

IRISH STANDARD

I.S. EN 50207:2000

ICS 29.200 45.060.10

National Standards Authority of Ireland Dublin 9 Ireland

Tel. (01) 807 3800 Tel. (01) 807 3838

RAILWAY APPLICATIONS - ELECTRONIC POWER CONVERTERS FOR ROLLING STOCK

This Irish Standard was published under the authority of the National Standards Authority of Ireland and comes into effect on March 9, 2001

NO COPYING WITHOUT NSAI PERMISSION EXCEPT AS PERMITTED BY COPYRIGHT LAW

© NSAI 2000

Price Code P

Údarás um Chaighdeáin Náisiúnta na hÉireann

This is a free page sample. Access the full version online.

EUROPEAN STANDARD

EN 50207

NORME EUROPÉENNE

EUROPÄISCHE NORM

September 2000

ICS 29 200, 45 060 10

English version

Railway applications - Electronic power converters for rolling stock

Applications ferroviaires - Convertisseurs électroniques de puissance pour matériel roulant

Bahnanwendungen - Elektronische Stromrichter auf Bahnfahrzeugen

This European Standard was approved by CENELEC on 2000-07-01. 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.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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 .



This European Standard was prepared by the Technical Committee CENELEC TC 9X, Electrical and electronic applications for railways

The text of the draft was submitted to the formal vote and was approved by CENELEC as EN 50207 on 2000-07-01.

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) 2001-07-01

 latest date by which the national standards conflicting with the EN have to be withdrawn

(dow) 2001-07-01

Annexes designated "normative" are part of the body of the standard. Annexes designated "informative" are given only for information. In this standard, annexes A and B informative.

Contents

| 1 | Scope | 5 |
|--------------------------------|---|------------|
| 2 | Normative references | 5 |
| 3 3.1 3.2 | Definitions Definitions related to equipment Definitions related to electrical parameters | 7 |
| 4 4.1 4 1.1 4.1.2 | Common clauses General Design | . 10 10 |
| 4.1.2 | Marking Technical documentation | . 11 |
| 4 1.4 4.1 5 4.2 | Reliability, availability, maintainability and safety Useful life Service conditions | 12 . 12 |
| 4 2.1 4 2.2 4.2.3 | General Altitude Temperature | 12 |
| 4.2.3 4 2.4 4.2.5 | Other environmental conditions Mechanical stress | 13 |
| 4 2.6 4 2.7 | Load profile characteristics | . 13 |
| 4 2.8 4 2 9 | Interference Input current limitations | 15 |
| 4.2.10 4.2.11 | Influence on the environment Temperature of surfaces | |
| 4.3 4.3.1 | Characteristics Characteristics of components | |
| 4 3.2 4.3.3 4.3.4 | Characteristics of semiconductor devices Characteristics of transformers, reactors and capacitors Characteristics of converters | 17 |
| 4.4 4 4.1 | Technical requirements | . 19 19 |
| 4 4 2 4 4 3 4 5 | EMC requirements for converters | 19 |
| 4 5.1 4.5.2 | General Converter tests | . 20 21 |
| 4 5.3 4.5.4 | Description of tests Failure of components during type tests | |
| 5 5.1 | Direct traction converters. Line commutated converters for d.c. motors | |
| 5 1.1 5 1.2 | Characteristics. Tests | 31 |
| 5.2 5.2.1 5.2.2 | Choppers for d.c. motors | 33 |
| 5.2.2 5.3 5.3.1 5.3.2 | Tests Multiphase converters for a.c. motors (inverters) Characteristics Tests | 36 36 |
| 6 | Indirect traction converters | 37 |
| 6.1 6.1.1 | Line converter Characteristics | 37 |
| 6.1.2 6.2 | Tests Motor converter (inverter) Meter converter for d.e. meters | 39 |
| 6.2.1 6.2.2 | Motor converter for d.c. motors | |

Page 4 EN 50207 2000

| | Auxiliary converters | 39 |
|--|--|--|
| 7.1 | Characteristics | 39 |
| 7.1.1 | Auxiliary converter starting conditions | 30 |
| 7.1.2 | Input conditions and characteristics | ac |
| 7 1.3 | Output characteristics | วฉ |
| 7 2 | Short-circuit protection | . UU M |
| 7.3 | Choice of rated insulation voltage in presence of isolating transformers | 41 11 |
| 7.4 | Tests | . 4 1 |
| 741 | Output characteristics test (type test) | . 41 |
| 7 4.2 | Starting and restarting test (type test) | . 4 |
| 7.4.2 | Short circuit toot (type test) | 42 |
| 7.4.3 | Short circuit test (type test) | . 42 |
| | Voltage and frequency ranges verification (type test) | 42 |
| 7.4.5 | Light load test (routine test) | . 42 |
| 7 4.6 | Overload capability test (type test) | 42 |
| 7.4.7 | Temperature rise test (type test) | . 42 |
| 7.4.8 | Load break test (type test) | . 43 |
| 8 | Semiconductors Drive Units (SDU) | 42 |
| 8.1 | Equivalent expressions | . 40 |
| 8.2 | Printed circuit board assemblies | . 43 |
| 8.3 | Function of the SDII | . 43 |
| 8.4 | Function of the SDU | 43 |
| | Particular requirements for the SDU | 43 |
| 8.5 | Service conditions | 44 |
| 8.6 | Insulation requirements for the SDU | 44 |
| 8.7 | Electromagnetic compatibility requirements. | . 44 |
| 8.8 | Tests of the SDU | .44 |
| | | |
| Annex A | (informative) Schemes of elementary converters | 15 |
| | (informative) Schemes of elementary converters | 45 |
| A.1 | Types of converters | 45 |
| A.1 A.2 | Types of converters | 45 45 |
| A.1 A.2 A.2.1 | Types of converters | 45 45 45 |
| A.1 A.2 A.2.1 A.2.2 | Types of converters Rectifier Function Block diagram | 45 45 45 45 |
| A.1 A.2 A.2.1 A.2.2 A.2.3 | Types of converters Rectifier Function Block diagram Control | 45 45 45 45 46 |
| A.1 A.2 A.2.1 A.2.2 A.2.3 A.3 | Types of converters Rectifier Function Block diagram Control Chopper | 45 45 45 46 46 |
| A.1 A.2 A.2.1 A.2.2 A.2.3 A.3 A.3 1 | Types of converters Rectifier Function Block diagram Control Chopper Function | 45 45 45 46 46 46 |
| A.1 A.2 A.2.1 A.2.2 A.2.3 A.3 A.3 1 A.3 2 | Types of converters Rectifier Function Block diagram Control Chopper Function Block diagram | 45 45 45 46 46 46 |
| A.1 A.2 A.2.1 A.2.2 A.2.3 A.3 A.3 1 A.3 2 A.3.3 | Types of converters Rectifier Function Block diagram Control Chopper Function Block diagram Types of choppers | 45 45 45 46 46 46 46 |
| A.1 A.2 A.2.1 A.2.2 A.2.3 A.3 A.3 1 A.3 2 A.3.3 A.3 4 | Types of converters Rectifier Function Block diagram Control Chopper Function Block diagram Types of choppers Control | 45 45 45 46 46 46 46 47 |
| A.1 A.2 A.2.1 A.2.2 A.2.3 A.3 A.3 1 A.3 2 A.3.3 A.3 4 A.4 | Types of converters Rectifier Function Block diagram Control Chopper Function Block diagram Types of choppers Control | 45 45 45 46 46 46 46 47 47 |
| A.1 A.2 A.2.1 A.2.2 A.2.3 A.3 A.3 1 A.3 2 A.3.3 A.3 4 A.4 A.4 | Types of converters Rectifier Function Block diagram Control Chopper Function Block diagram Types of choppers Control Inverter. Function | 45 45 45 46 46 46 46 47 47 47 |
| A.1 A.2 A.2.1 A.2.2 A.2.3 A.3 A.3 1 A.3 2 A.3.3 A.3.4 A.4 A.4 A.4.1 A.4.2 | Types of converters Rectifier Function Block diagram Control Chopper Function Block diagram Types of choppers Control Inverter Function Block diagram | 45 45 45 46 46 46 47 47 47 47 |
| A.1 A.2 A.2.1 A.2.2 A.2.3 A.3 A.3 1 A.3 2 A.3.3 A.3.4 A.4 A.4 A.4.1 A.4.2 A.4.3 | Types of converters Rectifier Function Block diagram Control Chopper Function Block diagram Types of choppers Control Inverter Function Block diagram Types of inverters | 45 45 45 46 46 46 47 47 47 47 |
| A.1 A.2 A.2.1 A.2.2 A.2.3 A.3 A.3 1 A.3 2 A.3.3 A.3.4 A.4 A.4.1 A.4.2 A.4.3 A.4.4 | Types of converters Rectifier Function Block diagram Control Chopper Function Block diagram Types of choppers Control Inverter Function Block diagram Types of inverters Control | 45 45 45 46 46 46 47 47 47 47 47 48 |
| A.1 A.2 A.2.1 A.2.2 A.2.3 A.3 1 A.3 2 A.3.3 A.3.4 A.4.1 A.4.2 A.4.3 A.4.4 A.5 | Types of converters Rectifier Function Block diagram Control Chopper Function Block diagram Types of choppers Control Inverter. Function Block diagram Types of inverters Control Block diagram Types of inverters Control Block diagram Types of inverters Control Block diagrams for line converters for different types of the intermediate link | 45 45 45 46 46 46 47 47 47 47 47 48 |
| A.1 A.2 A.2.1 A.2.2 A.3 A.3 1 A.3 2 A.3.3 A.3 4 A.4.1 A.4.2 A.4.3 A.4.4 A.5 A.5.1 | Types of converters. Rectifier. Function Block diagram Control Chopper Function Block diagram Types of choppers. Control Inverter. Function Block diagram Types of inverters. Control Block diagram Types of inverters Control Block diagram Types of inverters of inverters. | 45 45 45 46 46 47 47 47 47 47 48 49 |
| A.1 A.2 A.2.1 A.2.2 A.3.3 A.3.1 A.3.2 A.3.3 A.3.4 A.4.1 A.4.2 A.4.3 A.4.4 A.5 | Types of converters. Rectifier. Function Block diagram Control Chopper Function Block diagram Types of choppers Control Inverter Function Block diagram Types of inverters Control Block diagram Types of inverters Function Block diagram Types of inverters Control Block diagram Types of inverters Control Block diagrams for line converters for different types of the intermediate link Line converter with voltage-source intermediate link Line converter with current-source intermediate link | 45 45 45 46 46 46 47 47 47 47 47 47 48 48 49 49 |
| A.1 A.2 A.2.1 A.2.2 A.3 A.3 1 A.3 2 A.3.3 A.3 4 A.4.1 A.4.2 A.4.3 A.4.4 A.5 A.5.1 | Types of converters. Rectifier. Function Block diagram Control Chopper Function Block diagram Types of choppers Control Inverter Function Block diagram Types of inverters Control Block diagram Types of inverters Function Block diagram Types of inverters Control Block diagram Types of inverters Control Block diagrams for line converters for different types of the intermediate link Line converter with voltage-source intermediate link Line converter with current-source intermediate link | 45 45 45 46 46 46 47 47 47 47 47 47 48 48 49 49 |
| A.1 A.2.1 A.2.2 A.2.3 A.3.1 A.3.2 A.3.3 A.3.4 A.4.1 A.4.2 A.4.3 A.4.4 A.5.1 A.5.1 A.5.2 | Types of converters. Rectifier. Function Block diagram Control Chopper Function Block diagram Types of choppers. Control Inverter. Function Block diagram Types of inverters. Control Block diagram Types of inverters. Control Block diagram Types of inverters. Control Block diagram types of inverters for different types of the intermediate link Line converter with voltage-source intermediate link Line converter with current-source intermediate link Line converter with transformer intermediate a.c. link | 45 45 45 46 46 46 47 47 47 47 47 48 49 49 |
| A.1 A.2 A.2.1 A.2.2 A.3.3 A.3.1 A.3.2 A.3.3 A.3.4 A.4.1 A.4.2 A.4.3 A.4.4 A.5.1 A.5.1 A.5.2 A.5.3 A.6 | Types of converters. Rectifier. Function Block diagram Control Chopper Function Block diagram Types of choppers Control Inverter Function Block diagram Types of inverters Control Block diagram Types of inverters Function Block diagram Types of inverters Control Block diagram Types of inverters Control Block diagrams for line converters for different types of the intermediate link Line converter with voltage-source intermediate link Line converter with current-source intermediate link | 45 45 46 46 46 47 47 47 47 47 48 49 49 49 |



| | This is a free preview. | Purchase the e | entire publication | at the link below: |
|--|-------------------------|----------------|--------------------|--------------------|
|--|-------------------------|----------------|--------------------|--------------------|

Product Page

- Dooking for additional Standards? Visit Intertek Inform Infostore
- Dearn about LexConnect, All Jurisdictions, Standards referenced in Australian legislation