

ICS 25.040.30
CCS J28



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

GB/T 43210.1-2023

**Robotics - Modularity for service robots - Part 1: General
requirements**

机器人 服务机器人模块化 第1部分：通用要求

Issued on: September 7, 2023

Implemented on: September 7, 2023

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

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Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part

1. Structure and Drafting Rules of Standardization Documents" Drafting. This document is Part 1 of GB/T 43210 "Robot Service Robot Modularization". GB/T 43210 has released the following part.

1. General requirements. This document is equivalent to ISO 22166-1:2021 "Robot Service Robot Modularization Part

1. General Requirements". Please note that some content in this document may be subject to patents. The publisher of this document assumes no responsibility for identifying patents.

This document is proposed by China Machinery Industry Federation. This document is under the jurisdiction of the National Robot Standardization Technical Committee (SAC/TC591). This document was drafted by: Beijing Machinery Industry Automation Research Institute Co., Ltd., Shenzhen Yuntian Lifei Technology Co., Ltd., Aobo (Beijing) Intelligent Technology Co., Ltd., Lihong Safety Equipment Engineering (Shanghai) Co., Ltd., Qingneng Dechuang Electric Technology (Beijing) Co., Ltd., Su State Collaborative Innovation Medical Robot Research Institute, Capital Normal University, Harbin Sizherui Intelligent Medical Equipment Co., Ltd., Suzhou University, Qingdao Hua University, Institute of Automation, Chinese Academy of Sciences, Suzhou Ouli Robot Co., Ltd., Shenyang Institute of Automation, Chinese Academy of Sciences, Shanghai Communications University, Chongqing Luban Robot Technology Research Institute Co., Ltd. The main drafters of this document. Yuan Jie, Wei Hongxing, Li Liyan, Wang Jian, Yang Shuping, Shao Zhenzhou, Su Yanyu, Zou Yibo, Pan Changyong, Sun Yuning, Wang Shuo, Ou Yongsheng, Zhu Zhikun, Wang Hongguang, Cao Qixin, Wang Heguo, Pan Xin'an, He Guotian.

This document has been developed in response to the rapidly growing service robot industry. At present, the service robot market covers many small and small In different fields, it is difficult for people to develop the special and widely applicable components required. The market size and application of service robots are expected to be significant As it grows, its functions gradually increase. In order to realize the widespread application and interoperability development of service robots, a universal manufacturing service machine is needed robot method. This document lists general requirements. On the one hand, the current manufacturer-dependent architecture used in service robot design brings difficulties to design and development; In the product upgrade of robots, the replacement and reuse of modules is almost impossible. On the other hand, the research community has also established a huge machine We have established a knowledge base for modular robot design and continue to develop new methods to achieve modularity, but none of these methods has been widely used and has had an important impact. ring. In this case, this document can help service robot manufacturers produce high-quality products at the cost required by the market, and And there is an urgent need for new methods to help the market develop to meet global challenges. This document is about service robot modularization and interoperability of service robot modules, focusing on safety, (information) security, connectivity (from hardware (from the perspective of hardware and software) and functions, which are important for changing the pattern of service robots and accelerating the formation of a new service robot market. Crucial. This document divides service robot modularity into basic modules and composite modules with hardware and/or software parts. Requirements and The formation of guidelines facilitates the implementation of module-based design methods to meet users' needs in specific service robots and service robot system applications. requirements, and easy to configure. These issues are divided into

a) security and (information) security,

b) interoperability guidance. In addition, implementing open modules This approach makes the module easily replaceable by other modules with the same interface specifications, but its functionality may need to be enhanced. The safety requirements specified by current safety standards (for example, ISO 13482, ISO 10218-1, ISO 10218-2, ISO /T S15066) are both Applicable to system level and individual module level. This document establishes safety guidelines at the module level to ensure the safety of robot systems. Full compliance with Class C standards. (Information) security issues are very important when adopting an open modular approach and are therefore also included in this document Medium [for example, it is aligned with IEC /TC44 and IEC /TC65 (Information) Security related work items]. GB/T 43210 "Modularization of Robotic Service Robots" aims to standardize the modular design of various types of service robots. It is planned to be composed of the following departments. Composed into parts.

1.General requirements. The purpose is to propose general requirements and guidelines for modular design of service robots.

---Part.201.Common Information Model. The purpose is to propose a general information model for modular service robots.

---Part 202: Software information model. The purpose is to propose a software information model for modular service robots.

---Part 203: Hardware information model and physical interface. The purpose is to propose a hardware information model and object model for modular service robots. management interface.

---Part 301: Operation module. The purpose is to standardize the design of operating modules for modular service robots.

---Part 302: Mobile module. The purpose is to standardize the design of mobile modules for modular service robots.

---Part 303: Perception module. The purpose is to standardize the design of perception modules for modular service robots.

1 Scope

GB/T 43210.1-2023 is Part 1 of the Chinese series on modularity for service robots. Service robots are built in small volumes for many different applications, and each maker currently integrates its own mobile base, arm, sensor head and interface from scratch; modularity is the attempt to make those parts composable, so that a module from one supplier can be substituted for another without redesigning the robot around it. That requires agreement on more than connectors: on what a module is, what it must declare about itself, and how it is discovered and configured. Part 1 sets the terminology of components, modules, module