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**Elektrische Leistungsantriebssysteme mit einstellbarer Drehzahl –
Teil 7-301: Generisches Interface und Nutzung von Profilen für
Leistungsantriebssysteme (PDS) –
Abbildung von Profil-Typ 1 auf Netzwerktechnologien
(IEC 61800-7-301:2007);
Englische Fassung EN 61800-7-301:2008**

Adjustable speed electrical power drive systems –
Part 7-301: Generic interface and use of profiles for power drive systems –
Mapping of profile type 1 to network technologies (IEC 61800-7-301:2007);
English version EN 61800-7-301:2008

Entraînements électriques de puissance à vitesse variable –
Partie 7-301: Interface et utilisation génériques de profils pour les entraînements
électriques de puissance –
Mapping des profils de type 1 pour technologies réseaux (CEI 61800-7-301:2007);
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Nationales Vorwort

Vorausgegangener Norm-Entwurf: E DIN IEC 61800-7-3:2006-06.

Für diese Norm 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.

Die enthaltene IEC-Publikation wurde vom SC 22G „Semiconductor power converters for adjustable speed electric drive systems“ erarbeitet.

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**Adjustable speed electrical power drive systems –
Part 7-301: Generic interface and use of profiles for power drive systems –
Mapping of profile type 1 to network technologies
(IEC 61800-7-301:2007)**

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à vitesse variable –
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de puissance –
Mapping des profils de type 1
pour technologies réseaux
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mit einstellbarer Drehzahl –
Teil 7-301: Generisches Interface
und Nutzung von Profilen
für Leistungsantriebssysteme (PDS) –
Abbildung von Profil-Typ 1
auf Netzwerktechnologien
(IEC 61800-7-301:2007)

This European Standard was approved by CENELEC on 2008-02-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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

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CENELEC

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

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

The text of document 22G/185/FDIS, future edition 1 of IEC 61800-7-301, prepared by SC 22G, Adjustable speed electric drive systems incorporating semiconductor power converters, of IEC TC 22, Power electronic systems and equipment, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61800-7-301 on 2008-02-01.

The following dates were fixed:

- latest date by which the EN has to be implemented
at national level by publication of an identical
national standard or by endorsement (dop) 2008-11-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2011-02-01

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61800-7-301:2007 was approved by CENELEC as a European Standard without any modification.

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

IEC 61158	NOTE	Harmonized in EN 61158 series (not modified).
IEC 61499-1	NOTE	Harmonized as EN 61499-1:2005 (not modified).
IEC 61800	NOTE	Harmonized in EN 61800 series (not modified).
IEC 61800-7-1	NOTE	Harmonized as EN 61800-7-1:2008 (not modified).
IEC 61800-7-202	NOTE	Harmonized as EN 61800-7-202:2008 (not modified).
IEC 61800-7-203	NOTE	Harmonized as EN 61800-7-203:2008 (not modified).
IEC 61800-7-204	NOTE	Harmonized as EN 61800-7-204:2008 (not modified).
IEC 61800-7-302	NOTE	Harmonized as EN 61800-7-302:2008 (not modified).
IEC 61800-7-303	NOTE	Harmonized as EN 61800-7-303:2008 (not modified).
IEC 61800-7-304	NOTE	Harmonized as EN 61800-7-304:2008 (not modified).

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INTRODUCTION

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

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

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

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

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

There are several reasons to define a generic interface:

For a drive device manufacturer

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

For a control device manufacturer

- No influence of bus technology
- Easy device integration
- Independent of a drive supplier

For a system integrator

- Less integration effort for devices
- Only one understandable way of modeling
- Independent of bus technology

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

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

IEC 61800-7-1 is divided into a generic part and several annexes as shown in Figure 1. The drive profile types for CiA 402¹, CIP Motion^{TM2}, PROFIdrive³ and SERCOS interface^{TM4} are mapped to the generic interface in the corresponding annex. The annexes have been submitted by open international network or fieldbus organizations which are responsible for the content of the related annex and use of the related trademarks.

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

This part of IEC 61800-7 specifies how the profile type 1 (CiA 402) is mapped to the network technologies CANopen⁵, EtherCAT^{TM6} and Ethernet Powerlink^{TM7}.

IEC 61800-7-302, IEC 61800-7-303 and IEC 61800-7-304 specify how the profile types 2, 3 and 4 are mapped to different network technologies (such as DeviceNet^{TM8}, ControlNet^{TM9}, EtherNet/IP^{TM10}, PROFIBUS¹¹, PROFINET¹² and SERCOS interface)

- ¹ CiA 402 is a trade name of CAN in Automation, 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 name holder or any of its products. Compliance to this profile does not require use of the trade name CiA 402.
- ² CIP MotionTM is a trade name of Open DeviceNet Vendor Association, Inc. This information is given for the convenience of users of this International Standard and does not constitute an endorsement by IEC of the trademark holder or any of its products. Compliance to this profile does not require use of the trade name CIP MotionTM. Use of the trade name CIP MotionTM requires permission of Open DeviceNet Vendor Association, Inc.
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- ⁵ CANopen is an acronym for Controller Area Network *open* and is used to refer to EN 50325-4.
- ⁶ EtherCATTM is a trade name 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 trademark holder or any of its products. Compliance to this profile does not require use of the trade name EtherCATTM. Use of the trade name EtherCATTM requires permission of the trade name holder.
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- ¹¹ PROFIBUS is a trade name of PROFIBUS 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 International.
- ¹² PROFINET is a trade name of PROFIBUS 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 International.

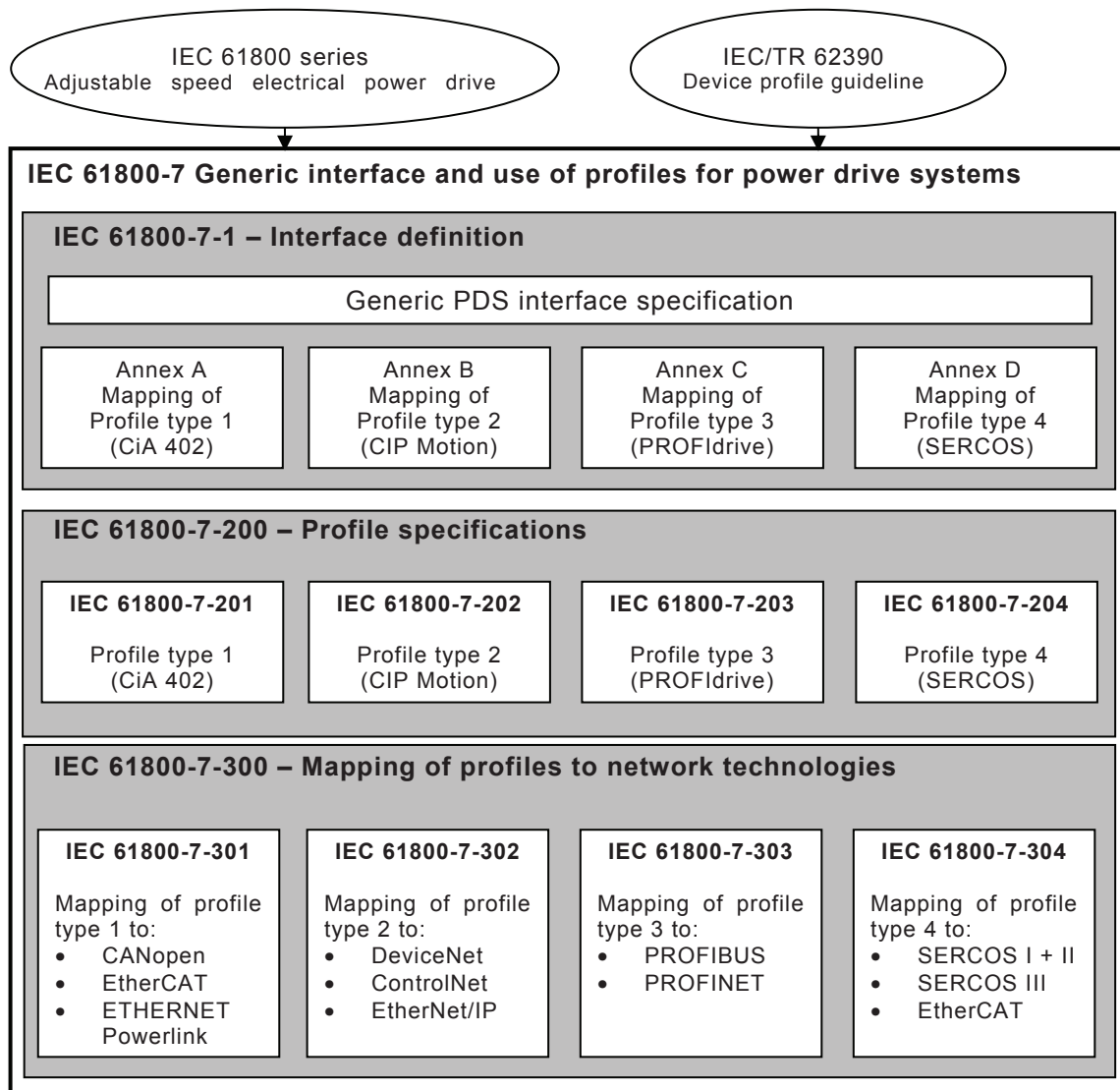


Figure 1 – Structure of IEC 61800-7

ADJUSTABLE SPEED ELECTRICAL POWER DRIVE SYSTEMS –

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

1 Scope

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;
- EtherCAT, see Clause 6;
- ETHERNET Powerlink, see Clause 7.

2 Normative references

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

IEC 61158-5-12, *Industrial communication networks – Fieldbus specifications – Part 5-12 (Ed.1.0): Application layer service definition – Type 12 elements*

IEC 61158-5-13, *Industrial communication networks – Fieldbus specifications – Part 5-13 (Ed.1.0): Application layer service definition – Type 13 elements*

IEC 61158-6-12, *Industrial communication networks – Fieldbus specifications – Part 6-12 (Ed.1.0): Application layer protocol specification – Type 12 elements*

IEC 61158-6-13, *Industrial communication networks – Fieldbus specifications – Part 6-13 (Ed.1.0): Application layer protocol specification – Type 13 elements*

IEC 61800-7 (all parts), *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, *Industrial communications subsystem based on ISO 11898 (CAN) for controller-device interfaces – Part 4: CANopen*

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

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

3.1.1

actual value

value of a variable at a given instant

[IEV 351-21-02]

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

3.1.2

application

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

NOTE An application may be distributed among resources, and may communicate with other applications.

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

3.1.3

attribute

property or characteristic of an entity

[IEC/TR 62390:2005, 3.1.3]

3.1.4

class

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

[ISO/IEC 19501, modified]

3.1.5

commands

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

NOTE 1 The behaviour is reflected by states or operating modes.

NOTE 2 The different commands may be represented by one bit each.

3.1.6

control

purposeful action on or in a process to meet specified objectives

[IEV 351-21-29]

3.1.7

control device

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

3.1.8

data type

set of values together with a set of permitted operations

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

3.1.9

device

field device

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

[IEC 61499-1:2005, 3.30, modified]

entity that performs control, actuating and/or sensing functions and interfaces to other such entities within an automation system

[ISO 15745-1:2003, 3.11]

3.1.10

device profile

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

NOTE This is a definition from IEC/TS 61915 which is extended by the addition of the device functional structure.

[IEC 61390, 3.19, modified]

3.1.11

feedback variable

variable which represents a controlled variable and which is returned to a comparing element

[IEV 351-27-03]

3.1.12

functional element

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

NOTE 1 A functional element has an interface, associations to other functional elements and functions.

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

[IEC/TR 62390:2005, 3.1.12]

3.1.13

input data

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

[IEC/TR 62390:2005, 3.1.14]

3.1.14

interface

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

[IEV 351-21-35, modified]

3.1.15

model

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

[IEV 351-21-36]

3.1.16

operating mode

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

[IEV 351-31-01]

3.1.17

output data

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

[IEC/TR 62390:2005, 3.1.21]

3.1.18

parameter

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

NOTE 1 Adapted from IEC/TS 61915.

NOTE 2 A parameter is typically characterized by a parameter name, data type and access direction.

[IEC/TR 62390:2005, 3.1.22, modified]

3.1.19

profile

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

3.1.20

set-point

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

3.1.21

status

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

NOTE The different status information may be coded with one bit each.

3.1.22

type

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

[IEC/TR 62390:2005, 3.1.25]

3.1.23

variable

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

[IEC/TR 62390:2005, 3.1.27]

NOTE The values of a variable as well as of a parameter are usually restricted to a certain data type.

3.2 Abbreviated terms

c	Constant
CiA	CAN in Automation
COB	Communication Object
EMCY	Emergency Message
FSA	Finite State Automaton
ID	Identifier
PDO	Process Data Object
ro	Read-Only
RPDO	Receive PDO
rw	Read-Write
SDO	Service Data Object
SYNC	Synchronisation Message
TIME	Time message

4 General

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

- CANopen, see Clause 5
- EtherCAT, see Clause 6
- ETHERNET Powerlink, see Clause 7

5 Mapping to CANopen

5.1 Overview

The following clauses specify 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_h: Device type

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

Table 2 – Additional information field for generic PDO mapping

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

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

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

5.3.3 Object 1029_h: Error behaviour

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

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

Table 4 – Value definition

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

Table 5 – Object description

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

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

5.3.4 Object 67FF_h: Single device type

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

5.4 Emergency message

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

5.5 Communication fault events

In addition to local drive device fault events, the following communication events shall cause a transition to the PDS FSA *fault reaction* state:

- NMT stopped state indication if the PDS FSA is in *Operation enabled* state or in *Quick-stop* state.
- NMT initialisation state indication if the PDS FSA is in *Operation enabled* state or in *Quick-stop* state.
- Heartbeat/Life guarding event indication if the PDS FSA is in *Operation enabled* state or in *Quick-stop* state.

5.6 Sets of pre-defined PDOs

5.6.1 General

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

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

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

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

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

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

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

5.6.2 PDO set for generic drive device

5.6.2.1 Overview and introduction

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

Table 7 – Overview on RPDO

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

Table 8 – Overview on TPDO

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

5.6.2.2 RPDO 1

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

Table 9 – Object description of communication parameters

Attribute	Value
Index	1400 _n
Name	Receive PDO1 parameter
Object Code	Record
Data Type	PDO CommPar
Category	Mandatory

Table 10 – Entry description of communication parameters

Attribute	Value
Sub-Index	00 _h
Description	Highest 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 PDO linking is supported)
PDO Mapping	No
Value Range	See EN 50325-4
Default Value	0000 0200 _h + node-ID
Sub-Index	02 _h
Description	Transmission type
Entry Category	Mandatory
Access	c or rw (if PDO type change is supported)
PDO Mapping	No
Value Range	See EN 50325-4
Default Value	255 _d
Sub-Index	05 _h
Description	Event timer
Entry Category	Optional
Access	rw
PDO Mapping	No
Value Range	See EN 50325-4
Default Value	0 _d

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	
Sub-Index	40 _h
Description	64th application object
Entry Category	Optional
Access	c or rw (if variable mapping is supported)
PDO Mapping	No
Value Range	See EN 50325-4
Default Value	Manufacturer-specific

5.6.2.3 RPDO 2

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

Table 13 – Object description of communication parameters

Attribute	Value
Index	1401 _h
Name	Receive PDO2 parameter
Object Code	Record
Data Type	PDO CommPar
Category	Optional

Table 14 – Entry description of communication parameters

Attribute	Value
Sub-Index	00 _h
Description	Highest supported sub-index
Entry Category	Mandatory
Access	ro
PDO Mapping	No
Value Range	See EN 50325-4
Default Value	02 _h
Sub-Index	01 _h
Description	COB-ID used by PDO
Entry Category	Mandatory
Access	c or rw (if PDO linking is supported)
PDO Mapping	No
Value Range	See EN 50325-4
Default Value	(0000 0300 _h or 8000 0300 _h) + node-ID
Sub-Index	02 _h
Description	Transmission type
Entry Category	Mandatory
Access	c or rw (if PDO type change is supported)
PDO Mapping	No
Value Range	See EN 50325-4
Default Value	255 _d
Sub-Index	05 _h
Description	Event timer
Entry Category	Optional
Access	rw
PDO Mapping	No
Value Range	See EN 50325-4
Default Value	0 _d

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

Table 15 – Object description of mapping parameters

Attribute	Value
Index	1601 _h
Name	Receive PDO2 mapping
Object Code	Record
Data Type	PDO mapping
Category	Conditonal, if 1401 _h is implemented

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
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

5.6.2.4 RPDO 3

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

Table 17 – Object description of communication parameters

Attribute	Value
Index	1402 _h
Name	Receive PDO3 parameter
Object Code	Record
Data Type	PDO CommPar
Category	Optional

Table 18 – Entry description of communication parameters

Attribute	Value
Sub-Index	00 _h
Description	Highest supported sub-index
Entry Category	Mandatory
Access	ro
PDO Mapping	No
Value Range	See EN 50325-4
Default Value	02 _h
Sub-Index	01 _h
Description	COB-ID used by PDO
Entry Category	Mandatory
Access	c or rw (if PDO linking is supported)
PDO Mapping	No
Value Range	See EN 50325-4
Default Value	(0000 0400 _h or 8000 0400 _h) + node-ID
Sub-Index	02 _h
Description	Transmission type
Entry Category	Mandatory

Attribute	Value
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	0 _d

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

Table 19 – Object description of mapping parameters

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

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

5.6.2.5 RPDO 4

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

Table 21 – Object description of communication parameters

Attribute	Value
Index	1403 _h
Name	Receive PDO4 parameter
Object Code	Record
Data Type	PDO CommPar
Category	Optional

Table 22 – Entry description of communication parameters

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

Attribute	Value
Entry Category	Mandatory
Access	ro
PDO Mapping	No
Value Range	See EN 50325-4
Default Value	02 _h
Sub-Index	01 _h
Description	COB-ID used by PDO
Entry Category	Mandatory
Access	c or rw (if PDO linking is supported)
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	0 _d

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

Table 23 – Object description of mapping parameters

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

Table 24 – Entry description of mapping parameters

Attribute	Value
Sub-Index	00 _h
Description	Highest 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

5.6.2.6 RPDO 5

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

Table 25 – Object description of communication parameters

Attribute	Value
Index	1404 _h
Name	Receive PDO5 parameter
Object Code	Record
Data Type	PDO CommPar
Category	Optional

Table 26 – Entry description of communication parameters

Attribute	Value
Sub-Index	00 _h
Description	Highest supported sub-index
Entry Category	Mandatory
Access	ro
PDO Mapping	No
Value Range	See EN 50325-4
Default Value	02 _h
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

Attribute	Value
PDO Mapping	No
Value Range	See EN 50325-4
Default Value	0 _d

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

Table 27 – Object description of mapping parameters

Attribute	Value
Index	1604 _h
Name	Receive PDO5 mapping
Object Code	Record
Data Type	PDO mapping
Category	Conditional, if 1404 _h is implemented

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

Attribute	Value
Description	3rd application object
Entry Category	Optional
Access	c or rw (if variable mapping is supported)
PDO Mapping	No
Value Range	See EN 50325-4
Default Value	Manufacturer-specific
to	
Sub-Index	40 _h
Description	64th application object
Entry Category	Optional
Access	c or rw (if variable mapping is supported)
PDO Mapping	No
Value Range	See EN 50325-4
Default Value	Manufacturer-specific

5.6.2.7 RPDO 6

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

Table 29 – Object description of communication parameters

Attribute	Value
Index	1405 _h
Name	Receive PDO6 parameter
Object Code	Record
Data Type	PDO CommPar
Category	Optional

Table 30 – Entry description of communication parameters

Attribute	Value
Sub-Index	00 _h
Description	Highest supported sub-index
Entry Category	Mandatory
Access	ro
PDO Mapping	No
Value Range	See EN 50325-4
Default Value	02 _h
Sub-Index	01 _h
Description	COB-ID used by PDO
Entry Category	Mandatory

Attribute	Value
Access	c or rw (if PDO linking is supported)
PDO Mapping	No
Value Range	See EN 50325-4
Default Value	8000 0000 _h
Sub-Index	02 _h
Description	Transmission type
Entry Category	Mandatory
Access	rw
PDO Mapping	No
Value Range	See EN 50325-4
Default Value	255 _d
Sub-Index	05 _h
Description	Event timer
Entry Category	Optional
Access	rw
PDO Mapping	No
Value Range	See EN 50325-4
Default Value	0 _d

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

Table 31 – Object description of mapping parameters

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

Table 32 – 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

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

5.6.2.8 RPDO 7

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

Table 33 – Object description of communication parameters

Attribute	Value
Index	1406 _h
Name	Receive PDO7 parameter
Object Code	Record
Data Type	PDO CommPar
Category	Optional

Table 34 – Entry description of communication parameters

Attribute	Value
Sub-Index	00 _h
Description	Highest supported sub-index
Entry Category	Mandatory
Access	ro
PDO Mapping	No
Value Range	See EN 50325-4
Default Value	02 _h
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	0 _d

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

Table 35 – Object description of mapping parameters

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

Table 36 – Entry description of mapping parameters

Attribute	Value
Sub-Index	00 _h
Description	Highest 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	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

Attribute	Value
Default Value	Manufacturer-specific
to	
Sub-Index	40 _h
Description	64th application object
Entry Category	Optional
Access	c or rw (if variable mapping is supported)
PDO Mapping	No
Value Range	See EN 50325-4
Default Value	Manufacturer-specific

5.6.2.9 RPDO 8

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

Table 37 – Object description of communication parameters

Attribute	Value
Index	1407 _h
Name	Receive PDO8 parameter
Object Code	Record
Data Type	PDO CommPar
Category	Optional

Table 38 – Entry description of communication parameters

Attribute	Value
Sub-Index	00 _h
Description	Highest supported sub-index
Entry Category	Mandatory
Access	ro
PDO Mapping	No
Value Range	See EN 50325-4
Default Value	02 _h
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

Attribute	Value
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	0 _d

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

Table 39 – Object description of mapping parameters

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

Table 40 – Entry description of mapping parameters

Attribute	Value
Sub-Index	00 _h
Description	Highest 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

Attribute	Value
Description	2nd application object
Entry Category	Mandatory
Access	c or rw (if variable mapping is supported)
PDO Mapping	No
Value Range	See EN 50325-4
Default Value	6060 0008 _h
Sub-Index	03 _h
Description	3rd application object
Entry Category	Optional
Access	c or rw (if variable mapping is supported)
PDO Mapping	No
Value Range	See EN 50325-4
Default Value	Manufacturer-specific
to	
Sub-Index	40 _h
Description	64th application object
Entry Category	Optional
Access	c or rw (if variable mapping is supported)
PDO Mapping	No
Value Range	See EN 50325-4
Default Value	Manufacturer-specific

5.6.2.10 TPDO 1

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

Table 41 – Object description of communication parameters

Attribute	Value
Index	1800 _h
Name	Transmit PDO1 parameter
Object Code	Record
Data Type	PDO CommPar
Category	Mandatory

Table 42 – Entry description of communication parameters

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

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