

ICS 13.110
CCS J 09



**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 38225-2019

Safety of machinery - Technical requirements for safety relays

机械安全 安全继电器技术条件

Issued on: October 18, 2019

Implemented on: May 1, 2020

**Issued by: State Administration for Market Regulation;
Standardization Administration of the PRC**

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Foreword

This standard was drafted in accordance with the rules given in GB/T 1.1-2009. This standard is proposed and managed by the National Machinery Safety Standardization Technical Committee (SAC/TC208). This standard was drafted. Nanjing Estun Automation Co., Ltd., Shanghai Chenzhu Instrument Co., Ltd., Anhui Nankaiyuan Machinery Co., Ltd. Company, Suzhou Angao Intelligent Security Technology Co., Ltd., Xiamen Xiaoxun New Energy Technology Co., Ltd., China Machine Productivity Promotion Center, Nanjing Forestry National/Joint Engineering Research Center for University/Electromechanical Products Packaging Biomass Materials, Fujian Xuanxuan Technology Co., Ltd., Jining Keli Photoelectric Industry Co., Ltd., Xi'an Zhiheng Electrical Technology Co., Ltd., Guangdong Yingde Digital Technology Co., Ltd., Xiamen Kunjin Electronic Technology Co., Ltd. Co., Ltd., Suzhou Product Quality Supervision and Inspection Institute, Jiangsu Ruxin Intelligent

Technology Co., Ltd., Xi'an Kaiyijin Electronic Technology Co., Ltd., South Anshi Zhongji Standardization Research Institute Co., Ltd., Xiamen Keli Electronics Co., Ltd., Beijing Xingtu Exploration Technology Co., Ltd., Suzhou Lihongbiao Zhunhua Consulting Services Co., Ltd., Zhejiang Tianzheng Electric Co., Ltd., Suzhou Quality and Standardization Institute, Zhejiang Fengmao Information Technology Co., Ltd. Company, Xi'an Expedition Automation Control Co., Ltd., Xiamen Meike Security Technology Co., Ltd. The main drafters of this standard. Xu Zhenghua, Min Min, Yu Jie, Zhou Ting, Xie Xueming, Li Ling, Liu Zhiyong, Hu Zhengbing, Fu Huiqing, Cheng Hongbing, Ju Ronghua, Li Qin, Li Haiming, Qi Haifu, Chen Zhuoxian, Liu Rongxing, Qi Jun, Chen Xiaoquan, Shen Junjie, Xu Lei, Song Xiaoning, Li Zhong, Li Liyan, Ping Ge, Shen Dehong, Huang Shufu, Ji Kun, Nan Zheng, Hou Hongying, Wu Yuansheng, Zhang Shuo, Chen Naian, Zhang Zhijin, Zhang Xiaofei.

The structure of safety standards in the mechanical field is as follows:

- Class A standard (basic safety standard), giving basic concepts, design principles and general characteristics applicable to all machines;
- Class B standard (General Safety Standard), which relates to a type of safety device that is a safety feature or a wide range of use in machinery. - Class B1, safety features (such as safety distance, surface temperature, noise) standards; - Class B2, standard for safety devices (such as two-hand control devices, interlock devices, pressure sensitive devices, and protective devices).
- Class C (machine safety standard), a standard that specifies detailed safety requirements for a particular machine or group of machines. According to GB/T 15706, this standard belongs to the Class B standard. This standard is particularly relevant to the following stakeholders related to mechanical safety.
- Machine manufacturer;
- Health and safety agencies. Other stakeholders affected by the level of mechanical safety are.
- Machine users;
- The owner of the machine;
- Service provider;
- Consumer (for machinery intended to be used by consumers). All of the above stakeholders are likely to participate in the drafting of this standard. In addition, this standard is intended to be used by standardization bodies for the drafting of Class C standards. The requirements specified in this standard may be supplemented or modified by the C standard. For machines that are designed and manufactured in accordance with Class C standards within the scope of Class C standards, the requirements of Class C standards are preferred. Safety relays are mainly used in safety control circuits to connect

safety sensor components (such as emergency stop switches, safety door interlocks, and electrical sensing). Protection device, etc.) and actuator (such as servo drive, contactor, valve); safety relay after safety sensor component is triggered normally. These signals are processed according to the set logic and the logic results are passed to the execution unit, thus making the machine relatively safe. State, protect people and machines safely. Appendix A and Appendix B give examples of applications for PL=d and PL=e, respectively. Mechanical safety and safety relay technical conditions

1 Scope

China's national technical requirements for safety relays. It specifies the terms and definitions and the requirements, beginning with the safety function and the response. A safety relay is the component that turns a safety input - an emergency stop button, a light curtain, a guard interlock - into a reliable disconnection of power. What distinguishes it from an ordinary relay is that it is built to fail in a known direction. Its contacts are mechanically linked, so that if a normally open contact welds shut the normally closed monitoring contact cannot close, and the fault is detected rather than hidden; the circuits are duplicated and cross-monitored; and it will not reset until both channels agree. That is the whole point: an ordinary relay whose contacts weld continues to look energised, and a machine whose emergency stop is wired through one has a stop button that does nothing and gives no sign of it.

This standard specifies the technical requirements of safety relays, analysis and confirmation of safety functions and safety performance. This standard applies to safety relays that implement hardware functions in combination with hardware logic.

2 Normative references

The following documents are indispensable for the application of this document. For dated references, only dated versions apply to this article. Pieces. For undated references, the latest edition (including all amendments) applies to this document.

GB/T 2423.5 Environmental testing - Part 2. Test methods Test Ea and guide. Impact

GB/T 2423.10 Environmental testing of electric and electronic products - Part 2. Test method test Fc. Vibration (sinusoidal)

GB/T 2423.22 Environmental testing - Part 2. Test methods Test N. Temperature change

GB/T 4208-2017 enclosure protection grade (IP code)

GB 5226.1-2008 Mechanical electrical safety machinery and electrical equipment - Part 1. General technical conditions

GB/T 14048.5-2017 Low-voltage switchgear and controlgear - Part 5-1. Control circuit electrical and switching components electromechanical Control circuit appliance

GB/T 15706-2012 Mechanical Safety Design General Risk Assessment and Risk Reduction

GB/T 16855.1 Safety related components of machinery safety control systems - Part 1

GB/T 16855.2-2015 Safety related components for machinery safety control systems - Part 2

GB/T 16895.10-2010 Low-voltage electrical installations - Part 4-44. Protection against voltage disturbances and electromagnetic disturbances

GB/T 17626.2-2018 Electromagnetic compatibility test and measurement technology Electrostatic discharge immunity test

GB/T 17626.3-2016 Electromagnetic compatibility test and measurement technology RF electromagnetic field radiation immunity test

GB/T 17626.4-2018 Electromagnetic compatibility test and measurement technology Electrical fast transient burst immunity test