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Replacing GB/T 22092-2008

Micrometer head and depth micrometer with electronic digital display

电子数显测微头和深度千分尺

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Standardization Administration of the PRC.

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Micrometer head and depth micrometer with electronic digital display

1 Scope

This Standard specifies the terms and definitions, type and basic parameters, requirements, inspection methods, test methods, marking and packaging of micrometer head and depth micrometer with electronic digital display.

This Standard is applicable to the micrometer head with electronic digital display with a resolution of 0.001 mm, a range of less than or equal to 50 mm, and the depth micrometer with electronic digital display with an upper limit of measurement range of 300 mm.

2 Normative references

The following documents are indispensable for the application of this document. For the dated references, only the editions with the dates indicated are applicable to this document. For the undated references, the latest edition (including all the amendments) are applicable to this document.

GB/T 1216-2018 External micrometer

GB/T 2423.3-2016 Environmental testing - Part 2: Testing method - Test Cab: Damp heat, steady state

GB/T 2423.22-2012 Environmental testing - Part 2: Tests methods - Test N: Change of temperature

GB/T 4208-2017 Degrees of protection provided by enclosure (IP code)

GB/T 1800.2-2009 Geometrical product specifications (GPS) - Limits and fits - Part 2: Tables of standard tolerance grades and limit deviations for holes and shafts

GB/T 17163-2008 Glossary of terms used in dimensional measuring instruments - General terms

GB/T 17164-2008 Glossary of terms used in dimensional measuring instruments - Product terms

4.2.4 The lower limit of the measurement range of depth micrometer with electronic digital display shall be an integral multiple of 0 mm or 25 mm.

5 Requirements

5.1 Appearance

5.1.1 The surface of micrometer head with electronic digital display and depth micrometer with electronic digital display shall not have defects such as cracks, scratches, bumps, rust, burrs, etc. which affect the appearance and service performance.

5.1.2 The plating and coating on the surface of micrometer head with electronic digital display and depth micrometer with electronic digital display shall not have falling off and other defects such as uneven color which affect the appearance.

5.1.3 The digital display of the electronic digital display device shall be transparent, clean, free of defects such as scratches, bubbles, etc. which affect the reading.

5.2 Material

5.2.1 The base plate of depth micrometer with electronic digital display shall be made of alloy tool steel, stainless steel, or other materials with similar properties.

5.2.2 The micrometric screw and measuring rod shall be made of alloy tool steel, stainless steel, or other materials with similar properties. The measuring surface shall be inlaid with cemented carbide or other wear-resistant materials.

5.3 Interaction

5.3.1 The micrometric screw and nut, within the full range, shall be fully meshed, and the fit shall be good. There shall be no jamming and obvious axial float.

5.3.2 The fit between the smooth cylindrical portion of micrometric screw and the shaft sleeve shall be good. There shall be no obvious radial swing.

5.4 Force measuring device

The micrometer head with electronic digital display and depth micrometer with electronic digital display shall be equipped with a force measuring device. The measuring force which acts on the measuring surface by the force measuring device shall be between 4 N~10 N. The change of the measuring force shall be no more than 2 N.

5.5 Locking device

5.8.3 The flatness tolerance of base plate measuring surface with a length of 50 mm of depth micrometer with electronic digital display shall not exceed 1.5 μm. The flatness tolerance of base plate measuring surface with a length of 100 mm shall not exceed 2.0 μm.

5.8.4 The perpendicularity error of the micrometric screw measuring surface of micrometer head with electronic digital display against its axis shall not be greater than 0.6 μm.

5.8.5 When the measuring surface of the measuring rod of depth micrometer with electronic digital display is flat, the parallelism tolerance between the measuring surface of measuring rod and the measuring surface of base plate shall not exceed the requirements of Table 1.

5.9 Scale mark

The scale mark on micrometer head with electronic digital display and depth micrometer with electronic digital display shall be in accordance with the provisions of 5.9 in GB/T 1216-2018.

5.10 Electronic digital display device

5.10.1 Function keys: The function keys of the electronic digital display device shall be flexible and reliable. The marked symbols or image-text shall be clear and accurate in meaning.

5.10.2 Digital display: The digital display of the electronic digital display device shall be clear, complete, and free of flash jump. The word height shall not be less than 4 mm.

5.10.3 Error of division: The error of division of the electronic digital display device shall not exceed 0.002 mm.

5.10.4 Numerical drift: The numerical drift of the electronic digital display device within 1 h shall not be greater than its resolution.

5.10.5 Communication interface: The electronic digital display device shall be equipped with communication interface. The communication interface of the electronic digital display device shall be a USB, RS-232, or wireless interface. The manufacturer shall be able to provide the communication cables, communication protocols, and communication software between the electronic digital display device and other equipment.

5.10.6 Degree of protection: The electronic digital display device shall be waterproof and dustproof. Its degree of protection shall not be lower than IP40 (SEE GB/T 4208-2017).

The flatness in the area of 0.4 mm from the edge of the measuring surface of micrometric screw and measuring rod and the area of 1 mm from the edge of the measuring surface of base plate is negligible.

6.1.2 Hardness: For measuring surfaces without cemented carbide or other wear-resistant materials inlaid, the hardness of the measuring surface can be inspected on the measuring surface or at the location 1 mm from the measuring surface.

For measuring surfaces with cemented carbide or other wear-resistant materials inlaid, the hardness may not be inspected.

6.1.3 Perpendicularity: The perpendicularity error of the measuring surface of the micrometric screw of micrometer head with electronic digital display can be inspected by an autocollimator.

6.1.4 Parallelism: The parallelism error between the flat measuring surface of measuring rod and the measuring surface of base plate of depth micrometer with electronic digital display is inspected when the indication error is inspected. When inspecting, USE gauge block with a size of approximately 1/2 of the measurement range. At four positions perpendicular to each other between the two measuring surfaces in the range of 1.5 mm (excluding the chamfer of measuring surface of the gauge block) from the edge of the measuring surface of measuring rod, gauge blocks are placed respectively for measurement. The difference between the maximum and minimum of the measured reading is its parallelism error.

6.2 “Zero” value error

When inspecting, firstly INSTALL 0 mm~25 mm measuring rod, and CALIBRATE the zero position of depth micrometer with electronic digital display; then REPLACE the measuring rod; and MEASURE the gauge block of the lower limit of size of the measuring rod. The difference between the displayed value of depth micrometer with electronic digital display and the actual size of the gauge block is the “zero” value error.

The depth micrometer with electronic digital display equipped with proofreading column is not inspected for “zero” value error.

6.3 Electronic digital display device

6.3.1 Error of division: The error of division is uniformly inspected at 25 points along the measurement direction within 1 circle. When inspecting, the difference between the displayed value of the electronic digital display device and the reading value of micro-drum for each point under inspection is read out. The error curve is made. The difference between the highest point and the

7.2 Temperature change test

The temperature change test of micrometer head with electronic digital display and depth micrometer with electronic digital display shall comply with the provisions of GB/T 2423.22-2012.

7.3 Damp heat test

The damp heat test of micrometer head with electronic digital display and depth micrometer with electronic digital display shall comply with the provisions of GB/T 2423.3-2016.

7.4 Electrostatic immunity test

The electrostatic immunity test of micrometer head with electronic digital display and depth micrometer with electronic digital display shall comply with the provisions of GB/T 17626.2-2006.

7.5 Electromagnetic immunity test

The electromagnetic immunity test of micrometer head with electronic digital display and depth micrometer with electronic digital display shall comply with the provisions of GB/T 17626.3-2016.

8 Marking and packaging

8.1 The micrometer head with electronic digital display and depth micrometer with electronic digital display shall be marked with:

a) Manufacturer’s name or trademark;

b) Measurement range;

c) Resolution;

d) Product serial number;

e) When the degree of protection is higher than IP40, it shall be marked with the sign for the degree of protection.

8.2 The nominal size of length shall be marked on the proofreading column.

8.3 The packaging box of micrometer head with electronic digital display and depth micrometer with electronic digital display shall be marked with:

a) Manufacturer’s name or trademark;

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