

SETUP & OPERATION



Configuration

Each measurement device comes with a configuration interface which includes the choice of multiple languages, targets, diagnostic and analytic settings that can be adjusted to any application.

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Probe Meter

The Probe Meter is an analog meter indicating the current probe/target gap of the selected probe. It is often used as a tool for setup and troubleshooting.

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Machine Capability Report

With a Machine Capability Report operators, programmers and management can quickly understand the machine's best performance characteristics which helps select the right machine and settings.

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Tutorials

There are a number of step-by-step instruction guides that take the guess work out of setting up, measuring, and evaluating a machine. These tutorials equip even the most novice user.

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Shop Capability Report

The Shop Capability Report provides a complete assessment of a filtered set of machinery across any size organization. This determines which site and machine will be the optimal one to run a job.

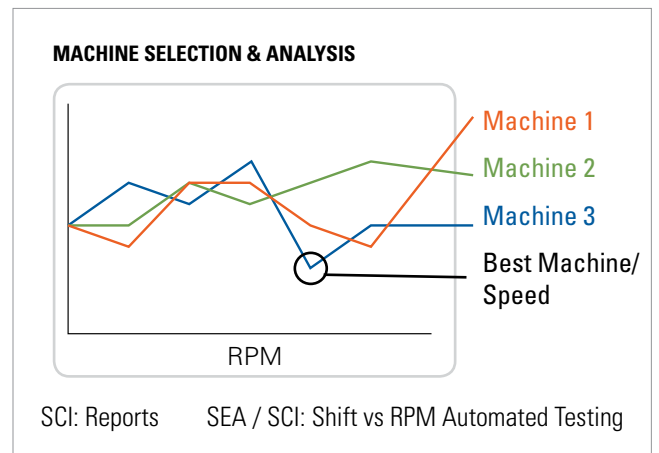
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Oscilloscope

The Oscilloscope is a utility display that emulates a basic oscilloscope, allowing a time-based view of the data acquired on any probe channels.

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THERMAL MEASUREMENT



Thermal

Thermal testing allows for rotating or non-rotating spindle measurement to analyze the effect temperature changes have on the machine tool. It is often used in troubleshooting environmental conditions or determining thermal stability.

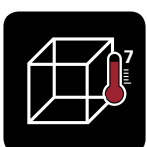
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Warm Up

When a cold spindle begins to rotate, friction heating of the bearings causes the spindle to expand (primarily in the Z axis). Knowing the time until a machine stabilizes allows for more precise scheduling/planning, less scrap, and may expose machine frame distortions.

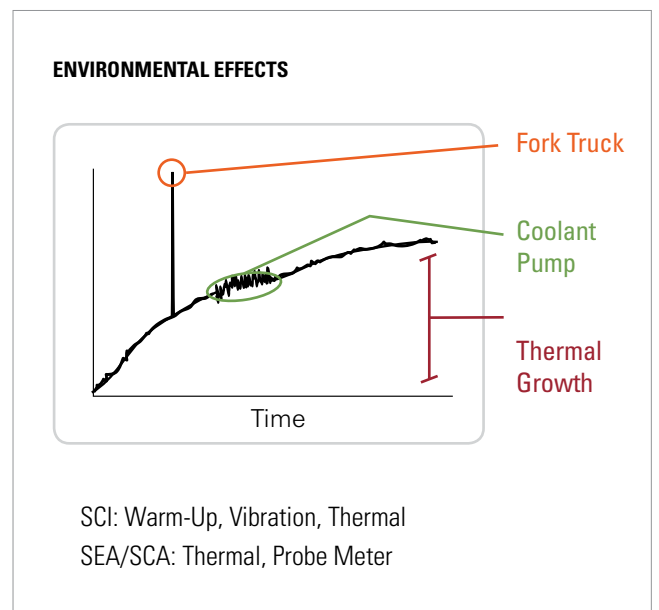
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Temp & Encoder Input Module

Uses sensors for monitoring temperature change. Also includes an encoder and index input for triggering the measurement.

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POSITION MEASUREMENT



FFT

The FFT analysis test acquires data from a single probe and displays the relative amplitude of its frequency components. A graph of amplitude vs. frequency is produced. FFT data is used in identifying bearing frequencies, resonant frequencies, harmonics, RPM and structural vibration.

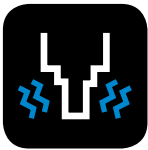
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Position Shift

The axis of rotation of the spindle may shift location with changes in RPM. Charting any changes in position of the axis of rotation of the spindle against RPM allows the operator the ability to adjust RPM or offsets to correct any errors.

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Vibration

Vibration impacts the surface finish capabilities of the machine. By studying the affects of vibration over time, any external factors that are impacting the performance of the tool can be identified. Vibration from a fork lift or coolant pump can often cause a part to fail if it occurs during a critical cut.

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Repeatability

As the mechanics of a machine wear, backlash and other issues will reduce its ability to accurately locate the cutting tool relative the workpiece. Performing this test allows the operator to better predict the machine's ability to hold tolerance of a feature location. Troubleshooting is simplified by determining which axis has the problem.

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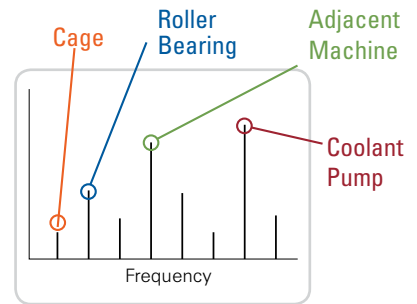


Meter Module

Provides a digital display of the displacement.

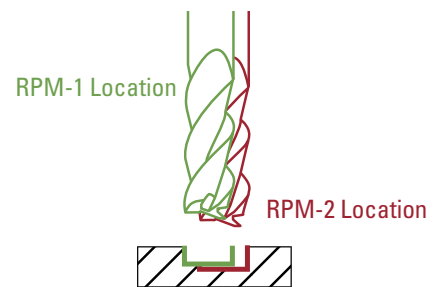
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ROOT CAUSE IDENTIFICATION



SEA/SCA: FFT

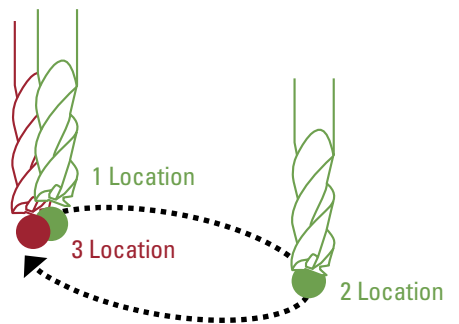
POSITION SHIFT WITH RPM



SCI: Position Shift

SEA/SCA: Shift with RPM

REPEATABILITY



SCI: Repeatability

DYNAMIC MEASUREMENT



Total Error

While the individual components of the “Total Rotation Error” provide insight into specific part errors; the Total Rotation Error (total error motion) gives a general condition of a spindle and a quick comparison of the condition of spindles on multiple machines.

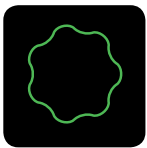
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Runout/TIR

Often used in manufacturing, Runout will affect the diameter of holes and straightness of cuts. It should not change dramatically with changes in speed. Changes in Runout are a potential sign of significant wear causing the system to shift or bend as the spindle turns faster.

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Synchronous Error/ Roundness Capability

The portion of the total error motion that repeats every revolution and relates to the ability of the machine to produce round features when drilling or boring in a milling operation or when doing longitudinal turning on a lathe.

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Asynchronous Error/ Surface Roughness

The portion of the total error motion that does not repeat from revolution to revolution. These are caused by machine vibrations and in ideal cutting conditions with a single point tool would be a reasonable indicator of the surface roughness (Ra) of the finished part.

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Radial Fixed Sensitive/Turning

Radial Fixed Sensitive acquires displacement in one axis relative to spindle angular location and displays the data in a polar plot. Most often used in lathe applications.

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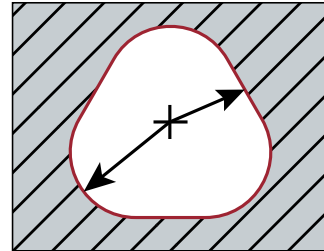


Radial Rotating Sensitive/Milling

Radial Rotating Sensitive acquires displacement data from two probes positioned 90° apart. The probes measure the X and Y displacement of the axis of rotation to generate a polar plot. Most often used when measuring mills.

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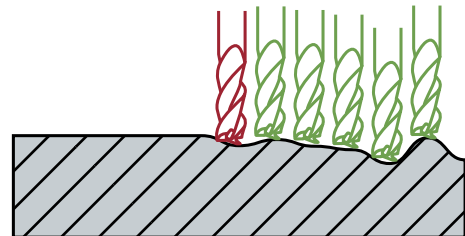
ROUNDNESS CAPABILITY



SCI: Roundness Capability

SEA/SCA: Radial Synchronous Error Motion

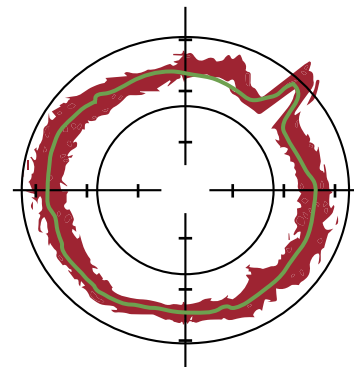
ROUGHNESS CAPABILITY



SCI: Roughness Capability

SEA/SCA: Radial and Axial Asynchronous Error Motion

POLAR PLOTS



SEA/SCA: Asynchronous & Synchronous Error



Axial

Axial Error Motion utilizes displacement data from one probe in the Z axis. The probe measures the axial displacement of the spindle. In addition to a polar plot, axial error motion can also be displayed in a linear, oscilloscope type display.

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Tilt Thermal

Using two probes in either the X or Y direction, thermal tilt can determine if there is a distortion of the machine frame which will cause a much larger error than simple thermal expansion.

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Tilt Dynamic

Using two probes in either the X or Y direction, dynamic tilt is measured to determine how much worse the synchronous error (related to roundness) and asynchronous error (related to surface roughness) are as the distance from the spindle nose increases. Results are displayed as polar plots or 3D plots.

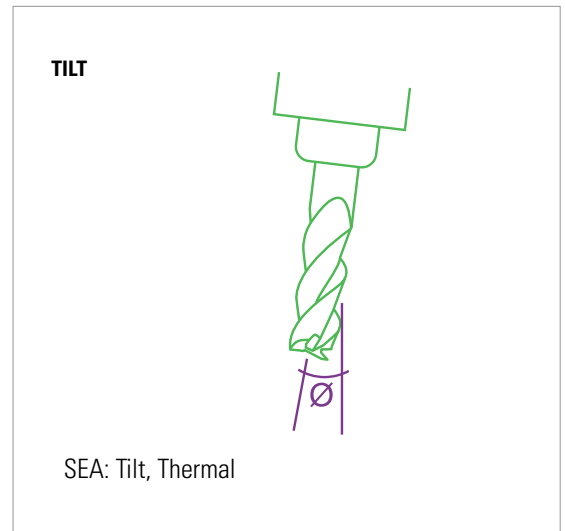
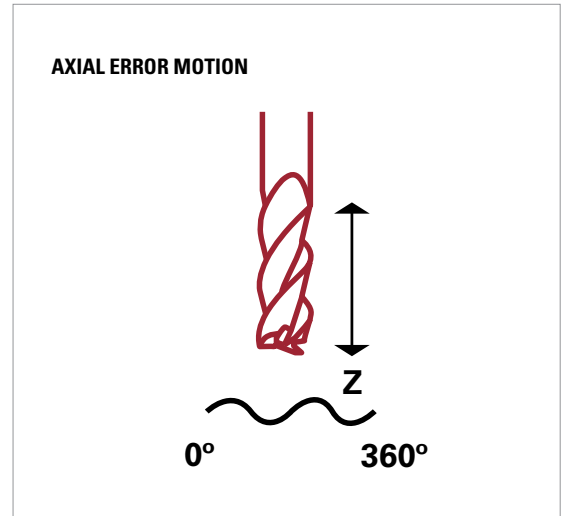
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Donaldson Reversal

Donaldson Reversal displays data from two Radial – Fixed Sensitive tests combined in such a way that form errors in the target (out of roundness) are separated from the synchronous error motion of the spindle.

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HARDWARE



Wireless

WiFi system allows you to have the device sensing electronics inside the machine tool with the doors closed while operating the software from outside the machine.

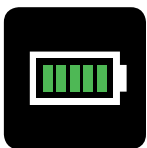
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No Export License Required

Export licenses are required for most measurement devices to export controlled countries. No Export License Required means that those devices do not need a license to be used.

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Battery Powered

In combination with WiFi capabilities the battery powered module removes the need for any cables or cords leaving outside the machines safety enclosure.

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Travel Case

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