

INTERNATIONAL STANDARD

IEC 61000-3-2

Edition 2.1
2001-10

Edition 2:2000 consolidated with amendment 1:2001

Electromagnetic compatibility (EMC) –

Part 3-2: Limits –

Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)

© IEC 2001 Copyright - all rights reserved

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 the publisher.

International Electrotechnical Commission, 3, rue de Varembe, PO Box 131, CH-1211 Geneva 20, Switzerland
Telephone: +41 22 919 02 11 Telefax: +41 22 919 03 00 E-mail: inmail@iec.ch Web: www.iec.ch



Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

CONTENTS

FOREWORD.....	7
INTRODUCTION.....	11
1 Scope.....	13
2 Normative references.....	13
3 Definitions.....	15
4 General.....	21
5 Classification of equipment.....	21
6 General requirements.....	23
6.1 Control methods.....	23
6.2 Harmonic current measurement.....	25
6.3 Equipment in a rack or case.....	29
7 Harmonic current limits.....	29
7.1 Limits for Class A equipment.....	33
7.2 Limits for Class B equipment.....	33
7.3 Limits for Class C equipment.....	33
7.4 Limits for Class D equipment.....	33
Annex A (normative) Measurement circuit and supply source.....	39
A.1 Test circuit.....	39
A.2 Supply source.....	39
Annex B (normative) Requirements for measurement equipment.....	45
Annex C (normative) Type test conditions.....	47
C.1 General.....	47
C.2 Test conditions for television (TV) receivers.....	47
C.3 Test conditions for audio amplifiers.....	47
C.4 Test conditions for video-cassette recorders.....	47
C.5 Test conditions for lighting equipment.....	47
C.6 Test conditions for independent and built-in incandescent lamp dimmers.....	49
C.7 Test conditions for vacuum cleaners.....	49
C.8 Test conditions for washing machines.....	51
C.9 Test conditions for microwave ovens.....	51
C.10 Test conditions for information technology equipment (ITE).....	51
C.11 Test conditions for induction hobs.....	51
C.12 Test conditions for air conditioners.....	51
C.13 Test conditions for kitchen machines as defined in IEC 60335-2-14.....	53
C.14 Test conditions for arc welding equipment which is not professional equipment.....	53
C.15 Test conditions for other equipment.....	53
Bibliography.....	55

Figure 1 – Flowchart for determining conformity	31
Figure A.1 – Measurement circuit for single-phase equipment.....	41
Figure A.2 – Measurement circuit for three-phase equipment.....	43
Table 1 – Limits for Class A equipment	35
Table 2 – Limits for Class C equipment	35
Table 3 – Limits for Class D equipment	35
Table 4 – Test observation period	37
Table C.1 – Conventional load for arc welding equipment tests	53

Withdrawn

INTERNATIONAL ELECTROTECHNICAL COMMISSION

ELECTROMAGNETIC COMPATIBILITY (EMC) –

Part 3-2: Limits –

Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)

FOREWORD

- 1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the 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, the IEC publishes International Standards. 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. The 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 the 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 National Committees.
- 3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical specifications, technical reports or guides and they are accepted by the National Committees in that sense.
- 4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.
- 5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.
- 6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 61000-3-2 has been prepared by sub-committee 77A: Low-frequency phenomena, of IEC technical committee 77: Electromagnetic compatibility.

It constitutes part 3-2 of IEC 61000.

This consolidated version of IEC 61000-3-2 is based on the second edition (2000) [documents 77A/310/FDIS and 77A/320/RVD] and its amendment 1 (2001) [documents 77A/337/FDIS and 77A/357/RVD].

It bears the edition number 2.1.

A vertical line in the margin shows where the base publication has been modified by amendment 1.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 3.

Annexes A, B and C form an integral part of this standard.

The committee has decided that the contents of the base publication and its amendments will remain unchanged until 2004. At this date, the publication will be

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

Withdrawn

INTRODUCTION

IEC 61000 is published in separate parts, according to the following structure:

Part 1: General

General considerations (introduction, fundamental principles)
Definitions, terminology

Part 2: Environment

Description levels
Classification of the environment
Compatibility levels

Part 3: Limits

Emission limits
Immunity limits (in so far as they do not fall under the responsibility of the product committees)

Part 4: Testing and measurement techniques

Measurement techniques
Testing techniques

Part 5: Installation and mitigation guidelines

Installation guidelines
Mitigation methods and devices

Part 6: Generic standards

Part 9: Miscellaneous

Each part is further subdivided into sections which are to be published either as international standards, technical specifications, or as technical reports.

These standards and reports will be published in chronological order and numbered accordingly (for example, 61000-6-1).

This part is an international standard which gives emission limits for harmonic currents from equipment having an input current up to and including 16 A per phase.

This part is a Product Family Standard.

ELECTROMAGNETIC COMPATIBILITY (EMC) –

Part 3-2: Limits –

Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)

1 Scope

This part of IEC 61000 deals with the limitation of harmonic currents injected into the public supply system.

It specifies limits of harmonic components of the input current which may be produced by equipment tested under specified conditions.

Harmonic components are measured according to annexes A and B.

This part of IEC 61000 is applicable to electrical and electronic equipment having an input current up to and including 16 A per phase, and intended to be connected to public low-voltage distribution systems.

Arc welding equipment which is not professional equipment, with input current up to and including 16 A per phase, is included in this standard.

Arc welding equipment intended for professional use, as specified in IEC 60974-1, is excluded from this standard and may be subject to installation restrictions as indicated in IEC 61000-3-4.

NOTE 1 It is intended to replace technical report IEC 61000-3-4 by an international standard, IEC 61000-3-12 (under consideration).

The tests according to this standard are type tests. Test conditions for particular equipment are given in annex C.

For systems with nominal voltages less than 220 V (line-to-neutral), the limits have not yet been considered.

NOTE 2 The words apparatus, appliance, device and equipment are used throughout this standard. They have the same meaning for the purpose of this standard.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 61000. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of IEC 61000 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

IEC 60050(131), *International Electrotechnical Vocabulary (IEV) – Chapter 131: Electric and magnetic circuits*

IEC 60050(161), *International Electrotechnical Vocabulary (IEV) – Chapter 161: Electromagnetic compatibility*

IEC 60065, *Audio, video and similar electronic apparatus – Safety requirements*

IEC 60107-1, *Methods of measurement on receivers for television broadcast transmissions – Part 1: General considerations – Measurements at radio and video frequencies*

IEC 60155, *Glow-starters for fluorescent lamps*

IEC 60268-3, *Sound system equipment – Part 3: Amplifiers*

IEC 60335-2-2, *Safety of household and similar electrical appliances – Part 2-2: Particular requirements for vacuum cleaners and water suction cleaning appliances*

IEC 60335-2-7, *Safety of household and similar electrical appliances – Part 2-7: Particular requirements for washing machines*

IEC 60335-2-14, *Safety of household and similar electrical appliances – Part 2-14: Particular requirements for kitchen machines*

IEC 60974-1, *Arc welding equipment – Part 1: Welding power sources*

IEC 61000-2-2, *Electromagnetic compatibility (EMC) – Part 2: Environment – Section 2: Compatibility levels for low-frequency conducted disturbances and signalling in public low-voltage power supply systems*

IEC/TS 61000-3-4, *Electromagnetic compatibility (EMC) – Part 3-4: Limits – Limitation of emission of harmonic currents in low-voltage power supply systems for equipment with rated current greater than 16 A*

IEC 61000-4-7, *Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – Section 7: General guide on harmonics and interharmonics measurements and instrumentation, for power supply systems and equipment connected thereto*