

**Adjustable speed electrical power drive systems -
Part 7-204: Generic interface and use of profiles for
power drive systems - Profile type 4 specification**

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drive systems - Profile type 4 specification

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN 61800-7-204:2008 sisaldab Euroopa standardi EN 61800-7-204:2008 ingliskeelset teksti.

Standard on kinnitatud Eesti Standardikeskuse 21.05.2008 käskkirjaga ja jõustub sellekohase teate avaldamisel EVS Teatajas.

Euroopa standardimisorganisatsioonide poolt rahvuslikele liikmetele Euroopa standardi teksti kättesaadavaks tegemise kuupäev on 11.04.2008.

Standard on kättesaadav Eesti standardiorganisatsioonist.

This Estonian standard EVS-EN 61800-7-204:2008 consists of the English text of the European standard EN 61800-7-204:2008.

This standard is ratified with the order of Estonian Centre for Standardisation dated 21.05.2008 and is endorsed with the notification published in the official bulletin of the Estonian national standardisation organisation.

Date of Availability of the European standard text 11.04.2008.

The standard is available from Estonian standardisation organisation.

ICS 29.200, 35.100.05

Võtmesõnad:

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Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonilisse süsteemi või edastamine ükskõik millises vormis või millisel teel on keelatud ilma Eesti Standardikeskuse poolt antud kirjaliku loata.

Kui Teil on küsimusi standardite autorikaitse kohta, palun võtke ühendust Eesti Standardikeskusega:
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**Adjustable speed electrical power drive systems -
Part 7-204: Generic interface and use of profiles for power drive systems -
Profile type 4 specification
(IEC 61800-7-204:2007)**

Entraînements électriques de puissance
à vitesse variable -
Partie 7-204: Interface et utilisation
génériques de profils pour les
entraînements électriques de puissance -
Spécifications des profils de type 4
(CEI 61800-7-204:2007)

Elektrische Leistungsantriebssysteme
mit einstellbarer Drehzahl -
Teil 7-204: Generisches Interface
und Nutzung von Profilen
für Leistungsantriebssysteme (PDS) -
Spezifikation von Profil-Typ 4
(IEC 61800-7-204:2007)

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.

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

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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/184/FDIS, future edition 1 of IEC 61800-7-204, 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 61800-7-204 on 2008-02-01.

This European Standard, together with its companion parts for Profile type 4 (SERCOS), partially replaces EN 61491:1998 which is at present being revised (to be issued as a Technical Report).

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 61800-7-204:2007 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	NOTE	Harmonized in EN 61800-7 series (not modified).
IEC 61800-7-1	NOTE	Harmonized as EN 61800-7-1:2008 (not modified).
IEC 61800-7-201	NOTE	Harmonized as EN 61800-7-201:2008 (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 61800-7-301	NOTE	Harmonized as EN 61800-7-301:2008 (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).

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

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.

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 61158-4-16	- ¹⁾	Industrial communication networks - Fieldbus specifications - Part 4-16: Data-link layer protocol specification - Type 16 elements	EN 61158-4-16	2008 ²⁾
IEC 61158-5-16	- ¹⁾	Industrial communication networks - Fieldbus specifications - Part 5-16: Application layer service definition - Type 16 elements	EN 61158-5-16	2008 ²⁾
IEC 61158-6-16	- ¹⁾	Industrial communication networks - Fieldbus specifications - Part 6-16: Application layer protocol specification - Type 16 elements	EN 61158-6-16	2008 ²⁾
IEC 61800-7	Series	Adjustable speed electrical power drive systems - Generic interface and use of profiles for power drive systems	EN 61800-7	Series
IEC 61800-7-304	- ¹⁾	Adjustable speed electrical power drive systems - Part 7-304: Generic interface and use of profiles for power drive systems - Mapping of profile type 4 to network technologies	EN 61800-7-304	2008 ²⁾

¹⁾ Undated reference.

²⁾ Valid edition at date of issue.

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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 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 (builds modules, machines, plants etc.)

- 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 specified with incompatibilities. It is up to the systems integrator to write interfaces to the application software to handle that which 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.

This part of IEC 61800-7 specifies the profile type 4 (SERCOS).

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

IEC 61800-7-301, IEC 61800-7-302, IEC 61800-7-303 and IEC 61800-7-304 specify how the profile types 1, 2, 3 and 4 are mapped to different network technologies (such as CANopen⁵, EtherCAT^{TM6}, Ethernet Powerlink^{TM7}, 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.
 - 3 PROFIdrive 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 PROFIdrive. Use of the trade name PROFIdrive requires permission of PROFIBUS International.
 - 4 SERCOSTM and SERCOS InterfaceTM are trade names 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 name holder or any of its products. Compliance to this profile does not require use of the trade name SERCOS and SERCOS interface. Use of the trade name SERCOS and SERCOS interface requires permission of the trade name holder.
 - 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.
 - 7 Ethernet PowerlinkTM is a trade name of B&R, control of trade name use is given to the non profit organisation EPSG. 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 Ethernet PowerlinkTM. Use of the trade name Ethernet PowerlinkTM requires permission of the trade name holder.
 - 8 DeviceNetTM 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 DeviceNetTM. Use of the trade name DeviceNetTM requires permission of Open DeviceNet Vendor Association, Inc.
 - 9 ControlNetTM is a trade name of ControlNet International, Ltd. 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 ControlNetTM. Use of the trade name ControlNetTM requires permission of ControlNet International, Ltd.
 - 10 EtherNet/IPTM is a trade name of ControlNet International, Ltd. and Open DeviceNet Vendor Association, Inc. This information is given for the convenience of users of this 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 EtherNet/IPTM. Use of the trade name EtherNet/IPTM requires permission of either ControlNet International, Ltd. or Open DeviceNet Vendor Association, Inc.
 - 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.

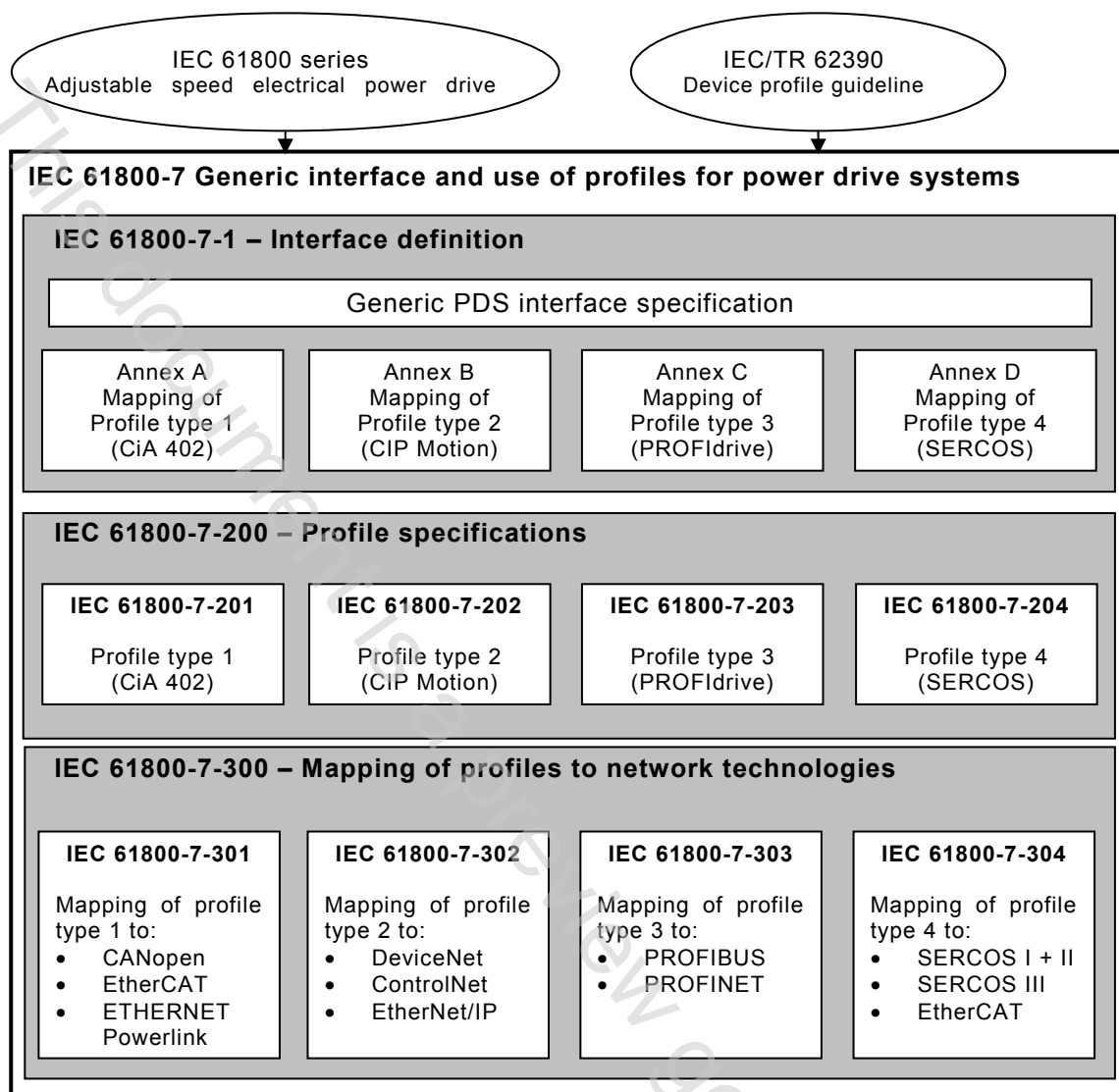


Figure 1 – Structure of IEC 61800-7

ADJUSTABLE SPEED ELECTRICAL POWER DRIVE SYSTEMS –

Part 7-204: Generic interface and use of profiles for power drive systems – Profile type 4 specification

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 profile type 4 for Power Drive Systems (PDS). Profile type 4 can be mapped onto different communication network technologies.

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 61158-4-16, *Industrial communication networks – Fieldbus specifications – Part 4-16 (Ed.1.0): Data-link layer protocol specification – Type 16 elements*

IEC 61158-5-16, *Industrial communication networks – Fieldbus specifications – Part 5-16 (Ed.1.0): Application layer service definition – Type 16 elements*

IEC 61158-6-16, *Industrial communication networks – Fieldbus specifications – Part 6-16 (Ed.1.0): Application layer protocol specification – Type 16 elements*

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

IEC 61800-7-304, *Adjustable speed electrical power drive systems – Part 7-304: Generic interface and use of profiles for power drive systems – Mapping of profile type 4 to network technologies*

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

acknowledge telegram (AT)

telegram, in which each slave inserts its data