

ICS 29.020
CCS J07



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

GB/T 18759.1-2025

Replacing GB/T 18759.1-2002

**Electrical equipment of machines - Open numerical control
system - Part 1: General rules**

机械电气设备 开放式数控系统 第1部分：总则

Issued on: October 5, 2025

Implemented on: May 1, 2026

**Issued by: State Administration for Market Regulation;
Standardization Administration of China**

Table of Contents

1	Scope
2	Normative references
3	Terms and Definitions
4	Hardware Platform; --Part
4.1	General Technical Requirements
4.2	Openness of the ONC System
4.3	Basic characteristics and functions of the first layer openness in the ONC system
5	Software Platform; --Part
5.1	Overview
5.3	ONC Application Software
5.4	System Configuration
6	Network Interfaces and Communication Protocols; --Part
7	General Technical Requirements; --Part

Foreword

This document conforms to GB/T 1.1-2020 "Standardization Work Guidelines Part

1. Structure and Drafting Rules of Standardization Documents". Drafting is scheduled. This document is Part 1 of GB/T 18759 "Open CNC Systems for Mechanical and Electrical Equipment". GB/T 18759 has been published. The following section. --Part

1 Scope

GB/T 18759.1-2025 is the Chinese national standard on electrical equipment of machines - open numerical control system - part 1: general rules, in the field of electrical engineering. The /T suffix marks it as a recommended standard: it is not compulsory by itself, but it becomes binding as soon as a contract, a tender or a customer specification calls it up - which in practice is how most foreign buyers meet it. It was issued on 5 October 2025 by the State Administration for Market Regulation; Standardization Administration of China, and has been in force since 1 May 2026. Classification: ICS 29.020, CCS J07. This page is published from the official record of the standard held by the Chinese standards administration: the identification, the dates, the classification and the issuing body are taken from there. The clause text, the tables and the numeric limits are in the document itself, which is delivered complete in English translation.

This document describes the functions and characteristics, basic architecture, and communication interfaces of the Open Numerical Control System (hereinafter referred to as. ONC system). It specifies the basic requirements for the modular topology and standardized communication interface of the ONC system. This document applies to electrical equipment used in metal processing machinery, textile machinery, printing machinery, sewing machinery, plastics and rubber machinery, woodworking machinery, etc. Design and development of a backup ONC system. Other open CNC systems used in industrial machinery should follow this guide.

2 Normative references

The contents of the following documents, through normative references within the text, constitute essential provisions of this document. Dated citations are listed below. For references to documents, only the version corresponding to that date applies to this document; for undated references, the latest version (including all amendments) applies. This document.

GB 4824 Limits and methods of measurement for radio frequency interference characteristics of industrial, scientific and medical devices

GB/T 5226.1 Electrical Safety of Machinery - Electrical Equipment of Machinery - Part

3 Terms and Definitions

The following terms and definitions apply to this document.

3.1 Open numerical control system; ONC The application software is built on a CNC system platform that adheres to the principles of openness, scalability, and compatibility, enabling the application software to possess... Portability, interoperability, and consistency of human-computer interface.

Note. An open CNC system consists of CNC devices, drive devices, etc., see GB/T 26220.

3.2 basic architecture The functional hierarchical logical structure derived from the functional reference model.

Note. This includes application software and system platforms.

3.3 system platform The basic components, consisting of a hardware platform and a software platform, are used to run CNC application software to control moving parts, and are integrated with the CNC system. Together with other components, it enables the operation and control of the machinery.

7 General Technical Requirements; --Part

8. Testing and Acceptance. This document supersedes GB/T 18759.1-2002 "Open CNC

Systems for Mechanical and Electrical Equipment - Part

1.General Principles", and is consistent with... Compared with GB/T 18759.1-2002, apart from structural adjustments and editorial changes, the main technical changes are as follows: --The scope of the document has been changed (see Chapter 1, Chapter 1 of the.2002 edition). --The terms and definitions of "human-machine control" and "scalability" have been removed (see

3.13 in the.2002 edition). --The description of "Openness of the CNC System" has been changed (see 4.2,.2002 version 4.2). --The description of "Functional Configuration of CNC System" has been changed (see 4.3.1,.2002 version 4.3.1). --Added requirements for CNC system interconnection and interoperability (see 4.3.2.4); --The description of the interaction interface between the CNC device and the drive device has been changed (see 4.3.3,.2002 version 4.3.3). --The description of the interaction interface between the CNC device and the logic control unit has been changed (see 4.3.4,.2002 version 4.3.4). --Added the description "CNC system is reconfigurable" (see 4.5.2). Please note that some content in this document may involve patents. The issuing organization of this document assumes no 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 Standardization of Electrical Systems for Industrial Machinery (SAC/TC 231). This document was drafted by: Beijing Machine Tool Research Institute Co., Ltd., Shenyang Institute of Computing Technology, Chinese Academy of Sciences Co., Ltd., and Xi'an Jiaotong University. Universities, Shandong University, Beijing University of Aeronautics and Astronautics, China General Technology Group Machine Tool Engineering Research Institute Co., Ltd., Guangzhou CNC Equipment Co., Ltd. Googol Technology Co., Ltd., Shenyang Zhongke CNC Technology Co., Ltd., Kede CNC Co., Ltd., Wuhan Huazhong CNC Co., Ltd. Limited Liability Company, Beijing Jingdiao Technology Group Co., Ltd., Beijing KND CNC Technology Co., Ltd., Jiangxi Research Institute of Beijing University of Aeronautics and Astronautics Research Institute, Central Research Institute of Shanghai Electric Group Co., Ltd., Nanjing Motion Control R&D Branch of Siemens (China) Co., Ltd., Zhejiang CIFI Intelligent Equipment Co., Ltd. The main drafters of this document are. Huang Zuguang, Xue Ruijuan, Yin Zhenyu, Wang Chuting, Yu Dong, Zhang Ying, Ji Shuai, Zhang Chengrui, Peng Chong, Huan Ji, and Zhang Guojie. Liu Heqiang, Shao Guoan, Wang Dawei, Chen Junheng, Zhu Yanjun, Yang Hongli, Yu Haoyu, Wang Yi, Chen Zhong, Yao Jian, Zhang Peisen, Wu Yiran, Gao Zhiguo Wu Zhai and Wu Zaoqiao. The release history of this document and the document it replaces is as follows: --First published in.2002 as GB/T 18759.1-2002; --This is the first revision.

With the rapid development of the CNC system industry, the standardization requirements for the research, development, testing and application of open CNC systems are becoming increasingly urgent. GB/T 18759 "Open CNC Systems for Mechanical and Electrical Equipment" aims to construct a scientific, systematic, and comprehensive standard for open CNC systems. The system provides detailed specifications for the architecture,

technical requirements, and testing methods of open CNC systems to ensure the quality of open CNC system products. To improve the quality, safety, and reliability of products and enhance the overall competitiveness of the industry. GB/T 18759 is proposed to consist of nine parts. --Part

1.General Principles. The purpose is to standardize the design framework of open CNC systems and establish modular integration of hardware and software, and communication protocols. The technical benchmarks for standardization and system reconfigurability are discussed. --Part

2.System Architecture. The purpose is to construct an architecture model for an open CNC system, clarifying the functional division and interaction of each layer. Mechanisms and component collaboration relationships provide guidance for system design and development. --Part

3.Bus Interface and Communication Protocol. The purpose is to standardize the internal bus interfaces and communication protocols between devices in open CNC systems. The communication protocol enables efficient and stable data interaction and collaborative work. --Part

4.Hardware Platform. The purpose is to provide a reference framework for the analysis, design, and implementation of open CNC system hardware platforms. The framework ensures that the hardware platform meets the open requirements of CNC systems for mechanical and electrical equipment. --Part

5.Software Platform. The purpose is to provide a reference framework for the analysis, design, and implementation of open CNC system software platforms. The frame meets the requirements for openness and interoperability of CNC systems for mechanical and electrical equipment. --Part

6.Network Interfaces and Communication Protocols. The purpose is to analyze the network interfaces and communication protocols of open CNC systems. The design and implementation provide a reference framework to meet the openness and interoperability requirements of CNC systems for mechanical and electrical equipment. --Part

7.General Technical Requirements. The purpose is to specify the requirements for open CNC systems in terms of functionality, performance, reliability, safety, and environmental performance. General technical requirements such as adaptability. --Part

8.Testing and Acceptance. The purpose is to specify the testing methods, test items, acceptance rules, and judgment criteria for open-loop CNC systems. Establish a basis for defining the technical benchmarks for system conformity verification. --Part

9.General Requirements for Performance Testing. The purpose is to specify the performance-related indicators, test conditions, and testing procedures for open-loop CNC systems. The general requirements of the process provide guidance for the performance