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Standards

Irish Standard  
I.S. EN 61375-3-3:2012

# Electronic railway equipment - Train communication network (TCN) -- Part 3 -3: CANopen Consist Network (CCN) (IEC 61375-3-3:2012 (EQV))

## I.S. EN 61375-3-3:2012

*Incorporating amendments/corrigenda issued since publication:*

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**Electronic railway equipment -  
Train communication network (TCN) -  
Part 3-3: CANopen Consist Network (CCN)  
(IEC 61375-3-3:2012)**

Matériel électronique ferroviaire -  
Réseau embarqué de train (TCN) -  
Partie 3-3: Réseau de rame CANopen  
(CCN)  
(CEI 61375-3-3:2012)

Elektronische Betriebsmittel für Bahnen -  
Zug-Kommunikations-Netzwerk (TCN) -  
Teil 3-3: CCN-CANopen Consist Network  
Bus  
(IEC 61375-3-3:2012)

This European Standard was approved by CENELEC on 2012-07-26. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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

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

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**CENELEC**

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

**Management Centre: Avenue Marnix 17, B - 1000 Brussels**

**I.S. EN 61375-3-3:2012**

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- 2 -

**Foreword**

The text of document 9/1646/FDIS, future edition 1 of IEC 61375-3-3, prepared by IEC/TC 9 "Electrical equipment and systems for railways" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 61375-3-3:2012.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2013-04-26
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2015-07-26

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

This document has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For the relationship with EU Directive(s) see informative Annex ZZ, which is an integral part of this document.

**Endorsement notice**

The text of the International Standard IEC 61375-3-3:2012 was approved by CENELEC as a European Standard without any modification.

## Annex ZA (normative)

### Normative references to international publications with their corresponding European publications

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.

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> |
|--------------------|-------------|--|--------------|-------------|
| -                  | -           | Industrial communications subsystem based on ISO 11898 (CAN) for controller-device interfaces -<br>Part 4: CANopen | EN 50325-4   | 2002        |
| IEC 61131          | Series      | Programmable controllers   | EN 61131     | Series      |
| IEC 61375-1        | -           | Electronic railway equipment - Train communication network (TCN) -<br>Part 1: General architecture                 | EN 61375-1   | -           |
| IEC 61375-2-1      | -           | Electronic railway equipment - Train communication network (TCN) -<br>Part 2-1: Wire Train Bus (WTB)               | EN 61375-2-1 | -           |
| IEC 61375-2-2      | -           | Electronic railway equipment - Train communication network (TCN) -<br>Part 2-2: Wire Train Bus conformance testing | EN 61375-2-2 | -           |
| ISO/IEC 646        | 1991        | Information technology - ISO 7-bit coded character set for information interchange                                 | -            | -           |
| ISO/IEC 9899       | 1999        | Programming languages - C  | -            | -           |
| ISO 11898-1        | 2003        | Road vehicles - Controller area network (CAN) -<br>Part 1: Data link layer and physical signalling                 | -            | -           |
| ISO 11898-2        | 2003        | Road vehicles - Controller area network (CAN) -<br>Part 2: High-speed medium access unit                           | -            | -           |

**Annex ZZ**  
(informative)

**Coverage of Essential Requirements of EU Directives**

This European Standard has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association and within its scope the standard covers all relevant essential requirements as given in Annex III of the EU Directive 2008/57/EC.

Compliance with this standard provides one means of conformity with the specified essential requirements of the Directive concerned.

**WARNING:** Other requirements and other EU Directives may be applicable to the products falling within the scope of this standard.

**CONTENTS**

|  |    |
|--|----|
| FOREWORD.....  | 10 |
| INTRODUCTION.....  | 12 |
| 1 Scope.....   | 13 |
| 2 Normative references .....                                       | 13 |
| 3 Terms, definitions and abbreviations .....                       | 14 |
| 3.1 Terms and definitions .....                                    | 14 |
| 3.2 Abbreviations .....  | 15 |
| 3.3 Conventions .....  | 15 |
| 4 Architecture.....  | 15 |
| 4.1 Content .....  | 15 |
| 4.2 Logical CANopen-based consist network .....                    | 15 |
| 4.3 Network topology.....  | 16 |
| 4.4 Addressing .....   | 16 |
| 4.5 Data classes .....   | 17 |
| 5 Physical layer.....  | 17 |
| 5.1 Content .....  | 17 |
| 5.2 Cabling.....   | 17 |
| 5.3 Connector .....  | 17 |
| 5.4 Physical medium attachment .....                               | 19 |
| 5.5 Physical signaling.....  | 19 |
| 6 Data Link layer .....  | 19 |
| 6.1 Content .....  | 19 |
| 6.2 CANopen data link layer .....                                  | 20 |
| 7 CANopen application layer .....                                  | 20 |
| 7.1 Content .....  | 20 |
| 7.2 Reference model .....  | 20 |
| 7.3 Field device model .....                                       | 20 |
| 7.4 CANopen communication objects .....                            | 22 |
| 7.5 CANopen object dictionary .....                                | 22 |
| 7.6 Predefined CANopen communication objects .....                 | 24 |
| 7.6.1 Content .....  | 24 |
| 7.6.2 Object 1000 <sub>h</sub> : Device type .....                 | 24 |
| 7.6.3 Object 1001 <sub>h</sub> : Error register.....               | 24 |
| 7.6.4 Object 1014 <sub>h</sub> : COB-ID emergency object.....      | 24 |
| 7.6.5 Object 1017 <sub>h</sub> : Heartbeat producer .....          | 24 |
| 7.6.6 Object 1018 <sub>h</sub> : Identity object.....              | 24 |
| 7.6.7 Object 1029 <sub>h</sub> : Error behavior .....              | 24 |
| 7.6.8 Object 67FF <sub>h</sub> : Device type.....                  | 25 |
| 7.6.9 Service data objects (SDOs).....                             | 25 |
| 7.6.10 Process data objects (PDOs).....                            | 25 |
| 8 Application data.....  | 25 |
| 8.1 Content .....  | 25 |
| 8.2 CANopen application data representation.....                   | 25 |
| 8.3 Recommended representation principle of application data ..... | 25 |
| 8.3.1 Content .....  | 25 |

|        |  |    |
|--------|--|----|
| 8.3.2  | Application data for door control .....                                | 25 |
| 8.3.3  | Consumed door control application objects .....                        | 26 |
| 8.3.4  | Produced door control application objects .....                        | 27 |
| 9      | CANopen network management .....                                       | 29 |
| 9.1    | Content .....  | 29 |
| 9.2    | CANopen NMT slave functionality .....                                  | 30 |
| 9.3    | CANopen manager functionality .....                                    | 30 |
| 9.3.1  | General .....  | 30 |
| 9.3.2  | Object dictionary usage .....  | 31 |
| 9.3.3  | Redundant networks .....   | 31 |
| 9.4    | CANopen NMT start-up .....   | 32 |
| 9.4.1  | NMT startup .....  | 32 |
| 9.4.2  | NMT startup simple .....   | 35 |
| 9.4.3  | Start process boot NMT slave .....                                     | 36 |
| 9.5    | Boot NMT slave .....   | 37 |
| 9.5.1  | Check configuration .....  | 42 |
| 9.5.2  | Check NMT state .....  | 43 |
| 9.5.3  | NMT flying master start up .....                                       | 43 |
| 9.5.4  | Error status .....   | 44 |
| 9.6    | Error control .....  | 45 |
| 9.6.1  | Start error control .....  | 45 |
| 9.6.2  | Error handler .....  | 46 |
| 9.6.3  | Bootup handler .....   | 47 |
| 9.7    | Additional NMT master services and protocols .....                     | 47 |
| 9.8    | Object dictionary entries .....  | 47 |
| 9.8.1  | Object 1020 <sub>h</sub> : Verify configuration .....                  | 47 |
| 9.8.2  | Object 102A <sub>h</sub> : NMT inhibit time .....                      | 48 |
| 9.8.3  | Object 1F20 <sub>h</sub> : Store DCF .....                             | 49 |
| 9.8.4  | Object 1F22 <sub>h</sub> : Concise DCF .....                           | 50 |
| 9.8.5  | Object 1F26 <sub>h</sub> : Expected configuration date .....           | 52 |
| 9.8.6  | Object 1F27 <sub>h</sub> : Expected configuration time .....           | 53 |
| 9.8.7  | Object 1F80 <sub>h</sub> : NMT startup .....                           | 54 |
| 9.8.8  | Object 1F81 <sub>h</sub> : NMT slave assignment .....                  | 56 |
| 9.8.9  | Object 1F82 <sub>h</sub> : Request NMT .....                           | 58 |
| 9.8.10 | Object 1F83 <sub>h</sub> : Request node guarding .....                 | 61 |
| 9.8.11 | Object 1F84 <sub>h</sub> : Device type identification .....            | 63 |
| 9.8.12 | Object 1F85 <sub>h</sub> : Vendor identification .....                 | 64 |
| 9.8.13 | Object 1F86 <sub>h</sub> : Product code .....                          | 65 |
| 9.8.14 | Object 1F87 <sub>h</sub> : Revision number .....                       | 66 |
| 9.8.15 | Object 1F88 <sub>h</sub> : Serial number .....                         | 67 |
| 9.8.16 | Object 1F89 <sub>h</sub> : Boot time .....                             | 68 |
| 9.8.17 | Object 1F8A <sub>h</sub> : Restore configuration .....                 | 69 |
| 9.8.18 | Object 1F91 <sub>h</sub> : Self starting nodes timing parameters ..... | 70 |
| 10     | Gateway functions .....  | 71 |
| 10.1   | Content .....  | 71 |
| 10.2   | Gateway architecture .....   | 72 |
| 10.3   | General principles and services .....                                  | 73 |
| 10.3.1 | Content .....  | 73 |
| 10.3.2 | Gateway class definitions .....  | 73 |



|        |   |     |
|--------|---|-----|
| 10.3.3 | Service primitives definitions .....                                      | 73  |
| 10.4   | Network access service specification.....                                 | 73  |
| 10.4.1 | SDO access services.....  | 73  |
| 10.4.2 | PDO access services.....  | 75  |
| 10.4.3 | CANopen NMT services.....   | 78  |
| 10.4.4 | Device failure management services .....                                  | 81  |
| 10.4.5 | CANopen interface configuration services .....                            | 82  |
| 10.4.6 | Gateway management services .....   | 84  |
| 10.4.7 | Manufacturer-specific services .....                                      | 85  |
| 10.5   | ASCII mapping of network access services .....                            | 85  |
| 10.5.1 | Content .....   | 85  |
| 10.5.2 | Definitions .....   | 86  |
| 10.5.3 | Network access command specification.....                                 | 89  |
| 11     | Train network management .....  | 97  |
| 11.1   | Content .....   | 97  |
| 11.2   | Manager, Agents and interfaces (informative).....                         | 98  |
| 11.3   | Management message protocol (informative) .....                           | 98  |
| 11.4   | Object interfaces (informative).....                                      | 98  |
| 11.5   | CANopen-specific management services .....                                | 98  |
| 11.5.1 | General .....   | 98  |
| 11.5.2 | Agent interfaces on a Station connected to CANopen consist network .....  | 98  |
| 11.5.3 | Management message structure for CANopen consist networks .....           | 99  |
| 11.5.4 | Notation for the CANopen specific SIF_codes .....                         | 99  |
| 11.5.5 | Notation for a call CANopen management message .....                      | 100 |
| 11.5.6 | Notation for a reply CANopen management message .....                     | 100 |
| 11.5.7 | Notation for the TNM CANopen services command codes .....                 | 100 |
| 11.6   | TNM CANopen services .....  | 101 |
| 11.6.1 | Content .....   | 101 |
| 11.6.2 | Call_Write_CANopen_Command (with reservation) .....                       | 101 |
| 11.6.3 | Reply_Write_CANopen_Command (with reservation) .....                      | 102 |
| 11.6.4 | Call_Read_CANopen_Command (without reservation) .....                     | 102 |
| 11.6.5 | Reply_Read_CANopen_Command (without reservation).....                     | 103 |
| 12     | CANopen management message data handling.....                             | 103 |
| 12.1   | General.....  | 103 |
| 12.2   | Message data format.....  | 105 |
| 12.3   | Requirements for message data communication within CANopen networks ..... | 105 |
| 12.4   | Object 1F78 <sub>h</sub> : CANopen message data reception .....           | 106 |
| 13     | Conformance testing .....   | 107 |
|        | Bibliography.....   | 108 |
|        | Figure 1 – Logical network architecture of the consist network.....       | 16  |
|        | Figure 2 – Network topology of CANopen-based consist network.....         | 16  |
|        | Figure 3 – 9-pin D-sub connector.....                                     | 18  |
|        | Figure 4 – 5-pin micro style connector .....                              | 18  |
|        | Figure 5 – Field device model .....                                       | 20  |
|        | Figure 6 – Minimum field device.....                                      | 21  |
|        | Figure 7 – CANopen device structure.....                                  | 22  |

|   |     |
|---|-----|
| Figure 8 – Structure of the device type object .....                              | 24  |
| Figure 9 – Object structure .....   | 26  |
| Figure 10 – Object structure .....  | 27  |
| Figure 11 – Object structure .....  | 28  |
| Figure 12 – NMT startup, part 1 .....   | 32  |
| Figure 13 – NMT startup, part 2 .....   | 34  |
| Figure 14 – NMT startup simple .....  | 35  |
| Figure 15 – Start process boot NMT slave .....                                    | 36  |
| Figure 16 – Boot NMT slave, part 1 .....  | 37  |
| Figure 17 – Boot NMT slave, part 2 .....  | 39  |
| Figure 18 – Boot NMT slave, part 3 .....  | 40  |
| Figure 19 – Check configuration .....   | 42  |
| Figure 20 – Check NMT state .....   | 43  |
| Figure 21 – Start error control .....   | 45  |
| Figure 22 – Error handler .....   | 46  |
| Figure 23 – Bootup handler .....  | 47  |
| Figure 24 – Data stream definition of concise DCF .....                           | 51  |
| Figure 25 – Object structure .....  | 54  |
| Figure 26 – Bit structure of the configuration value .....                        | 54  |
| Figure 27 – Object structure of the value .....                                   | 56  |
| Figure 28 – Bit structure of the configuration value .....                        | 57  |
| Figure 29 – Gateway between Train backbone and CANopen consist network .....      | 72  |
| Figure 30 – Management messages (informative) .....                               | 97  |
| Figure 31 – Agent interface on a CANopen (gateway) station for message data ..... | 99  |
| Figure 32 – Call_Write_CANopen_Command .....                                      | 102 |
| Figure 33 – Reply_Write_CANopen_Command .....                                     | 102 |
| Figure 34 – Call_Read_CANopen_Command (without reservation) .....                 | 103 |
| Figure 35 – Reply_Read_CANopen_command (without reservation) .....                | 103 |
| Figure 36 – CANopen device capable to handle TNM management messages .....        | 104 |
| Figure 37 – Message data format comparison .....                                  | 105 |
| Table 1 – Pinning for 9-pin D-sub connector .....                                 | 18  |
| Table 2 – Pinning for 5-pin micro style connector .....                           | 19  |
| Table 3 – Bit timing .....  | 19  |
| Table 4 – CANopen object dictionary structure .....                               | 23  |
| Table 5 – Value definition .....  | 26  |
| Table 6 – Object description .....  | 26  |
| Table 7 – Entry description .....   | 27  |
| Table 8 – Value definition .....  | 27  |
| Table 9 – Object description .....  | 27  |
| Table 10 – Entry description .....  | 28  |
| Table 11 – Value definition .....   | 29  |
| Table 12 – Object description .....   | 29  |

|  |    |
|--|----|
| Table 13 – Entry description .....                           | 29 |
| Table 14 – Error status .....                                | 44 |
| Table 15 – Object description .....                          | 48 |
| Table 16 – Entry description .....                           | 48 |
| Table 17 – Object description .....                          | 49 |
| Table 18 – Entry description .....                           | 49 |
| Table 19 – Object description .....                          | 49 |
| Table 20 – Entry description .....                           | 50 |
| Table 21 – Object description .....                          | 51 |
| Table 22 – Entry description .....                           | 52 |
| Table 23 – Object description .....                          | 52 |
| Table 24 – Entry description .....                           | 53 |
| Table 25 – Object description .....                          | 53 |
| Table 26 – Entry description .....                           | 54 |
| Table 27 – Value NMT master (bit: 0) .....                   | 55 |
| Table 28 – Value Start all nodes (bit: 1) .....              | 55 |
| Table 29 – Value NMT master start (bit: 2) .....             | 55 |
| Table 30 – Value Start node (bit: 3) .....                   | 55 |
| Table 31 – Reset all nodes (bit: 4) .....                    | 55 |
| Table 32 – Flying master (bit: 5) .....                      | 55 |
| Table 33 – Stop all nodes (bit: 6) .....                     | 55 |
| Table 34 – Exceptions for NMT start-up capable devices ..... | 56 |
| Table 35 – Object description .....                          | 56 |
| Table 36 – Entry description .....                           | 56 |
| Table 37 – NMT slave (bit: 0) .....                          | 57 |
| Table 38 – NMT boot slave (bit: 2) .....                     | 57 |
| Table 39 – Mandatory (bit: 3) .....                          | 57 |
| Table 40 – Reset communication (bit: 4) .....                | 57 |
| Table 41 – Software version (bit: 5) .....                   | 57 |
| Table 42 – Software update (bit: 6) .....                    | 57 |
| Table 43 – Restore (bit: 7) .....                            | 58 |
| Table 44 – Object description .....                          | 58 |
| Table 45 – Entry description .....                           | 58 |
| Table 46 – Value definition .....                            | 60 |
| Table 47 – Object description .....                          | 60 |
| Table 48 – Entry description .....                           | 61 |
| Table 49 – Value definition .....                            | 62 |
| Table 50 – Object description .....                          | 62 |
| Table 51 – Entry description .....                           | 63 |
| Table 52 – Object description .....                          | 64 |
| Table 53 – Entry description .....                           | 64 |
| Table 54 – Object description .....                          | 65 |
| Table 55 – Entry description .....                           | 65 |

|   |    |
|---|----|
| Table 56 – Object description .....                             | 66 |
| Table 57 – Entry description .....                              | 66 |
| Table 58 – Object description .....                             | 67 |
| Table 59 – Entry description .....                              | 67 |
| Table 60 – Object description .....                             | 68 |
| Table 61 – Entry description .....                              | 68 |
| Table 62 – Object description .....                             | 69 |
| Table 63 – Entry description .....                              | 69 |
| Table 64 – Object description .....                             | 69 |
| Table 65 – Entry description .....                              | 70 |
| Table 66 – Object description .....                             | 70 |
| Table 67 – Entry description .....                              | 71 |
| Table 68 – Upload SDO service .....                             | 74 |
| Table 69 – Download SDO parameters .....                        | 75 |
| Table 70 – Configure SDO timeout parameters .....               | 75 |
| Table 71 – Configure RPDO service parameters .....              | 76 |
| Table 72 – Configure TPDO service parameters .....              | 77 |
| Table 73 – Read PDO data service parameters .....               | 77 |
| Table 74 – Write PDO data service parameters.....               | 78 |
| Table 75 – RPDO received service parameters.....                | 78 |
| Table 76 – Start node service parameters.....                   | 78 |
| Table 77 – Stop node service parameters .....                   | 79 |
| Table 78 – Set node to pre-operational service parameters ..... | 79 |
| Table 79 – Reset node service parameters .....                  | 79 |
| Table 80 – Reset communication service parameters.....          | 80 |
| Table 81 – Enable node guarding service parameters.....         | 80 |
| Table 82 – Disable node guarding service parameters .....       | 80 |
| Table 83 – Start heartbeat consumer service parameters .....    | 81 |
| Table 84 – Disable heartbeat consumer service parameters .....  | 81 |
| Table 85 – Error control event received parameters .....        | 81 |
| Table 86 – Read device error service parameters .....           | 82 |
| Table 87 – Emergency event received service parameters.....     | 82 |
| Table 88 – Initialize gateway service parameters .....          | 82 |
| Table 89 – Store configuration service parameters .....         | 83 |
| Table 90 – Restore configuration service parameters.....        | 83 |
| Table 91 – Set heartbeat producer service parameters .....      | 83 |
| Table 92 – Set node-ID service parameters .....                 | 84 |
| Table 93 – Start emergency consumer service parameters .....    | 84 |
| Table 94 – Stop emergency consumer service parameters.....      | 84 |
| Table 95 – Set default network service parameters .....         | 85 |
| Table 96 – Start default node-ID service parameters .....       | 85 |
| Table 97 – Get version service parameters .....                 | 85 |
| Table 98 – Syntax and CANopen data types .....                  | 86 |

|   |    |
|---|----|
| Table 99 – Command notation in BNF .....                          | 87 |
| Table 100 – Response notation.....                                | 88 |
| Table 101 – Internal error code (InEC).....                       | 88 |
| Table 102 – Notation for event triggered messages .....           | 88 |
| Table 103 – Syntax for upload SDO command .....                   | 89 |
| Table 104 – Examples for upload SDO command .....                 | 89 |
| Table 105 – Syntax for Download SDO command .....                 | 89 |
| Table 106 – Examples for download SDO command .....               | 89 |
| Table 107 – Syntax for configure SDO timeout command.....         | 89 |
| Table 108 – Syntax for configure RPDO command.....                | 90 |
| Table 109 – Examples for configure RPDO command .....             | 90 |
| Table 110 – Syntax for configure TPDO command .....               | 90 |
| Table 111 – Examples for configure TPDO command.....              | 90 |
| Table 112 – Syntax for read PDO data command.....                 | 91 |
| Table 113 – Response syntax for read PDO data command.....        | 91 |
| Table 114 – Syntax for write PDO data command .....               | 91 |
| Table 115 – Syntax for RPDO receive command.....                  | 91 |
| Table 116 – Examples RPDO received command .....                  | 91 |
| Table 117 – Syntax for start node command .....                   | 91 |
| Table 118 – Syntax for stop node command .....                    | 92 |
| Table 119 – Syntax set node to pre-operational command .....      | 92 |
| Table 120 – Syntax reset node command .....                       | 92 |
| Table 121 – Syntax reset communication command.....               | 92 |
| Table 122 – Syntax enable node guarding command .....             | 92 |
| Table 123 – Syntax disable node guarding command.....             | 93 |
| Table 124 – Syntax start heartbeat consumer command .....         | 93 |
| Table 125 – Syntax disable heartbeat consumer command .....       | 93 |
| Table 126 – Syntax for error control event received command ..... | 93 |
| Table 127 – Syntax for read device error command .....            | 94 |
| Table 128 – Syntax for emergency event received command .....     | 94 |
| Table 129 – Syntax for initialize gateway command .....           | 94 |
| Table 130 – Bit rate indices .....                                | 94 |
| Table 131 – Syntax for store configuration command.....           | 95 |
| Table 132 – Storage specifier .....                               | 95 |
| Table 133 – Syntax restore configuration command .....            | 95 |
| Table 134 – Syntax set heartbeat producer command.....            | 95 |
| Table 135 – Syntax set node-ID command.....                       | 95 |
| Table 136 – Syntax set default network command.....               | 96 |
| Table 137 – Syntax set default node-ID command .....              | 96 |
| Table 138 – Syntax for get version command.....                   | 96 |
| Table 139 – Response syntax for get version command.....          | 96 |
| Table 140 – Example for get version response.....                 | 97 |
| Table 141 – Management message structure.....                     | 99 |

**I.S. EN 61375-3-3:2012**

61375-3-3 © IEC:2012

– 9 –

|   |     |
|---|-----|
| Table 142 – CANopen specific SIF_codes .....  | 100 |
| Table 143 – Notation for a call CANopen management message .....                        | 100 |
| Table 144 – Notation for a reply CANopen management message .....                       | 100 |
| Table 145 – TNM CANopen services command codes (reservation required).....              | 101 |
| Table 146 – TNM CANopen services command codes (reservation not required) .....         | 101 |
| Table 147 – Value definition for Call_Write_CANopen_Command .....                       | 102 |
| Table 148 – Value definition Reply_Write_CANopen_Command .....                          | 102 |
| Table 149 – Value definition for Call_Read_CANopen_Command (without reservation) .....  | 103 |
| Table 150 – Value definition for Reply_Read_CANopen_Command (without reservation) ..... | 103 |
| Table 151 – Object description .....  | 106 |
| Table 152 – Entry description .....   | 106 |

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**ELECTRONIC RAILWAY EQUIPMENT –  
TRAIN COMMUNICATION NETWORK (TCN) –****Part 3-3: CANopen Consist Network (CCN)**

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International Standard IEC 61375-3-3 has been prepared by IEC technical committee 9: Electrical equipment and systems for railways.

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

|             |                  |
|-------------|------------------|
| FDIS        | Report on voting |
| 9/1646/FDIS | 9/1670/RVD       |

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

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

A list of all parts of IEC 61375 series, under the general title *Electronic railway equipment – Train Communication Network (TCN)*, can be found on the IEC website.

**I.S. EN 61375-3-3:2012**

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– 11 –

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

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.



## INTRODUCTION

TCN is an International Standard with the aim of defining interfaces so as to achieve plug-in compatibility:

- a) between equipment located in different vehicles or consists, and
- b) between equipment and devices located within the same vehicle or consist.

One of the key success factors for the deployment of any technology is standardization and ensuring interoperability among various implementations. To facilitate interoperability a conformance test should be implemented.

In this part of IEC 61375, the TCN deals with:

the consist network based on CANopen.

In addition gateway devices between the Train Backbone and the CANopen-based consist network are considered.

This standard is structured into 13 clauses.

## **ELECTRONIC RAILWAY EQUIPMENT – TRAIN COMMUNICATION NETWORK (TCN) –**

### **Part 3-3: CANopen Consist Network (CCN)**

#### **1 Scope**

This part of IEC 61375 specifies the data communication bus inside consists that are based on CANopen. CANopen was developed for use in, but is not limited to, industrial automation applications. These applications may include devices such as input/output modules, motion controllers, human machine interfaces, sensors, closed-loop controllers, encoders, hydraulic valves or programmable controllers.

In the application field of rail vehicles CANopen networks are utilized to network subsystems in consists such as e.g. brake control system, diesel engine control system and interior or exterior lighting control system. In addition CANopen is utilized as consist network to enable the data exchange between the different subsystems within one single rail vehicle or a group of rail vehicles sharing the same Consist Network.

This part of IEC 61375 applies to all equipment and devices operated on a CANopen-based consist network within TCN architecture as described in IEC 61375-1.

The applicability of this standard to a TCN implementation allows for individual conformance checking of the implementation itself and is a pre-requisite for further interoperability checking between different TCN implementations. In any case, proof of compatibility between Train Backbone and the Consist Network will have to be brought by the supplier.

This part of IEC 61375 applies to the architecture of communication systems in Open trains. In addition it may be applicable to closed trains and multiple unit trains when so agreed between purchaser and supplier.

#### **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 61131 (all parts): *Programmable controllers*

IEC 61375-1, ed3, *Electronic railway equipment – Train Communication Network (TCN) – Part 1: General Architecture*

IEC 61375-2-1, *Electronic railway equipment – Train Communication Network (TCN) – Part 2-1: Wire Train Bus (WTB)*

IEC 61375-2-2, *Electronic railway equipment – Train Communication Network (TCN) – Part 2-2: WTB – Wire Train Bus conformance testing*

ISO/IEC 646:1991 *Information technology – ISO 7-bit coded character set for information interchange*

ISO/IEC 9899:1999, *Programming languages – C*

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