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**Lifting appliances - Intelligent systems - Part 1: Vocabulary and
classification**

起重机械 智能化系统 第1部分：术语和分级

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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. This document is part 1 of GB/T 45163 Intelligent systems for lifting machinery. GB/T 45163 has been published in the following parts.

1. Terminology and classification. Please note that some of the contents of this document may involve patents. 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 for Standardization of Lifting Machinery (SAC/TC227). This document was drafted by: Beijing Hoisting and Conveying Machinery Design and Research Institute Co., Ltd., Nanjing Institute of Technology, Beijing Kezhengping Engineering Technology Inspection Co., Ltd. Co., Ltd., Dalian Kerun Intelligent Technology Co., Ltd., Shanghai Zhenhua Heavy Industries (Group) Co., Ltd., Xuzhou Heavy Machinery Co., Ltd. Ltd., Zoomlion Heavy Industry Science & Technology Co., Ltd., Dalian Huarui Heavy Industry Group Co., Ltd., Taiyuan Heavy Industry Co., Ltd., Henan Mining Crane Co., Ltd., Shanghai Baosight Software Co., Ltd., Henan Weihua Heavy Machinery Co., Ltd., China Shipbuilding Industry Corporation No.

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In recent years, my country's lifting machinery has gradually developed rapidly towards the direction of intelligence, but at present, due to the lack of standards for intelligent lifting machinery at home and abroad, It is still in a blank stage, causing the relevant stakeholders such as crane manufacturers, users, inspection agencies and regulatory authorities to have a long-term understanding of the intelligentization of cranes. Therefore, in order to improve the safety, reliability and stability of the intelligent system of lifting machinery, In order to provide a standard technical basis for the production, inspection and use of intelligent systems of lifting machinery, it is necessary to speed up the development of GB/T 45163 "Lifting Machinery Intelligent System". "Intelligent System of Heavy Machinery". GB/T 45163 aims to define or standardize the terms, classification, technical requirements and test methods of intelligent systems of lifting machinery. The formulation of standards will promote the transformation and upgrading of lifting machinery towards intelligence while ensuring safety, and support the high-quality development of the lifting machinery industry. Exhibition is of great significance. This formulation, combined with the establishment and improvement of the intelligent standard system for lifting machinery and the actual production and use needs, intends to divide GB/T 45163 into The following 6 parts.

1. Terminology and classification. The purpose is to define the terminology of lifting machinery intelligent systems and the To be graded.
2. Positioning technical specifications. The purpose is to standardize the technical requirements for the positioning function of each mechanism of the intelligent system of lifting machinery.
3. Anti-sway technical specifications. The purpose is to standardize the technical requirements for anti-sway of slings or loads in intelligent systems of lifting machinery.
4. Technical specification for obstacle avoidance. The purpose is to standardize the technical requirements for the intelligent system of lifting machinery to avoid obstacles or people.
5. Identification technical specifications. The purpose is to standardize the identification of the operating environment of the intelligent system of lifting machinery, the identification of the hoisted objects, Category. Technical requirements for posture recognition of lifting machinery.
6. Communication technology specification. The purpose is to standardize the communication mode, communication interface and communication protocol of the intelligent system of lifting machinery And other technical requirements. Intelligent system of lifting machinery Part

1 Scope

GB/T 45163.1-2024 is the first part of the Chinese standard on intelligent systems for lifting appliances, and it does the two things that have to come first: it fixes the vocabulary and it defines the levels. Cranes are being sold as intelligent, semi-automatic or automatic with no agreement about what those words mean, and a buyer cannot compare two offers or write an acceptance clause without that agreement. The document defines the terms for the intelligent functions, perception, positioning, anti-sway control, path planning, collision avoidance, remote operation, condition monitoring and predictive maintenance, and then sets out a classification into levels of intelligence, from operator-assisted through partly automated to fully automated operation, with the criteria that place a machine at each level. The later parts of the series build the technical requirements on this base. For a crane maker, a port or works buying lifting equipment, or a certification body in China, this is the reference the claims are measured against.

This document defines the terms and definitions of intelligent systems for lifting machinery, and stipulates the classification principles and requirements for the classification of intelligent systems for lifting machinery. elements and corresponding functional requirements and technical requirements. This document is applicable to the intelligent systems of lifting machinery defined in GB/T 20776, and other intelligent systems of lifting machinery shall be implemented for reference.

2 Normative references

This document has no normative references.

3 Terms and definitions

The following terms and definitions apply to this document.

3.1 Crane machinery integrates computer network, big data, Internet of Things, artificial intelligence and other technologies, and integrates people, machines and environment in a coordinated manner. The attributes that meet the needs of lifting operations through perception, decision-making, execution and other comprehensive capabilities.

3.2 A system consisting of hardware and software that enables intelligent operation of lifting machinery.

Note. This system is a part of the lifting machinery that completes the lifting work.

3.3 The ability of the lifting machinery intelligent system to perform lifting tasks is interrupted or lost.

3.4 Failure of other systems outside the lifting machinery intelligent system results in interruption or loss of the intelligent system's ability to perform lifting tasks.

3.5 liftingtask All work performed by lifting machinery and/or personnel from receiving the lifting order to completing the entire operation.

Note. The lifting task is generally completed by the driver and/or the intelligent system of the lifting machinery or by the on-duty personnel and the intelligent system of the lifting machinery.

3.6 The lifting machinery operates in the three-dimensional space of X, Y, and Z. X includes the left and right relative directions, and Y includes the left and right relative directions. A includes the two relative directions of front and back, and Z includes the two relative directions of up and down.

Note. For lifting machinery with a central slewing mechanism, the movement direction of the slewing mechanism is defined as the R axis, with clockwise and counterclockwise being the two relative directions.

3.7 Design operating range designoperatingrange The external conditions applicable to the functional operation of the lifting machinery are determined during the design of the intelligent system.