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

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**Reliability of industrial automation devices and systems - Part
2: System reliability**

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3.1 Terms and Definitions

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 of Standardization Documents" drafted.

This document is part 2 of GB /Z 42023 "Industrial Automation Equipment and System Reliability". GB /Z 42023 has issued the following part.

--- Part 2. System reliability.

This document is equivalent to IEC TR63164-2.2020 "Industrial Automation Equipment and System Reliability Part 2. System Reliability".

The document type is adjusted from IEC technical report to my country's national standardization guiding technical document.

Please note that some content of this document may be patented. The issuing agency of this document assumes no responsibility for identifying patents.

Introduction

In the context of intelligent manufacturing, new production models such as mass customization based on interconnected factories require real-time interconnection, frequent switching and cross-layer

secondary integration. Therefore, reliability is an important requirement of factory automation systems. Reliability data for automated systems is the basis for maintenance planning, e.g.

Such as inventory of spare parts for production lines. An automation system usually

consists of several different devices or machines in series, parallel or mixed.

GB /Z 42023 "Industrial Automation Equipment and System Reliability" provides guidance for system integrators to evaluate the reliability of the entire system. It is planned to consist of two parts

constitute.

--- Part 1. Guarantee of automation equipment reliability data and its source specification. The purpose is to standardize the reliability of automation equipment

data.

--- Part 2. System reliability. The purpose is to standardize the calculation method of system reliability.

This document focuses on calculating the failure rate or reliability index of a system based on the failure rate or reliability index of a single device of the system structure.

This helps system integrators or designers calculate the reliability of the entire system based on the reliability indicators of individual devices.

Industrial Automation Equipment and System Reliability

Part 2. System reliability

1 Scope

Based on reliability data for individual equipment and/or subsystems and the representation of the data, this document provides information that can be simplified as series, parallel

Guidelines for calculating reliability data for automated systems that are linked or hybrid.

Note. This process is only for the reliability of automated systems, not systems embedded with automated systems, such as process factories.

Reliability is included in reliability, and this document focuses on random hardware failures that affect reliability. Credibility is a time-dependent

Generic term for quality characteristics, including, in addition to reliability, availability, recoverability, repairability, repair support performance, and in some cases

other characteristics, such as durability, functional safety and cybersecurity, but these are outside the scope of this document.

2 Normative references

There are no normative references in this document.

3.1 Terms and Definitions

The following terms and definitions apply to this document.

3.1.1

automationsystem

In the process industry for monitoring and controlling production equipment, DCS or PLC-based systems, including controllers using fieldbus technology control system.

Note. When referring to "system" in this document, it means "automation system", DCS is distributed control system, PLC is programmable control system.

[Source. GB/T 25928-2010, 2.1, with revisions and notes added]

3.1.2

B10 threshold B10threshold

10% of the time a component fails.

Note 1. The applicable time interval depends on the nature and use of the asset, which can be operating time, operating hours, number of cycles, etc.

Note 2. In this document, the average failure rate is obtained by dividing 10% by the B10 threshold (in hours). Ignoring the effect of early failure, it is usually considered that the failure rate

Significant increase only after B10.

Note 3. Once the B10 threshold is reached, the failure rate of pneumatic and electromechanical components is considered unacceptable.

3.1.3

dependability

The ability to perform as required when required.

Note 1. Credibility includes availability (192-01-23), reliability (192-01-24), recovery (192-01-25), maintainability (192-01-27) and maintenance support

(192-01-29), and in some cases, other features such as durability (192-01-21), functional safety, and cybersecurity.

Note 2 to entry. Dependability is a collective term used for product and time-related quality characteristics.

[Source. GB/T 2900.99-2016, 192-01-22, with modifications, safety and security are

modified to functional safety and network security]

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