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

**GB/T 25931-2010**

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**Precision clock synchronization protocol for networked  
measurement and control systems**

网络测量和控制系统的精确时钟同步协议

**(English Translation)**

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## Foreword

This standard is identical with IEC 61588. "precision clock synchronization protocol network measurement and control systems," 2009 (in English). This standard 61588 and IEC .2009 no differences in the technical content, only the text in GB/T 1.1-2000 requirements of editorial changes.

Made editorial changes are.

--- Remove IEC 61588:2009 Foreword, according to GB/T 1.1-2000 rewrite the foreword of

this standard;

--- Remove IEC 61588:2009 Introduction, according to IEC 61588:2009 Introduction, Chapter 1, an overview of the content and other technical form Cost standard introduction;

--- Remove IEC 61588:2009 Overview Chapter 1, Chapter 1, rewriting the scope of this standard;

--- According to the requirements of standards on the part of the footnote to modify or delete;

--- The original text of "IEEEStd1588.2008" with the "standard" instead of the original text of the IEEE1588 with IEC 61588 instead;

--- The original text of the "standard version 1" and the "standard version 2" respectively "PTP version 1" and "PTP version 2" instead.

PTP version 1 corresponds to IEC 61588:2004, PTP version 2 corresponds to this standard;

--- According to GB/T 1.1 editorial changes.

The standard Appendix D, Appendix E, Appendix F, Appendix G, Appendix H, Appendix I, Appendix J are normative appendices, Appendix A, Appendix B, attached Record C, Appendix K, Appendix L, Appendix M informative appendices.

The standard proposed by China Machinery Industry Federation.

This standard by the national industrial process measurement and control Standardization Technical Committee.

This standard was drafted. Machinery Industrial Instrumentation Technology and Economy Institute.

## Introduction

This standard specifies the use of network communication, local computing and distributed object technology to achieve the measurement and control system, to realize the clock Precise synchronization precision time protocol (PrecisionTimeProtocol, PTP), and supports the Precision Time Protocol required node system and communication characteristics.

This standard describes the following sections.

--- Time synchronization model PTP protocol provides a basic model. Given PTP systems, packet type, device type, synchronization mechanisms and PTP protocol communications Overview of the main aspects. PTP model clarifies the type of equipment and related internal calibration process, the request - response delay mechanism and peer delay Packet switching and delay measurement mechanisms under the stamp generator, PTP

communications topologies.

--- PTP data types, data sets and packet format it defines the basic data types and derived data types PTP used in the system. Given dataset general specification, as well as ordinary time Clock, boundary clock and transparent clock data set specification. It specifies the general messages and event messages format.

--- PTP protocol requirements and correction Separately for ordinary clock and boundary clock, transparent clock and specifies the general protocol requirements. Given the realization of common clock and boundary Clock protocol state machine and the best master clock algorithm. And for clock synchronization clock skew, path delay, dwell time and right He said predetermined correction mechanism.

--- Management requirements Provides message management mechanism and management process, and for different implement the provisions of the general optional features, including. unicast packets consultations Tracking and alternative path when the other standard. In addition to the best master clock algorithm used in conjunction, the state also provides optional configuration to improve performance or to end Select the port state control to perform more.

--- Compatibility and consistency to ensure the realization of different versions of the PTP protocol device compatibility, packet formats, data types and naming it provides compatibility requirements.

Also it specifies conformance requirements to ensure the interoperability of different equipment.

--- PTP transmission and default on different communication networks PTP profiles PTP provides the UDP/IPV4, UDP/IPV6, IEEE802.3/Ethernet, DeviceNET, ControlNET and IEC 61158 10 on the transmission type. This standard specifies the use of default PTP norm.

GB/T 25931-2010/IEC 61588:2009 Network measurement and control system accurate Clock synchronization protocol

## 1 Scope

This standard specifies the use of network communication, local computing and distributed object technology to achieve the measurement and control system, to realize the clock Precision Time Protocol accurate synchronization, and support for the precision time protocol required nodes, systems and communications features.

This standard applies to the field of industrial automation, telecommunications, manufacturing, electricity and other military and measurement and control systems.

GB/T 25931-2010/IEC 61588:2009