

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE

**Low-voltage switchgear and controlgear – Controller-device interfaces (CDIs) –  
Part 1: General rules**

**Appareillage à basse tension – Interfaces appareil de commande-appareil (CDI) –  
Partie 1: Règles générales**





## THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2019 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de l'IEC ou du Comité national de l'IEC du pays du demandeur. Si vous avez des questions sur le copyright de l'IEC ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de l'IEC de votre pays de résidence.

IEC Central Office  
3, rue de Varembe  
CH-1211 Geneva 20  
Switzerland

Tel.: +41 22 919 02 11  
[info@iec.ch](mailto:info@iec.ch)  
[www.iec.ch](http://www.iec.ch)

### About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

### About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

#### IEC publications search - [webstore.iec.ch/advsearchform](http://webstore.iec.ch/advsearchform)

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee,...). It also gives information on projects, replaced and withdrawn publications.

#### IEC Just Published - [webstore.iec.ch/justpublished](http://webstore.iec.ch/justpublished)

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

#### IEC Customer Service Centre - [webstore.iec.ch/csc](http://webstore.iec.ch/csc)

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: [sales@iec.ch](mailto:sales@iec.ch).

#### Electropedia - [www.electropedia.org](http://www.electropedia.org)

The world's leading online dictionary on electrotechnology, containing more than 22 000 terminological entries in English and French, with equivalent terms in 16 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

#### IEC Glossary - [std.iec.ch/glossary](http://std.iec.ch/glossary)

67 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

### A propos de l'IEC

La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

### A propos des publications IEC

Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

#### Recherche de publications IEC -

[webstore.iec.ch/advsearchform](http://webstore.iec.ch/advsearchform)

La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études,...). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

#### IEC Just Published - [webstore.iec.ch/justpublished](http://webstore.iec.ch/justpublished)

Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et une fois par mois par email.

#### Service Clients - [webstore.iec.ch/csc](http://webstore.iec.ch/csc)

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: [sales@iec.ch](mailto:sales@iec.ch).

#### Electropedia - [www.electropedia.org](http://www.electropedia.org)

Le premier dictionnaire d'électrotechnologie en ligne au monde, avec plus de 22 000 articles terminologiques en anglais et en français, ainsi que les termes équivalents dans 16 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

#### Glossaire IEC - [std.iec.ch/glossary](http://std.iec.ch/glossary)

67 000 entrées terminologiques électrotechniques, en anglais et en français, extraites des articles Termes et Définitions des publications IEC parues depuis 2002. Plus certaines entrées antérieures extraites des publications des CE 37, 77, 86 et CISPR de l'IEC.



# INTERNATIONAL STANDARD

# NORME INTERNATIONALE

---

**Low-voltage switchgear and controlgear – Controller-device interfaces (CDIs) –  
Part 1: General rules**

**Appareillage à basse tension – Interfaces appareil de commande-appareil (CDI) –  
Partie 1: Règles générales**

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

COMMISSION  
ELECTROTECHNIQUE  
INTERNATIONALE

---

ICS 29.130.20

ISBN 978-2-8322-6868-1

**Warning! Make sure that you obtained this publication from an authorized distributor.  
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.**

## CONTENTS

FOREWORD .....	3
INTRODUCTION .....	5
1 Scope .....	6
2 Normative references .....	6
3 Terms and definitions .....	7
4 Classifications .....	8
5 Characteristics .....	8
5.1 CDI components .....	8
5.2 Interfaces .....	9
5.3 Topology .....	9
5.4 Information exchanges .....	9
5.5 Attributes .....	9
6 Product information .....	9
6.1 Instructions for installation, operation and maintenance .....	9
6.2 Profiles .....	9
6.3 Marking .....	10
6.4 Degree of protection .....	10
7 Normal service, mounting and transport conditions .....	10
7.1 General .....	10
7.2 Normal service conditions .....	10
7.2.1 General .....	10
7.2.2 Ambient air temperature .....	10
7.2.3 Altitude .....	10
7.2.4 Climatic conditions .....	10
7.3 Conditions during transport and storage .....	11
7.4 Mounting .....	11
8 Constructional and performance requirements .....	11
8.1 General .....	11
8.2 Electromagnetic compatibility (EMC) .....	11
8.2.1 Immunity .....	11
8.2.2 Emission .....	12
8.2.3 EMC tests .....	12
9 Tests .....	12
9.1 General .....	12
9.2 Type tests .....	13
9.3 Electromagnetic compatibility .....	13
Bibliography .....	14
Table 1 – Immunity requirements .....	12

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**LOW-VOLTAGE SWITCHGEAR AND CONTROLGEAR –  
CONTROLLER-DEVICE INTERFACES (CDIs) –****Part 1: General rules**

## FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as “IEC Publication(s)”). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 62026-1 has been prepared by subcommittee 121A: Low-voltage switchgear and controlgear, of IEC technical committee 121: Switchgear and controlgear and their assemblies for low voltage.

This third edition cancels and replaces the second edition published in 2007. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) additional requirements for safety information and instructions, including the measures to be taken, if any, for achieving EMC compliance;
- b) EMC immunity requirements aligned with current IEC 61000-6 series of standards. Radiated radio-frequency electromagnetic fields test level increased to 6 GHz;
- c) EMC emissions requirements aligned with current CISPR 11 publication.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
121A/280/FDIS	121A/295/RVD

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

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

A list of all parts of the IEC 62026, under the general title *Low-voltage switchgear and controlgear – Controller-device interfaces (CDIs)*, can be found on the IEC website.

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

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

## INTRODUCTION

The class of controller-device interfaces (CDIs) covered in this document includes industrial CDIs for control systems, factory automation and process automation.

Industrial CDIs have proliferated to meet specific user needs, but no single CDI meets all needs. The reason for multiple solutions is the wide range of physical, usage, information content and configuration requirements. The physical requirements have resulted in CDIs with widely differing signal and line conditioning mechanisms in order to meet distance, node count and environmental considerations.

While there is wide variation in CDI technologies, there are common components, interfaces and environmental requirements that are specified by this document. Standardized definitions of these common CDI requirements assist the user in comparing and selecting technologies to match the distance, node count, throughput and installation requirements for a specific application.

This document simplifies the CDI selection process by providing a common structure for generating a specific CDI's IEC standard while also allowing specific interface features and capabilities to be included. Clauses 4 to 8 contain the outline of general requirements that the CDI's IEC standard identifies. Clause 9 contains the test specification.

Standardization of CDI aspects also simplifies the task of writing the software for the higher layer functions of industrial control systems, such as supervisory control, operator interface and control strategy programming.

For this document to be complete and usable, it requires the availability of specific CDI standards, which make up the other parts of the IEC 62026 series.

# LOW-VOLTAGE SWITCHGEAR AND CONTROLGEAR – CONTROLLER-DEVICE INTERFACES (CDIs) –

## Part 1: General rules

### 1 Scope

This part of IEC 62026 applies to interfaces between low-voltage switchgear, controlgear, and controllers (e.g. programmable controllers, personal computers, etc.).

This document does not apply to higher level industrial communication networks that have become known as fieldbuses and are considered by IEC subcommittee 65C.

The purpose of this document is to harmonize and define rules, components and requirements of a general nature applicable to industrial CDIs. Those features of the various CDI standards which can be considered as general have therefore been brought together in this document.

For each CDI, two main documents are necessary to determine all requirements and tests:

- a) this document, referred to as “IEC 62026-1” in the relevant CDI parts covering the various types of CDIs;
- b) the specific CDI part of the IEC 62026 series.

A specific CDI part may omit a general requirement if it is not applicable, or it may add to it if it is inadequate in the particular case.

NOTE Product-specific requirements for products incorporating a CDI are given in the relevant product standards. These requirements apply in addition to those given in this document.

### 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 60947-1:2007, *Low-voltage switchgear and controlgear – Part 1: General rules*  
IEC 60947-1:2007/AMD1:2010  
IEC 60947-1:2007/AMD2:2014

IEC 61000-4-2:2008, *Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test*

IEC 61000-4-3:2006, *Electromagnetic compatibility (EMC) – Part 4-3: Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test*  
IEC 61000-4-3:2006/AMD1:2007  
IEC 61000-4-3:2006/AMD2:2010

IEC 61000-4-4:2012, *Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement techniques – Electrical fast transient/burst immunity test*

IEC 61000-4-5:2014, *Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test*  
IEC 61000-4-5:2014/AMD1:2017

IEC 61000-4-6:2013, *Electromagnetic compatibility (EMC) – Part 4-6: Testing and measurement techniques – Immunity to conducted disturbances, induced by radio-frequency fields*

IEC 61000-6-2:2016, *Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity standard for industrial environments*

CISPR 11:2015, *Industrial, scientific and medical equipment – Radio-frequency disturbance characteristics – Limits and methods of measurement*  
CISPR 11:2015/AMD1:2016

### 3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org.obp>

#### 3.1

##### **change of state**

process of data exchange which occurs only when a device's or controller's data changes state according to specific change criteria

#### 3.2

##### **controller**

programmable controller, personal computer or equivalent computing hardware in which the software controlling the application or process runs

#### 3.3

##### **controller-device communication medium**

means (such as two or more wires or fibre optic cable) utilized by devices or controllers to transfer data to other devices or controllers

Note 1 to entry: A CDI that has "power on the communication medium" architecture uses two wires that also distribute power within the CDI.

#### 3.4

##### **controller-device interface**

##### **CDI**

arrangement of nodes and their interconnections that transport information between controllers and devices in an industrial control system

Note 1 to entry: This note applies to the French language only.

#### 3.5

##### **CDI component**

device, controller or other component for which the requirements are specified in a CDI part

#### 3.6

##### **CDI power supply**

power supply with characteristics and parameters suitable for the CDI's functionality and capability

### 3.7

#### **CDI power distribution medium**

inter-connecting means used to transfer power within a CDI

Note 1 to entry: In the case of a CDI that has "power on the communication medium" architecture, the CDI power distribution medium also transfers data within the CDI.

### 3.8

#### **device**

physical unit containing application elements and that may contain communication elements

EXAMPLE Control circuit device (see 2.2.16 of IEC 60947-1:2007), presence sensing device, pressure sensing device, actuator, annunciator, operator terminal, motor controller, current sensor, valve control, data logger, bar-code scanner, push-button, pilot light, etc.

### 3.9

#### **device profile**

representation of device functionality available to the CDI

### 3.10

#### **multicast**

process of data exchange which occurs when a device or controller produces one message to multiple devices and/or controllers for their appropriate action

### 3.11

#### **polling**

process of data exchange which occurs when a device or a controller sends data to, or requests data from, a specific device or controller

Note 1 to entry: The receiving device responds to the polling by acting according to the data it receives or by returning its status data. When this transaction is completed, the device polls the next device in a predetermined sequence.

### 3.12

#### **port**

particular interface of the specified apparatus with the external electromagnetic environment

Note 1 to entry: See Figure 17 of IEC 60947-1:2007 for examples of ports.

[SOURCE: IEC 60947-1:2007, 2.7.1]

## 4 Classifications

This clause in the specific CDI parts shall list the classifications below, where applicable, with appropriate details:

- CDI components;
- interfaces;
- topology;
- information exchanges;
- attributes.

## 5 Characteristics

### 5.1 CDI components

Specific CDI parts shall specify requirements for the devices, controllers and other components that may be used.