Access	c or rw (if variable mapping is supported)
PDO mapping	No
Value range	See EN 50325-4
Default value	6060 0008 _h
Sub-index	03 _h
Description	3rd application object
Entry category	Optional
Access	c or rw (if variable mapping is supported)
PDO mapping	No
Value range	See EN 50325-4
Default value	Manufacturer-specific
to	
Sub-index	40 _h
Description	64th application object
Entry category	Optional
Access	c or rw (if variable mapping is supported)
PDO mapping	No
Value range	See EN 50325-4
Default value	Manufacturer-specific

5.6.2.4 RPDO 3

Table 17 specifies the object description and Table 18 specifies the entry description of the PDO communication parameters.

Table 17 – Object description of communication parameters

Attribute	Value
Index	1402 _h
Name	Receive PDO3 parameter
Object code	Record
Data type	PDO commpar
Category	Optional

Table 18 – Entry description of communication parameters

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	c
PDO mapping	No
Value range	See EN 50325-4
Default value	Manufacturer-specific
Sub-index	01 _h
Description	COB-ID used by PDO
Entry category	Mandatory
Access	c or rw (if COB-ID is changeable)
PDO mapping	No
Value range	See EN 50325-4
Default value	(0000 0400 _h or 8000 0400 _h) + node-ID
Sub-index	02 _h
Description	Transmission type
Entry category	Mandatory
Access	c or rw (if PDO type change is supported)
PDO mapping	No
Value range	See EN 50325-4
Default value	255 _d
Sub-index	05 _h
Description	Event timer
Entry category	Optional
Access	rw
PDO mapping	No
Value range	See EN 50325-4
Default value	Manufacturer-specific

Table 19 specifies the object description and Table 20 specifies the entry description of the PDO mapping parameters.

Table 19 – Object description of mapping parameters

Attribute	Value
Index	1602 _h
Name	Receive PDO3 mapping
Object code	Record
Data type	PDO mapping
Category	Conditonal, if 1402 _h is implemented

Table 20 – Entry description of mapping parameters

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	c or rw (if variable mapping is supported)
PDO mapping	No
Value range	See EN 50325-4
Default value	02 _h
Sub-index	01 _h
Description	1st application object
Entry category	Mandatory
Access	c or rw (if variable mapping is supported)
PDO mapping	No
Value range	See EN 50325-4
Default value	6040 0010 _h
Sub-index	02 _h
Description	2nd application object
Entry category	Mandatory
Access	c or rw (if variable mapping is supported)
PDO mapping	No
Value range	See EN 50325-4
Default value	607A 0020 _h
Sub-index	03 _h
Description	3rd application object
Entry category	Optional
Access	c or rw (if variable mapping is supported)
PDO mapping	No
Value range	See EN 50325-4
Default value	Manufacturer-specific
to	
Sub-index	40 _h
Description	64th application object
Entry category	Optional
Access	c or rw (if variable mapping is supported)
PDO mapping	No
Value range	See EN 50325-4
Default value	Manufacturer-specific

5.6.2.5 RPDO 4

Table 21 specifies the object description and Table 22 specifies the entry description of the PDO communication parameters.

Table 21 – Object description of communication parameters

Attribute	Value
Index	1403 _h
Name	Receive PDO4 parameter
Object code	Record
Data type	PDO commpar
Category	Optional

Table 22 – Entry description of communication parameters

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	c
PDO mapping	No
Value range	See EN 50325-4
Default value	Manufacturer-specific
Sub-index	01 _h
Description	COB-ID used by PDO
Entry category	Mandatory
Access	c or rw (if COB-ID is changeable)
PDO mapping	No
Value range	See EN 50325-4
Default value	(0000 0500 _h or 8000 0500 _h) + node-ID
Sub-index	02 _h
Description	Transmission type
Entry category	Mandatory
Access	c or rw (if PDO type change is supported)
PDO mapping	No
Value range	See EN 50325-4
Default value	255 _d
Sub-index	05 _h
Description	Event timer
Entry category	Optional
Access	rw
PDO mapping	No
Value range	See EN 50325-4
Default value	Manufacturer-specific

Table 23 specifies the object description and Table 24 specifies the entry description of the PDO mapping parameters.

Table 23 – Object description of mapping parameters

Attribute	Value
Index	1603 _h
Name	Receive PDO4 mapping
Object code	Record
Data type	PDO mapping
Category	Conditonal, if 1403 _h is implemented

Table 24 – Entry description of mapping parameters

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	c or rw (if variable mapping is supported)
PDO mapping	No
Value range	See EN 50325-4
Default value	02 _h
Sub-index	01 _h
Description	1st application object
Entry category	Mandatory
Access	c or rw (if variable mapping is supported)
PDO mapping	No
Value range	See EN 50325-4
Default value	6040 0010 _h
Sub-index	02 _h
Description	2nd application object
Entry category	Mandatory
Access	c or rw (if variable mapping is supported)
PDO mapping	No
Value range	See EN 50325-4
Default value	60FF 0020 _h
Sub-index	03 _h
Description	3rd application object
Entry category	Optional
Access	c or rw (if variable mapping is supported)
PDO mapping	No
Value range	See EN 50325-4
Default value	Manufacturer-specific
to	
Sub-index	40 _h
Description	64th application object
Entry category	Optional
Access	c or rw (if variable mapping is supported)
PDO mapping	No
Value range	See EN 50325-4
Default value	Manufacturer-specific

5.6.2.6 RPDO 5

Table 25 specifies the object description and Table 26 specifies the entry description of the PDO communication parameters.

Table 25 – Object description of communication parameters

Attribute	Value
Index	1404 _h
Name	Receive PDO5 parameter
Object code	Record
Data type	PDO commpar
Category	Optional

Table 26 – Entry description of communication parameters

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	c
PDO mapping	No
Value range	See EN 50325-4
Default value	Manufacturer-specific
Sub-index	01 _h
Description	COB-ID used by PDO
Entry category	Mandatory
Access	rw
PDO mapping	No
Value range	See EN 50325-4
Default value	8000 0000 _h
Sub-index	02 _h
Description	Transmission type
Entry category	Mandatory
Access	c or rw (if PDO type change is supported)
PDO mapping	No
Value range	See EN 50325-4
Default value	255 _d
Sub-index	05 _h
Description	Event timer
Entry category	Optional
Access	rw
PDO mapping	No
Value range	See EN 50325-4
Default value	Manufacturer-specific

Table 27 specifies the object description and Table 28 specifies the entry description of the PDO mapping parameters.

Table 27 – Object description of mapping parameters

Attribute	Value
Index	1604 _h
Name	Receive PDO5 mapping
Object code	Record
Data type	PDO mapping
Category	Conditonal, if 1404 _h is implemented

Table 28 – Entry description of mapping parameters

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	c or rw (if variable mapping is supported)
PDO mapping	No
Value range	See EN 50325-4
Default value	02 _h
Sub-index	01 _h
Description	1st application object
Entry category	Mandatory
Access	c or rw (if variable mapping is supported)
PDO mapping	No
Value range	See EN 50325-4
Default value	6040 0010 _h
Sub-index	02 _h
Description	2nd application object
Entry category	Mandatory
Access	c or rw (if variable mapping is supported)
PDO mapping	No
Value range	See EN 50325-4
Default value	6071 0010 _h
Sub-index	03 _h
Description	3rd application object
Entry category	Optional
Access	c or rw (if variable mapping is supported)
PDO mapping	No
Value range	See EN 50325-4
Default value	Manufacturer-specific
to	
Sub-index	40 _h
Description	64th application object
Entry category	Optional
Access	c or rw (if variable mapping is supported)
PDO mapping	No
Value range	See EN 50325-4
Default value	Manufacturer-specific

5.6.2.7 RPDO 6

Table 29 specifies the object description and Table 30 specifies the entry description of the PDO communication parameters.

Table 29 – Object description of communication parameters

Attribute	Value
Index	1405 _h
Name	Receive PDO6 parameter
Object code	Record
Data type	PDO commpar
Category	Optional

Table 30 – Entry description of communication parameters

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	c
PDO mapping	No
Value range	See EN 50325-4
Default value	Manufacturer-specific
Sub-index	01 _h
Description	COB-ID used by PDO
Entry category	Mandatory
Access	c or rw (if COB-ID is changeable)
PDO mapping	No
Value range	See EN 50325-4
Default value	8000 0000 _h
Sub-index	02 _h
Description	Transmission type
Entry category	Mandatory
Access	rw
PDO mapping	No
Value range	See EN 50325-4
Default value	255 _d
Sub-index	05 _h
Description	Event timer
Entry category	Optional
Access	rw
PDO mapping	No
Value range	See EN 50325-4
Default value	Manufacturer-specific

Table 31 specifies the object description and Table 32 specifies the entry description of the PDO mapping parameters.

Table 31 – Object description of mapping parameters

Attribute	Value
Index	1605 _h
Name	Receive PDO6 mapping
Object code	Record
Data type	PDO mapping
Category	Conditonal, if 1405 _h is implemented

Table 32 – Entry description of mapping parameters

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	c or rw (if variable mapping is supported)
PDO mapping	No
Value range	See EN 50325-4
Default value	02 _h
Sub-index	01 _h
Description	1st application object
Entry category	Mandatory
Access	c or rw (if variable mapping is supported)
PDO mapping	No
Value range	See EN 50325-4
Default value	6040 0010 _h
Sub-index	02 _h
Description	2nd application object
Entry category	Mandatory
Access	c or rw (if variable mapping is supported)
PDO mapping	No
Value range	See EN 50325-4
Default value	6042 0010 _h
Sub-index	03 _h
Description	3rd application object
Entry category	Optional
Access	c or rw (if variable mapping is supported)
PDO mapping	No
Value range	See EN 50325-4
Default value	Manufacturer-specific
to	
Sub-index	40 _h
Description	64th application object
Entry category	Optional
Access	c or rw (if variable mapping is supported)
PDO mapping	No
Value range	See EN 50325-4
Default value	Manufacturer-specific

5.6.2.8 RPDO 7

Table 33 specifies the object description and Table 34 specifies the entry description of the PDO communication parameters.

Table 33 – Object description of communication parameters

Attribute	Value
Index	1406 _h
Name	Receive PDO7 parameter
Object code	Record
Data type	PDO commpar
Category	Optional

Table 34 – Entry description of communication parameters

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	c
PDO mapping	No
Value range	See EN 50325-4
Default value	Manufacturer-specific
Sub-index	01 _h
Description	COB-ID used by PDO
Entry category	Mandatory
Access	rw
PDO mapping	No
Value range	See EN 50325-4
Default value	8000 0000 _h
Sub-index	02 _h
Description	Transmission type
Entry category	Mandatory
Access	c or rw (if PDO type change is supported)
PDO mapping	No
Value range	See EN 50325-4
Default value	255 _d
Sub-index	05 _h
Description	Event timer
Entry category	Optional
Access	rw
PDO mapping	No
Value range	See EN 50325-4
Default value	Manufacturer-specific

Table 35 specifies the object description and Table 36 specifies the entry description of the PDO mapping parameters.

Table 35 – Object description of mapping parameters

Attribute	Value
Index	1606 _h
Name	Receive PDO7 mapping
Object code	Record
Data type	PDO mapping
Category	Conditonal, if 1406 _h is implemented

Table 36 – Entry description of mapping parameters

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	c or rw (if variable mapping is supported)
PDO mapping	No
Value range	See EN 50325-4
Default value	02 _h
Sub-index	01 _h
Description	1st application object
Entry category	Mandatory
Access	c or rw (if variable mapping is supported)
PDO mapping	No
Value range	See EN 50325-4
Default value	6040 0010 _h
Sub-index	02 _h
Description	2nd application object
Entry category	Mandatory
Access	c or rw (if variable mapping is supported)
PDO mapping	No
Value range	See EN 50325-4
Default value	60FE 0120 _h
Sub-index	03 _h
Description	3rd application object
Entry category	Optional
Access	c or rw (if variable mapping is supported)
PDO mapping	No
Value range	See EN 50325-4
Default value	Manufacturer-specific
to	
Sub-index	40 _h
Description	64th application object
Entry category	Optional
Access	c or rw (if variable mapping is supported)
PDO mapping	No
Value range	See EN 50325-4
Default value	Manufacturer-specific

5.6.2.9 RPDO 8

Table 37 specifies the object description and Table 38 specifies the entry description of the PDO communication parameters.

Table 37 – Object description of communication parameters

Attribute	Value
Index	1407 _h
Name	Receive PDO8 parameter
Object code	Record
Data type	PDO commpar
Category	Optional

Table 38 – Entry description of communication parameters

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	c
PDO mapping	No
Value range	See EN 50325-4
Default value	Manufacturer-specific
Sub-index	01 _h
Description	COB-ID used by PDO
Entry category	Mandatory
Access	rw
PDO mapping	No
Value range	See EN 50325-4
Default value	8000 0000 _h
Sub-index	02 _h
Description	Transmission type
Entry category	Mandatory
Access	c or rw (if PDO type change is supported)
PDO mapping	No
Value range	See EN 50325-4
Default value	255 _d
Sub-index	05 _h
Description	Event timer
Entry category	Optional
Access	rw
PDO mapping	No
Value range	See EN 50325-4
Default value	Manufacturer-specific

Table 39 specifies the object description and Table 40 specifies the entry description of the PDO mapping parameters.

Table 39 – Object description of mapping parameters

Attribute	Value
Index	1607 _h
Name	Receive PDO8 mapping
Object code	Record
Data type	PDO mapping
Category	Conditonal, if 1407 _h is implemented

Table 40 – Entry description of mapping parameters

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	c or rw (if variable mapping is supported)
PDO mapping	No
Value range	See EN 50325-4
Default value	02 _h
Sub-index	01 _h
Description	1st application object
Entry category	Mandatory
Access	c or rw (if variable mapping is supported)
PDO mapping	No
Value range	See EN 50325-4
Default value	6040 0010 _h
Sub-index	02 _h
Description	2nd application object
Entry category	Mandatory
Access	c or rw (if variable mapping is supported)
PDO mapping	No
Value range	See EN 50325-4
Default value	6060 0008 _h
Sub-index	03 _h
Description	3rd application object
Entry category	Optional
Access	c or rw (if variable mapping is supported)
PDO mapping	No
Value range	See EN 50325-4
Default value	Manufacturer-specific
to	
Sub-index	40 _h
Description	64th application object
Entry category	Optional
Access	c or rw (if variable mapping is supported)
PDO mapping	No
Value range	See EN 50325-4
Default value	Manufacturer-specific

5.6.2.10 TPDO 1

Table 41 specifies the object description and Table 42 specifies the entry description of the PDO communication parameters.

Table 41 – Object description of communication parameters

Attribute	Value
Index	1800 _h
Name	Transmit PDO1 parameter
Object code	Record
Data type	PDO commpar
Category	Mandatory

Table 42 – Entry description of communication parameters

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	c
PDO mapping	No
Value range	See EN 50325-4
Default value	Manufacturer-specific
Sub-index	01 _h
Description	COB-ID used by PDO
Entry category	Mandatory
Access	c or rw (if COB-ID is changeable)
PDO mapping	No
Value range	See EN 50325-4
Default value	4000 0180 _h + node-ID
Sub-index	02 _h
Description	Transmission type
Entry category	Mandatory
Access	c or rw (if PDO type change is supported)
PDO mapping	No
Value range	See EN 50325-4
Default value	255 _d
Sub-index	03 _h
Description	Inhibit time
Entry category	Optional
Access	rw
PDO mapping	No
Value range	See EN 50325-4
Default value	Manufacturer-specific
Sub-index	05 _h
Description	Event timer
Entry category	Optional
Access	rw
PDO mapping	No
Value range	See EN 50325-4
Default value	Manufacturer-specific