Rotary table and indexing head calibration

rotary-table-indexing

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Application template; not a claim of a completed customer project.

Scope

Full-circle indexing error and repeatability of NC tables, indexing heads and multi-tooth tables for acceptance, compensation and repair verification.

Equipment and configuration guidance

• Polygon mirror or high-grade circular encoder

• 0.1″ autocollimator

• Centring fixture and temperature log

Principle and calculation

Error = table reading − nominal polygon angle − zero offset. Closure checks consistency.

On-site checklist

• Polygon certificate valid

• Eccentricity checked

• Both directions acquired

• Closure within limit

Limitations

Polygon grade sets the floor; radial and axial runout are separate.

Detailed teaching example

Worked 12-face polygon index error with closure check

Scenario and task

Teaching example: the table is compared with a 12-face polygon every 30°; the sum of all deviations should close to zero and is used as a consistency check.

Preparation and measurement steps

01. Confirm polygon faces, eccentricity and start angle; define stations.

02. Mount the polygon coaxially and align the autocollimator over the full circle.

03. Index face by face and record table and autocollimator readings.

04. Compute indexing error and closure; run both directions to separate backlash.

Teaching example readings

• Index deviations in arc-seconds: +0.0, +0.4, -0.3, +0.2, -0.1, +0.5, -0.4, +0.1, -0.2, +0.3, -0.5, +0.0.

• Closure 0″, peak-to-peak 1″.

• Polygon grade and autocollimator resolution are logged separately; together they set the floor.

Calculation procedure

Index error = table reading − nominal polygon angle − start zero; the twelve terms close to 0″. A non-zero closure means a zero drift or a reading error.

Example result and interpretation

Peak-to-peak index error is 1″ with a near-sinusoidal pattern, typical of eccentric mounting.

Example verification checklist

• Polygon and table must be coaxial; eccentricity appears as the first harmonic.

• Read each position in both directions to separate backlash from true index error.

• Temperature changes expand polygon and table differently; log it during long runs.

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