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

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**Automation systems and integration - Digital twin framework
for manufacturing - Part 4: Information exchange**

自动化系统与集成 面向制造的数字孪生框架 第4部分：信息交换

(English Translation)

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Reference

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 for standardization documents" Drafting.

This document is part 4 of GB/T 45616 "Automation systems and integrated digital twin framework for manufacturing". GB/T 45616 the following parts have been published.

--- Part 4: Information exchange.

This document is equivalent to ISO 23247-4:2021 "Automation systems and integrated digital twin framework for manufacturing - Part 4: Information Information Exchange.

Introduction

ISO 23247 (all parts) defines a framework to support the creation of digital twins of observable manufacturing elements, including people, equipment, Materials, manufacturing processes, facilities, environment, products and supporting documentation.

Digital twins help detect anomalies in the manufacturing process to enable real-time control, predictive maintenance, in-process adjustments, big data the digital twin monitors its observable manufacturing requirements by continuously updating relevant operational and environmental data.

Gain visibility into processes and execution through digital twins to enhance manufacturing operations and business collaboration.

The types of manufacturing supported by an implementation of the ISO 23247 (all parts) framework depend on the standards and technologies available for producing observable manufacturing elements.

Different manufacturing areas may use different data standards. As a framework, this document does not specify specific data formats and communication protocol.

GB/T 45616 "Digital Twin Framework for Automation Systems and Integration for Manufacturing" is planned to consist of four parts.

--- Part 1: Overview and general principles. The purpose is to clarify the general principles and requirements for developing digital twins in manufacturing processes.

--- Part 2: Reference architecture. The purpose is to provide a reference system architecture with a functional view.

--- Part 3: Digital representation of manufacturing elements. The purpose is to standardize the basic information attributes of observable manufacturing elements.

--- Part 4: Information Exchange. The purpose is to specify the technical requirements for information exchange between entities in the reference architecture.

Figure 1 shows the relationship between this document and other parts of ISO 23247.

Figure 1 ISO 23247 series standard structure

Appendices A to E provide use cases that illustrate the digital twin system framework for the manufacturing industry.

The use cases are mainly distributed in the discrete manufacturing field, where the digital twin is modeled using ISO 10303 (all parts).

For example, in the oil and gas sector, digital twins can be modeled using ISO 15926 (all parts), while in building construction, digital twins can be modeled using ISO 15926 (all parts).

For the design industry, digital twins are modeled using the ISO 16739 series.

Automation systems and integration for digital manufacturing Twin Framework Part 4:
Information Exchange

1 Scope

This document specifies the technical requirements for information exchange between entities in the reference architecture.

This document applies to information exchange in the following networks.

- User network connecting user entities and digital twin entities;
- A service network connecting sub-entities within a digital twin entity;
- An access network that connects the device communication entity to the digital twin entity and the user entity;
- An adjacency network that connects device communication entities to observable manufacturing elements.

2 Normative references

The contents of the following documents constitute essential clauses of this document through normative references in this document.

For referenced documents without a date, only the version corresponding to that date applies to this document; for referenced documents without a date, the latest version (including all amendments) applies to this document.

ISO 23247-1 Automation systems and integration - Digital twin framework for manufacturing - Part 1: Overview and general principles (Auto-general principles)

3 Terms and definitions

For the purposes of this document, the terms and definitions defined in ISO 23247-1 and the following apply.

ISO and IEC maintain terminology databases for standardization at the following URLs.

A system or device that provides communication between devices.

Example. A cell controller sends instructions to equipment within a manufacturing cell and collects results from sensors on the equipment.

[Source. ISO 23247-2:2021, 3.4] 3.2 Digital Twin Entity A system or set of systems that provide implementation, management, synchronization, and simulation capabilities for digital twins.