

Svenska Elektriska Kommissionen, SEK

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## Industriella distribuerade kommunikationssystem baserade på ISO 11898 (CAN) – Del 1: Allmänna fordringar

*Industrial communications subsystem based on ISO 11898 (CAN) for controller-device interfaces –  
Part 1: General requirements*

Som svensk standard gäller europastandarden EN 50325-1:2002. Den svenska standarden innehåller den officiella engelska språkversionen av EN 50325-1:2002.

### Nationellt förord

Tidigare utgiven svensk standard SS-EN 50325-1, utgåva 1, 2001, gäller ej fr o m 2005-07-01.

### *Standarder underlättar utvecklingen och höjer elsäkerheten*

Det finns många fördelar med att ha gemensamma tekniska regler för bl a säkerhet, prestanda, dokumentation, utförande och skötsel av elprodukter, elanläggningar och metoder. Genom att utforma sådana standarder blir säkerhetskraven tydliga och utvecklingskostnaderna rimliga samtidigt som marknadens acceptans för produkten eller tjänsten ökar.

Många standarder inom elområdet beskriver tekniska lösningar och metoder som åstadkommer den elsäkerhet som föreskrivs av svenska myndigheter och av EU.

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Svenska Elektriska Kommissionen, SEK, svarar för standardiseringen inom elområdet i Sverige och samordnar svensk medverkan i internationell och europeisk standardisering. SEK är en ideell organisation med frivilligt deltagande från svenska myndigheter, företag och organisationer som vill medverka till och påverka utformningen av tekniska regler inom elektrotekniken.

SEK samordnar svenska intressenters medverkan i SEKs tekniska kommittéer och stödjer svenska experters medverkan i internationella och europeiska projekt.

### *Stora delar av arbetet sker internationellt*

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Standardiseringsarbetet inom SEK är organiserat i referensgrupper bestående av ett antal tekniska kommittéer som speglar hur arbetet inom IEC och CENELEC är organiserat.

Arbetet i de tekniska kommittéerna är öppet för alla svenska organisationer, företag, institutioner, myndigheter och statliga verk. Den årliga avgiften för deltagandet och intäkter från försäljning finansierar SEKs standardiseringsverksamhet och medlemsavgift till IEC och CENELEC.

### *Var med och påverka!*

Den som deltar i SEKs tekniska kommittéarbete har möjlighet att påverka framtida standarder och får tidig tillgång till information och dokumentation om utvecklingen inom sitt teknikområde. Arbetet och kontakterna med kollegor, kunder och konkurrenter kan gynnsamt påverka enskilda företags affärsutveckling och bidrar till deltagarnas egen kompetensutveckling.

Du som vill dra nytta av dessa möjligheter är välkommen att kontakta SEKs kansli för mer information.

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EUROPEAN STANDARD

**EN 50325-1**

NORME EUROPÉENNE

EUROPÄISCHE NORM

December 2002

ICS 43.180

Supersedes EN 50325-1:2000

English version

**Industrial communications subsystem  
based on ISO 11898 (CAN)  
for controller-device interfaces  
Part 1: General requirements**

Sous-système de communications  
industriel basé sur l'ISO 11898 (CAN)  
pour les interfaces des dispositifs de  
commande  
Partie 1: Prescriptions générales

Industrielles Kommunikationssystem  
basierend auf ISO 11898 (CAN)  
Teil 1: Allgemeine Anforderungen

This European Standard was approved by CENELEC on 2002-07-01. 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 one official version (English). 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, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, 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 65CX, Fieldbus.

The text of the draft was submitted to the Unique Acceptance Procedure and was approved by CENELEC as EN 50325-1 on 2002-07-01.

This European Standard replaces EN 50325-1:2000.

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) 2003-07-01
- latest date by which the national standards conflicting  
with the EN have to be withdrawn (dow) 2005-07-01

This European standard is divided into four parts:

Part 1	General requirements
Part 2	DeviceNet
Part 3	Smart Distributed System (SDS)
Part 4	CANopen

NOTE This European Standard exists only in English.

The specifications for DeviceNet, SDS and CANopen are based on ISO 11898 *Controller area network (CAN) for high-speed communication*, a broadcast-oriented communications protocol. However, ISO 11898 specifies only part of a complete communication system, and additional specifications are needed for other layers to ensure precise data exchange functionality and support of inter-operating devices. The DeviceNet and SDS specifications build on ISO 11898 to describe a complete industrial communication system.

### **General information on licensing and patents**

CENELEC calls attention to the fact that patent rights are linked to part 3 of this EN 50325. The patent holder, Honeywell Inc., has assured to CENELEC that it is willing to grant a licence under these patents on reasonable and non discriminatory terms and conditions to anyone wishing to obtain such a license, applying the rules of CEN/CENELEC Memorandum 8.

CENELEC takes no position concerning the evidence, validity and scope of this patent right.

Honeywell's undertakings (policy letter on licensing, the license offer and the form of license) in this respect are on file with CENELEC and available for inspection by all interested parties at the CENELEC Central Secretariat.

The license details may be obtained from

The Director  
(Industrial Marketing and Applied Technology Sensing and Controls Europe)  
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Attention is drawn to the possibility that some of the elements of this European Standard may be the subject of patent rights other than those identified above. CENELEC shall not be held responsible for identifying any or all such patent rights.

Further attention is drawn to the Standards EN 50325-2 (DeviceNet) and EN 50325-4 (CANopen) and the possibility that some of the elements of those European Standards may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights

If during the application of those Standards Intellectual Property Rights may appear and will not be made available on reasonable and non discriminatory terms and conditions to anyone wishing to obtain such a license, applying the rules of CEN/CENELEC Memorandum 8, this fact shall be brought to the attention of CENELEC Central Secretariat for further action.

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## Introduction

The controller-device interfaces described in this standard utilise a common base protocol to provide solutions to users in industrial environments who have a need for simple communications and diagnostics. The application layer of each network has been created to meet specific performance and market requirements.

The objective of the interface user is a gain in productivity that may be realised through reduced wiring, reduced start up time, improved quality of output and reduced down time. The interfaces described provide low-cost connectivity between low-voltage switchgear, controlgear, control circuit devices, switching elements and controlling devices (e.g. programmable controllers, personal computers, etc.) and eliminate expensive hardwiring. The direct connectivity provides improved communication between devices as well as important device-level diagnostics not easily accessible or available through hardwired I/O interfaces.

The interfaces described are based on a broadcast-oriented communications protocol - Controller Area Network (CAN). The CAN protocol was originally developed by Robert Bosch GmbH for the European automotive market for replacing expensive, wire harnesses with low cost network cable on vehicles. As a result, the CAN protocol has fast response and high reliability and the protocol has been standardised as ISO 11898. Chips are available in a variety of packages with temperature and noise immunity ratings well suited to the industrial automation market. Demand for CAN is the key driver in the "low price with high performance" characteristic of CAN chips.

As a result of the common use of CAN, the interfaces described provide a common set of capabilities that are ideally targeted to applications which include simple devices, limited distance and limited amount of data per transmission.

## 1 Scope

This European Standard applies to controller-device interfaces that provide defined interfaces between low-voltage switchgear, controlgear, control circuit devices, switching elements and controlling devices (e.g. programmable controllers, personal computers, etc.). It may also be applied for the interfacing of other devices and elements to a controller-device interface.

This standard specifies requirements for controllers and devices utilising these interfaces, including not only the communication protocol specification, but also associated relevant electrical and mechanical characteristics. It also specifies the electrical and EMC tests required to verify the performance of each controller-device interface when connected to the appropriate controllers and devices.

This part 1 establishes a consistent terminology and format for the subsequent interfaces. It also harmonises requirements of a general nature in order to reduce the need for testing to different standards, increase understanding and facilitate comparisons of controller-device interface standards. Those requirements of the various controller-device interface standards which can be considered as general have therefore been gathered in this part 1.

In addition to meeting the specific requirements stated in this part 1, the controller-device interfaces included in this standard

- are documented in the English language in accordance with the requirements specified in this part 1,
- are already in use in commercial products and running in industrial plants,
- are available in quantity and at low price,
- are available from several sources and commercialised openly,
- to satisfy the tests specified, amongst others, in EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, and EN 61000-4-6 against the test levels specified in EN 50082-2,
- have appropriate mechanisms for transmission error detection,
- are open, widely accepted, well documented, stable and support inter-operability,
- are complete and describe the necessary interfaces in sufficient detail to enable error-free implementation,
- are free of any restriction related to testing the implementation.

For each controller-device interface only two documents are necessary to determine all requirements and tests:

- the general requirements of this standard, referred to as "part 1" in the relevant parts covering the various types of controller-device interfaces;
- the relevant controller-device interface standard hereinafter referred to as the "relevant controller-device interface standard" or "controller-device interface standard".

The solutions described in this standard have been used for many years by industry to solve application requirements involving low-voltage switchgear and controlgear. They are characterised by:

- their ability to power connected devices directly from the network;
- their ability to operate in harsh environments typified by those encountered at the machine level by controls in industrial applications;
- usage of the sophisticated medium access rules of CAN which allows both organisation of traffic based on user-assigned priorities and efficient resolution of occasional access conflict;
- a wide range of exchange services allowing precise tailoring of data exchange to the actual application needs as well as simultaneous distribution of data to a selected set of connected devices;
- their capability to simultaneously support data acquisition, diagnostics, messaging and programming/configuration as required, amongst others, for systems interfacing controllers to low-voltage switchgear and controlgear in industrial applications.

NOTE The controller-device interface standards currently part of this series are:

- EN 50325-2: DeviceNet
- EN 50325-3: Smart Distributed System (SDS)
- EN 50325-4: CANopen