IEC 63044-5-2

Edition 1.1 2022-06
CONSOLIDATED VERSION

FINAL VERSION

VERSION FINALE

Home and building electronic systems (HBES) and building automation and control systems (BACS) –
Part 5-2: EMC requirements for HBES/BACS used in residential, commercial and light-industrial environments

Systèmes électroniques pour les foyers domestiques et les bâtiments (HBES) et systèmes de gestion technique du bâtiment (SGTB) –
Partie 5-2: Exigences CEM relatives aux HBES/SGTB destinés à être utilisés dans des environnements résidentiels, commerciaux et de l'industrie légère

IEC 63044-5-2:2017-01+AMD1:2022-06 CSV(en-fr)

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

HOME AND BUILDING ELECTRONIC SYSTEMS (HBES) AND BUILDING AUTOMATION AND CONTROL SYSTEMS (BACS) –

Part 5-2: EMC requirements for HBES/BACS used in residential, commercial and light-industrial environments

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.

This consolidated version of the official IEC Standard and its amendment has been prepared for user convenience.

IEC 63044-5-2 edition 1.1 contains the first edition (2017-01) [documents 23/737/CDV and 23/749/RVC] and its amendment 1 (2022-06) [documents 23/1002/FDIS and 23/1008/RVD].

This Final version does not show where the technical content is modified by amendment 1. A separate Redline version with all changes highlighted is available in this publication.

International Standard IEC 63044-5-2 has been prepared by IEC technical committee 23: Electrical accessories.

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

A list of all parts in the IEC 63044 series, published under the general title *Home and Building Electronic Systems (HBES) and Building Automation and Control Systems (BACS)*, can be found on the IEC website.

This International Standard is to be used in conjunction with IEC 63044-5-1:2017 and with IEC 63044-5-1:2017/AMD1:2022.

The committee has decided that the contents of the base publication and its amendment will remain unchanged until the stability date indicated on the IEC web site under 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.

INTRODUCTION

The IEC 63044 series deals with developing and testing Home and Building Electronic Systems (HBES) and Building Automation and Control Systems (BACS).

The IEC 63044-5 series ensures a common level of EMC requirements for HBES/BACS devices

HOME AND BUILDING ELECTRONIC SYSTEMS (HBES) AND BUILDING AUTOMATION AND CONTROL SYSTEMS (BACS) –

Part 5-2: EMC requirements for HBES/BACS used in residential, commercial and light-industrial environments

1 Scope

Clause 1 of IEC 63044-5-1:2017 and of IEC 63044-5-1:2017/AMD1:2022 applies, with the following modification:

Replace the last paragraph by the following one:

This document specifies EMC requirements for HBES/BACS to be installed in residential, commercial and light-industrial environments, according to the definition given in IEC 61000-6-1.

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 63044-5-1:2017, *Home and Building Electronic Systems (HBES) and Building Automation and Control Systems (BACS) – Part 5-1: EMC requirements, conditions and test set-up*
IEC 63044-5-1:2017/AMD1:2022

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

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

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

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

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

IEC 61000-4-8, *Electromagnetic compatibility (EMC) – Part 4-8: Testing and measurement techniques – Power frequency magnetic field immunity test*

IEC 61000-4-11, *Electromagnetic compatibility (EMC) – Part 4-11: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations immunity tests*

IEC 61000-6-3:2020, *Electromagnetic compatibility (EMC) – Part 6-3: Generic standards – Emission standard for equipment in residential environments*

3 Terms, definitions and abbreviated terms

For the purposes of this document, the terms, definitions and abbreviations given in IEC 63044-5-1:2017 and of IEC 63044-5-1:2017/AMD1:2022 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

4 General requirements

Clause 4 of IEC 63044-5-1:2017 and of IEC 63044-5-1:2017/AMD1:2022 applies.

5 Performance criteria

Clause 5 of IEC 63044-5-1:2017 and of IEC 63044-5-1:2017/AMD1:2022 applies.

6 Standard test conditions

Clause 6 of IEC 63044-5-1:2017 and of IEC 63044-5-1:2017/AMD1:2022 applies.

7 EMC requirements

7.1 Immunity requirements

7.1.1 Enclosure

EMC immunity requirements for the enclosure are given in Table 1.

Table 1 – EMC immunity requirements for enclosure

Phenomenon	Basic standard	Test specification	Performance criterion	Remarks
Power-frequency magnetic fields	IEC 61000-4-8	50/60 Hz 3 A/m	A	a,b,c
Radio-frequency electromagnetic field Amplitude modulated	IEC 61000-4-3 [d]	(80 to 1 000) MHz 80 % AM (1 kHz) 3 V/m 10 V/m	 A B [g]	e,f
Radio-frequency electromagnetic field Amplitude modulated	IEC 61000-4-3 [d]	(1,4 to 2,0) GHz 80 % AM (1 kHz) 3 V/m [e]	 A	h
Radio-frequency electromagnetic field Amplitude modulated	IEC 61000-4-3 [d]	(2,0 to 6,0) GHz 80 % AM (1 kHz) 1 V/m	 A	e,h
Electrostatic discharge	IEC 61000-4-2	±4 kV (contact) ±8 kV (air)	B B	i

[a] The test shall be carried out at the frequencies appropriate to the power supply frequency. Equipment intended for use in areas supplied only at one of these frequencies need only be tested at that frequency.

[b] Applicable only to apparatus containing devices susceptible to magnetic fields.

[c] For CRTs, the acceptable jitter depends upon the character size and is calculated for a test level of 1 A/m as follows:

$J \leq (3C + 1)/40$

where jitter J and character size C are in millimetres.

As jitter is linearly proportional to the magnetic field strength, tests can be carried out at other test levels extrapolating the maximum jitter level appropriately.

[d] IEC 61000-4-20 may be used for small EUTs as defined in IEC 61000-4-20:2010, 6.1.

[e] The test level specified is the r.m.s. value of the unmodulated carrier.

[f] If the test is passed with the higher level and performance criteria A, the test for the lower level is not necessary.

[g] Except for the ITU broadcast frequency bands 87 MHz to 108 MHz, 174 MHz to 230 MHz and 470 MHz to 790 MHz, where the level shall be 3 V/m and the performance criteria A.

[h] The frequency range has been selected to cover the frequencies with the highest potential risk of disturbance.

[i] See basic standard for applicability of contact and/or air discharge tests.

7.1.2 HBES/BACS network port

EMC immunity requirements for the HBES/BACS network port are given in Table 2.

Table 2 – EMC immunity requirements for HBES/BACS network port

Phenomenon	Basic standard	Test specification	Performance criterion [h]	Remarks
Radio-frequency common mode	IEC 61000-4-6	(0,15 to 80) MHz 80 % AM (1 kHz) 3 V 10 V	 A B [b]	[a,c,d,e]
Fast transients (bursts)	IEC 61000-4-4	t_r/t_h 5/50 ns 5 kHz repetition ±0,5 kV ±1 kV	 A B	[c,e] Capacitive clamp used
Transients (surge) Line to earth Line to line – balanced transmission – unbalanced transmission	IEC 61000-4-5	T_r/T_h 1,2/50(8/20) µs ±2 kV No test ±1 kV	 B B	[f,g]

[a] The test level can also be defined as the equivalent current into a 150 Ω load.

[b] Except for the ITU broadcast frequency band 47 MHz to 68 MHz, where the level shall be 3 V and the performance criteria A.

[c] Applicable only to communication interfaces with cables whose total length according to the manufacturer's functional specification may exceed 3 m.

[d] The test level specified is the r.m.s. value of the unmodulated carrier.

[e] If the test is passed with the higher level and performance criteria A, the test for the lower level is not necessary.

[f] Applicable only to communication interfaces with cables whose total length according to the manufacturer's functional specification may exceed 30 m.

[g] Where normal functioning cannot be achieved because of the impact of the CDN on the EUT, this test is not required.

[h] See definition of performance criterion A in 5.1 and 5.2 of IEC 63044-5-1:2017 for details.

7.1.3 Signal port

EMC immunity requirements for the signal port are given in Table 3.

Table 3 – EMC immunity requirements for signal port

Phenomenon	Basic standard	Test specification	Performance criterion	Remarks
Radio-frequency common mode	IEC 61000-4-6	(0,15 to 80) MHz 80 % AM (1 kHz)		a,c,d,e
		3 V	A	
		10 V	B [b]	
Fast transients (bursts)	IEC 61000-4-4	t_r/t_h 5/50 ns		c,e
		5 kHz repetition		Capacitive clamp used
		±0,5 kV	A	
		±1 kV	B	
Transients (surge)	IEC 61000-4-5	T_r/T_h 1,2/50(8/20) µs		g
Line to earth		±2 kV	B [f]	
Line to line				
– balanced transmission		No test		
– unbalanced transmission		±0,5 kV	B	

[a] The test level can also be defined as the equivalent current into a 150 Ω load.

[b] Except for the ITU broadcast frequency band 47 MHz to 68 MHz, where the level shall be 3 V and the performance criteria A.

[c] Applicable only to communication interfaces with cables whose total length according to the manufacturer's functional specification may exceed 3 m.

[d] The test level specified is the r.m.s. value of the unmodulated carrier.

[e] If the test is passed with the higher level and performance criteria A, the test for the lower level is not necessary.

[f] Applicable only to communication interfaces with cables whose total length according to the manufacturer's functional specification may exceed 30 m.

[g] Where normal functioning cannot be achieved because of the impact of the CDN on the EUT, this test is not required.

7.1.4 DC power ports

EMC immunity requirements for DC power ports are given in Table 4.

Table 4 – EMC immunity requirements for DC power ports

Phenomenon	Basic standard	Test specification	Performance criterion	Remarks
Radio-frequency common mode	IEC 61000-4-6	(0,15 to 80) MHz 80 % AM (1 kHz)		a,c,d
		3 V	A	
		10 V	B [b]	
Fast transients (bursts)	IEC 61000-4-4	t_r/t_h 5/50 ns		d,e,f
		5 kHz repetition		
		±0,5 kV	A	
		±1 kV	B	
Transients (surge)	IEC 61000-4-5	T_r/T_h 1,2/50(8/20) µs		e,g
Line to earth		±2 kV	B	
Line to line				
– balanced transmission		No test		
– unbalanced transmission		±0,5 kV	B	

[a] The test level can also be defined as the equivalent current into a 150 Ω load.

[b] Except for the ITU broadcast frequency band 47 MHz to 68 MHz, where the level shall be 3 V and the performance criteria A.

[c] The test level specified is the r.m.s. value of the unmodulated carrier.

[d] If the test is passed with the higher level and performance criteria A, the test for the lower level is not necessary.

[e] Not applicable to input ports intended for connection to a battery or a rechargeable battery which must be removed or disconnected from the apparatus for recharging.

[f] DC ports which are not intended to be connected to a DC distribution network are treated as signal ports.

[g] The test is applicable to DC power input ports intended to be connected permanently to cables longer than 3 m.

7.1.5 AC power ports

EMC immunity requirements for AC power ports are given in Table 5.

Table 5 – EMC immunity requirements for AC power ports

Phenomenon	Basic standard	Test specification	Performance criterion	Remarks
Radio-frequency common mode	IEC 61000-4-6	(0,15 to 80) MHz 80 % AM (1 kHz)		a,c,d
		3 V	A	
		10 V	B [b]	
Fast transients (bursts)	IEC 61000-4-4	t_r/t_h 5/50 ns		d
		5 kHz repetition		
		±1 kV	A	
		±2 kV	B	
Transients (surge)	IEC 61000-4-5	T_r/T_h 1,2/50 µs		e,f,g
Line to earth		±2 kV	B	
Line to line		±1 kV	B	
Voltage dips	IEC 61000-4-11	0 % residual voltage for 1 cycle	A	h,i,j
		40 % residual voltage for 10/12 cycles at 50/60 Hz	B	
		70 % residual voltage for 25/30 cycles at 50/60 Hz	B	
Voltage interruptions	IEC 61000-4-11	0 % residual voltage for 250/300 cycles at 50/60 Hz	C	h,i,j

[a] The test level can also be defined as the equivalent current into a 150 Ω load.

[b] Except for the ITU broadcast frequency band 47 MHz to 68 MHz, where the level shall be 3 V and the performance criteria A.

[c] The test level specified is the r.m.s. value of the unmodulated carrier.

[d] If the test is passed with the higher level and performance criteria A, the test for the lower level is not necessary.

[e] Apparatus with an AC power input port intended for use with a mains transformer shall be tested on the mains input of the transformer specified by the manufacturer or, where none is so specified, using a typical transformer of minimum 300 VA.

[f] Applicable only to AC power input ports intended to be connected permanently to cables longer than 10 m.

[g] Applicable only to apparatus with an AC input power port intended for use with a mains transformer or mains power supply. It shall be tested on the AC power input port of the device with the coupling impedance for other lines (42 Ω). Reason for this test: the coupling of surges into the AC power line is the same as for communication interface (long distance parallel to the mains).

[h] Voltage shift at zero crossing.

[i] Applicable only to input ports.

[j] For electronic power converters, the operation of protective devices is allowed.

7.2 Emission requirements

The requirements of IEC 61000-6-3 apply.

The limits of Clause 8 of IEC 61000-6-3:2020 apply.