

ICS 25.040

CCS N 10



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

GB/T 36006-2018

**Control and communication network -- Safety-over-Ether CAT
specification**

Issued on: March 15, 2018

Implemented on: October 1, 2018

**Issued by: State Administration for Market Regulation, China National
Standardization Administration**

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3.1 Terms and definitions

Foreword

This standard was drafted in accordance with the rules given in GB/T 1.1-2009.

This standard uses the translation method equivalent to IEC 61784-3-12.2010 "Industrial Communication Network Profiles Part 3-12. Functional Safety

Additional Specifications for Fieldbus CPF12.

The documents of our country that have a consistent correspondence with the international documents referenced in this standard are as follows.

--- GB 5226.1-2008 Mechanical electrical safety machinery and electrical equipment - Part 1. General technical conditions (IEC 602041.

2005, IDT)

--- GB/T 15969.2-2008 Programmable controllers - Part 2. Equipment requirements and testing (IEC 61131-2.2007,

IDT)

--- GB/T 16657.2-2008 Industrial Communication Network Fieldbus Specification Part 2. Physical Layer Specification and Service Definition

(IEC 61158-2.2007, IDT)

---GB/T 17799.2-2003 Electromagnetic compatibility general standard immunity test in industrial environment (IEC 61000-6-2.

1999, IDT)

---GB/T 20438 (all parts) Functional safety of electrical/electronic/programmable electronic safety related systems [IEC 61508

There are some)]

This standard has made the following editorial changes.

- Change the standard name to "Control and Communication Network Safety-over-EtherCAT Specification";
- Modified some formatting formats according to Chinese habits;
- Replace "IEC 61508" with "IEC 61508 series standard", delete the description of the trademark, and the unpublished standard

The quasi-current has been released, so delete the footnote content in the original text.

This standard was proposed by the China Machinery Industry Federation.

This standard is under the jurisdiction of the National Industrial Process Measurement Control and Automation Standardization Technical Committee (SAC/TC124).

This standard was drafted. Institute of Mechanical Industry Instrumentation and Instrumentation, Institute of Automation, Chinese Academy of Sciences, Shenyang Institute of Automation, Tsinghua University

Xue, Southwest University, Beijing University of Aeronautics and Astronautics, Beijing Heli System Engineering Co., Ltd., Shanghai Automation Instrument Co., Ltd., Shenyang Machine Tool

(Group) Design and Research Institute Co., Ltd., Haitian Drive Co., Ltd., Omron Automation (China) Co., Ltd., EtherCAT Technology Association,

Germany Beckhoff Automation Co., Ltd.

Introduction

The IEC 61158 fieldbus standard and its companion standards IEC 61784-1 and IEC 61784-2 define a set of communication protocols.

Implement distributed control of automated applications. Fieldbus technology is now generally accepted and proven to be viable. Therefore, many fieldbus technologies

The technology continues to improve, covering areas that have not been standardized, such as real-time, functional safety-related and information security-related applications.

This standard is based on the IEC 61508 series of standards, describes the principles of functional safety communication, and is standardized based on IEC 61784-1, IEC

61784-2 and the IEC 61158 series of standards for communication profiles and protocol layers of several secure communication layers (profiles and corresponding protocols), but excluding electricity

Gas safety and intrinsic safety aspects.

Figure 1 shows the relationship between this standard and the relevant safety and fieldbus standards in the mechanical environment.

Note. 6.7.6.4 (high complexity) and 6.7.8.1.6 (low complexity) in GB 28526 specify the relationship between PL (category) and SIL.

Figure 1 Relationship between IEC 61784-3 and other standards (mechanical)

Figure 2 shows the relationship between this standard and the relevant safety and fieldbus standards in the process environment.

a For the specified electromagnetic environment, otherwise see IEC 61326-3-1.

Figure 2 Relationship between IEC 61784-3 and other standards (processes)

In a safety-related system built according to the IEC 61508 series of standards, the secure communication layer is implemented as part of this layer.

The transmission of messages (information) between fieldbus participants of two or more safety-related systems provides the necessary credibility; or on the fieldbus

Provides sufficient credibility for safe behavior in fault or failure events.

The secure communication layer specified in this standard enables fieldbus to be used for functional safety to achieve safety integrity level (SIL) applications.

The SIL level is specified by its corresponding functional safety communication profile.

The final SIL of a system is determined by the implementation of the selected functional safety communication profile in the system - functional safety

The implementation of the letter profile in standard equipment in accordance with this standard is not sufficient to certify that the device is a security device.

This standard describes.

--- Implement the basic principles of the IEC 61508 series of standards for safety-related data communication requirements, including possible transmission failures, remediation measures

Considerations that affect data integrity;

--- Separate descriptions of the functional safety profiles of multiple communication profiles in IEC 61784-1 and IEC 61784-2;

--- Security layer extension to the communication services and protocols part of the IEC 61158 series of standards.

Control and communication network

Safety-over-EtherCAT specification

1 Scope

This standard specifies the secure communication layer (services and protocols) of CPF12 and IEC 61158 type 12 based on IEC 61784-2, and

The principle of functional safety communication as defined in IEC 61784-3 is relevant to the secure communication layer in this standard.

Note 1. Does not include electrical safety and intrinsic safety aspects. Electrical safety is related to dangers such as electric shock. Intrinsic safety and related to potentially explosive environments

The danger is related.

This standard defines a mechanism for transmitting security-related messages between participants in a distributed network using fieldbus technology.

It meets the functional safety requirements of the IEC 61508 series of standards. These mechanisms can be used in a variety of industrial applications such as process control, manufacturing

Mobility and machinery.

This standard provides guidance to developers and evaluators of equipment and systems that comply with this standard.

Note 2. The final SIL of a system is determined by the implementation of the functional safety communication profile selected in the system---functional safety communication profile

Implementations in accordance with this standard in a quasi-device are not sufficient to certify that the device is a secure device.

2 Normative references

The following documents are indispensable for the application of this document. For dated references, only dated versions apply to this article.

Pieces. For undated references, the latest edition (including all amendments) applies to this document.

IEC 60204-1 Mechanical electrical safety machinery and electrical equipment - Part 1. General technical conditions (Safetyofmachinery-E-

Lectricalequipmentofmachines-Part 1.Generalrequirements)

IEC 61000-6-2 Electromagnetic compatibility general standard immunity test in industrial environment (Electromagneticcompatibility