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GB/T 44253-2024

Safety requirements for inspection robots

巡检机器人安全要求

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Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for standardization work Part

1. Structure and drafting rules for standardization documents" Drafting. Please note that some of the contents of this document may involve patents, and the issuing organization of this document does not assume the responsibility for identifying patents. This document was proposed by the China Machinery Industry Federation. This document is under the jurisdiction of the National Technical Committee on Robotics Standardization (SAC/TC591). This document was drafted by: Hangzhou Shenhao Technology Co., Ltd., Zhejiang University, State Grid Corporation of China, State Grid Zhejiang Electric Power Co., Ltd. Company, Hangzhou Metro Operation Co., Ltd., State Grid Jiangsu Electric Power Co., Ltd., Zhejiang University Zhoushan Marine Research Center, China Yangtze Power Co., Ltd. Co., Ltd., Shanghai Xuji Electric Co., Ltd., State Grid Electric Power Research Institute Co., Ltd., China Electric Power Research Institute Co., Ltd. Han Branch, Shanghai Shentong Metro Group Co., Ltd., Xi'an Rail Transit Group Co., Ltd., Shaanxi Yanchang Petroleum (Group) Co., Ltd. Company, Zhejiang Provincial Standardization Research Institute, Guoneng Dadu River Basin Hydropower Development Co., Ltd., Chongqing Kairui Robotics Technology Co., Ltd., Shanghai Electric Science Research Institute (Group) Co., Ltd., Beijing Machinery Industry Automation Research Institute Co., Ltd., China Energy Research Institute (Beijing) Electric Power Research Institute, State Grid Intelligent Technology Co., Ltd., State Grid Jiangxi Electric Power Co., Ltd., State Grid Information and Communication Industry Group Co., Ltd. Beijing Branch, Hangzhou HikRobot Co., Ltd., China University of Metrology, Hangzhou Yunshenchu Technology Co., Ltd., Hangzhou Yushu Technology Co., Ltd., Quanhang Technology Co., Ltd., Shenyang Institute of Automation, Chinese Academy of Sciences, Zhejiang Robotics Industry Association, Anjielun (Fuzhou) Power Technology Co., Ltd. Co., Ltd., CRRC Qingdao Sifang Locomotive and Rolling Stock Co., Ltd., China Coal Technology and Engineering Xi'an Research Institute Group Co., Ltd., China Railway

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1 Scope

GB/T 44253-2024 sets the safety requirements for inspection robots, the wheeled, tracked, rail-mounted and legged machines that patrol substations, tunnels, pipe galleries, data centres and industrial plant. They are an unusual safety case because they work unattended in places where people are occasionally present, they carry sensors and sometimes manipulators, they operate near live electrical equipment, and they must not themselves become the hazard they were sent to look for. The standard sets the general safety requirements and then the specific ones: the mechanical safety and the limits on speed, force and stability, the detection of people and obstacles and the behaviour on encountering them, the safety-related control system and its performance, the emergency stop and the manual intervention, the safe behaviour on loss of communication or of localisation, the battery and charging safety, the electrical safety and the clearances to live parts, the environmental protection and the fire behaviour, and the information for use, together with the verification of each. It takes effect on 1 February 2025.

This document specifies the risk assessment, safety requirements, verification and validation, and usage information of the inspection robot. This document applies to the design, production, inspection, use and maintenance of inspection robots. This document is applicable to inspection robots in specific scenarios of industrial equipment operation and maintenance, such as power grid, rail transportation, petrochemical and marine industries. The inspection robots used in other scenarios can be implemented by reference. This document does not apply to.

---Space robots;

---Nuclear industry robots;

---Medical robots;

---Military robots.

2 Normative references

The contents of the following documents constitute the essential clauses of this document through normative references in this document. For referenced documents without a date, only the version corresponding to that date applies to this document; for referenced documents without a date, the latest version (including all amendments) applies to This document.

GB/T 4208-2017 Enclosure protection degree (IP code)

GB/T 5226.1-2019 Electrical safety of machinery Electrical equipment of machinery Part

3 Radio frequency electromagnetic field radiation immunity test

GB/T 17626.5-2019 Electromagnetic compatibility test and measurement technology surge (impact) immunity test

GB/T 17626.8-2006 Electromagnetic compatibility test and measurement technology Power frequency magnetic field immunity test

GB/T 17626.9-2011 Electromagnetic compatibility test and measurement technology Pulse magnetic field immunity test

GB/T 17626.10-2017 Electromagnetic compatibility test and measurement technology Damped oscillation magnetic field immunity test

GB/T 17799.4-2022 General standard for electromagnetic compatibility Part

4 Emissions in industrial environments

GB/T 20272-2019 Information technology security operating system security technical requirements

GB/T 20273-2019 Information security technology - Technical requirements for database management systems

GB/T 20721-2022 General technical requirements for automated guided vehicles

GB/T 23821-2022 Mechanical safety Safety distance to prevent upper and lower limbs from touching dangerous areas

GB/T 33509-2017 General specification for mechanical seals

GB/T 36896.1-2018 Lightweight cable-controlled underwater robots Part