

ICS 17.040.30; 17.040.40
CCS J 42



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

GB/T 16857.13-2025

**Geometrical product specifications (GPS) - Acceptance and
reverification tests for coordinate measuring systems (CMS) -
Part 13: Optical 3D CMS
(English Translation)**

Issued on: May 30, 2025

Implemented on: September 1, 2025

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

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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 GB/T 16857 "Product geometry specification (GPS) Coordinate

measurement system (CMS) acceptance test and re-test" Part 13 of GB/T 16857. The following parts have been published.

- Part 1: Vocabulary;
- Part 2: Coordinate measuring machines for measuring linear dimensions;
- Part 3: Coordinate measuring machines with a turntable axis as the fourth axis;
- Part 4: Coordinate measuring machines used in scanning mode;
- Part 5: Coordinate measuring machines using single-probe or multi-probe contact probing systems;
- Part 6: Evaluation of the error in calculating Gaussian fit elements;
- Part 7: Coordinate measuring machine with image detection system;
- Part 8: Coordinate measuring machines using optical distance sensors;
- Part 9: Coordinate measuring machines equipped with multiple probing systems;
- Part 901: Coordinate measuring machine with multi-image detection system;
- Part 10: Laser tracker;
- Part 12: Articulated arm coordinate measuring machine;
- Part 13: Optical three-dimensional coordinate measuring systems.

This document is modified to adopt ISO 10360-13:2021 "Product geometrical technical specification (GPS) Coordinate measurement system (CMS) acceptance inspection" Optical three-dimensional coordinate measuring systems.

The technical differences between this document and ISO 10360-13:2021 and their reasons are as follows.

- "Other types of coordinate measurement systems" are described in detail according to the introduction to the international standard (see Chapter 1), avoiding Create ambiguity;
- ISO 10360-1 was replaced by the normative reference GB/T 16857.1 to adapt to my country's technical conditions (see Chapter 3), and the addition of Operability;
- ISO 14253-1 was replaced by the normative reference GB/T 18779.1 to adapt to my country's technical conditions (see Chapter 3, 5.2.2 and Chapter 7) to increase operability.

The following editorial changes were made to this document.

- Replace all parts of ISO 25178 with all parts of GB/T 33523 with informative references to adapt to my country's technical conditions (See Chapter 1), increase operability;
- ISO 10360-2 was replaced by the informative GB/T 16857.2 to adapt to my country's technical conditions (see Appendix B.2.5).

Increase operability;

--- ISO 14253-5 was replaced by the informative reference GB/T 18779.5 to adapt to my country's technical conditions (see Appendix G), and the addition Operability;

--- ISO 1 was replaced with the informative GB/T 19765 to adapt to my country's technical conditions (see G.4.3), and operability was increased.

Sexuality;

--- Replaced ISO 14638 with the informative reference GB/T 20308 to adapt to my country's technical conditions (see H.1), and increased operability Sexuality;

--- ISO 8015 was replaced by the informative GB/T 4249 to adapt to my country's technical conditions (see H.1), and operability was increased.

Sex;

--- Deleted a reference symbol in Figure 1 "Pos-i (i = 1, 2,, 12) --- Position -i" (see 6.2.2.3.1);

--- Deleted a reference symbol in Figure 2 "Pos-i (i = 1, 2,, 6) --- position -i" (see 6.3.5.3);

--- Deleted the reference to ISO 10360-11.

Introduction

In view of the key issues such as the lack of acceptance inspection and re-inspection standards for coordinate measuring machines and the urgent need for corresponding inspection standards, this paper focuses on the research of acceptance inspection and re-inspection standards for coordinate measuring machines.

Verify the acceptance test and re-test methods, qualification judgment rules, acceptance test and re-test application of coordinate measuring machines, formulate product compliance National standard for acceptance testing and retesting of coordinate measurement systems (CMS) to geometric technical specifications (GPS).

GB/T 16857 "Acceptance test and re-inspection test of product geometry specification (GPS) coordinate measurement system (CMS)" is based on product the product geometry specification (GPS) system uses coordinate measurement technology, sensor technology and error theory, etc., through theoretical analysis, international standard research Recommended national standards for acceptance testing and re-testing of coordinate measuring machines developed based on research, measurement application and practical experience summary.

The formulation of GB/T 16857 can fill the gap in the acceptance inspection and re-inspection inspection standards of coordinate measuring machines in my country, and will help relevant coordinate measuring machines Manufacturers unify the testing methods

to improve the consistency and stability of the performance of the CMMs shipped out of the factory, and provide a basis for the acceptance and re-inspection of CMMs.

Provide strong technical support.

This document has two technical purposes.

a) According to the requirements of GB/T 16857.2, GB/T 16857.7, GB/T 16857.8 and GB/T 16857.10, the detection system and Mobile carrier combination test, in the entire measuring range of CMS, to detect the indication error when passing the calibration length;

b) According to GB/T 16857.5, GB/T 16857.7, GB/T 16857.8, GB/T 16857.9, GB/T 16857.10 and the detection system is tested according to the requirements of GB/T 16857.12 to detect the indication error within the local measurement range.

The measurement results are directly traceable to length units (meters) and provide information on the coordinate measuring machine (CMM) or coordinate measuring system (CMS).

Information in similar length measurements.

GB/T 16857 is planned to consist of 13 parts.

--- Part 1: Vocabulary. The purpose is to define the vocabulary of coordinate measuring machines and their acceptance and re-verification tests.

--- Part 2: Coordinate measuring machines for measuring linear dimensions. The purpose is to specify coordinate measuring machines for measuring linear dimensions.

Verification method for acceptance testing according to the characteristic indicators given by the manufacturer, and periodic re-testing of the measuring machine by the user
Verification method.

--- Part 3: Coordinate measuring machines with a rotary table axis as the fourth axis. The purpose is to specify the verification of a coordinate measuring machine specified by the manufacturer.

The acceptance test specifications for the performance of the four-axis coordinate measuring machine are determined, and the users can periodically re-verify the performance of the four-axis coordinate measuring machine.

Inspection and testing specifications.

--- Part 4: Coordinate measuring machines used in scanning mode. The purpose is to specify coordinate measuring machines used in scanning mode Acceptance testing and re-testing of performance.

--- Part 5: Coordinate measuring machines using single-probe or multi-probe contact probing systems.