

Railway applications — Rolling stock — Combined testing —

Part 2: Chopper-fed direct current traction motors and their control

The European Standard EN 61377-2:2002 has the status of a
British Standard

ICS 45.060

National foreword

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The UK participation in its preparation was entrusted to Technical Committee GEL/9, Railway electrotechnical applications, which has the responsibility to:

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This British Standard was published under the authority of the Standards Policy and Strategy Committee on 17 January 2003

Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 24, an inside back cover and a back cover.

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Amendments issued since publication

Amd. No.	Date	Comments

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ISBN 0 580 41122 2

**Railway applications -
Rolling stock -
Combined testing
Part 2: Chopper-fed direct current traction motors
and their control
(IEC 61377-2:2002)**

Applications ferroviaires -
Matériel roulant -
Essais combinés
Partie 2: Moteurs de traction
à courant continu alimentés
par hacheur et leur régulation
(CEI 61377-2:2002)

Bahnanwendungen -
Bahnfahrzeuge -
Kombinierte Prüfung
Teil 2: Chopper-gespeiste Gleichstrom-
Bahnmotoren und deren Steuerung
(IEC 61377-2:2002)

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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

The text of document 9/676/FDIS, future edition 1 of IEC 61377-2, prepared by IEC TC 9, Electrical equipment and systems for railways, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61377-2 on 2002-09-01.

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) 2003-06-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2005-09-01

Annexes designated "normative" are part of the body of the standard.
Annexes designated "informative" are given for information only.
In this standard, annex ZA is normative and annex A is informative.
Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61377-2:2002 was approved by CENELEC as a European Standard without any modification.

CONTENTS

1	Scope and object	5
2	Normative references	6
3	Definitions	7
4	Combined system interfaces and characteristics	9
4.1	Specified interfaces	9
4.2	Specified characteristics	9
4.3	Declared characteristics	10
4.4	Combined system characteristics and values	10
4.5	Exchange of information and responsibility	11
5	Test categories	11
5.1	General	11
5.2	Type tests	11
5.3	Investigation tests	12
6	Tests	12
6.1	General	12
6.2	Test conditions	12
6.2.1	Cooling during the tests	12
6.2.2	Power cables	12
6.2.3	Power supply	12
6.2.4	Mechanical output measurement	13
6.3	Temperature-rise tests	13
6.3.1	General	13
6.3.2	Measurement of temperatures	13
6.4	Commutation test	13
6.5	Characteristic tests and tolerances	14
6.5.1	Torque characteristics	14
6.6	Protection system testing	15
6.6.1	Power supply for control equipment of the combined system	15
6.6.2	DC power supply	15
6.6.3	Short-time d.c. power supply interruption (optional type test)	15
6.6.4	Sudden variation of the supply voltage (optional type test)	15
6.6.5	Harmonics in the input current of the chopper (optional type test)	15
6.6.6	Interference test (optional type test)	15
6.7	Investigation tests	16
	Annex A (informative) List of clauses in which agreement between user and manufacturer is mentioned	23
	Annex ZA (normative) Normative references to international publications with their corresponding European publications	24

Figure 1 – Traction drive	5
Figure 2 – Mandatory external characteristics and optional internal characteristics for a combined system with chopper and d.c. series motor, in motoring configuration.....	17
Figure 3 – Mandatory external characteristics and optional internal characteristics for a combined system with chopper and separately excited d.c. motor, in motoring configuration	18
Figure 4 – Mandatory external characteristics and optional internal characteristics for a combined system with chopper and series or separately excited d.c. motor, in braking configuration	19
Figure 5 – Mandatory external characteristics and optional internal characteristics for a combined system with chopper and series or separately excited d.c. motor, in braking configuration	20
Figure 6 – Example of braking configuration for a combined system with separately excited d.c. motor	21
Figure 7 – Test-bed arrangement for back-to-back test of a chopper and d.c. motor combined system	21
Figure 8 – Example of circuit configuration for short-time d.c. power supply interruption.....	22
Figure 9 – Example of circuit configuration for sudden variation of supply voltage	22
Table 1 – List of tests.....	16

RAILWAY APPLICATIONS ROLLING STOCK – COMBINED TESTING –

Part 2: Chopper-fed direct current traction motors and their control

1 Scope and object

This part of IEC 61377 applies to the combinations of motor(s), chopper and their control, and its object is to specify

- the performance characteristics of electric drives consisting of a chopper, direct current motors, and the related control system;
- methods of verifying these performance characteristics by tests.

In traction drives, a combined system with chopper and direct current motor(s) without any control between the mechanical output and the chopper is not usual. It is not, therefore, considered in this standard.

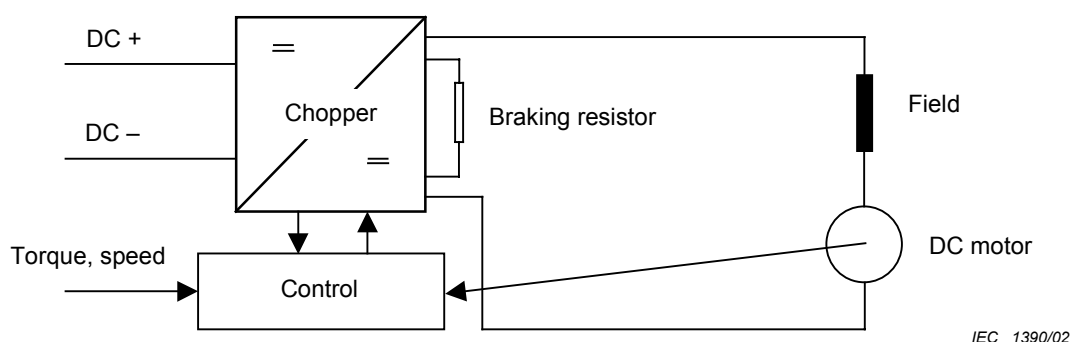
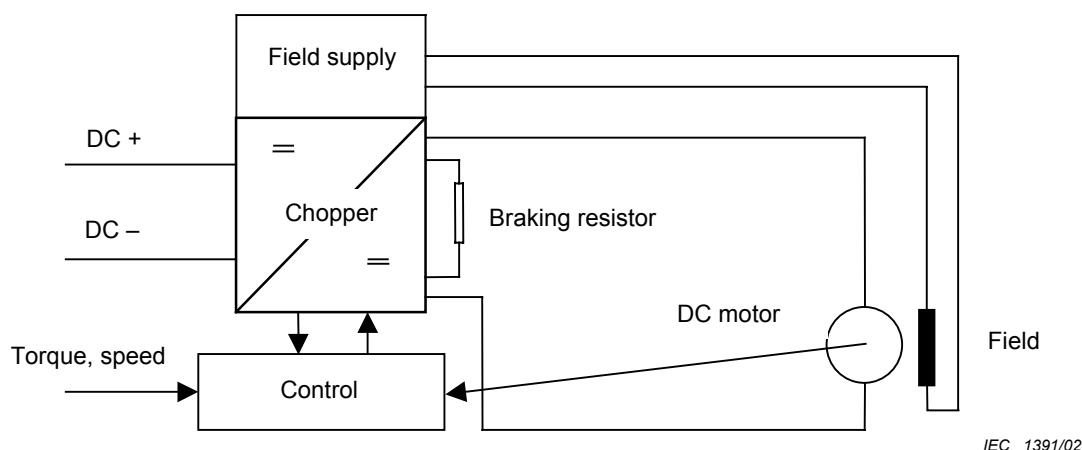


Figure 1a – Combined system with series d.c. motor



NOTE The smoothing reactor is considered as a part of the chopper.

Figure 1b – Combined system with separately excited d.c. motor

Figure 1 – Traction drive

IEC 60349-1 applies to chopper-fed direct current motors, IEC 61287-1 to power electronic convertors, and IEC 60571 to electronic equipments.

This standard applies to the combination of motor(s), chopper, and their control. As a consequence, IEC 60349-1 describes the tests to demonstrate the compliance of the motor to its specification, while IEC 61287-1 does the same for the chopper. It is self-evident that some of the tests mentioned in this standard may generally replace the corresponding ones described in the above-mentioned standards. An agreement should be reached between the parties to avoid the duplication of tests.

A complete combined test is heavy and often requires high power, which is not always available in a workshop. An agreement between the user and the manufacturer may be reached to allow testing either in the workshop or on the vehicle.

At the time of drafting this standard, only the following combinations of motors and choppers are used for traction applications, but it may also apply to other combinations, which may be used in the future:

- direct current series motors (one or more connected in series and/or in parallel) fed by a chopper converter (figure 1a)
- direct current separately excited motors (one or more connected in series) fed by a chopper converter (figure 1b).

For both cases, electrical braking circuits, if used, are included.

The separate exciting circuits and their control, or the shunting circuit and their control, for series motors, are considered as a part of the combined system.

More details on possible system combinations can be found in IEC 61287-2.

The d.c. source can be a supply line, a rectifier, a chopper, an input convertor, and a diesel generator with integrated rectifiers, etc.

Environmental conditions relative to motor, chopper, and control system are detailed in IEC 60349-1, IEC 61287-1 and IEC 60571.

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 60050-411:1996, *International Electrotechnical Vocabulary (IEV) – Chapter 411: Rotating machines*

IEC 60050-551:1998, *International Electrotechnical Vocabulary (IEV) – Part 551: Power electronics*

IEC 60050-811:1991, *International Electrotechnical Vocabulary (IEV) – Chapter 811: Electric traction*

IEC 60349-1:1999, *Electric traction – Rotating electrical machines for rail and road vehicles – Part 1: Machines other than electronic convertor-fed alternating current motors*

IEC/TR2 60349-3:1995, *Electric traction – Rotating electrical machines for rail and road vehicles – Part 3: Determination of the total losses of convertor-fed alternating current motors by summation of the component losses*

IEC/TS 61287-2:2001, *Power convertors installed on board railway rolling stock – Part 2: Additional technical information*

IEC 60571:1998, *Electronic equipment used on rail vehicles*

IEC 60850:2000, *Railway applications – Supply voltages of traction systems*

IEC 61287-1:1995, *Power convertors installed on board rolling stock – Part 1: Characteristics and test methods*

3 Definitions

For the definition of general terms used in this standard, reference should be made to IEC 60050-411, IEC 60050-551, IEC 60050-811, IEC 61287-1 and IEC 60349-1.

For the purpose of this part of IEC 61377, the following definitions apply.

3.1

combined system

unit consisting of the chopper, motoring and braking, the motor(s), their related control system, equivalent power cables connecting them, and an equivalent cooling system

3.2

user

organization which orders the combined system. The user is normally an organization, which uses the vehicle or the equipment, unless the responsibility is delegated to a main contractor or consultant

3.3

manufacturer

organization which has the technical responsibility for the supply of the combined system

NOTE The manufacturer as defined above may also be the supplier of the motor, of the chopper, of the control, or of all of them, or of none of them.

3.4

supplier

organization which has the responsibility of one or more of the constituents of the combined system