ActiveEdge

Micron Accurate Cutting Edge Adjustments Using Wireless Technology

Zenith

Rigibore’s Total Automation Solution For Producing Micron Accurate Bores

Rigibore® The Most Accurately Adjustable Boring Tools in the World
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The ActiveEdge Tool

ActiveEdge Boring tools use wireless technology to remotely adjust up to seven cutting edges on a single tool with micron accuracy...

Tool Summary

The ActiveEdge tool is a custom designed boring bar with the capability to adjust its cutting edges with micron accuracy using wireless transmission.

This cartridge-based solution allows up to seven ActiveEdge cartridges to be mounted on a single tool. ActiveEdge cartridges are user replaceable.

ActiveEdge tools enable multiple critical diameters to be machined simultaneously, significantly reducing cycle time and increasing process efficiency.

ActiveEdge Component Diagram

- **Shank** - The tool can be produced with any taper, spindle connection or adapter as required.
- **Yoke** - Contains wireless hardware that enables the tool to be remotely adjusted inside the machine carousel.
- **Cartridge Slide** - The slide is the only part of the tool moving radially, ensuring no negative impact on tool balance.
- **Through Coolant** - Coolant is supplied through the ActiveEdge cartridge to the cutting edge of the insert.
- **Batteries** - The two 6V batteries power the wireless communication and actuation of the cartridge.
- **ActiveEdge Cartridge** - Contains the drive mechanism and micron-accurate position sensor.
<table>
<thead>
<tr>
<th>Cartridge Image</th>
<th>Part Number</th>
<th>Minimum Bore</th>
<th>&quot;F&quot; Dimension</th>
<th>Insert</th>
<th>Approach Angle</th>
<th>Notes</th>
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<td>17</td>
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<td>Through coolant from base of the cartridge pocket</td>
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<td>17</td>
<td>CC.060204</td>
<td>90</td>
<td>Through coolant from base of the cartridge pocket</td>
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<td>Thicker insert for large boring applications</td>
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<td>25</td>
<td>TC.110304</td>
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<td>Thicker insert for large boring applications</td>
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<td>Integral coarse adjust with replaceable insert holder</td>
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<td>25</td>
<td>TC.110204</td>
<td>90</td>
<td>Integral coarse adjust with replaceable insert holder</td>
</tr>
</tbody>
</table>
ActiveEdge Options Overview

Rigibore’s ActiveEdge tooling gives precision performance, adjusting multiple cutting edges with micron accuracy using wireless technology.

The ActiveEdge tool allows for a faster, simpler and more accurate boring operation.

*ActiveEdge tooling can be used in the following ways:*

**Option 1 - Remote Controlled (Manual) Adjustment**

Precise cutting edge changes are made using the ActiveEdge Remote Control handset. Entering the tool’s unique ID and required diameter change into the Remote Control initiates a compensation of the ActiveEdge cartridge.

This option allows remote adjustments to be made to the tool’s cutting edges without removal from the machine, reducing cycle time and maximising spindle efficiency without risking operator safety.

**Option 2 - Rigibore’s Zenith Solution**

The Zenith solution is Rigibore’s total automation solution for producing micron accurate bores.

Zenith integrates in-process measurement with ActiveEdge boring tools to enable a machine controller to automatically compensate for insert wear, temperature variation and material inconsistency without manual intervention and without stopping the manufacturing process.

This option provides a speedy and continuous Return On Investment (ROI), reducing machining downtime and eliminating scrap.

<table>
<thead>
<tr>
<th>Benefit</th>
<th>Option 1 - Remote Adjustment</th>
<th>Option 2 - Rigibore’s Zenith Solution</th>
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</thead>
<tbody>
<tr>
<td>Micron Accuracy In Adjustment</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Reduction In Skill Requirements</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Health and Safety Improvements</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Adjustments In The Machine Carousel</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Reduction In Scrap and Re-work</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Improve Process Control (Cpk)</td>
<td>✗</td>
<td>✔</td>
</tr>
<tr>
<td>Removed Operator Intervention</td>
<td>✗</td>
<td>✔</td>
</tr>
<tr>
<td>Automatic Cutting Edge Adjustments</td>
<td>✗</td>
<td>✔</td>
</tr>
<tr>
<td>Lights Out Manufacturing Capability</td>
<td>✗</td>
<td>✔</td>
</tr>
</tbody>
</table>
Remote Controlled Adjustment

Rigibore’s pioneering ActiveEdge boring tools use wireless technology to remotely adjust up to seven cutting edges on a single tool with micron accuracy.

Entering the unique tool ID and required adjustment into the ActiveEdge Remote Control initiates a cutting edge compensation and each ActiveEdge Cartridge is independently adjustable.

Precision tolerances are met without removal from the machining envelope, reducing cycle time and improving operator safety.

Remote Adjustment With ActiveEdge

1 - Enter adjustment value in microns into the Remote Control.

2 - Adjustment data transmitted to the tool’s cutting edge.

3 - ActiveEdge cartridge adjusts to the required diameter.

Key Benefits

Micron Accuracy
Calibrated position sensing of the cutting edge ensures perfect tool sizing.

Reduce Reliance On Skilled Operators
Precision adjustments can be made simply.

Health and Safety
Tool adjustments can be made without the operator entering the machine.

Minimise Cycle Time
Micron accurate adjustments are made without having to stop the manufacturing process.
Rigibore’s Zenith Solution

Unlock unparalleled savings by reducing labour costs, removing scrap and supporting 24 hour production through lights-out manufacturing...

What is Zenith?

Zenith is Rigibore’s total automation solution for producing micron-accurate bores.

Modern CNC machines, regardless of their sophistication, cannot automatically compensate a boring tool’s cutting edges. Rigibore’s ActiveEdge tooling in combination with in-process measurement has overcome this problem.

The Zenith system integrates ActiveEdge tools with in-process gauging to enable a machine controller to automatically compensate for insert wear, temperature change and material inconsistency.

Closed-Loop Manufacturing

1. Initial Bore — A hole is bored using the ActiveEdge tool.
2. Measurement — The bore is measured using in-process gauging and the measured diameter is placed in a variable in the CNC control.
3. Calculation — This measured diameter is assessed against user defined limits. If necessary a compensation value is calculated.
4. Compensation — If compensation is needed, an automatic compensation request is sent directly to the ActiveEdge tool, which adjusts to ensure the next machined bore achieves nominal size.
5. Process Monitoring — ActiveNet PC software captures a chronological record of all tool operations and provides easy data retrieval for analysis and optimisation.

Whether high-value or high-volume production is your objective, Rigibore’s Zenith solution creates and sustains an accurate and repeatable process to revolutionise your boring operations.
Rigibore’s Zenith Solution

Unlock unparalleled savings by reducing labour costs, removing scrap and supporting 24 hour production through lights-out manufacturing...

The Importance Of Accurate Bore Measurements

ActiveEdge tool sizing can only produce micron-accurate bores if micron accurate measurements are provided by in-process gauging.

In order to maximise benefit from the Zenith solution, it is essential that the measurement process is accurate and repeatable.

Rigibore’s partnership with metrology experts Metrology Software Products (MSP), a Renishaw associated company guarantees precision probing data for the production of perfect bores in an automated and traceable process.

Key Benefits - All the benefits from Remote Controlled Adjustment, plus :-

- **Lights-Out Manufacturing**
  The Zenith solution supports 24-hour production through lights-out manufacturing, accelerating output.

- **Automatic Cutting Edge Adjustment**
  Micron accurate adjustments are triggered automatically from measurement data.

- **Remove Operator Intervention**
  Removing operator intervention reduces cost whilst ensuring precision tolerances are met on boring operations.

- **Eliminating Scrap and Re-Work**
  This automated solution delivers supreme consistency and repeatability.
Zenith’s precision performance and repeatability provides tangible and continued savings, reducing machine downtime and eliminating scrap...

Eliminate Scrap

Zenith can provide a speedy and continuous Return On Investment (ROI), far outweighing the cost of the initial outlay, especially on high value components.

This automated solution ensures micron-accurate manufacturing, removing the risk of scrap and maximising production.

Adjustment In The Carousel

This automated solution adjusts the tool anywhere in the machine envelope, minimising the time which the tool spends idle and maximising spindle utilisation.

<table>
<thead>
<tr>
<th>Manual Adjustment</th>
<th>Automatic Adjustment (Zenith)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stopped for several minutes while operators make</td>
<td>Adjustment in a matter of seconds, minimal spindle downtime.</td>
</tr>
<tr>
<td>adjustments.</td>
<td></td>
</tr>
<tr>
<td>If operators are occupied with other tasks, the</td>
<td>No operator intervention, staff are available for other shopfloor activities.</td>
</tr>
<tr>
<td>manufacturing operation halts altogether.</td>
<td></td>
</tr>
<tr>
<td>Relies on skilled operators to make accurate</td>
<td>Reliable, micron-accuracy in adjustment.</td>
</tr>
<tr>
<td>adjustments.</td>
<td></td>
</tr>
<tr>
<td>Difficulty in adjusting in the machine spindle, risk</td>
<td>A streamlined and efficient process, reducing cycle time significantly.</td>
</tr>
<tr>
<td>of errors and oversized bores.</td>
<td></td>
</tr>
</tbody>
</table>

Increase Productivity

Automating the bore sizing process facilitates accelerated productivity without increasing variable costs associated with production.

- Lights-out manufacturing allows production to run 24/7.
- Rigibore macros set an upper and lower warning limit on bore sizes to ensure the bore specification is not exceeded.
- Automation eliminates reliance on a skilled operator being present to carry out precise manual adjustments.