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

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Industrial trucks - Safety monitoring systems

工业车辆 安全监控管理系统

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1 Scope

China's national standard for safety monitoring systems on industrial trucks. It specifies the terms and definitions, the composition of the monitoring system and the requirements. A forklift is among the most dangerous machines in ordinary workplaces: it is heavy, it has poor visibility past its load, it operates among pedestrians, and it becomes unstable in ways the driver may not anticipate. A monitoring system addresses those directly by instrumenting the truck - detecting whether the operator is seated and belted, monitoring the load weight and the mast position against the stability envelope, watching for pedestrians in the path, limiting speed on turns, and recording impacts. The recording function is the one that changes behaviour most: a truck that logs every impact and identifies the driver alters how it is driven, because the damage that used to be attributed to nobody is now attributable.

This standard specifies the composition, content, requirements, inspection methods and inspection items of the safety monitoring system for industrial truck (hereinafter referred to as the "monitoring system"). This standard applies to counterbalanced forklifts, reach forklifts, side forklifts, leg forklifts, pallet stackers, three-way stacker forklifts. Other types of industrial trucks may use it as a reference.

2 Normative references

The following documents are essential to the application of this document. For the dated

documents, only the versions with the dates indicated are applicable to this document; for the undated documents, only the latest version (including all the amendments) are applicable to this standard.

GB/T 6104.1 Industrial trucks - Terminology and classification - Part 1: Types of industrial trucks

GB/T 10827.1 Industrial trucks - Safety requirements and verification -Part 1: Self-propelled industrial trucks (except for unmanned vehicles, telescopic forklifts and trucks)

3 Terms and definitions

The terms and definitions as defined in GB/T 6104.1 and GB/T 10827.1 as well as the following terms and definitions apply to this document.

3.1 Safety monitoring system A system that monitors the working process of industrial trucks and can record and manage operating parameters and status.

3.2 Information source The maximum relative error between the measured value and the set value of the monitoring system.

3.11 Remote monitoring center A device whose remote server receives the information transmitted by the remote information transfer unit, monitors and manages the information.

3.12 Working time During the power-on of industrial trucks, the specific time corresponding to each working state, which is the clock time (year / month / day / hour / minute / second) when recording a working state.

3.13 Blind area When the industrial truck operator is located in the normal operating position, the area which cannot be directly observed by his sight because it is blocked by the truck or cargo.

Note: The blind area can be divided into front blind area and rear blind area.

4 Composition of the monitoring system

4.1 The monitoring system shall consist of hardware and software. Its functional units shall include information collection unit, information processing unit, control output unit, information storage unit, information display unit, information output interface unit, etc.

Note: This monitoring system is an integral part of the electrical control system of industrial trucks and is not an independent product.

4.2 The structure mode of the monitoring system shall be as shown in Figure 1.

6.3 Comprehensive error Under actual operating conditions of industrial trucks, the comprehensive system error shall not be greater than 10%.

6.4 Communication protocol requirements

6.4.1 The communication protocol of the system shall comply with the current national standards.

6.4.2 The communication protocol related to safety monitoring parameters and status shall be open to the outside world.

6.5 Recording and control functions

6.5.1 The monitoring system shall be configured with information collection units according to Table 1.

6.5.2 The monitoring system shall have recording and traceability functions.

6.5.3 The monitoring system shall have a self-check function when it is turned on.

6.5.4 When the monitoring system fails and such failure affects normal use, it shall immediately send out an alarm signal.

6.5.5 The monitoring system of industrial trucks shall have warning and reminding functions during operation.

6.5.6 When the monitoring system detects that the operator leaves the operating position and the industrial truck is in a non-parking brake state, the monitoring system shall issue an alarm.

6.5.7 When an industrial truck is equipped with a corresponding monitoring device, the industrial truck shall have the following control functions and issue warning messages:

- a) When the monitoring system detects that the actual lifting capacity of the industrial truck exceeds the rated lifting capacity, the system shall alarm;
- b) For electric industrial trucks, the monitoring system shall limit the operating speed of industrial trucks based on the detected lifting height;
- c) For electric industrial trucks, when the monitoring system detects the turning of the industrial truck, it shall be able to achieve automatic speed reduction;
- d) When the monitoring system detects that the operator leaves the

6.8 Display requirements

6.8.1 The monitoring system shall ensure that the displayed information is clearly identifiable under the use environmental conditions of the truck.

6.8.2 The monitoring system shall have a real-time display function of the operating status of industrial trucks; it can display the operating status and operating parameters of industrial trucks in the form of graphics, images, charts or text.

6.8.3 The text displayed by the monitoring system shall be in simplified Chinese.

6.9 Management authority requirements

6.9.1 The management personnel of the monitoring system shall be authorized.

6.9.2 The operators of industrial trucks shall have corresponding qualifications and be authorized.

7 Testing method

7.1 Lifting weight When the industrial truck is stationary, lift the test load. Select 60%, 70%, 100% of the rated lifting capacity as the test load. During the test, check the lifting capacity value recorded and displayed by the monitoring system in real time; verify whether the comprehensive error meets the requirements.

7.2 Lifting height The industrial truck carries out the lifting operation under no load. Select 20%, 50%, 80% of the maximum lifting height as the test lifting height. During the test, check the lifting height value recorded and displayed by the monitoring system in real time; verify whether the comprehensive error meets the requirements.

7.3 Tilt angle of mast Tilt the mast to any position. Respectively select two different angle positions for forward and backward tilting operations. During the test, check the mast tilt angle as recorded and displayed in real time of the monitoring system; verify whether the comprehensive error meets the requirements.

7.4 Running speed Make the vehicle drive at a steady speed. Respectively select two different running speeds to run forward and backward. During the test, check the running speed values recorded and displayed by the monitoring system in real time; information collection and incorrect information collection in turn. Check whether the industrial truck will send out a reminder that the collection is completed; whether the correct information collection and incorrect information collection reminders are inconsistent.

7.12 Video device Observe the front and rear blind area status of industrial trucks from the normal operating position of the operator. Check whether the monitoring system records the blind area's video information in real time.

7.13 Lifting overload alarm The industrial truck lifts

1.1 times the load of the rated lifting capacity. Check whether the industrial truck issues an alarm.

7.14 Operation speed control during lifting In the rated load state, the electric industrial truck is lifted to the lifting height corresponding to the design speed limit; observe whether the maximum operating speed of the industrial truck is restricted.