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Replacing GB/T 25315-2010

Home Control Systems - Guidelines Relating to Safety

(IEC Guide 110: 2014, MOD)

家庭控制系统 安全导则

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Foreword

This Standard is drafted in accordance with stipulations in GB/T 1.1-2009.

This Standard is drafted as a replacement of GB/T 25315-2010 Home Control Systems - Guidelines Relating to Safety. In comparison with GB/T 25315-2010, apart from editorial modifications, this Standard has the following main technological changes as follows:

- Application examples are newly added and adjusted (refer to Chapter 4 in Version 2010);
- The title of 5.1 is modified to “General Rules”; “electrical safety” is adjusted to “equipment safety”; consideration of cyber security is newly added (refer to 5.1 in Version 2010);
- Dangerous situations of reserving application are modified (refer to 5.2 in Version 2010);
- Restart after failure (refer to 5.3.2), full life cycle safety (refer to 5.3.3), reasonable foreseeable misuse (refer to 5.3.4), contact current accumulation (refer to 5.3.5) and communication (refer to 5.3.6) are newly added;
- Relevant product fields that might be involved are modified (refer to Chapter 6 in Version 2010).

This Standard is redrafted in accordance with IEC Guide 110: 2014 Home Control Systems - Guidelines Relating to Safety.

The technological differences between this Standard and IEC Guide 110: 2014, and the causes for these differences are listed below:

- In terms of scope, this Standard makes adjustment that brings technological differences to comply with the specific stipulation of scope in GB/T 1.1-2009;
- In terms of normative references, this Standard makes adjustment that brings technological differences to comply with the technological conditions of China. The adjustment is concentratedly reflected in Chapter 2 “Normative References”. Please see the specific adjustment below:
 - GB 4943.1-2011, which is modified in accordance with international standards, is adopted as a replacement of IEC 60950-1:2005 (refer to 5.3.5);
 - ISO/IEC Guide 51, which is not mentioned in the Standard, is deleted;
 - Reference IEC 62368-1 is adjusted to normative reference (refer to 5.3.5);

Home Control Systems - Guidelines Relating to Safety

1 Scope

This Standard provides safety-related information of home control systems for signal transmission through low-voltage or extra-low voltage building wiring (through wired or wireless mode) for household purposes or places with similar purposes. This Standard stipulates safety requirements that shall be considered in equipment that constitutes home control systems, including relevant functional safety and regular safety requirements.

This Standard is applicable to home control systems that are adopted in the interconnection of information technology equipment. Home control systems are merely limited to single residences or commercial places with a similar level of complexity.

Home control systems, which are involved in this Standard, provide communication and operation of household equipment (such as control, cooling, heating, illumination, audio/video, communication and safety of equipment); household gateway between internal home control system and external wide area network (for example, the Internet).

Please refer to IEC Guide 107 for stipulations regarding electromagnetic compatibility. This aspect of content is not included in this Standard.

2 Normative References

The following documents are indispensable to the application of this Standard. In terms of references with a specified date, only versions with a specified date are applicable to this Standard. The latest version (including all the modifications) of references without a specified date is also applicable to this Standard.

GB 4943.1-2011 Information Technology Equipment - Safety - Part 1: General Requirements (IEC 60950-1: 2005, MOD)

IEC 62368-1 Audio/Video, Information and Communication Technology Equipment - Part 1: Safety Equipment

EN 50491-3 General Requirements for Home and Building Electronic Systems (HBES) and Building Automation and Control Systems (BACS) - Part 3: Electrical Safety Requirements

- Fire alarm;
- Window-shades control;
- Garage door remote control switch;
- Different forms of safety control (audio/video).

When several application equipment can be interconnected through home control network (wired or wireless), a system that is thus generated shall be deemed as a home control system.

Home control system can be established on different transmission medium (such as power line, twisted pair, infrared or radio), and interconnected with other external network (such as telephone network and wired TV network).

Generally speaking, a home control system will be assembled to cover certain fundamental application, such as illumination, heating and ventilation control. It can include equipment from different manufacturers. Under most circumstances, equipment shall comply with different product standards.

Furthermore, this system will probably be expanded to include more application functions in the future. Under most circumstances, these expansions will not be completed by previous system installers.

In a regular electrical installation system, each function needs to be equipped with its own cable; each control system is an independent network. On the contrary, a home control system can adopt a shared line to complete the induction, conversion, control, monitoring and signal transmission of all the functions and programs. Equipment can be directly connected to power or receive power supply through the network.

Home control system includes inter-equipment signal transmission network that is connected to home network. Equipment is connected through interfaces. Interfaces can be integrated in equipment. All the equipment that is connected with the home control system can be managed through a center manager. Communication among equipment can also be implemented directly without the center manager.

The size of family control system varies. It can be constituted of several types of equipment, or several hundred types of equipment.

In home control system, home network can adopt several topological structures listed in Figure 1 below, or a combination of these topologies.



might trigger dangers, limitation of contact current from telecommunication network and overheating protection of telecommunication network, etc.

Furthermore, several other questions shall also be considered. Standards that provide specific stipulations of these questions include, but are not limited to:

- Please refer to GB/T 20438 series standard for functional safety questions;
- When equipment or system is connected with network, please refer to EN 50491-3 for certain specific safety requirements;
- Please refer to EN 50491-4-1 for specific stipulations of simultaneously considering functional safety questions and some electrical safety questions;
- Please refer to GB/T 14536.1-2008 for requirements of system components in home control system; these components are adopted to guarantee functional safety of home control system, and cyber security of communication through open network, for example, mobile network or the Internet.

5.2 Functional Safety

It is suggested that functional safety shall be considered from the following aspects: design, development and application environment of home control system; identification of risks and dangerous events; implementation of risk reduction measures and safety integrity.

It is important that any part in home control system does not rely on unconfirmed safety determination information. As to new system and modified (configuration expansion and variation) system, this is also applicable.

The confirmation of safety determination information is probably:

- Clarified (for example: the process of verification);
- Implicit (for example: the application of information pattern that cannot be forged or imitated).

The network or any other part of home control system shall not influence equipment safety and shall comply with all the safety requirements of equipment standard. Likewise, the connection between equipment and network shall not influence the safety of home control system.

If the safe operation of an equipment depends on its system, but the correctness of its functions cannot be verified, the equipment shall maintain an appropriate safety level.

Reserved application shall be analyzed to determine all the dangerous situations that might happen during the operation.

It is equally important that in different product standards, safety shall be handled in a compatible mode, for example, safe extra-low voltage/ protective extra-low voltage, creepage distance and electric clearance.

In two different buildings in different potential areas, safety questions regarding the application of home control system need to be studied.

The connection of application equipment might influence the electromagnetic compatibility of equipment itself and the control system; the requirements of electromagnetic compatibility might need to be adjusted in product standard of application equipment.

5.3.2 Restart after failure

In case of a failure, equipment shall be able to restart safely after power supply is resumed. The failure might be caused by the equipment itself or external reasons, for example, power failure. Unwatched equipment operation shall also be taken into consideration in home network.

5.3.3 Full life cycle safety

Equipment shall be designed in accordance with expected service life. In the end of a life cycle, equipment safety might become invalid. In addition, the situation of unwatched equipment shall also be taken into consideration in home network.

5.3.4 Reasonable foreseeable misuse

Any reasonably foreseeable misuse shall be considered in equipment application in home network system. During this period, equipment safety shall be maintained.

5.3.5 Contact current accumulation

Equipment that provide home network connection to other equipment shall not trigger dangers because of the accumulation of contact current. Please refer to GB 4943.1-2011, IEC 62368-1 Appendix W and EN 50491-3 for specific stipulations.

5.3.6 Telecommunication

Equipment safety shall be maintained in home network system; telecommunication that is independent from home network shall also be maintained. Any interference or error commands through the network shall not trigger any unsafe situations. Home network shall be prevented from cyber threats.

6 Conclusion and Suggestion

In terms of the integration of home control system, information technology equipment and telecommunication technology, please refer to principles and unified terms in IEC

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