IEC 61000-3-12

Edition 2.0 2021-06

INTERNATIONAL STANDARD

NORME INTERNATIONALE

AMENDMENT 1
AMENDEMENT 1

**Electromagnetic compatibility (EMC) –
Part 3-12: Limits – Limits for harmonic currents produced by equipment connected to public low-voltage systems with input current >16 A and ≤ 75 A per phase**

**Compatibilité électromagnétique (CEM) –
Partie 3-12: Limites – Limites pour les courants harmoniques produits par les appareils connectés aux réseaux publics basse tension ayant un courant appelé >16 A et ≤75 A par phase**

IEC 61000-3-12:2011-05/AMD1:2021-06(en-fr)

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ELECTROMAGNETIC COMPATIBILITY (EMC) –

Part 3-12: Limits – Limits for harmonic currents produced by equipment connected to public low-voltage systems with input current >16 A and ≤75 A per phase

AMENDMENT 1

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Amendment 1 to IEC 61000-3-12:2011 has been prepared by subcommittee 77A: EMC – Low frequency phenomena, of IEC technical committee 77: Electromagnetic compatibility.

The text of this Amendment is based on the following documents:

CDV	Report on voting
77A/1042/CDV	77A/1074/RVC

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this Amendment is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications/.

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The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under 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- withdrawn,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.

1 Scope

Replace, in the first paragraph, “a.c.” *with* “AC”*.*

In Note 2, replace "and future IEC/TR 61000-3-14" *with* "and IEC/TR 61000-3-14"*.*

2 Normative references

Replace IEC 61000-3-2 with the following:

IEC 61000-3-2:2018, *Electromagnetic compatibility (EMC) – Part 3-2: Limits – Limits for harmonic current emissions (equipment input current ≤16 A per phase)*
IEC 61000-3-2:2018/AMD1:2020

3 Terms and definitions

Replace the existing text of the first paragraph with the following:

For the purposes of this document, the definitions given in IEC 60050-161 and the following 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

3.6
three-phase equipment

Replace, in definition 3.6, the existing Note 2 with the following:

NOTE 2 Equipment intended to be connected to all three phases and to the neutral and where the neutral conductor is used as a current-carrying conductor, is considered as three separate single-phase items or as hybrid equipment.

5.2 Limits for emission

Replace the existing text of the ninth and tenth paragraphs with the following:

Table 4 may be used with balanced three-phase equipment if any one of the following conditions is met:

a) The 5^{th} and 7^{th} harmonic currents are each less than 5 % of the reference current during the whole test observation period.

NOTE 4 This condition is normally fulfilled by 12-pulse pieces of equipment.

b) The design of the piece of equipment is such that the phase angle of the 5^{th} harmonic current has no preferential value over time during normal operation and can take any value from 0° to 360°.

NOTE 5 This condition is normally fulfilled by converters with fully controlled thyristor bridges.

c) Among all the 5th harmonic current values measured in each DFT time window as defined in IEC 61000-4-7 over the entire test observation period, the phase angle of the 5th harmonic current related to the fundamental phase-to-neutral voltage (see 3.16) is in the range of 90° to 150° for at least 99 % of the harmonic current values that have an RMS value higher than 10,7 % of the reference current.

NOTE 6 This condition is normally fulfilled by equipment with an uncontrolled rectifier bridge and capacitive filter, including a 3 % AC or 4 % DC reactor.

Table 5 may be used with balanced three-phase equipment if any one of the following conditions is met:

d) The 5th and 7th harmonic currents are each less than 3 % of the reference current during the whole test observation period.

NOTE 7 This condition is normally fulfilled by 12-pulse pieces of equipment.

e) The design of the piece of equipment is such that the phase angle of the 5th harmonic current has no preferential value over time during normal operation and can take any value from 0° to 360°.

NOTE 8 This condition is normally fulfilled by converters with fully controlled thyristor bridges.

f) Among all the 5th harmonic current values measured in each DFT time window as defined in IEC 61000-4-7 over the entire test observation period, the phase angle of the 5th harmonic current related to the fundamental phase-to-neutral voltage (see 3.16) is in the range of 150° to 210° for at least 99 % of the harmonic current values that have an RMS value higher than 10,7 % of the reference current.

NOTE 9 This condition is normally fulfilled by a 6-pulse converter with a small DC link capacitance, operating as a load.

Add the following new subclause 5.3:

5.3 Procedure if the reference current is less than 16 A

If equipment that has a rated current above 16 A draws a reference current that is less than or equal to 16 A under the specified test conditions, the manufacturer shall use one of the following procedures:

a) Comply with the relevant emission limits given in IEC 61000-3-12, choosing the required R_{sce}.

b) Comply with the absolute limits given in IEC 61000-3-2:2018, Table 1, instead of the proportional limits given in IEC 61000-3-12, using and complying with all other requirements given in IEC 61000-3-12, and the manufacturer shall state in the instruction manual "Equipment complying with IEC 61000-3-12", without having to declare a minimum short circuit power S_{sc}.

c) Change the test observation period to a representative 2,5 min period expected as the operating period with the highest THC, and proceed as in a) above, choosing the required R_{sce}.

The manufacturer shall state in the test report which of these procedures was used, so that subsequent tests are carried out with the same procedure.

6 Product documentation

Replace the existing text with the following:

For equipment complying with the harmonic current emission limits corresponding to R_{sce} = 33, the manufacturer shall state in the instruction manual supplied with the equipment:

"Equipment complying with IEC 61000-3-12"

For equipment not complying with the harmonic current emission limits corresponding to R_{sce} = 33, the manufacturer shall determine the minimum value of R_{sce} for which the limits given in the relevant Table 2, Table 3, Table 4 or Table 5 are not exceeded and either:

a) declare the value of the short-circuit power S_{sc} corresponding to this minimum value of R_{sce} (see 3.14) in the instruction manual, and instruct the user to determine, in consultation with the distribution network operator if necessary, that the equipment is connected only to a supply of that S_{sc} value or more, or

b) declare the value of the short-circuit ratio R_{sce} corresponding to this minimum value of R_{sce} (see 3.14) in the instruction manual, and instruct the user to determine, in consultation with the distribution network operator if necessary, that the characteristics of the equipment (S_{equ} or I_{equ}) and the supply (S_{sc}) are such that a short-circuit ratio of that R_{sce} value or more is achieved.

For item a), the statement in the instruction manual shall be:

"This equipment complies with IEC 61000-3-12 provided that the short-circuit power S_{sc} is greater than or equal to xx at the interface point between the user's supply and the public system. It is the responsibility of the installer or user of the equipment to ensure, by consultation with the distribution network operator if necessary, that the equipment is connected only to a supply with a short-circuit power S_{sc} greater than or equal to xx."

where xx is the value of S_{sc} corresponding to the minimum value of R_{sce} for which the limits given in the relevant Table 2, Table 3, Table 4 or Table 5 are not exceeded.

For item b), the statement in the instruction manual shall be:

"This equipment complies with IEC 61000-3-12 provided that the short-circuit ratio R_{sce} is greater than or equal to xx at the interface point between the user's supply and the public system. It is the responsibility of the installer or user of the equipment to ensure, by consultation with the distribution network operator if necessary, that the short-circuit ratio R_{sce} is greater than or equal to xx."

where xx is the minimum value of R_{sce} for which the limits given in the relevant Table 2, Table 3, Table 4 or Table 5 are not exceeded. The manufacturer shall explain how to calculate S_{sc} from R_{sce} using the relevant formula in 3.14.

7.3 Requirements for simulation

Replace, in item a), the existing text of the first paragraph with the following:

a) Measurement of the type of equipment under normal laboratory conditions as described in 7.2, with possible higher voltage distortion is allowed, however the harmonic levels shall not exceed the compatibility levels given in IEC 61000-2-4, class 3. These measurements shall show that the equipment complies with the relevant limits.

A.2 Test conditions for air conditioners

Replace the existing title with the following new title:

A.2 Test conditions for air conditioners and heat pumps

*Replace, in the first paragraph, "*If the input power of the air conditioner compressor motor or fan is controlled by*" with "*If the input power of the compressor motor or fan of the equipment is controlled by*".*

*Replace, in the second paragraph, "*For air conditioners having electronically supplied compressors (VSD)*" with "*For equipment having electronically supplied compressors*".*

*Replace, in the fourth paragraph, item a) "*for the air conditioner under normal operating conditions*" with "*for the equipment under normal operating conditions*".*

*Replace, in the fifth paragraph, "*Air conditioning systems having only a compressor motor of the directly connected type*" with "*Equipment having only a compressor motor of the directly connected type*".*

Bibliography

Remove the footnote related to IEC/TR 61000-3-14*.*

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COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

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COMPATIBILITÉ ÉLECTROMAGNÉTIQUE (CEM) –

Partie 3-12: Limites – Limites pour les courants harmoniques produits par les appareils connectés aux réseaux publics basse tension ayant un courant appelé >16 A et ≤75 A par phase

AMENDEMENT 1

AVANT-PROPOS

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