

INTERNATIONAL STANDARD

Low-voltage switchgear and controlgear – Controller-device interfaces (CDIs) –
Part 3: DeviceNet

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**LOW-VOLTAGE SWITCHGEAR AND CONTROLGEAR –
CONTROLLER-DEVICE INTERFACES (CDIs) –****Part 3: DeviceNet**

FOREWORD

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International Standard IEC 62026-3 has been prepared by subcommittee 17B: Low-voltage switchgear and controlgear, of IEC technical committee 17: Switchgear and controlgear.

This second edition of IEC 62026-3 cancels and replaces the first edition published in 2000. This second edition constitutes a technical revision.

The main changes with respect to the previous edition are listed below:

- addition of new services to the base messaging protocol in 5.2;
- replacement of detailed application layer requirements in former annexes by references in 5.3 to corresponding specifications in the new edition of IEC 61158 (2007);
- addition of requirements for a corresponding safety protocol in 5.6 (by reference to IEC 61784-3);
- modified presentation of cable and connector specifications in 8.2 and 8.4, and addition of a new type;
- addition of references for safety tests for both EMC and logical tests in 8.10 and 9.3)

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

FDIS	Report on voting
17B/1580/FDIS	17B/1585/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 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 publication will remain unchanged until the maintenance result 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- withdrawn,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.

A bilingual version of this publication may be issued at a later date.

INTRODUCTION

DeviceNet™¹⁾ is intended for use in, but is not limited to, industrial automation applications. These applications may include devices such as limit switches, proximity sensors, electro-pneumatic valves, relays, motor starters, operator interface panels, analogue inputs, analogue outputs and controllers.

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1) DeviceNet™ 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 standard does not require use of the trade name DeviceNet™. Use of the trade name DeviceNet™ requires permission of Open DeviceNet Vendor Association, Inc.

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

Part 3: DeviceNet

1 Scope

This part of IEC 62026 specifies an interface system between single or multiple controllers, and control circuit devices or switching elements. The interface system uses two twisted shielded conductor pairs within one cable – one of these pairs provides a differential communication medium and the other pair provides power to the devices. This part establishes requirements for the interchangeability of components with such interfaces.

This part of IEC 62026 specifies the following particular requirements for DeviceNet:

- requirements for interfaces between controllers and switching elements;
- normal service conditions for devices;
- constructional and performance requirements;

tests to verify conformance to requirements.

These particular requirements apply in addition to the general requirements of IEC 62026-1.

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 60529:1989, *Degrees of protection provided by enclosures (IP Code)*
Amendment 1 (1999)

IEC 60947-5-2:1997, *Low-voltage switchgear and controlgear – Part 5-2: Control circuit devices and switching elements – Proximity switches*
Amendment 1 (1999)
Amendment 2 (2003)

IEC 61000-4-2:1995, *Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test*
Amendment 1 (1998)
Amendment 2 (2000)

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

IEC 61000-4-4:2004, *Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement techniques – Electrical fast transient/burst immunity test*

IEC 61000-4-5:2005, *Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test*

IEC 61000-4-6:2003, *Electromagnetic compatibility (EMC) – Part 4-6: Testing and measurement techniques – Immunity to conducted disturbances, induced by radio-frequency fields*

Amendment 1 (2004)

Amendment 2 (2006)

IEC 61158 (all parts), *Digital data communications for measurement and control – Fieldbus for use in industrial control systems*

IEC 61158-4-2, *Industrial communication networks – Fieldbus specifications – Part 4-2: Data-link layer protocol specification – Type 2 elements*

IEC 61158-5-2, *Industrial communication networks – Fieldbus specifications – Part 5-2: Application layer service definition – Type 2 elements*

IEC 61158-6-2, *Industrial communication networks – Fieldbus specifications – Part 6-2: Application layer protocol specification – Type 2 elements*

IEC 61508 (all parts), *Functional safety of electrical/electronic/programmable electronic safety-related systems*

IEC 61784-3-2, *Industrial communication networks – Profiles – Part 3-2: Functional safety fieldbuses – Additional specifications for CPF 2*

IEC 62026-1:2007, *Low-voltage switchgear and controlgear – Controller-device interfaces (CDIs) – Part 1: General rules*

ISO/IEC 7498-1:1994, *Information technology – Open Systems Interconnection – Basic Reference Model: The Basic Model*

ISO 11898-1:2003, *Road vehicles – Controller area network (CAN) – Part 1: Data link layer and physical signalling*

ISO 11898-2:2003, *Road vehicles – Controller area network (CAN) – Part 2: High-speed medium access unit*

CISPR 11:2003, *Industrial, scientific and medical (ISM) radio-frequency equipment – Electromagnetic disturbance characteristics – Limits and methods of measurement*

Amendment 1 (2004)

Amendment 2 (2006)

3 Terms, definitions, symbols and abbreviated terms

For the purposes of this part of IEC 62026, the following terms, definitions, symbols and abbreviations, in addition to those given in IEC 62026-1, apply.

3.1 Terms and definitions

3.1.1

acknowledged fragmentation

fragmentation performed on an explicit message, in which the transmission of a fragment from the transmitting object is followed by the transmission of an acknowledgement by the receiving object

NOTE The reception of each fragment is acknowledged by the receiving object.

3.1.2

ack status

field within an acknowledgement/response message format that indicates whether or not an error has been encountered by the receiver of a fragmented message

NOTE This applies specifically to the DeviceNet fragmentation protocol.

3.1.3

application objects

set of object classes and their object instances that are available within the node

NOTE These objects manage and provide the exchange of data and messages across DeviceNet controller-device interfaces (CDIs) and within the DeviceNet compliant node.

3.1.4

attribute

description of an externally accessible characteristic or feature of an object

NOTE Attributes typically provide status information or govern the operation of an object.

3.1.5

bit-strobe

communication using strobing

3.1.6

broadcast

communication from one node to all other nodes

3.1.7

CAN (Controller Area Network)

ISO specification that defines a generic physical layer and data link medium access procedure based on non-destructive bit-wise arbitration, see ISO 11898-1 and ISO 11898-2

3.1.8

CAN_H

positive half of the differential physical CAN signal

3.1.9

CAN_L

negative half of the differential physical CAN signal

3.1.10

client

(1) object which uses the services of another (server) object to perform a task, see server (3.1.43)

(2) initiator of a message to which a server reacts

3.1.11

common service

CIP service used by DeviceNet objects (see IEC 61158-5-2, 6.2.1.3 and IEC 61158-6-2, 4.1.8)

3.1.12

communication objects

objects that manage and provide run-time exchange of messages across DeviceNet

3.1.13

connection

logical binding between two or more application objects