

# SIPCON

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WE MEASURE

# RICERCA E MISURE

SOLUTIONS FOR QUALITY CONTROL



## Comprehensive Cutting Tool Inspection



[ricercaemisure.it](http://ricercaemisure.it)

## TOOL INSPECTOR



## APPLICATIONS

- End mills
- Drills
- Reamers
- Step drills
- Inserts
- Taps
- Microtools
- Screws/bolts
- Ball Nose
- Custom tooling

SPECIFICATION	SVI-TI-3D
Measuring Range	X-Axis: 200mm; Y-Axis: 200mm; Z-Axis 100mm
Resolution	0.001 mm
Accuracy	$(3+L/200)\mu\text{m}$
Repeatability	2 microns
Magnification	14X-90X
Working Distance	170 mm
Field of view	Max 18-Min 2.8mm
Max Tool Diameter (Std.)	25 mm diameter with rotary fixture & 100 mm with V block.
Max Tool Diameter (Opt.)	50mm with rotary fixture
Max tool Length	200mm
Camera	High Resolution 3MP
Rotary plate range	360°
Rotary Plate resolution	6"
Accuracy of Granite	Din Grade 0
Accuracy of the V block	Grade 1
Max Load Capacity	20 Kgs
Illumination	LED cold light
Illumination - Back	LED



# MORE THAN 100 MEASUREMENT PARAMETERS

## COMPREHENSIVE MEASUREMENT LIBRARY

### END MILL

Axial primary relief angle  
 Axial rake angle  
 Axial secondary clearance angle  
 Concavity angle of end cutting edge  
 Core diameter  
 Corner  
 Cutting diameter  
 Cutting edge  
 Dish angle  
 End cutting edge  
 End gash  
 End teeth  
 Flute  
 Flute length  
 Flute washout  
 Gash  
 Gulet  
 Helix angle  
 Land  
 Length below shank  
 Length of cut  
 Overall length  
 Peripheral cutting edge  
 Primary clearance angle  
 Primary land  
 Rake angle  
 Rake angle gaging depth  
 Secondary clearance angle

Shank  
 Shank diameter  
 Shank flat  
 Side teeth  
 Tool height  
 Tool width  
 Web

### DRILLS

Body  
 Body Clearance  
 Body Clearance diameter  
 Chisel edge  
 Chisel edge angle  
 Cutting edge  
 Depth of body clearance  
 Drill diameter  
 Flank  
 Flute  
 Flute length  
 Flute width  
 Functional length  
 Height of point  
 Helix angle  
 Land width  
 Lead  
 Lip clearance angle  
 Lip length  
 Margin

Margin width  
 Neck length  
 Outer corner  
 Overall length  
 Point angle  
 Relative lip height  
 Shank length  
 Tang  
 Taper shank  
 Web or core thickness

### REAMERS

Chamfer angle  
 Chamfer length  
 Chamfer relief angle  
 Cutting length  
 Flute length  
 Helix angle  
 Land width  
 Lead angle  
 Lead angle length  
 Margin  
 Neck  
 Overall length  
 Primary relief angle  
 Rake angle  
 Reamer dia  
 Secondary relief angle  
 Shank length



# FAST & ACCURATE MEASUREMENTS



NOTCH RAKE ANGLE



LIP RELIEF



CHAMFER LENGTH



SECONDARY CHISEL  
EDGE ANGLE



DUB LIP RELIEF



INCLUDED POINT ANGLE



STEP LENGTH



CROWN HEIGHT



STEP ANGLE



PRIMARY CHISEL  
EDGE ANGLE



WEB THICKNESS



SECONDARY CUTTING EDGE



STEP LIP RELIEF



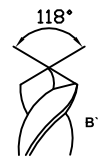
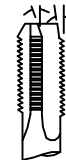
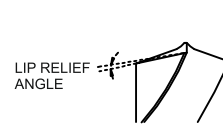
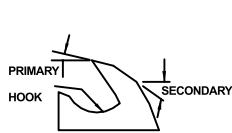
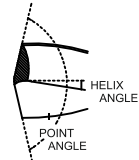
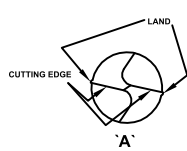
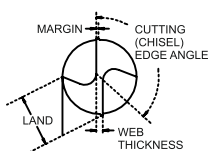
NOTCH HEEL ANGLE



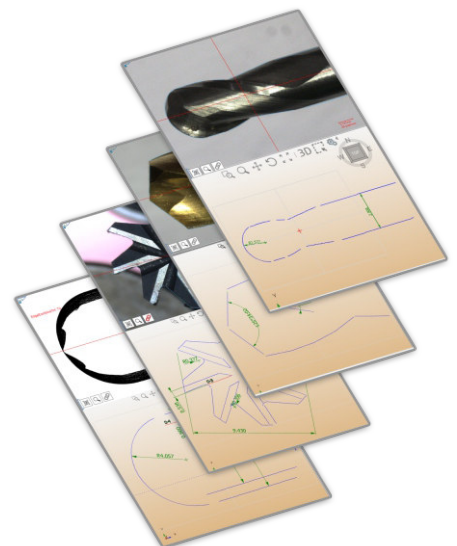
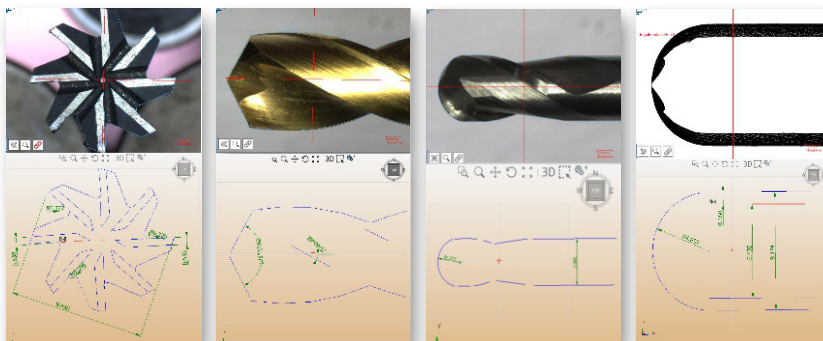
CHISEL EDGE



HALF RELIEF  
(BACKOFF)

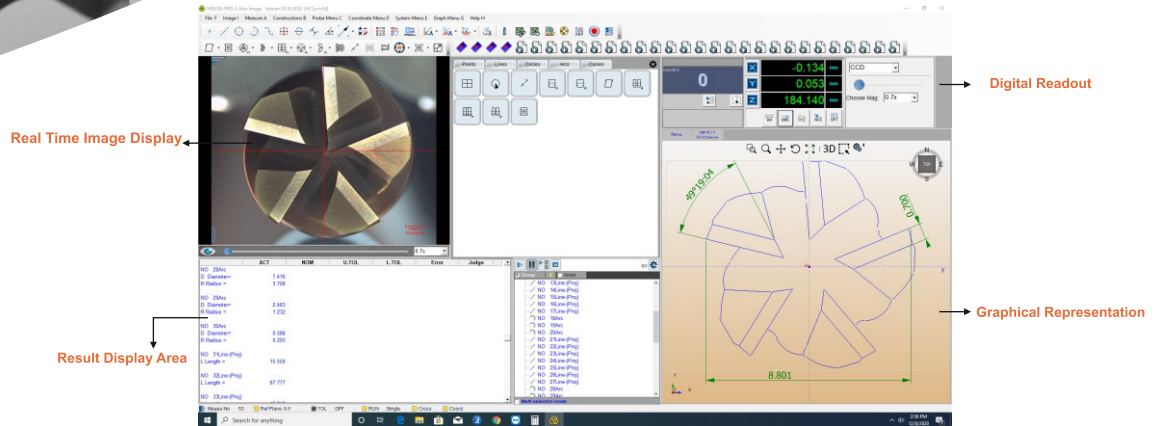


# PATENTED TOOLS FOR MEASUREMENTS



# TOOL MEASURING SOFTWARE TOOL PRO

## SOFTWARE DESKTOP



## BASIC FEATURES

### Distance

- Center to Centre
- X Distance
- Y Distance
- Land Width
- Step Distance X,Y

### Angle

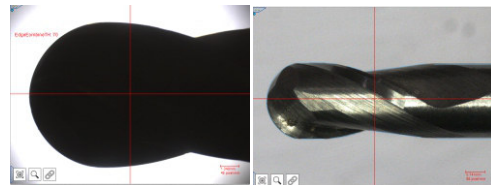
- X Axis
- Y Axis
- Included
- 180-L
- 180+L
- 360-L
- Drill Point Angle
- Helical Angle
- Rotational
- Angle
- Relative to X,Y
- Axis
- Gash Angle
- Rake Angle
- Ball Nose Taper

### Radius

- Ball Nose Radius/ Dia
- Rotational Distance
- Radius

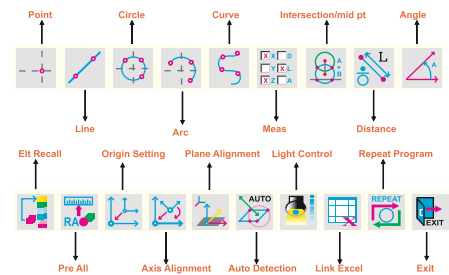
### Light Control

Software capable of handling 4 channel light controller with programming capability for each channel i.e. intensity value for each channel source would be memorized in the program and would be repeated at the time of running. This can also be used to control the 4 Quadrant LED light controller.



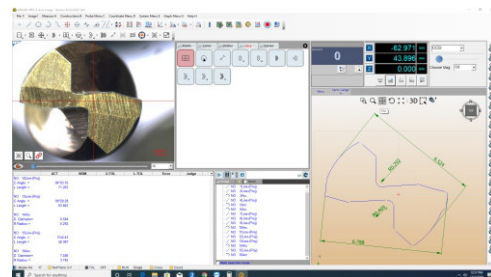
### Click & Measure Top Menu Bar

One Click Menu bar for all geometric measurement, origin setting, axis alignment, MS-excel output & Programming.



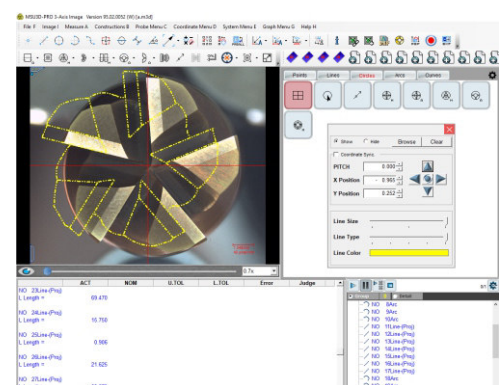
### Data Management - Export

Option to save graphs as DXF or IGS files makes it possible to export our measurements to CAD and CAM for further editing. You can also "click" the features in the graph to calculate the measurements between the elements. For example to measure the distance between the 2 circles in the graph just click the distance button and then click the two circles from the graph. The result is on the screen.....



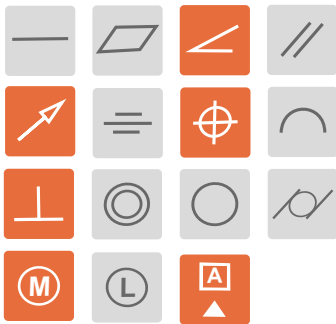
### Overlap Comparison

Overlap your DXF files on the magnified image to quickly check whether the tool is within the tolerance or not.



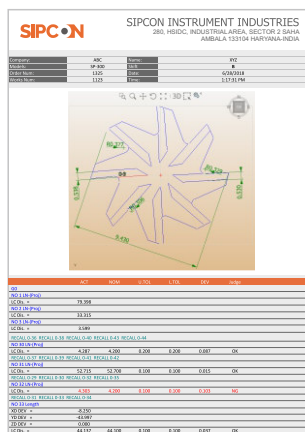
## TOLERANCE SETTING & RESULT DISPLAY

Supports more than 10 types of Tolerance setting including group Tolerancing (Circularity, Concentricity, Perpendicularity, Parallelism etc .... ) and Result window will display all the results with tolerance values and will give an indication for PASS or Fail features.



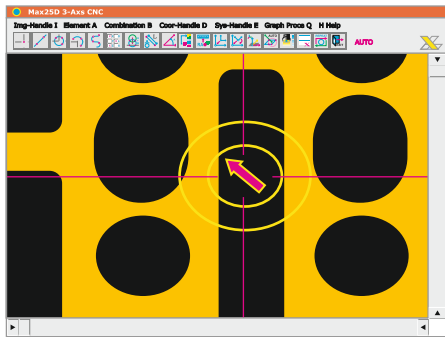
## REPORT GENERATION

Customised report generation with color coded pass and fail, options to add the company logo , batch number, operator name, date and time etc. Image of measurement done is also the part of the report format.



## PROGRAMMING & NAVIGATION

Teach programs with one click and repeat those with the help of navigation Tool bar shown in the above picture. This navigation Toolbar guides you what features are to be measured and where is there exact location - Just press the mouse clicks and complete part will be measured . So just measure one part other similar ones would be measured automatically.



## FOCUS INDICATOR FOR ACCURATE 3-D MEASUREMENT

This will indicate the best focus value and the corresponding Z value to make sure focus is clear before measurement. A must to do for 3-D Measurement.

**Focus Indicator**

Now Value(NV):

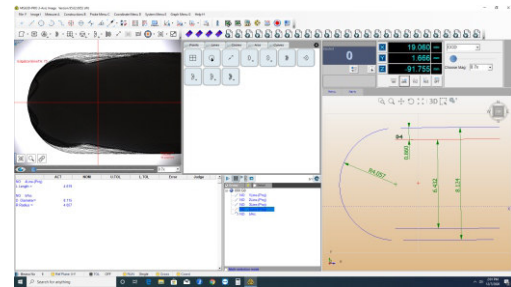
Stable Value  (1~99)

Best Z Value(BZ):

Best Value(BV):

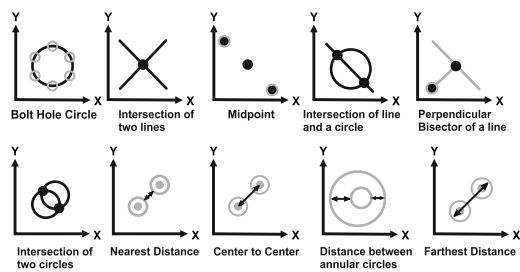
## PATENTED TOOLS

Patented tools for ball nose radius calculations and high point calculation makes the measurement simple and accurate.



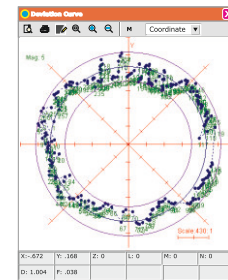
## CONSTRUCTION CAPABILITIES

Select two or more features to create intersections or constructions. This reduces operator effort by eliminating confusing construction menus.



## DEVIATION ANALYSIS OF POINT DATA

This feature gives you the coordinates of the points taken on the element along with the form tolerance value of each point. This is very useful to analyze the irregularities on the feature. You can choose the type of result you want - Min, Max or Avg. Also you can have a print out of this report.





## Lighting

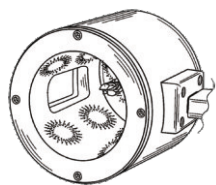
Lighting is critical to obtaining good images with the PG1000. All new PG1000 units include an adjustable LED spotlight and a light diffuser but other lighting accessories may benefit each user's unique inspection requirements.

### Illumination Tube

p/n 1000-648



The eight quadrant LED illumination tube supplies a controllable light environment for precise tool inspections. Highly magnified small tool images will benefit from the customizable lighting controls associated with the illumination tube. The light intensity for each quadrant is controlled individually through the REACTION software. When used with the Scenes and Inspections feature in the REACTION software the exact lighting parameters you save can be recalled for future repeat tool inspections. The illumination tube assembly includes an adjustable articulating arm which connects to the base block for positioning.



### Ring Light

p/n 1000-661-1 (PG1000-400)

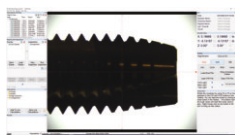
p/n 1000-661-2 (PG1000-200)



The LED ring light is mounted to the camera/microscope assembly and provides shadow free illumination. The light intensity is easy to control through the REACTION software. When used with the Scenes and Inspections feature in the REACTION software the exact lighting parameters you save can be recalled for future repeat tool inspections.

### Backlight

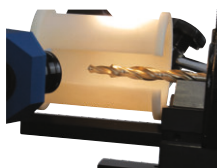
p/n 1000-662



The 6" x 6" LED backlight panel is an ideal lighting accessory for capturing a profile image. By placing light behind the tool, the outline of the tool is very clear. The light intensity is controlled through the REACTION software. When used with the Scenes and Inspections feature in the REACTION software the exact lighting parameters you save can be recalled for future repeat tool inspections. The backlight assembly includes an adjustable articulating arm which connects to the base block for positioning.

### Light Diffuser Tube

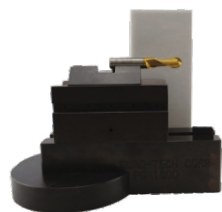
p/n 1000-515



The light diffuser tube is included with the PG1000-400 and can be used with the LED spotlight to help reduce hotspots on the tool. The light diffuser tube assembly includes an adjustable articulating arm which connects to the base block for positioning.

### Light Diffuser Plate

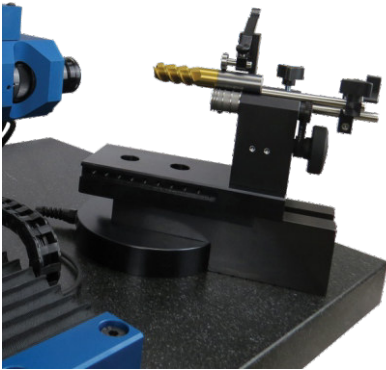
p/n 00495-00



The light diffuser plate is included with the PG1000-200 and can be used with the LED spotlight to help reduce hot spots on the tool. Besides diffusing light and reducing hot spots, the diffuser plate can also be used as a clean white background when capturing images. The diffuser plate includes a magnetic tape backing for mounting to the base block or V block.

## Tool Holding

### Concentricity Fixtures



The PG concentricity fixture, also known as a 3 roller, provides a constant smooth part rotation that allows for easy and accurate measurements of the tool. All precision concentricity fixture are certified to be accurate within  $2\mu$  over the rollers. Each

unit includes an adjustable multi-position top arm yoke (top roller), a manual drive timing belt pulley system and a steel base plate to mount the fixture to the PG1000 base block. The REACTION software includes 9 Edge Detection calculations which require the use of a concentricity fixture. This accessory is ideal for customers that want to measure diameter or radius using the Edge Detection feature in the REACTION software.



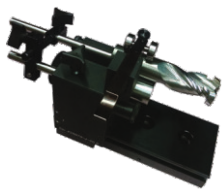
p/n 1000-570

Concentricity fixture with precision custom rollers, top roller and backstop. Most popular.  
Shank/tool size range: 0.125" - 1.0"  
(3 - 25mm).



p/n 1000-571

Concentricity fixture for small/micro tools. Includes precision rollers and top roller.  
Shank/tool size range: 0.010" - 0.250"  
(.25 - 6.5mm).



p/n 1000-572

Concentricity fixture for larger tools. Includes precision rollers, top roller and backstop.  
Shank/tool size range: 0.375" - 2.0"  
(9.5 - 50mm).

### Center Fixtures

The PG center fixtures include hardened and precision ground male centers to minimize runout between centers.



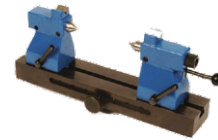
p/n 1000-500-1 (PG1000-200)

Center fixture assembly for tools up to 12" long. The center fixture assembly mounts on the existing pivot plate in place of the base block.



p/n 1000-500-2 (PG1000-400)

Center fixture assembly for tools up to 12" long. Includes A Axis rotation encoder for tracking tool position in degrees via the REACTION software. The center fixture assembly mounts on the existing pivot plate in place of the base block.



p/n 1000-501

Mini center fixture assembly for tools up to 6" long. The mini center fixture assembly includes a steel base plate to mount the fixture to the PG1000 base block.

### Gun Drill Fixture

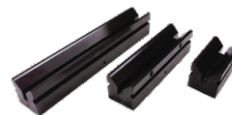
p/n 1000-650



The PG gun drill fixture can accommodate gun drill lengths up to 24" and includes a steel base plate to mount the fixture to the PG1000 base block. Specify 1/2" (00372-1M), 3/4" (00372-2M), or 12mm (00372-3M) gun drill bushing holder at time of order. Gun drill bushing is not supplied.

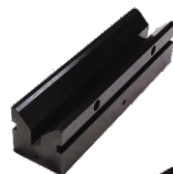
### V Blocks

All PG V blocks are manufactured with A2 tool steel hardened to Rc 60. The V block mounts to the PG1000 base block. A 5" V block is supplied with all PG1000-200 and PG1000-400 models however longer V blocks are available for special applications.



p/n 1000-209-1

10" V block for long tools.



p/n 1000-209-2

15" V block for extra long tools.





### V Block Inserts

All PG V blocks inserts are manufactured with A2 tool steel hardened to Rc 60. The V block inserts mount in the V blocks are used when inspecting smaller tools. Models with and without a notch are available. The notch allows for easier tool rotation.

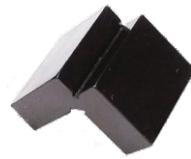


p/n 00030-1MA

V block insert with notch, 3.15" (80mm). Included with all PG I000-200 & 400 models.

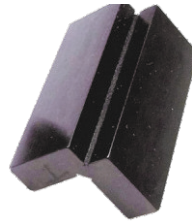
p/n 00030-2MA

Matched set of (2) notched 00030-1MA V block inserts for inspecting longer tools, 3.15" (80 mm). Typically used with the 10" or 15" V block.



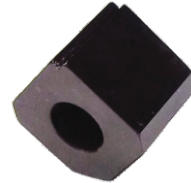
p/n 00030-3MA

Short V block insert for small/short tools, 1.5" (38mm).



p/n 00030-4MA

V block insert without notch, 3.15" (80 mm).



p/n 00257-1MB

Mini V block insert for micro tools (1 - 3mm shank).

### Calibration Reticles

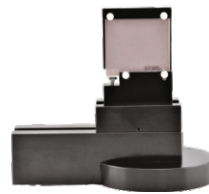
A precise calibration is the foundation for any accurate mechanical or optical inspection. Only after a proper calibration can accurate and repeatable inspection results be obtained. All PG I000's are delivered having been factory calibrated, using proprietary certified glass reticles and a calibration process that is integrated in our REACTION software. PG Inspection Technologies recommends recalibrating PG I000 systems once every two years for light use, annually for regular use and as often as monthly or quarterly for heavy or multishift use.

The PG I000 systems can be calibrated with either a standard or linear calibration reticle. Both reticles calibrate the system at each zoom magnification.

The standard 1000-443 reticle will also calibrate the scales on the X-axis (horizontal) and Y-axis (vertical) over a 50x50mm area. This reticle works well for applications that require a relatively small designated measuring area.

When a larger measuring area is routinely used, it is important to calibrate at more points along the X- and Y-axes. The larger 1000-645 linear calibration reticles calibrate the scales over the entire measuring range.

For both reticles, accurate distance compensation values are saved and applied during tool inspection for each axis, assuring accurate distance measurement.



p/n 1000-443

Standard calibration reticle supplied in mounting bracket and foam lined Pelican case. Includes secondary NIST certification valid for a minimum of 4 year from date of shipment. For screen calibration and scale calibration over a measuring range of: 50mm x 50mm.




p/n 1000-645-1

Linear segmented calibration reticle supplied in mounting bracket and foam lined Pelican case. Includes secondary NIST certification valid for a minimum of 9 years from date of shipment. For screen calibration and scale calibration over the full measuring range of the system. Calibrates 85mm vertical in 5mm segments and 200mm horizontal in 10mm segments.



p/n 1000-645-2 (PG I000-400LT only)

Linear segmented calibration reticle supplied in mounting bracket and foam lined Pelican case. Includes secondary NIST certification valid for a minimum of 9 years from date of shipment. For screen calibration and scale calibration over the full measuring range of the system. Calibrates 135mm vertical in 5mm segments and 350mm horizontal in 10mm segments.

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## SOLUTIONS FOR QUALITY CONTROL



**You think**

**WE MEASURE**

**45**  
YEARS  
**SIPCON**



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