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**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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## 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.

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## 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.

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# 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 <sup>[1]</sup>, 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*  
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## 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

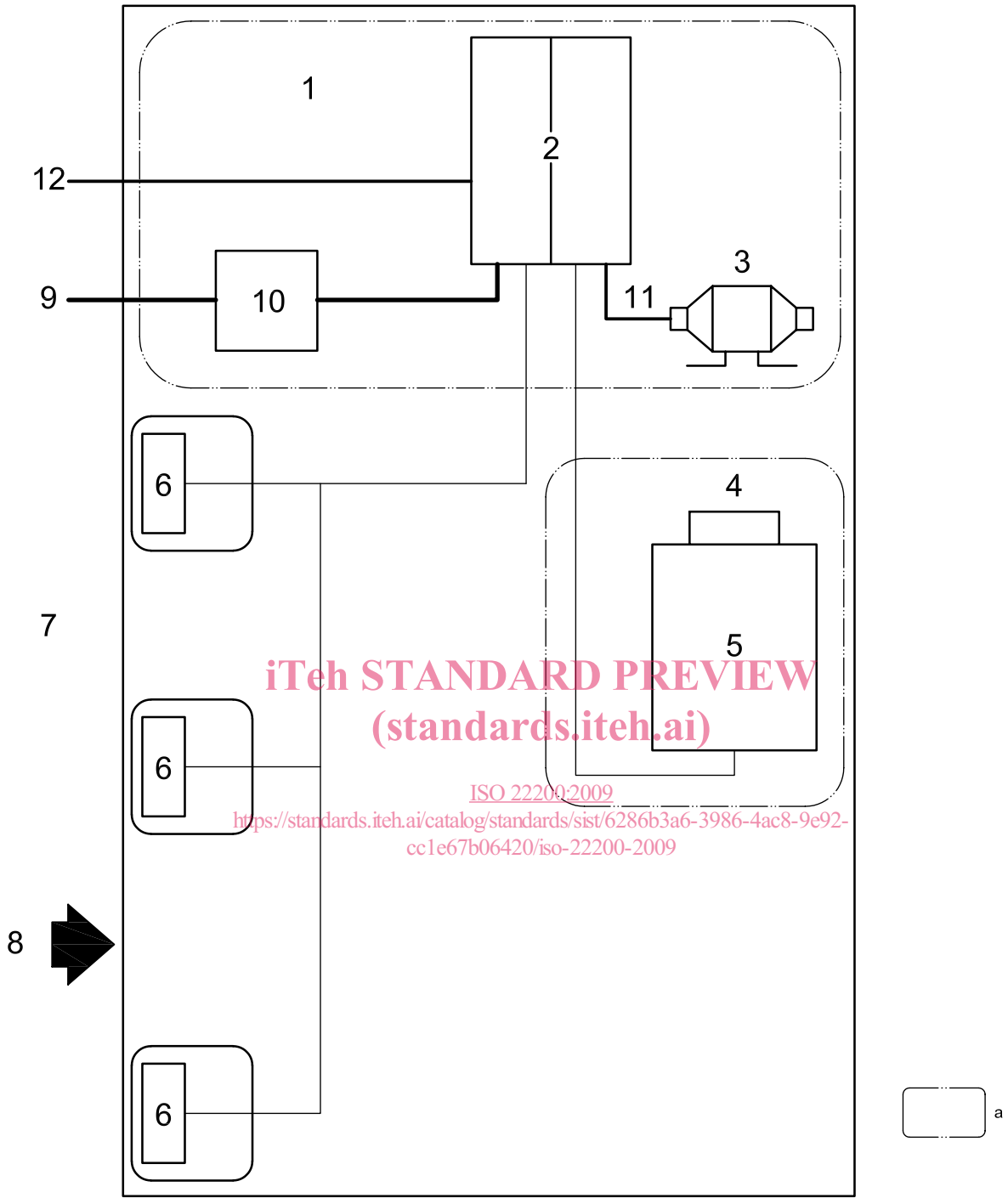
**3.7****general function circuit**

circuitry used in apparatus which does not incorporate safety circuits

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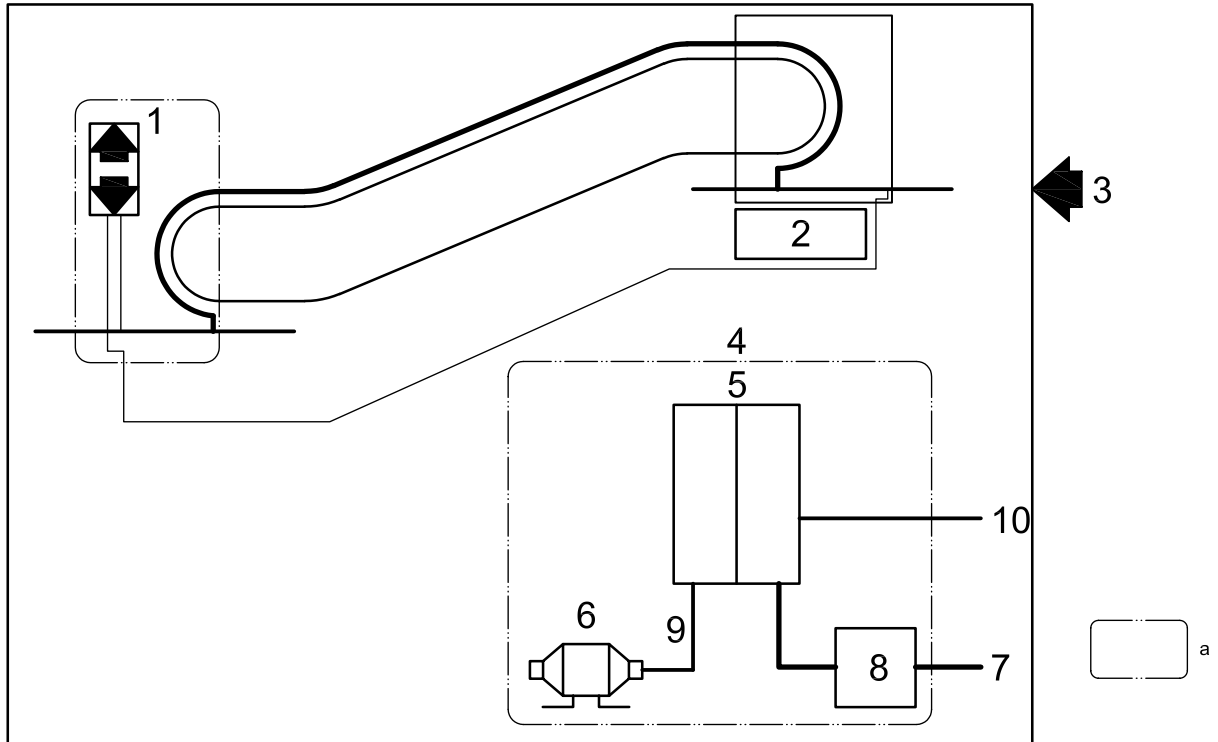
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**Key**

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

**Figure 1 — EMC example (immunity) for lift systems**

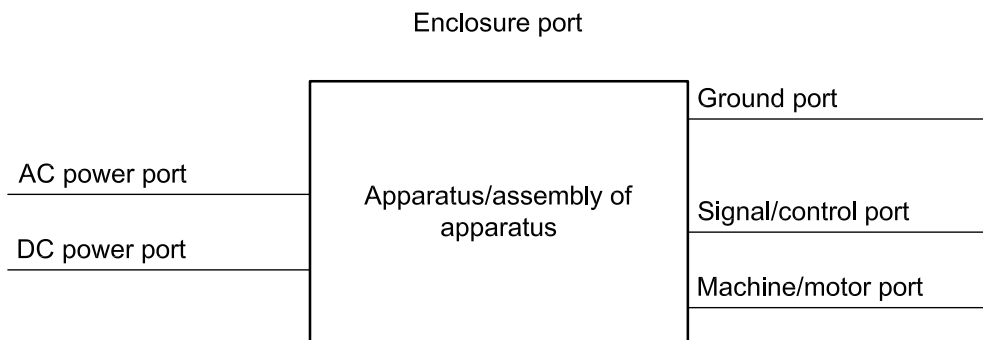


**Key**

- 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
- <sup>a</sup> 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**