

DIN EN 61800-7-301

ICS 29.200; 29.160.30

Einsprüche bis 2014-07-16
Vorgesehen als Ersatz für
DIN EN 61800-7-301:2008-11

Entwurf

**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 22G/272/CDV:2014);
Englische Fassung FprEN 61800-7-301:2014**

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 22G/272/CDV:2014);
English version FprEN 61800-7-301:2014

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
(CEI 22G/272/CDV:2014);
Version anglaise FprEN 61800-7-301:2014

Anwendungswarnvermerk

Dieser Norm-Entwurf mit Erscheinungsdatum 2014-05-16 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.

Gesamtumfang 168 Seiten

DKE Deutsche Kommission Elektrotechnik Elektronik Informationstechnik im DIN und VDE

Nationales Vorwort

Die Englische Fassung des europäischen Dokuments FprEN 61800-7-301:2014 „Elektrische Leistungsantriebssysteme mit einstellbarer Drehzahl – Teil 7-301: Generisches Interface und Nutzung von Profilen für Leistungsantriebssysteme (PDS) – Abbildung von Profil-Typ 1 auf Netzwerktechnologien“ (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 22G/272/CDV:2014 „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“ unverändert in den Entwurf FprEN 61800-7-301:2014 übernommen worden.

Das internationale Dokument wurde vom SC 22G „Adjustable speed electric drive systems incorporating semiconductor power converters“ 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 226 „Ausrüstung von Starkstromgeräten und -anlagen mit elektronischen Betriebsmitteln“ der DKE Deutsche Kommission Elektrotechnik Elektronik Informationstechnik im DIN und VDE (www.dke.de) zuständig.

Das Präsidium des DIN hat mit Präsidialbeschluss 1/2004 festgelegt, dass DIN-Normen, deren Inhalt sich auf internationale Arbeitsergebnisse der Informationsverarbeitung gründen, unter bestimmten Bedingungen allein in englischer Sprache veröffentlicht werden dürfen. Das K 226 hat mit RS 226_2013-0060 beschlossen, dass die Bedingungen des DIN-Präsidialbeschlusses 1/2004 für das vorliegende Normprojekt erfüllt sind.

Da sich die Benutzer der vorliegenden Norm der englischen Sprache als Fachsprache bedienen, wird die Englische Fassung der IEC 61800-7-301 veröffentlicht. Zu deren Abschnitt 1 bis 3, der den Anwendungsbereich, Normative Verweisungen sowie die Abkürzungen und Begriffe festlegt, wurde eine Übersetzung angefertigt und als informativer Nationaler Anhang NA der vorliegenden Norm hinzugefügt. Für viele 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 der entsprechenden zukünftigen Deutschen Norm auf die deutsche Sprachfassung zu verzichten und diese in der englischsprachigen Fassung zu veröffentlichen

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.

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.

Nationaler Anhang NA (informativ)

1 Anwendungsbereich

IEC 61800-7 beschreibt Profile für Leistungsantriebssysteme (en: Power Drive Systems, PDS) und ihre Abbildung auf bestehende Kommunikationssysteme unter Verwendung eines generischen Schnittstellenmodells.

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

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

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

2 Normative Verweisungen

Die folgenden Dokumente, die in diesem Dokument teilweise oder als Ganzes zitiert werden, sind für die Anwendung dieses Dokuments erforderlich. Bei datierten Verweisungen gilt nur die in Bezug genommene Ausgabe. Bei undatierten Verweisungen gilt die letzte Ausgabe des in Bezug genommenen Dokuments (einschließlich aller Änderungen).

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 61784-1, *Industrial communication networks – Profiles – Part 1: Fieldbus profiles*

IEC 61784-2, *Industrial communication networks – Profiles – Part 2: Additional fieldbus profiles for real-time networks based on ISO/IEC 8802-3*

IEC 61800-7-1, *Adjustable speed electrical power drive systems – Part 522 7-1: Generic interface and use of profile for power drive systems – Profile type 1 specification*

IEC 61800-7-301, *Adjustable speed electrical power drive systems – Part 7-201: Generic interface and use of profile for power drive systems – Mapping of profile type 1 to network technologies*

IEC 61800-7 (alle Teile), *Adjustable speed electrical power drive systems – Generic interface and use of profiles for power drive systems*

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, *Industrielles Kommunikationssystem basierend auf ISO 11898 (CAN) – Teil 4: CANopen*

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: Istwert oder Ist-Größe werden in diesem Teil der Reihe IEC 61800-7 als Eingangsdaten des Programmes zur Steuerung der Anwendung verwendet, um Rückführgrößen oder andere Prozessgrößen des PDS zu überwachen.

[QUELLE: IEC 351-21-02]

3.1.2

Anwendung (en: application)

Funktionales Element der Software, spezifisch für die Problemlösung beim Messen und Steuern in industriellen Prozessen,

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

[QUELLE: IEC/TR 62390:2005, Begriff 3.1.2, modifiziert]

3.1.3

Attribut (en: attribute)

Eigenschaft oder Charakteristik einer Funktionseinheit

[QUELLE: IEC/TR 62390:2005, Begriff 3.1.3]

3.1.4

Klasse (en: class)

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

[QUELLE: ISO/IEC 19501, modifiziert]

3.1.5

Befehle (en: commands)

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

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

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

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 351-21-29]

3.1.9

Steuergerät (en: control device)

physikalische Einheit, die – innerhalb eines Moduls/einer Baugruppe oder eines Gerätes – ein Anwendungsprogramm zur Steuerung des PDS enthält

3.1.10

Datentyp (en: data type)

Menge von Werten mit einer Menge zulässige Operationen

[QUELLE: ISO/IEC 2382-15:1999, 15.04.01, modifiziert]

3.1.11

Gerät (en: device)

Feldgerät (en: field device)

vernetzte unabhängige physikalische Einheit eines industriellen Automatisierungssystems, die fähig ist, spezifische Funktionen in einen bestimmten Kontext auszuführen und die durch ihre Schnittstellen begrenzt ist

[QUELLE: IEC 61499-1:2005, Begriff 3.30, modifiziert]

Einheit, die Steuerungs- und Regelfunktionen, sowie Aktor- und/oder Sensorfunktionen ausführt und Schnittstellen zu anderen derartigen Einheiten innerhalb eines Automatisierungssystems hat

[QUELLE: ISO 15745-1:2003, Begriff 3.11]

3.1.12**Geräteprofil (en: device profile)**

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

Anmerkung 1 zum Begriff: Dies ist eine Definition von IEC/TS 61915, die durch das Hinzufügen der funktionalen Gerätestruktur erweitert ist.

[QUELLE: IEC 61390, Begriff 3.19, modifiziert]

3.1.13**Einheit (en: entity)**

besonderes Ding, wie eine Person, ein Ort, ein Prozess, ein Objekt, eine Zuordnung oder ein Ereignis

3.1.14**Rückführgröße (en: feedback variable)**

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

[IEV 351-27-03]

3.1.15**funktionales Element (en: functional element)**

Einheit von Software oder von Hardware, die mit Hardware kombiniert ist, fähig eine festgelegte Funktion eines Gerätes 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/TR 62390:2005, Begriff 3.1.12]

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/TR 62390:2005, Begriff 3.1.14]

3.1.17**Schnittstelle (en: interface)**

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

[QUELLE: IEC 351-21-35, modifiziert]

3.1.18**Abbildung (en: mapping)**

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

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 351-21-36]

3.1.21

Betriebsart (en: operating mode)

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

[QUELLE: IEC 351-31-01]

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 die-sen zu einem externen System übermittelt werden

[QUELLE: IEC/TR 62390:2005, Begriff 3.1.21]

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: Aus IEC TS 61915, angepasst.

Anmerkung 2 zum Begriff: Ein Parameter ist typischerweise durch einen Parameternamen, einen Datentyp und eine Zugriffsrichtung gekennzeichnet.

[QUELLE: IEC/TR 62390:2005, Begriff 3.1.22, modifiziert]

3.1.25

Profil (en: profile)

Darstellung einer PDS-Schnittstelle hinsichtlich ihrer Parameter, Parametergruppierung und ihres Verhaltens nach einem Kommunikations- und einem Geräteprofil

3.1.26

Sollwert (en: set-point)

Wert oder Variable, die als Ausgangsdatenwert bzw. -variable von dem Programm zur Steuerung der Anwendung verwendet wird, um das PDS zu steuern

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 Elementes des PDS wiedergeben

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

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/TR 62390:2005, Begriff 3.1.25]

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/TR 62390:2005, Begriff 3.1.27]

3.2 Abkürzungen

c	Konstante (en: Constant)
CAN	Controller Area Network
CiA	CAN in Automation
COB	Kommunikationsobjekt (en: Communication Object)
EMCY	Nachricht bei besonderen Ereignissen (en: Emergency Message)
EPA	Ethernet for Plant Automation
FAL	Feldbus-Anwendungsschicht (en: Fieldbus Application Layer)
EM	(als Präfix) Typ 14-Management
FSA	Automatisierung mit endlichen Zuständen (en: Finite State Automation)
ID	Kennzeichner (en: Identifier)
IP	Internetprotokoll (en: Internet protocol)
MSGID	Nachrichtenkennzeichner (en: Message identifier)
MOB	Managementobjektbasis (en: Management Object Base)
NMT	Netzwerkmanagement (en: Network management)
PDO	Prozessdatenobjekt (en: Process Data Object)
PDS	Leistungsantriebssystem (en: Power Drive System)
ro	nur Lesezugriff (en: Read-Only)
RPDO	Empfangs-PDO (en: Receive PDO)
rw	Lese- und Schreibzugriff (en: Read-Write)
SDO	Dienstdatenobjekt (en: Service Data Object)
SYNC	Synchronisierungsnachricht (en: Synchronisation Message)
TIME	Zeitnachricht (en: Time message)
TPDO	Übertragungsprozessdatenobjekt (en: Transmit process data object)

CONTENTS

FOREWORD.....	10
INTRODUCTION.....	12
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	19
5 Mapping to CANopen	20
5.1 Overview	20
5.2 Mapping of communication objects	20
5.3 Communication parameter objects.....	20
5.3.1 General	20
5.3.2 Object 1000 _h : Device type.....	20
5.3.3 Object 1029 _h : Error behaviour	21
5.3.4 Object 67FF _h : Single device type	22
5.4 Emergency message	22
5.5 Communication fault events	22
5.6 Sets of pre-defined PDOs.....	23
5.6.1 General	23
5.6.2 PDO set for generic drive device	23
5.6.3 PDO set for frequency converter.....	59
5.6.4 PDO set for servo drive	73
5.6.5 PDO set for stepper motor	92
5.7 PDO mapping attributes	111
6 Mapping to CC-Link IE Field Network	115
6.1 Overview	115
6.2 Device model	115
6.3 Mapping of communication objects.....	115
6.3.1 General	115
6.3.2 The detailed mapping of communication object.....	115
6.3.3 FAL syntax description	116
6.3.4 FAL transfer syntax	117
6.4 Communication parameter objects.....	121
6.4.1 General	121
6.4.2 Object 1000 _h : Device type	121
6.5 Sets of pre-defined PDOs.....	121
6.5.1 General	121
6.5.2 PDO set for generic drive device	121
6.6 PDO mapping attributes	124
7 Mapping to EPA	124
7.1 Overview	124
7.2 Device module	125
7.2.1 Overview	125
7.2.2 Additional definition for mapping to CiA 402	126
7.2.3 CiA 402 mapping module.....	127
7.2.4 FAL management object for CiA 402 mapping	128

7.3	PDOs mapping on cyclic PDU transmission	132
7.3.1	Overview	132
7.3.2	Configuration	133
7.3.3	Procedure of sending PDOs	134
7.3.4	Procedure of receiving PDOs	135
7.3.5	FRTRead service	135
7.3.6	FRTWrite service	136
7.3.7	FRTRead service process	137
7.3.8	FRTWrite service process	137
7.4	Alarm mechanism	137
7.4.1	Overview	137
7.4.2	EventReport service	138
7.4.3	EventReportAcknowledge Service	138
7.4.4	Event object	138
7.4.5	Alarm process	139
7.4.6	Error code	139
8	Mapping to EtherCAT	139
8.1	Overview	139
8.2	Mapping of communication objects	139
8.3	Communication parameter objects	140
8.3.1	General	140
8.3.2	Object 1000 _h : Device type	140
8.4	Sets of pre-defined PDOs	140
8.5	PDO mapping attributes	141
9	Mapping to ETHERNET Powerlink	141
9.1	Overview	141
9.2	Mapping of communication objects	141
9.3	Communication parameter objects	141
9.3.1	General	141
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	142
9.5.1	General	142
9.5.2	PDO set for generic drive device	142
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
	Figure 1 – Structure of IEC 61800-7	14
	Figure 2 – Structure of EPA drive system	125
	Figure 3 – CiA 402 mapping structure	128
	Figure 4 – Format of type 14 PDU for FRT application	133

Table 1 – List of used data types

Table 2 – Additional information field for generic PDO mapping

Table 3 – Additional information field for type-specific PDO mapping	21
Table 4 – Value definition	21
Table 5 – Object description	22
Table 6 – Entry description	22
Table 7 – Overview on RPDO	23
Table 8 – Overview on TPDO	24
Table 9 – Object description of communication parameters	24
Table 10 – Entry description of communication parameters	24
Table 11 – Object description of mapping parameters	25
Table 12 – Entry description of mapping parameters	25
Table 13 – Object description of communication parameters	26
Table 14 – Entry description of communication parameters	26
Table 15 – Object description of mapping parameters	27
Table 16 – Entry description of mapping parameters	27
Table 17 – Object description of communication parameters	28
Table 18 – Entry description of communication parameters	28
Table 19 – Object description of mapping parameters	29
Table 20 – Entry description of mapping parameters	29
Table 21 – Object description of communication parameters	30
Table 22 – Entry description of communication parameters	31
Table 23 – Object description of mapping parameters	31
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	40
Table 39 – Object description of mapping parameters	40
Table 40 – Entry description of mapping parameters	41
Table 41 – Object description of communication parameters	42
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	47
Table 51 – Object description of mapping parameters	48
Table 52 – Entry description of mapping parameters	48
Table 53 – Object description of communication parameters	49
Table 54 – Entry description of communication parameters	49
Table 55 – Object description of mapping parameters	50
Table 56 – Entry description of mapping parameters	50
Table 57 – Object description of communication parameters	51
Table 58 – Entry description of communication parameters	52
Table 59 – Object description of mapping parameters	53
Table 60 – Entry description of mapping parameters	53
Table 61 – Object description of communication parameters	54
Table 62 – Entry description of communication parameters	54
Table 63 – Object description of mapping parameters	55
Table 64 – Entry description of mapping parameters	55
Table 65 – Object description of communication parameters	56
Table 66 – Entry description of communication parameters	57
Table 67 – Object description of mapping parameters	58
Table 68 – Entry description of mapping parameters	58
Table 69 – Overview on RPDO	59
Table 70 – Overview on TPDO	59
Table 71 – Object description of communication parameters	59
Table 72 – Entry description of communication parameters	60
Table 73 – Object description of mapping parameters	60
Table 74 – Entry description of mapping parameters	61
Table 75 – Object description of communication parameters	62
Table 76 – Entry description of communication parameters	62
Table 77 – Object description of mapping parameters	63
Table 78 – Entry description of mapping parameters	63
Table 79 – Object description of communication parameters	64
Table 80 – Entry description of communication parameters	64
Table 81 – Object description of mapping parameters	65
Table 82 – Entry description of mapping parameters	65
Table 83 – Object description of communication parameters	66
Table 84 – Entry description of communication parameters	66
Table 85 – Object description of mapping parameters	67
Table 86 – Entry description of mapping parameters	67
Table 87 – Object description of communication parameters	68
Table 88 – Entry description of communication parameters	69
Table 89 – Object description of mapping parameters	70
Table 90 – Entry description of mapping parameters	70

Table 91 – Object description of communication parameters.....	71
Table 92 – Entry description of communication parameters.....	71
Table 93 – Object description of mapping parameters.....	72
Table 94 – Entry description of mapping parameters.....	72
Table 95 – Overview on RPDO	73
Table 96 – Overview on TPDO.....	73
Table 97 – Object description of communication parameters.....	74
Table 98 – Entry description of communication parameters.....	74
Table 99 – Object description of mapping parameters.....	75
Table 100 – Entry description of mapping parameters.....	75
Table 101 – Object description of communication parameters.....	76
Table 102 – Entry description of communication parameters.....	76
Table 103 – Object description of mapping parameters.....	77
Table 104 – Entry description of mapping parameters.....	77
Table 105 – Object description of communication parameters.....	78
Table 106 – Entry description of communication parameters.....	78
Table 107 – Object description of mapping parameters.....	79
Table 108 – Entry description of mapping parameters.....	79
Table 109 – Object description of communication parameters.....	80
Table 110 – Entry description of communication parameters.....	80
Table 111 – Object description of mapping parameters.....	81
Table 112 – Entry description of mapping parameters.....	81
Table 113 – Object description of communication parameters.....	82
Table 114 – Entry description of communication parameters.....	82
Table 115 – Object description of mapping parameters.....	83
Table 116 – Entry description of mapping parameters.....	84
Table 117 – Object description of communication parameters.....	85
Table 118 – Entry description of communication parameters.....	85
Table 119 – Object description of mapping parameters.....	86
Table 120 – Entry description of mapping parameters.....	86
Table 121 – Object description of communication parameters.....	87
Table 122 – Entry description of communication parameters.....	87
Table 123 – Object description of mapping parameters.....	88
Table 124 – Entry description of mapping parameters.....	88
Table 125 – Object description of communication parameters.....	89
Table 126 – Entry description of communication parameters.....	90
Table 127 – Object description of mapping parameters.....	91
Table 128 – Entry description of mapping parameters.....	91
Table 129 – Overview on RPDO	92
Table 130 – Overview on TPDO.....	92
Table 131 – Object description of communication parameters.....	92
Table 132 – Entry description of communication parameters.....	93
Table 133 – Object description of mapping parameters.....	93
Table 134 – Entry description of mapping parameters.....	94

Table 135 – Object description of communication parameters	95
Table 136 – Entry description of communication parameters	95
Table 137 – Object description of mapping parameters	96
Table 138 – Entry description of mapping parameters	96
Table 139 – Object description of communication parameters	97
Table 140 – Entry description of communication parameters	97
Table 141 – Object description of mapping parameters	98
Table 142 – Entry description of mapping parameters	98
Table 143 – Object description of communication parameters	99
Table 144 – Entry description of communication parameters	99
Table 145 – Object description of mapping parameters	100
Table 146 – Entry description of mapping parameters	100
Table 147 – Object description of communication parameters	101
Table 148 – Entry description of communication parameters	101
Table 149 – Object description of mapping parameters	102
Table 150 – Entry description of mapping parameters	103
Table 151 – Object description of communication parameters	104
Table 152 – Entry description of communication parameters	104
Table 153 – Object description of mapping parameters	105
Table 154 – Entry description of mapping parameters	105
Table 155 – Object description of communication parameters	106
Table 156 – Entry description of communication parameters	106
Table 157 – Object description of mapping parameters	107
Table 158 – Entry description of mapping parameters	107
Table 159 – Object description of communication parameters	108
Table 160 – Entry description of communication parameters	109
Table 161 – Object description of mapping parameters	110
Table 162 – Entry description of mapping parameters	110
Table 163 – PDO mapping attributes of CiA 402 objects	111
Table 164 – Object dictionary structure	115
Table 165 – FieldMotionSpecificTransient	117
Table 166 – command (dataType: 08 _h , dataSupType: 0002 _h)	118
Table 167 – subCommand type for each command type	118
Table 168 – Structure of Set Cycle Time Request	118
Table 169 – ctCycle	118
Table 170 – syCycle	119
Table 171 – Structure of Set Cycle Time Response	119
Table 172 – result	120
Table 173 – Structure of Read Object Request	120
Table 174 – Structure of Read Object Response	120
Table 175 – Structure of Write Object Request	120
Table 176 – Structure of Write Object Response	121
Table 177 – List of used data types	121
Table 178 – Overview on object in RPDO	122

Table 179 – Overview on object in TPDO	122
Table 180 – Object description of mapping parameters	122
Table 181 – Entry description of mapping parameters	122
Table 182 – Object description of mapping parameters	123
Table 183 – Entry description of mapping parameters	123
Table 184 – List of used data types	125
Table 185 – Overview on receiving PDO	126
Table 186 – Overview on sending PDO	126
Table 187 – Management object base	126
Table 188 – Definition of Type 14 FRT link object	133
Table 189 – Encoding of FRTRead request parameters	136
Table 190 – Encoding of FRTRead positive response parameters	136
Table 191 – Encoding of FRTRead negative response parameters	136
Table 192 – Encoding of FRTWrite request parameters	136
Table 193 – Encoding of FRTWrite positive response parameters	136
Table 194 – Encoding of FRTWrite negative response parameters	137
Table 195 – Encoding of EventReport parameters	138
Table 196 – Format of EventReport service for alarm	138
Table 197 – Encoding of EventReportAcknowledge parameters	138
Table 198 – Format of EventReportAcknowledge service for alarm	138
Table 199 – Event object assignment	139
Table 200 – Example of Event Object Header	139
Table 201 – Example of Event Object	139
Table 202 – List of used data types	140
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	145
Table 213 – Object description of mapping parameters	146
Table 214 – Entry description of mapping parameters	146
Table 215 – Overview on objects in RPDO	148
Table 216 – Overview on objects in TPDO	148
Table 217 – Object description of communication parameters	148
Table 218 – Entry description of communication parameters	148
Table 219 – Object description of mapping parameters	149
Table 220 – Entry description of mapping parameters	149
Table 221 – Object description of communication parameters	150
Table 222 – Entry description of communication parameters	150

Table 223 – Object description of mapping parameters	151
Table 224 – Entry description of mapping parameters	151
Table 225 – Overview on objects in RPDO	152
Table 226 – Overview on objects in TPDO	152
Table 227 – Object description of communication parameters	152
Table 228 – Entry description of communication parameters	152
Table 229 – Object description of mapping parameters	153
Table 230 – Entry description of mapping parameters	153
Table 231 – Object description of communication parameters	154
Table 232 – Entry description of communication parameters	154
Table 233 – Object description of mapping parameters	155
Table 234 – Entry description of mapping parameters	155
Table 235 – Overview on objects in RPDO	156
Table 236 – Overview on objects in TPDO	156
Table 237 – Object description of communication parameters	156
Table 238 – Entry description of communication parameters	157
Table 239 – Object description of mapping parameters	157
Table 240 – Entry description of mapping parameters	158
Table 241 – Object description of communication parameters	158
Table 242 – Entry description of communication parameters	159
Table 243 – Object description of mapping parameters	159
Table 244 – Entry description of mapping parameters	160

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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**

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 61800-7-301 has been prepared by subcommittee SC 22G: Adjustable speed electric drive systems incorporating semiconductor power converters, of IEC technical committee TC 22: Power electronic systems and equipment.

This second edition cancels and replaces the first edition published in 2007. This edition constitutes a technical revision.

The main changes with respect to the previous edition are listed below.

- Additional mappings to communication systems are included (see clause 6 and clause 7).

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

FDIS	Report on voting
22G/XX/FDIS	22G/XXX/RVD

53
54 Full information on the voting for the approval of this standard can be found in the report on
55 voting indicated in the above table.

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

57 A list of all parts of the IEC 61800 series, under the general title *Adjustable speed electrical*
58 *power drive systems*, can be found on the IEC website.

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

- 62 • reconfirmed,
63 • withdrawn,
64 • replaced by a revised edition, or
65 • amended.

66

67 – The National Committees are requested to note that for this publication the stability date is
68 2019.

69 – This text is included for the information of the national committees and will be deleted at
70 the publication stage.

71 –

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

INTRODUCTION

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

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

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

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

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

93 There are several reasons to define a generic interface:

94 **For a drive device manufacturer**

- 95 – Less effort to support system integrators
- 96 – Less effort to describe drive functions because of common terminology
- 97 – The selection of drives does not depend on availability of specific support

98 **For a control device manufacturer**

- 99 – No influence of bus technology
- 100 – Easy device integration
- 101 – Independent of a drive supplier

102 **For a system integrator**

- 103 – Less integration effort for devices
- 104 – Only one understandable way of modeling
- 105 – Independent of bus technology

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

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

120 IEC 61800-7-1 is divided into a generic part and several annexes as shown in Figure 1. The
121 drive profile types for CiA® 402¹, CIP Motion^{TM2}, PROFIdrive³ and SERCOS®⁴ are mapped
122 to the generic interface in the corresponding annex. The annexes have been submitted by
123 open international network or fieldbus organizations, which are responsible for the content of
124 the related annex and use of the related trade marks.

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

127 This part of IEC 61800-7 specifies how the profile type 1 (CiA® 402) is mapped to the network
128 technologies CANopen®⁵, CC-Link IE® Field Network⁶, EPA^{TM7}, EtherCAT®⁸ and Ethernet
129 Powerlink^{TM9}.

130 IEC 61800-7-302, IEC 61800-7-303 and IEC 61800-7-304 specify how the profile types 2, 3
131 and 4 are mapped to different network technologies (such as EtherCAT®, DeviceNet^{TM10},
132 ControlNet^{TM11}, EtherNet/IP^{TM12}, PROFIBUS¹³, PROFINET¹⁴ and SERCOS®).

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 MotionTM 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 MotionTM. Use of the trade mark CIP MotionTM 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 EPATM 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 EPATM. Use of the trade mark EPATM 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 PowerlinkTM is a trade mark of Bernecker & Rainer Industrielektronik 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 PowerlinkTM. Use of the trade mark requires permission of the trade mark holder.

10 DeviceNetTM 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 DeviceNetTM. Use of the trade mark DeviceNetTM requires permission of ODVA, Inc.

11 ControlNetTM 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 ControlNetTM. Use of the trade mark ControlNetTM requires permission of ODVA, Inc.

12 EtherNet/IPTM 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

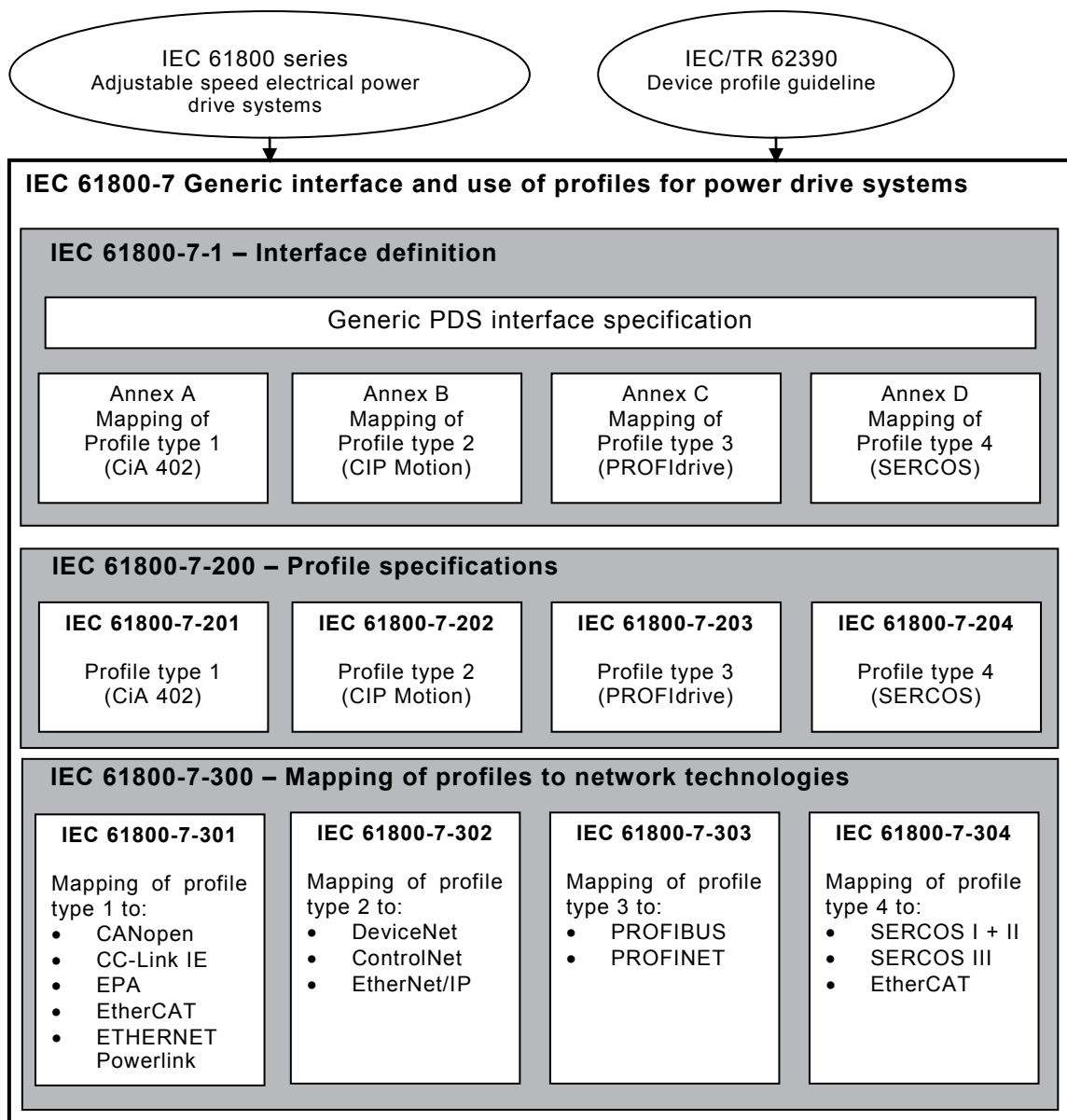


Figure 1 – Structure of IEC 61800-7

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.

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**

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

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.

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

- 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 61158-5-12, *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 61784-1, *Industrial communication networks – Profiles – Part 1: Fieldbus profiles*

IEC 61784-2, *Industrial communication networks – Profiles – Part 2: Additional profiles for real-time networks based on ISO/IEC 8802-3*

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

183 IEC 61800-7 (all parts), *Adjustable speed electrical power drive systems – Generic interface*
184 *and use of profiles for power drive systems*

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

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

189 **3 Terms, definitions and abbreviated terms**

190 **3.1 Terms and definitions**

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

192 **3.1.1**

193 **actual value**

194 value of a variable at a given instant

195 Note 1 to entry: Actual value or actual variable are used in this part of the IEC 61800-7 series as input data of the
196 application control program to monitor feedback variables or other process variables of the PDS.

197 [SOURCE: IEC 351-21-02]

198 **3.1.2**

199 **application**

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

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

203 [SOURCE: IEC/TR 62390:2005, 3.1.2, modified]

204 **3.1.3**

205 **attribute**

206 property or characteristic of an entity

207 [SOURCE: IEC/TR 62390:2005, 3.1.3]

208 **3.1.4**

209 **class**

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

212 [SOURCE: ISO/IEC 19501, modified]

213 **3.1.5**

214 **commands**

215 set of commands from the application control program to the PDS to control the behaviour of
216 the PDS or functional elements of the PDS

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

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

219 **3.1.6**

220 **communication macrocycle**

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

223 **3.1.7**

224 **configuration data**

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

- 226 **3.1.8**
227 **control**
228 purposeful action on or in a process to meet specified objectives
229 [SOURCE: IEC 351-21-29]
- 230 **3.1.9**
231 **control device**
232 physical unit that contains – in a module/subassembly or device – an application program to
233 control the PDS
- 234 **3.1.10**
235 **data type**
236 set of values together with a set of permitted operations
237 [SOURCE: ISO/IEC 2382-15:1999, 15.04.01, modified]
- 238 **3.1.11**
239 **device**
240 field device
241 networked independent physical entity of an industrial automation system capable of
242 performing specified functions in a particular context and delimited by its interfaces
243 [SOURCE: IEC 61499-1:2005, 3.30, modified]
- 244 entity that performs control, actuating and/or sensing functions and interfaces to other such
245 entities within an automation system
246 [SOURCE: ISO 15745-1:2003, 3.11]
- 247 **3.1.12**
248 **device profile**
249 representation of a device in terms of its parameters, parameter assemblies and behaviour
250 according to a device model that describes the device's data and behaviour as viewed
251 through a network
252 Note 1 to entry: This is a definition from IEC/TS 61915 which is extended by the addition of the device functional
253 structure.
254 [SOURCE: IEC 61390, 3.19, modified]
- 255 **3.1.13**
256 **entity**
257 particular thing, such as a person, place, process, object, concept, association, or event
- 258 **3.1.14**
259 **feedback variable**
260 variable which represents a controlled variable and which is returned to a comparing element
261 [SOURCE: IEC 351-27-03]
- 262 **3.1.15**
263 **functional element**
264 entity of software or software combined with hardware, capable of accomplishing a specified
265 function of a device
266 Note 1 to entry: A functional element has an interface, associations to other functional elements and functions.
267 Note 2 to entry: A functional element can be made out of function block(s), object(s) or parameter list(s).
268 [SOURCE: IEC/TR 62390:2005, 3.1.12]
- 269 **3.1.16**
270 **input data**
271 data transferred from an external source into a device, resource or functional element
272 [SOURCE: IEC/TR 62390:2005, 3.1.14]

- 273 **3.1.17**
274 **interface**
275 shared boundary between two entities defined by functional characteristics, signal
276 characteristics, or other characteristics as appropriate
- 277 [SOURCE: IEC 351-21-35, modified]
- 278 **3.1.18**
279 **mapping**
280 set of values having defined correspondence with the quantities or values of another set,
- 281 **3.1.19**
282 **message**
283 ordered series of octets intended to convey information
- 284 **3.1.20**
285 **model**
286 mathematical or physical representation of a system or a process, based with sufficient
287 precision upon known laws, identification or specified suppositions
- 288 [SOURCE: IEC 351-21-36]
- 289 **3.1.21**
290 **operating mode**
291 characterisation of the way and the extent to which the human operator intervenes in the
292 control equipment
- 293 [SOURCE: IEC 351-31-01]
- 294 **3.1.22**
295 **offset**
296 number of octets from a specially designed position
- 297 **3.1.23**
298 **output data**
299 data originating in a device, resource or functional element and transferred from them to
300 external systems
- 301 [SOURCE: IEC/TR 62390:2005, 3.1.21]
- 302 **3.1.24**
303 **parameter**
304 data element that represents device information that can be read from or written to a device,
305 for example through the network or a local HMI
- 306 Note 1 to entry: Adapted from IEC/TS 61915.
307 Note 2 to entry: A parameter is typically characterized by a parameter name, data type and access direction.
308 [SOURCE: IEC/TR 62390:2005, 3.1.22, modified]
- 309 **3.1.25**
310 **profile**
311 representation of a PDS interface in terms of its parameters, parameter assemblies and
312 behaviour according to a communication profile and a device profile
- 313 **3.1.26**
314 **set-point**
315 value or variable used as output data of the application control program to control the PDS
- 316 **3.1.27**
317 **status**
318 set of information from the PDS to the application control program reflecting the state or mode
319 of the PDS or a functional element of the PDS
- 320 Note 1 to entry: The different status information may be coded with one bit each.

321 **3.1.28**
322 **type**
323 hardware or software element which specifies the common attributes shared by all instances
324 of the type

325 [SOURCE: IEC/TR 62390:2005, 3.1.25]

326 **3.1.29**
327 **variable**
328 software entity that may take different values, one at a time

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

330 [SOURCE: IEC/TR 62390:2005, 3.1.27]

331 **3.2 Abbreviated terms**

332	c	Constant
333	CAN	Controller Area Network
334	CiA	CAN in Automation
335	COB	Communication Object
336	EMCY	Emergency Message
337	EPA	Ethernet for Plant Automation
338	FAL	Fieldbus Application Layer
339	EM	(as a prefix) Type 14 Management
340	FSA	Finite State Automation
341	ID	Identifier
342	IP	Internet protocol
343	MSGID	Message identifier
344	MOB	Management Object Base
345	NMT	Network management
346	PDO	Process Data Object
347	PDS	Power drive system
348	ro	Read-Only
349	RPDO	Receive PDO
350	rw	Read-Write
351	SDO	Service Data Object
352	SYNC	Synchronisation Message
353	TIME	Time message
354	TPDO	Transmit process data object

355 **4 General**

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

- 358 – CANopen, see Clause 5
- 359 – CC-Link IE, see Clause 6
- 360 – EPA, see Clause 7
- 361 – EtherCAT, see Clause 8
- 362 – 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

COB for real-time data transmission shall be mapped to Process Data Object message (PDOs). COB for configuration data transmission shall be mapped to Service Data Object message(s) (SDO). COB for emergency information transmission shall be mapped to Emergency messages (EMCY). COB for network management commands shall be mapped to NMT message. COB for network management state information may be mapped to Heartbeat message or Node guarding message. COB for synchronisation 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
PDOComm Par	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_n: 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.

402

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

403

404

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

405

406 5.3.3 Object 1029_h: Error behaviour

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

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

412

413

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

414

415

Table 5 – Object description

Attribute	Value
Index	1029 _h
Name	Error behaviour
Object Code	Array
Data Type	UNSIGNED8
Category	Optional

416

417

Table 6 – Entry description

Attribute	Value
Sub-Index	00 _h
Description	Highest supported sub-index
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

418

419 5.3.4 Object 67FF_h: Single device type

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

423 5.4 Emergency message

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

427 5.5 Communication fault events

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

429 5.6 Sets of pre-defined PDOs

430 5.6.1 General

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

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

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

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

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

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

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

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

449 5.6.2 PDO set for generic drive device

450 5.6.2.1 Overview and introduction

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

455 **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

456

457

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

458

459 **5.6.2.2 RPDO 1**

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

462

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

463

464

Table 10 – Entry description of communication parameters

Attribute	Value
Sub-Index	00 _h
Description	Highest supported sub-index
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

Attribute	Value
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 supported sub-index
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	



Attribute	Value
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

471

472 **5.6.2.3 RPDO 2**

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

475 **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

476

477 **Table 14 – Entry description of communication parameters**

Attribute	Value
Sub-Index	00 _h
Description	Highest supported sub-index
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



Attribute	Value
Description	Event timer
Entry Category	Optional
Access	rw
PDO Mapping	No
Value Range	See EN 50325-4
Default Value	Manufacturer-specific

478

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

481

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

482

483

Table 16 – Entry description of mapping parameters

Attribute	Value
Sub-Index	00 _h
Description	Highest supported sub-index
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



Attribute	Value
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

484

485 5.6.2.4 RPDO 3

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

488

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

489

490

Table 18 – Entry description of communication parameters

Attribute	Value
Sub-Index	00 _h
Description	Highest supported sub-index
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

Attribute	Value
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

491

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

494

Table 19 – Object description of mapping parameters

Attribute	Value
Index	1602 _h
Name	Receive PDO3 mapping
Object Code	Record
Data Type	PDO mapping
Category	Conditional, if 1402 _h is implemented

495

496

Table 20 – Entry description of mapping parameters

Attribute	Value
Sub-Index	00 _h
Description	Highest supported sub-index
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

Attribute	Value
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

497

498 5.6.2.5 RPDO 4

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

501 **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

502

503

Table 22 – Entry description of communication parameters

Attribute	Value
Sub-Index	00 _h
Description	Highest supported sub-index
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

504

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

507

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

508

509

Table 24 – Entry description of mapping parameters

Attribute	Value
Sub-Index	00 _h
Description	Highest supported sub-index
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

510

511 **5.6.2.6 RPDO 5**

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

514 **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

515

516 **Table 26 – Entry description of communication parameters**

Attribute	Value
Sub-Index	00 _h
Description	Highest supported sub-index
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

517

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

520 **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

521

522 **Table 28 – Entry description of mapping parameters**

Attribute	Value
Sub-Index	00 _h
Description	Highest supported sub-index
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	



Attribute	Value
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

523

524 5.6.2.7 RPDO 6

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

527

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

528

529

Table 30 – Entry description of communication parameters

Attribute	Value
Sub-Index	00 _h
Description	Highest supported sub-index
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



Attribute	Value
Default Value	255 _d
Sub-Index	05 _n
Description	Event timer
Entry Category	Optional
Access	rw
PDO Mapping	No
Value Range	See EN 50325-4
Default Value	Manufacturer-specific

530

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

533

Table 31 – Object description of mapping parameters

Attribute	Value
Index	1605 _n
Name	Receive PDO6 mapping
Object Code	Record
Data Type	PDO mapping
Category	Conditional, if 1405 _n is implemented

534

535

Table 32 – Entry description of mapping parameters

Attribute	Value
Sub-Index	00 _n
Description	Highest supported sub-index
Entry Category	Mandatory
Access	c or rw (if variable mapping is supported)
PDO Mapping	No
Value Range	See EN 50325-4
Default Value	02 _n
Sub-Index	01 _n
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 _n
Sub-Index	02 _n
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

Attribute	Value
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

536

537 5.6.2.8 RPDO 7

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

540

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

541

542

Table 34 – Entry description of communication parameters

Attribute	Value
Sub-Index	00 _h
Description	Highest supported sub-index
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



Attribute	Value
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

543

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

546

Table 35 – Object description of mapping parameters

Attribute	Value
Index	1606 _h
Name	Receive PDO7 mapping
Object Code	Record
Data Type	PDO mapping
Category	Conditional, if 1406 _h is implemented

547

548

Table 36 – Entry description of mapping parameters

Attribute	Value
Sub-Index	00 _h
Description	Highest supported sub-index
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



Attribute	Value
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

549

550 5.6.2.9 RPDO 8

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

553 **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

554

555

Table 38 – Entry description of communication parameters

Attribute	Value
Sub-Index	00 _h
Description	Highest supported sub-index
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

556

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

559

Table 39 – Object description of mapping parameters

Attribute	Value
Index	1607 _h
Name	Receive PDO8 mapping
Object Code	Record
Data Type	PDO mapping
Category	Conditional, if 1407 _h is implemented

560

561

Table 40 – Entry description of mapping parameters

Attribute	Value
Sub-Index	00 _h
Description	Highest supported sub-index
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

562

563 **5.6.2.10 TPDO 1**

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

566 **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

567

568 **Table 42 – Entry description of communication parameters**

Attribute	Value
Sub-Index	00 _h
Description	Highest supported sub-index
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



Attribute	Value
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

569

570 Table 43 specifies the object description and Table 44 specifies the entry description of the
571 PDO mapping parameters.

572

Table 43 – Object description of mapping parameters

Attribute	Value
Index	1A00 _h
Name	Transmit PDO1 mapping
Object Code	Record
Data Type	PDO mapping
Category	Mandatory

573

574

Table 44 – Entry description of mapping parameters

Attribute	Value
Sub-Index	00 _h
Description	Highest supported sub-index
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	6041 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

