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**Calibration Specification for Optical Shaft Measuring
Instrument
(English Translation)**

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4 Metrological characteristics(1)

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Oblique circular runout of the rotary spindle tip (1)

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The concentricity between the upper center axis and the rotary spindle (2)

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Parallelism between the movement of the vertical guide rail and the line connecting the two centers (2)

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Indication error of shaft diameter measurement (2)

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Indication error of shaft length measurement (2)

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Repeatability of shaft diameter measurement (2)

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5 Calibration conditions(2)

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Calibration items and calibration standards and other equipment (2)

6 Calibration Items and Calibration Methods(3)

6.1

Oblique circular runout of the rotary spindle tip (3)

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The concentricity between the upper center axis and the rotary spindle (3)

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Parallelism between the movement of the vertical guide rail and the line connecting the two centers (4)

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Appendix A Example of Uncertainty Evaluation of Indication Error in Shaft Diameter Measurement (7)

Appendix B Example of Uncertainty Evaluation of Indication Error in Shaft Length Measurement (10)

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Introduction

JJF 1071-2010 "Rules for Compilation of National Metrology Calibration Standards", JJF 1001-2011 "General Metrology Terminology and Definition", JJF 1059.1-2012 "Assessment and Expression of Measurement Uncertainty" together constitute the basis for the formulation of this specification Basic series of specifications:

This specification is published for the first time:

Calibration specification for optical shaft measuring instruments

1 Scope

This specification is applicable to the measurement of optical shafts with the upper limit of shaft diameter measurement up to 150mm and the measurement limit of shaft length up to 1000mm:

Calibration of gauges:

2 References

This specification references the following documents:

JJF 1094-2002 Evaluation of Measuring Instrument Characteristics for dated references, only the dated version applies to this specification; for undated references document, its latest version (including all amendments) applies to this specification:

3 Overview

Optical shaft measuring instrument is an instrument that uses CCD and grating measuring system to measure shaft diameter and shaft length: general package Including rotary spindle (C axis) and vertical axis (Z axis), mainly composed of mechanical body, lighting system, CCD measuring system, it consists of control system and data processing system:

Figure 1 Schematic diagram of the structure and measurement principle of the optical shaft measuring instrument

1-Rotary spindle (C axis); 2-Lower top; 3-Illumination light source; 4-Up top; 5-Vertical motion guide rail;

6-Column; 7-CCD measuring system; 8-Measuring carriage (including Z axis) 0; 9-Base the schematic diagram of the structure and measurement principle of common optical shaft measuring instruments is shown in Figure 1: When working, measure the workpiece clamped at Between the two tops, the CCD measurement system and the lighting source are driven by the measurement carriage and move to the measurement position along the Z axis:

The measurement image is collected by the CCD, and the data processing system processes the image collected by the CCD and the moving distance of the grating:

The shaft diameter and shaft length of the measured workpiece are obtained:

4 Metrological characteristics

4.1 Oblique circular runout of the rotary spindle tip refer to Table 1 for the oblique circular runout requirements of the rotary spindle tip: