INTERNATIONAL STANDARD

ISO 22200

Second edition
2009-06-01

Electromagnetic compatibility — Product family standard for lifts, escalators and moving walks — Immunity

Compatibilité électromagnétique — Norme pour la famille de produits: ascenseurs, escaliers mécaniques et trottoirs roulants — Immunité

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ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 22200 was prepared by Technical Committee ISO/TC 178, *Lifts, escalators and moving walks*.

This second edition cancels and replaces the first edition (ISO 22200:2006), which has been technically revised.

Introduction

ISO 22200 is a type-C standard as stated in ISO 12100-1. When provisions of a type-C standard are different from those which are stated in type-A or type-B standards, the provisions of the type-C standard take precedence over the provisions of the other standards for machines that have been designed and built according to the provisions of the type-C standard.

This International Standard is based upon the European Standard EN 12016:2004. This International Standard contains no technical deviations from EN 12016:2004, except that the most recent specified radio frequency limits have been taken into account.

The requirements of this International Standard have been specified so as to ensure a level of electromagnetic immunity which will allow minimal disturbance to the product family.

Two levels of immunity are given which have been selected such that the immunity levels for safety circuit apparatus are higher than the immunity levels for general function apparatus. The higher levels cover the possibility for example of disturbances emanating from hand-held transmitters in close proximity to safety circuit apparatus.

Neither level, however, covers cases where an extremely low probability of occurrence exists.

The immunity levels given are on the basis that equipment of the product family range is installed both indoor and outdoor in all types of building and, generally, is connected to a low voltage system.

It is known that in the field of electromagnetic compatibility (EMC) provision, technology changes often require amendments to standards. It can be expected that radio frequency (RF) field ranges above 500 MHz for communications technology will continue to be introduced into the market. This International Standard has been prepared with the assumption that equipment utilizing frequencies above 500 MHz is not used in close proximity (200 mm) to lift, escalator and moving walk controls.

New technology equipment operating in high radio frequency (RF) field ranges will steadily be introduced into the market.

a) Important changes

- As a result of harmonization with the latest EN standard, the following new requirements have been established with this International Standard.
- Change of the term “installation” to “system”. The scope of the standard is applicable to the apparatus and assembly of apparatus of lifts and escalators and assembly into systems.
- New requirements for radio frequency electromagnetic field above 500 MHz, which have been extended to cover digital mobile telephone services up to 2 170 MHz.
- New requirements for surge testing on safety circuits.
- New requirements for radio frequency electromagnetic fields regarding safety circuits.
- New requirement to address the possible effects of mobile telephones or radio transmitters.
- Advanced requirements for several environmental phenomena considering the progress in EMC technology and the results of the EN 12016:2004 risk assessment.
- New requirements for immunity to mains power supply voltage interruptions and voltage dips.

b) Environmental issues

1) Lifts, escalators and moving walks are systems whose component apparatus/assembly of apparatus are distributed (and some of which move) throughout the building. The definition, in terms of the EMC, of the use of the building (residential or industrial) cannot be predetermined or assumed to be fixed. Therefore, to cover requirements in all cases, no differentiation between environments was made and a single set of limits has been maintained.

2) Severe electromagnetic environments have not been considered. Examples of these are: radio transmitter stations, railways and metros, heavy industrial plants and electricity power stations. Additional tests and immunity measurements may need to be taken on apparatus to be used in these environments.

3) The levels of immunity and the resultant performance criteria, which are given in this International Standard, reflect the fact that lifts, escalators and moving walks are deemed to consist of self-contained subsystems and apparatus (e.g. machine room and lift car).

The related EMC product family standard for emission is ISO 22199.

Electromagnetic compatibility — Product family standard for lifts, escalators and moving walks — Immunity

1 Scope

This International Standard specifies the immunity performance criteria and test levels for apparatus used in lifts, escalators and moving walks, which are intended to be permanently installed in buildings, including the basic safety requirements in regard to their EMC environment. These levels represent essential EMC requirements.

This International Standard refers to normal EMC conditions as existing in residential, office and industrial buildings, but does not cover more severe EMC environments such as

— radio transmitter stations,

— railways and metros,

— heavy industrial plants,

— electricity power stations,

which need additional investigations.

It is assumed that no ports connected to safety circuit only are rated at currents greater than 100 amps.

It is assumed that mobile telephones and radio transmitters used at frequencies and power of that stated in Table 1 are not placed within 200 mm distance from safety circuit(s).

This International Standard addresses commonly known EMC related hazards and hazardous situations relevant to lifts, escalators and moving walks when they are used as intended and under the conditions foreseen by the lift installer or escalator and/or moving walk manufacturer. This International Standard also comprises a list of documentation requirements for the installation and use of the apparatus.

This International Standard does not address all life cycle phases of the apparatus/assembly of apparatus such as manufacturing phase, construction phase, etc. The manufacturer should utilize other standards, e.g. ISO 14798 [1], to assess risks during these phases and address them with respect to EMI phenomena.

This International Standard only covers performance criteria and test levels for apparatus/assembly of apparatus used in general function circuits in environmental conditions defined by the manufacturer (temperature, humidity, etc.).

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

IEC 61000-6-1, *Electromagnetic compatibility (EMC) — Part 6-1: Generic standards — Immunity for residential, commercial and light-industrial environments*

IEC 61000-6-2, *Electromagnetic compatibility (EMC) — Part 6-2: Generic standards — Immunity for industrial environments*

IEC 60050-161, *International Electrotechnical Vocabulary — Chapter 161: Electromagnetic compatibility*

3 Terms and definitions

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

3.1
system
lift escalator or moving walk comprising assembly of apparatus with electrical and electronic equipment and interconnections

NOTE See Figure 1 and Figure 2.

3.2
assembly of apparatus
arrangement of interconnected apparatus, which can be tested together

NOTE See Figure 1 and Figure 2.

3.3
apparatus
assembly of components with an intrinsic function as defined by its manufacturer

NOTE See Figure 1 and Figure 2.

3.4
port
particular interface of specified apparatus/assembly of apparatus with the external electromagnetic environment

NOTE See Figure 3.

3.5
enclosure port
physical boundary of apparatus/assembly of apparatus through which electromagnetic fields may radiate or impinge

NOTE See Figure 3.

3.6
safety circuit
that part of an electric or electronic safety device (as defined in national lift norms), which causes any of the following actions:

a) removal of power from machine motor and brake (traction lifts), respectively, from motor and/or involved valve(s) (hydraulic lifts);

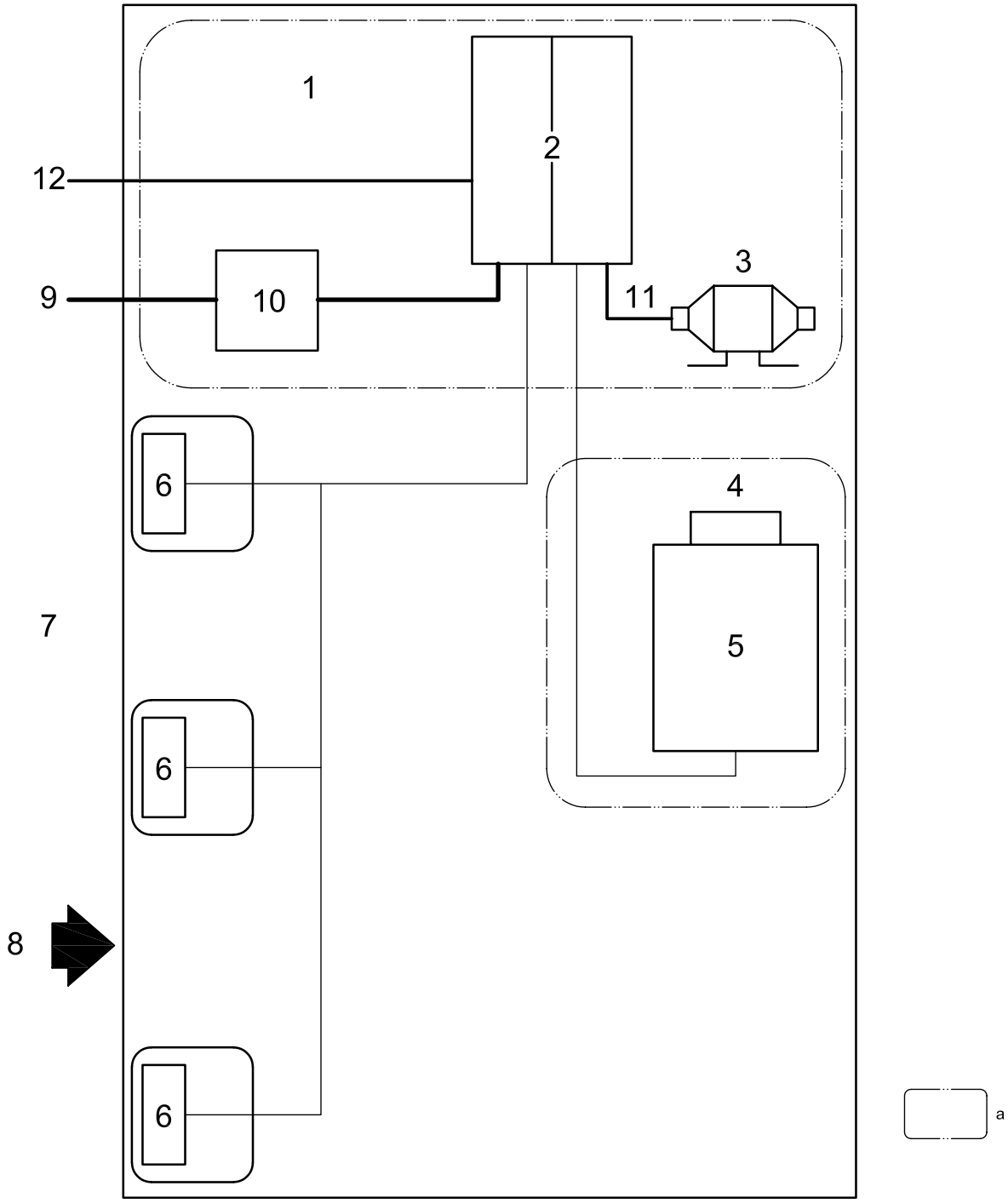
b) blocking (prevention) of automatic operation of lift;

c) limit of travel range;

d) interruption of supply circuit to the coil of the circuit breaker contactor;

e) other actions prescribed by national lift norms to be safety circuit related

3.7
general function circuit
circuitry used in apparatus which does not incorporate safety circuits

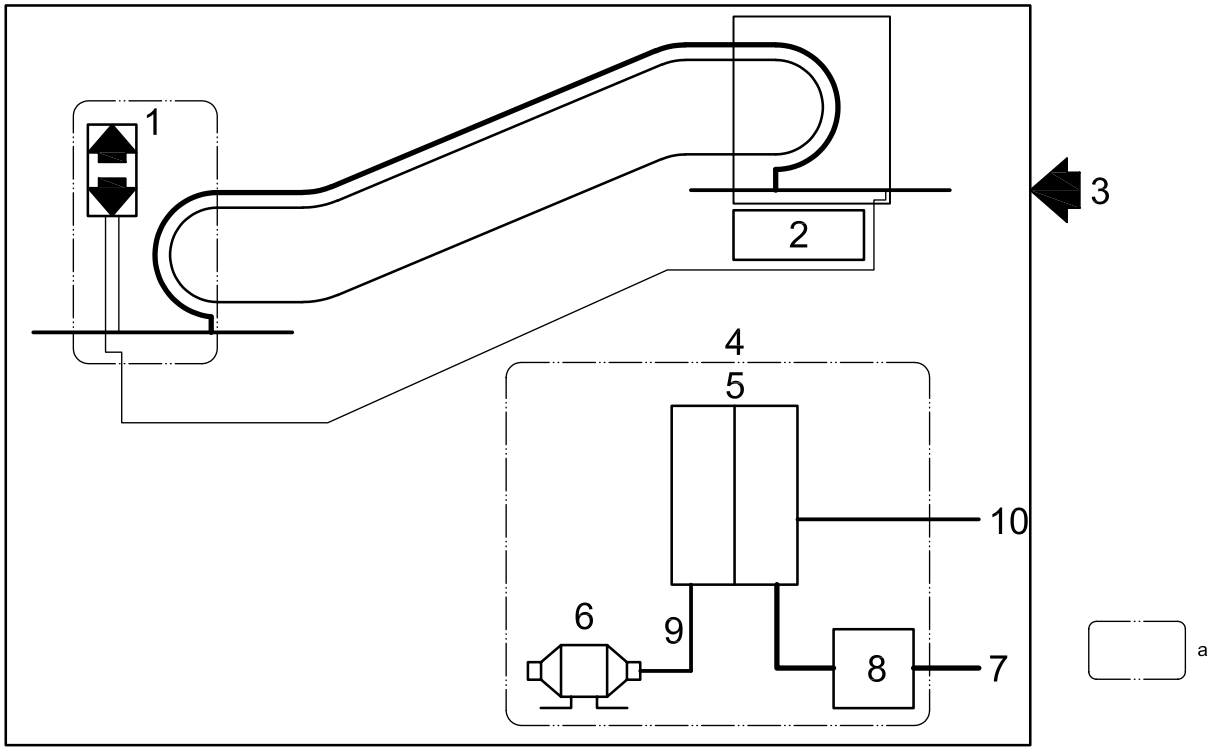


Key

1 machinery space
2 main control/control cabinet
3 machine
4 door control
5 lift car
6 apparatus installed at the landing (e.g. push buttons, indicators)
7 landings
8 system boundary
9 AC and/or DC power ports
10 main switch
11 output power port
12 ports for monitoring and remote alarm systems (signal and control ports)

[a] Assembly of apparatus.

Figure 1 — EMC example (immunity) for lift systems



Key

1 control panels
2 machinery space (see 4 to 10)
3 system boundary
4 machinery space
5 main control/control cabinet
6 machine
7 AC and/or DC power ports
8 main switch
9 output power port
10 ports for monitoring and remote alarm systems

[a] Assembly of apparatus.

NOTE The machinery space can also be an external room.

Figure 2 — EMC example (immunity) for escalator and moving walk systems

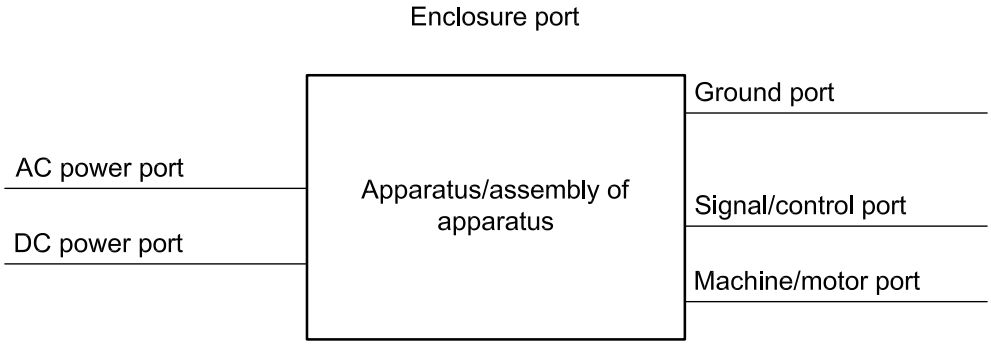


Figure 3 — Examples of ports

4 Test procedure

4.1 The tests shall be carried out as stated in IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-11, as appropriate (see Tables 1 to 7).

An attempt shall be made to maximize susceptibility by varying the position of the test sample in the test facility.

4.2 Cables likely to be more than 5 m long shall be represented by a sample of at least 5 m long connected to the relevant port for the purpose of testing for susceptibility.

4.3 It is not always possible to measure the immunity levels for every function of the apparatus/assembly of apparatus. In such cases, the most critical period of operation shall be selected.

4.4 The test shall be carried out under a single set of environmental conditions within the specified operating range of temperature, humidity, air pressure and supply voltage, unless otherwise indicated in the standards referred to in 4.1.

4.5 Tests shall be carried out in well-defined and reproducible conditions.

4.6 To facilitate testing, assemblies of apparatus may be tested together. However, where apparatus contain safety circuits, the tests shall prove that the safety circuits comply with the immunity requirements for all circuits and specific requirements for safety circuits.

This does not imply that those parts of the whole assembly, which are general function circuits, have to comply with the safety circuit requirements.

4.7 Tests shall be carried out at the following ports of the apparatus or assembly of apparatus, where they exist:

— enclosure port (see Table 1);

— ports for signal and control lines (see Table 2);

— ports for monitoring and remote alarm systems crossing the system boundaries (see Table 3);

— input and output D.C. power ports with current rating $\leqslant$ 100 A (see Table 4);

— input and output D.C. power ports with current rating $>$ 100 A (see Table 5);

NOTE For D.C. power ports with current rating greater than 100 A, also conduct tests in Table 4 with the current limited to the load current for a subsystem in the assembly of apparatus.

— input and output A.C. power ports with current rating at $\leqslant$ 100 A per phase (see Table 6);

— input and output A.C. power ports with current rating $>$ 100 A per phase (see Table 7).

NOTE For A.C. power ports with current rating greater than 100 A, also conduct tests in Table 6 with the current limited to the load current for a subsystem in the assembly of apparatus.

4.8 The configuration and mode of operation during measurement shall be recorded.

4.9 Test values shall be applied as specified in Tables 1 to 7, and the performance criteria in 6.2 shall be met as appropriate. The tests shall be carried out individually as single tests and in sequence.

5 Applicability of tests

5.1 The application of tests for evaluation of immunity depends on the type of apparatus/assembly of apparatus, its configuration, ports, technology and operating conditions.

5.2 It might be determined from consideration of the electrical characteristics and usage of a particular apparatus/assembly of apparatus that some of the tests are inappropriate and therefore unnecessary. In such a case the decision and justification not to test shall be recorded.

5.3 Where deviations from the test methods specified in 4.1 are applied, such deviations shall be justified and recorded.

6 Evaluation of test results

6.1 Introduction

The special requirements of the product family make it necessary to define precise criteria for the evaluation of the immunity test results.

A performance criterion derived from the immunity levels of IEC 61000-6-1 is deemed sufficient for most functions. However, for safety circuits, where any malfunction that may produce an unsafe operating mode cannot be tolerated, higher immunity levels derived from IEC 61000-6-2 are stipulated.

6.2 Performance criteria

A functional description of the apparatus or assembly of apparatus and a definition of performance criteria, during or as a consequence of testing shall be recorded.

The definition of performance criteria shall be based on:

a) Performance criterion A

The apparatus/assembly of apparatus shall continue to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by its manufacturer, when the apparatus or assembly of apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer then either of these may be derived from the product description and documentation and what the user may reasonably expect from the apparatus or assembly of apparatus if used as intended.

b) Performance criterion B

The apparatus/assembly of apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by its manufacturer, when the apparatus or assembly of apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed. No change of actual operating state or stored data is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer then either of these may be derived from the product description and documentation and what the user may reasonably expect from the apparatus or assembly of apparatus if used as intended.

c) Performance criterion C

Not used.

d) Performance criterion D

The apparatus/assembly of apparatus and the associated safety component(s) shall continue to operate as intended, or no degradation of performance or loss of function is allowed other than a failure into a safe state.

6.3 Enclosure ports of safety circuits

Where a risk assessment demonstrates that the location of a safety circuit may allow a mobile telephone or emergency services radio transmitter to be placed directly beside or on the device, then the enclosure port of the device shall be implemented so that performance criterion D is satisfied in these conditions.

7 Documentation for the installer of the apparatus/assembly of apparatus

The installer shall be provided with documentary information and instructions for installation and use so that compliance with this International Standard is maintained.

This shall include, where applicable:

— instructions for assembly and physical arrangement with other apparatus;

— instructions and precautions for interconnection to other apparatus;

— specifications of interconnection cables and devices;

— instructions for commissioning and testing;

— guidance on avoiding incorrect actions and assembly of apparatus which are known to cause non-compliance with this International Standard.

Table 1 — Immunity — Enclosure port

Environmental phenomenon	Test set-up	Unit	Test value		Performance criterion	
			All circuits[a]	Safety circuit[b]	All circuits[a]	Safety circuit[b]
Electrostatic discharge[e]	IEC 61000-4-2	kV (charge voltage)	4 (contact) 8 (air discharge)	6 (contact) 15 (air discharge)	B	D
Radio frequency electromagnetic field[c]	IEC 61000-4-3	MHz V/m (rms, unmodulated) % AM (1 kHz)	80 to 166 10 80	80 to 166 10[d] 80	A	D
Radio frequency electromagnetic field[c]	IEC 61000-4-3	MHz V/m (rms, unmodulated) % AM (1 kHz)	166 to 1 000 10 80	166 to 1 000 30[d] 80	A	D
Radio frequency electromagnetic field[c]	IEC 61000-4-3	MHz V/m (rms, unmodulated) % AM (1 kHz)	1 429 to 1 516[f] 10 80	1 429 to 1 516[f] 30[d] 80	A	D
Radio frequency electromagnetic field[c]	IEC 61000-4-3	MHz V/m (rms, unmodulated) % AM (1 kHz)	1 710 to 1 785[f] 10 80	1 710 to 1 785[f] 30[d] 80	A	D
Radio frequency electromagnetic field[c]	IEC 61000-4-3	MHz V/m (rms, unmodulated) % AM (1 kHz)	1 840 to 2 170[f] 3 80	1 840 to 2 170[f] 10[d] 80	A	D

[a] Test values for ports containing general function and/or safety circuits.

[b] Test values for ports containing safety circuits.

[c] For the relationship between test levels, protection distances and radiated powers of mobile telephones, see IEC 61000-4-3.

[d] Field strength may be limited by distance on site, e.g. 200 mm for mobile phones; therefore if no RF shielding barrier is used then a physical barrier shall be used to maintain a distance of 200 mm between the safety circuit and potential sources of perturbation.

[e] If safety circuits are not in a grounded metal box, either at least 8 mm of distance between box and circuitry shall be applied to avoid on-site damage or other type of insulation shall be used.

[f] Test values for Japanese mobile frequency ranges: a) 1429-1453,1465-1468,1477-1501,1513-1516 MHz, of which OUTPUT power is 0.8W; b) 1749.9-1784.9, 1844.9-1879.9, 1920-1980, 2010-2025, 2110-2170 MHz, of which send power is 0.2 W.

Table 2 — Immunity — Ports for signal and control lines

Environmental phenomenon	Test set-up	Unit	Test value		Performance criterion	
			All circuits [a]	Safety circuit[b]	All circuits [a]	Safety circuit[b]
Fast transients common mode	IEC 61000-4-4	kV (peak) T_r/T_h (ns) Rep. frequency (kHz)	0,5 5/50 5	2,0 5/50 5	B	D
Surge line to ground line to line	IEC 61000-4-5	T_r/T_h (µs) kV (peak) kV (peak)	Not relevant	1,2/50 ± 2,0 ± 1,0	Not relevant	D
Radio frequency common mode	IEC 61000-4-6	MHz V (rms, unmodulated) % AM (1 kHz)	0,15 to 80 3 80[c, d]	0,15 to 80 10 80[d]	A	D

NOTE T_r is the rise time of the pulse, T_h is the time duration of the pulse; shape of the pulse is defined in the relevant test set-up standard.

[a] Test values for ports containing general function and/or safety circuits.

[b] Test values for ports containing safety circuits.

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

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

Table 3 — Immunity — Ports for monitoring and remote alarm systems crossing the system boundaries not applicable to input ports intended for connection to dedicated non-rechargeable power supplies

Environmental phenomenon	Test set-up	Unit	Test value		Performance criterion	
			All circuits[a]	Safety circuits[b]	All circuits[a]	Safety circuit[b]
Fast transients common mode	IEC 61000-4-4	kV (peak) T_r/T_h (ns) Rep. frequency (kHz)	± 1,0 5/50 5[c]	Covered by Table 2	B	Refer to Table 2
Surge line to ground line to line	IEC 61000-4-5	T_r/T_h (µs) kV (peak) kV (peak)	1,2/50 ± 1,0 ± 0,5	Covered by Table 2	B	Refer to Table 2
Radio frequency common mode	IEC 61000-4-6	MHz V (rms, unmodulated) % AM (1 kHz)	0,15 to 80 3 80[c, d]	Not relevant	A	Not relevant

NOTE T_r is the rise time of the pulse, T_h is the time duration of the pulse; shape of the pulse is defined in the relevant test set-up standard.

a Test values for ports containing general function and/or safety circuits.

b Test values for ports containing safety circuits.

c Applicable only to ports interfacing with cables whose total length according to the manufacturer's functional specification may exceed 3 m.

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

Table 4 — Immunity — Input and output D.C. power ports with current rating $\leqslant$ 100 A not applicable to input ports intended for connection to dedicated non-rechargeable power supplies

Environmental phenomenon	Test set-up	Unit	Test value		Performance criterion	
			All circuits[a]	Safety circuit[b]	All circuits[a]	Safety circuit[b]
Fast transients common mode	IEC 61000-4-4	kV (peak)	0,5	4,0	B	D
		T_r/T_h (ns)	5/50	5/50		
		Rep. frequency (kHz)	5[d]	2,5		
Surge	IEC 61000-4-5	T_r/T_h (µs)	1,2/50	1,2/50	B	D
line to ground		kV (peak)	± 0,5	± 2,5		
line to line		kV (peak)	± 0,5 [d]	± 1,0		
Radio frequency common mode	IEC 61000-4-6	MHz	0,15 to 80	0,15 to 80	A	D
		V (rms, unmodulated)	3	10		
		% AM (1 kHz)	80[c]	80 [c]		

NOTE T_r is the rise time of the pulse, T_h is the time duration of the pulse; shape of the pulse is defined in the relevant test set-up standard.

[a] Test values for ports containing general function and/or safety circuits.

[b] Test values for ports containing safety circuits.

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

[d] Applicable only to input ports crossing the system boundary.

Table 5 — Immunity — Input and output D.C. power ports with current rating > 100 A not applicable to input ports intended for connection to dedicated non-rechargeable power supplies

Environmental phenomenon	Test set-up	Unit	Test value		Performance criterion	
			All circuits[a]	Safety circuit[b]	All circuits[a]	Safety circuit[b]
Fast transients common mode	IEC 61000-4-4	kV (peak) T_r/T_h (ns) Rep. frequency (kHz)	1,0 5/50 5 [d]	Not relevant	B	Not relevant
Surge line to ground line to line	IEC 61000-4-5	T_r/T_h (µs) kV (peak) kV (peak)	1,2/50 ± 1,0 ± 0,5[d]	Not relevant	B	Not relevant
Radio frequency common mode	IEC 61000-4-6	MHz V (rms, unmodulated) % AM (1 kHz)	0,15 to 80 3 80[c]	Not relevant	A	Not relevant

NOTE T_r is the rise time of the pulse, T_h is the time duration of the pulse; shape of the pulse is defined in the relevant test set-up standard.

a Test values for ports containing general function and/or safety circuits.

b Test values for ports containing safety circuits.

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

d Applicable only to input ports crossing the system boundary.

Table 6 — Immunity — Input and output A.C. power ports rated at ⩽ 100 A per phase not applicable to input ports intended for connection to dedicated non-rechargeable power supplies

Environmental phenomenon	Test set-up	Unit	Test value		Performance criterion	
			All circuits[a]	Safety circuit[b]	All circuits[a]	Safety circuit[b]
Fast transients common mode	IEC 61000-4-4	kV (peak) T_r/T_h (ns) Rep. frequency (kHz)	1,0 5/50 5	4.0 5/50 2,5	B	D
Voltage dips[g, h]	IEC 61000-4-11	% reduction period	30 0,5	30 and 60 [e] 0,5 to 5 in 0,5 period steps | 10 to 50 in 5 period steps	A	D
Voltage interruptions[g, h]	IEC 61000-4-11[c]	% reduction period	Not relevant	>95[e] 250	Not relevant	D
Surge line to ground line to line	IEC 61000-4-5	T_r/T_h (µs) kV (peak) kV (peak)	1,2/50 ± 2,0 ± 1,0[f]	1,2/50 ± 2,0 ± 1,0	B	D
Radio frequency common mode	IEC 61000-4-6	MHz V (rms, unmodulated) % AM (1 kHz)	0,15 to 80 3 80[d]	0,15 to 80 10 80 [d]	A	D

NOTE T_r is the rise time of the pulse, T_h is the time duration of the pulse; shape of the pulse is defined in the relevant test setup standard.

a Test values for ports containing general function and/or safety circuits.

b Test values for ports containing safety circuits.

c See also IEC 61800-3:1996, 5.2.2.

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

e The safety circuit shall go into a safe state if the voltage falls below the designed functional limits.

f Only applicable to input ports.

g Limited to a maximum of 25 A for testing.

h Applicable to single-phase systems only; three-phase tests are under consideration.

Table 7 — Immunity — Input and output A.C. power ports rated at > 100 A per phase

Environmental phenomenon	Test set-up	Unit	Test value		Performance criterion	
			General function circuit[a]	Safety circuit[b]	General function circuit[a]	Safety circuit[b]
Fast transients common mode	IEC 61000-4-4	kV (peak) T_r/T_h (ns) Rep. frequency (kHz)	± 2,0 5/50 5	Not relevant	B	Not relevant
Surge[c] line to ground line to line	IEC 61000-4-5	T_r/T_h (µs) kV (peak) kV (peak)	1,2/50 ± 2,0 ± 1,0	Not relevant	B	Not relevant
Radio frequency common mode	IEC 61000-4-6	MHz V (rms, unmodulated) % AM (1 kHz)	0,15 – 80 3 80[d]	Not relevant	A	Not relevant

NOTE T_r is the rise time of the pulse, T_h is the time duration of the pulse; shape of the pulse is defined in the relevant test setup standard.

[a] Test values for ports containing general function circuits only.

[b] Test values for ports containing safety circuits.

[c] Only applicable to input AC ports.

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

Bibliography

[1] ISO 14798, *Lifts (elevators), escalators and moving walks — Risk assessment and reduction methodology*

[2] IEC 61800-3:1996, *Adjustable speed electrical power drive systems — Part 3: EMC product standard including specific test methods*

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