Measuring Instruments
Rocking Type

Size inspection of small batches
Measuring - Rocking Type

There are a number of methods to inspect the true size over or between balls and pins of gears and splines. The most simple methods by use of pins or balls depend on the operator and his experience and require rocking the instrument to find the correct size. These rocking methods prevent the use of electronic readouts and are a cost-efficient solution for individual items and small batches. The instruments are not suitable for helical gears and splines with odd number of teeth.

A needle deflection to the left when measuring internal sizes, means a larger dimension.

Proof of a sufficiently small measurement uncertainty is given via a UPM certificate issued by Frenco.

To be ordered separately!

A needle deflection to the left when measuring external sizes, means a smaller dimension.

A sufficiently small measurement uncertainty of these instruments (VA) is only guaranteed, in most applications, if a profiled setting master is used for adjustments.
## Product Overview

### IVA

<table>
<thead>
<tr>
<th>Type</th>
<th>Pitch circle diameter</th>
<th>Picture</th>
</tr>
</thead>
<tbody>
<tr>
<td>IVA 0</td>
<td>4 - 15 mm</td>
<td><img src="image1.png" alt="IVA 0 Picture" /></td>
</tr>
<tr>
<td>IVA 1</td>
<td>15 - 28 mm</td>
<td><img src="image2.png" alt="IVA 1 Picture" /></td>
</tr>
<tr>
<td>IVA 2</td>
<td>28 - 130 mm</td>
<td><img src="image3.png" alt="IVA 2 Picture" /></td>
</tr>
<tr>
<td>IVA 3</td>
<td>50 - 330 mm</td>
<td><img src="image4.png" alt="IVA 3 Picture" /></td>
</tr>
<tr>
<td>IVA 4</td>
<td>greater than 190 mm</td>
<td><img src="image5.png" alt="IVA 4 Picture" /></td>
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</table>

### AVAL

<table>
<thead>
<tr>
<th>Type</th>
<th>Pitch circle diameter</th>
<th>Picture</th>
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<tbody>
<tr>
<td>AVAL 1</td>
<td>0 - 35 mm</td>
<td><img src="image6.png" alt="AVAL 1 Picture" /></td>
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<tr>
<td>AVAL 2</td>
<td>35 - 70 mm</td>
<td><img src="image7.png" alt="AVAL 2 Picture" /></td>
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<tr>
<td>AVAL 3</td>
<td>70 - 135 mm</td>
<td><img src="image8.png" alt="AVAL 3 Picture" /></td>
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<tr>
<td>AVAL 4</td>
<td>135 - 180 mm</td>
<td><img src="image9.png" alt="AVAL 4 Picture" /></td>
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</table>
Internal Tooth Profile Gauges – Rocking Type IVA

The internal tooth profile gauges IVA 0 to IVA 3 consist of the following components: measuring head with ball inserts, extensions (if necessary), handle and indicating gauge. The measuring head can only be used for a specific size and a specific measuring ball diameter, not universally. The indicator gauge has a special clock face for gear tolerance dimensions.

The use of a profiled setting master and an inspection certificate UPM is highly recommended.

**IVA 0**

For PCD 4 – 15 mm

Measuring head with needle and soldered measuring balls

**IVA 1**

For PCD 15 – 28 mm

Measuring head with needle and ball inserts
Internal Tooth Profile Gauges – Rocking Type IVA

IVA 2 and 3
IVA 2: For PCD 28 – 130 mm
IVA 3: For PCD 50 – 330 mm

IVA 4
The internal tooth profile gauges IVA 4 are measuring instruments with measuring force retraction. The set screw at the opposite end ensures that the instrument can be adjusted and universally used.

The ball inserts are standard components with M2.5.
External Tooth Profile Gauges – Rocking Type AVA

**AVAL**

- AVAL 1: For PCD 0 - 35 mm
- AVAL 2: For PCD 35 - 70 mm
- AVAL 3: For PCD 70 - 135 mm
- AVAL 4: For PCD 135 - 180 mm

Measuring ball inserts (exchangeable)

Measuring pin insert (not exchangeable)
AVA Design

The external tooth profile gauges AVA are very robust. A ball track between indicator gauge and measuring ball insert stabilizes the lateral forces when looking for the reversal point. At the same time, a lifting arm ensures a simple search for the tooth positions.

Two heat isolation plates prevent heat transfer from the operator’s hands. The measuring ball insert on the right can be quickly and safely adjusted and clamped. The relevant setting plug has a sectored gear profile and is made of aged and hardened steel. The actual size is shown by the marking.

It is recommended to also order an inspection certificate UPM. This will ensure a sufficiently small measurement uncertainty of the instrument with regards to the tolerance to be measured. The dial indicator is accurately adjusted for the measurement of gears and splines and has a measuring force of 1 N. The measuring range of the dial indicator is -0.060 (left) to +0.140 µm (right). The calibration is carried out with the setting plug.
Frenco Product Range

**High Precision Gears and Splines H**
- Gear and Spline Gauges
- Master Gears, Master Wheels
- Artefacts, Masters
- Punches, Dies & Electrodes
- Profiled Clamping Systems
- Gear and Spline Manufacture

**Rotation Measuring Systems R**
- Instruments with Measuring Circles
- Multiple Inspector
- Gear Flank Analysing
  - Linear Gear Flank Analyser Rack
  - Gear Flank Analyser
  - Double Flank Gear Roll Inspection

**Instruments for Size Inspection Series V**
- Measuring Pins and Ball Inserts
- Instruments, Rocking Type
- Instruments with Face Stop
- Instruments with Guiding Profiles
- Circumferential Backlash Instrument
- Customized Solutions

**Gear & Spline Inspection P**
- DAkkS-Calibration
- Monitoring of Inspection Equipment
- Workpiece Inspections
- Analysis of Deviations

**Know-How-Transfer K**
- Software
- Training, Seminars, Workshops
- Consulting and Calculations
- Literature and Documentations
- National and International Standards