MADE IN THE USA

12.67°
Primary Clearance

22.79°
Secondary Clearance

0.401mm
Front Clearance Height

2.782mm
Tool Radi

0.969mm
Flute Radi

...54mm
...gth of Cut

0.182mm
Primary Land Width

44.77
Helix Angle

PG INSPECTION
T E C H N O L O G I E S

PG1000 CATALOG

pg@pg1000.com • 262-946-5420 • **www.pg1000.com**

PG INSPECTION
T E C H N O L O G I E S

ACCURATE & REPEATABLE · DURABLE · EASY TO USE

Table of Contents

MADE IN USA

Our Story

The original PG cutting tool inspection gauge was made in Germany by Guehring Automation apprentices and resold in the US as the PG100. After the sale of Guehring Automation in 1993, former employees of Guehring Automation USA formed the company Euro-Tech Corporation. One of their first orders of business was to redesign the PG100 based on input from customers.

In 1993, Euro-Tech introduced the PG1000 and began to manufacture the new machine in the USA. The original PG1000 was a manual gauge using a Swiss-made monocular microscope and digital readout capable of measuring step lengths, diameters, relief and clearance angles, margin, and land widths. With time, more customers voiced that they would like a cutting tool inspection system that used a video camera/microscope in place of the monocular microscope. In 1997, Euro-Tech was the first to introduce a cutting tool inspection system using a 0.5MB video camera, frame grabber, and Windows 95 PC with the first generation of our proprietary software. As the digital age evolved, so did the PG1000. Today's PG1000 cutting tool inspection system uses a 5MB camera, 4K monitor, and 7x and 14x zoom modules. Our evolving software allows PG1000s to be cutting edge gauges capable of tool geometry measurements to the micron level.

As of November 20, 2019, the PG1000 cutting tool inspection system will be manufactured, sold, and serviced through a new entity named PG Inspection Technologies LLC.

Because this new company is dedicated solely to the PG1000, we will be able to better support our existing and future customers. Our commitment to our customers and partners remains our highest priority.

PG1000 Model Comparison

Model	Recommended Tool Diameter	Tool Measuring Length	Magnification Range (low to high)
PG1000-400 *Most Popular*	0.025 - 3.00'' *(0.635 - 75mm)*	up to 7.5'' *(190mm)*	12.5 - 145x
PG1000-400-1.0X *Micro Tools*	0.010 - 0.40'' *(0.254 - 10mm)*	up to 7.5'' *(190mm)*	25 - 290x
PG1000-400LT *Large/Long Tools*	0.075 - 5.00'' *(1.91 - 125mm)*	up to 13.4'' *(340mm)*	8 - 100x

The PG1000-400 is a tool geometry inspection system durable enough for everyday shop floor use and precise enough for a metrology laboratory's incoming and outgoing quality inspections. All models utilize a 5MP camera which reproduces and displays high resolution cutting tool images on a 4K monitor.

All PG1000-400 systems can collect and display data from the horizontal (X), vertical (Y), cross-hair rotation (Z), magnification (M), focus (F) and base block/tool holder rotation (A) axis's as well as allow for optional lighting control through the software.

The data collected and displayed by optional M, F and A data encoders decreases the amount of information that needs to be manually entered into the software by the user. These extra encoders also increase the probability of accurate and repeatable inspection results and limit the possibility of human error.

Over 1000 systems have been sold since 1996. The PG1000 is the preferred inspection system for in line process inspections because the system is easy to use, accurate, and repeatable measurements can be obtained very quickly.

REACTION Software Collects and Displays the Below Data					
X Axis Horizontal *(in or mm)*	**Y Axis** Vertical *(in or mm)*	**Z Axis** Cross-hair Rotation *(degrees)*	**M Encoder** Microscope Magnification	**F Encoder** Focus Position	**A Encoder** Tool Rotational Position *(degrees)*
Yes	Yes	Yes	Standard	Standard	Optional
Yes	Yes	Yes	Standard	Standard	Optional
Yes	Yes	Yes	Standard	Standard	Optional

TYPES OF CUTTING TOOLS
- End mills
- Drills
- Step drills
- Reamers
- Inserts
- Taps
- Micro tools
- Custom tooling
- Screws/bolts

TYPES OF MEASUREMENTS
- 50+ Preset Calculations/Measurements
- Distances
- Radii
- Angles
- Diameter
- Comparisons

APPLICATIONS
- Quick setup / in process inspections – on the shop floor next to the tool grinder
- Advanced geometry and visual inspections in the metrology laboratory
- Creating reports for incoming/outgoing quality control
- Scenes and Inspections software feature for testing large quantity tool runs
    - Create inspection macro to control testing process ensuring accurate & repeatable tests

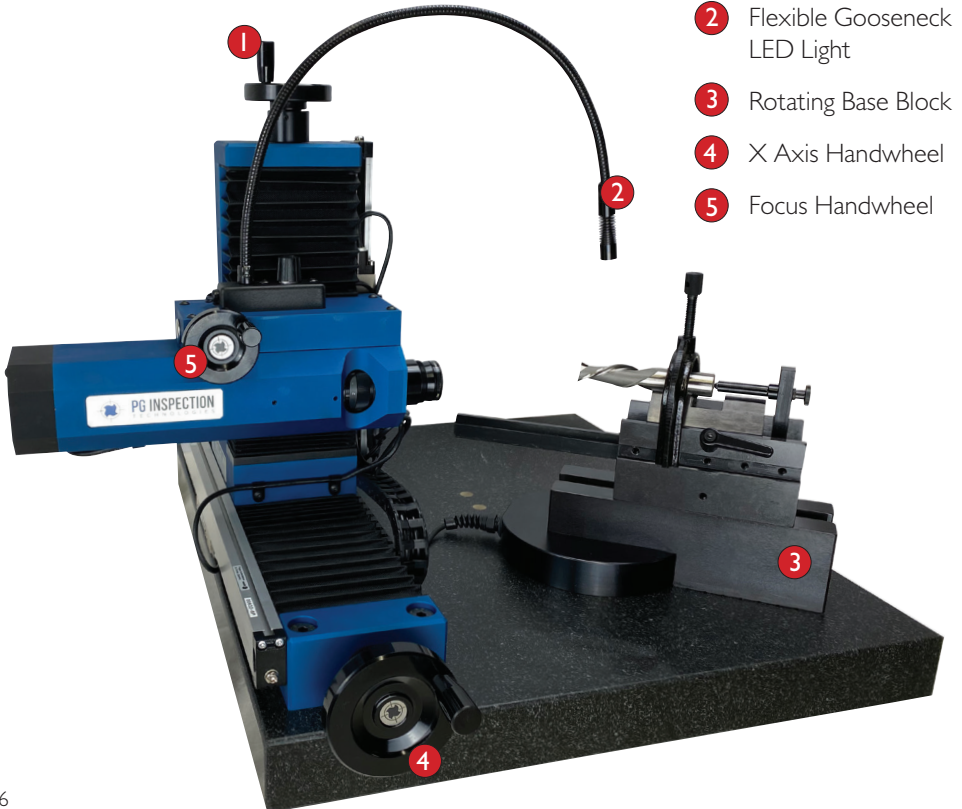# Optical Cutting Tool Inspection
System with REACTION Software
For tools up to 3.00" (75mm) in diameter

The PG1000-400 REACTION software allows the user to measure tool geometries in multiple ways.
- Screen: take measurements by picking points on the monitors screen
- Scales: use the X & Y axis handwheels to mark points and take measurements via the scales
- Edge Detection: allows the software to detect the tools edges when taking measurements
- Comparisons: the software can create comparison geometries for quick referencing (Go/No-Go)
- DXF/DWG file: import overlay for tool size comparisons
- CTM file: Create and save tool image to use as an overlay for tool alignment and inspections

The PG REACTION software is very user friendly and incorporates on screen prompts, instructions and video demos for each tool calculation.

With the click of an icon the software can export data to an Excel/CSV file or create a customized PDF report with results and user entered tolerances, images, customer details as well as an optional PASS/FAIL notification.

1. Y Axis Handwheel
2. Flexible Gooseneck LED Light
3. Rotating Base Block
4. X Axis Handwheel
5. Focus Handwheel

Features

- Quick - measurements taken in less than 30 seconds
- Extremely accurate and repeatable
- User friendly software interface
- Flexibility during inspection – inspections done your way
- Live image calculations - no pixel manipulation
- Snap Points to Edges (edge detection)
- Contouring – see what edge detection sees
- Edge detection (rotational w/concentricity fixture)
- 50+ calculations/measurements available in software
- Perform multiple calculations over a single image
- Create inspection macro templates
- DXF/DWG overlay software lockable to scale movement
- DXF/DWG data collection

- Tool comparisons
- Customizable PDF inspection reports
- Export results and data as Excel or CSV file
- Save tool images as PNG or JPG
- Built-in screen recorder – build custom training library
- Magnifications automatically synchronized to PC
- Center of tool focus indication
- Tool position in degrees displayed in software
- Certified granite base
- High precision linear bearings for all axis
- 270° pivoting base block for tool holding fixtures
- All units delivered fully calibrated and ready for use
- 1 year warranty
- MADE IN USA

.625" 2 Flute End Mill
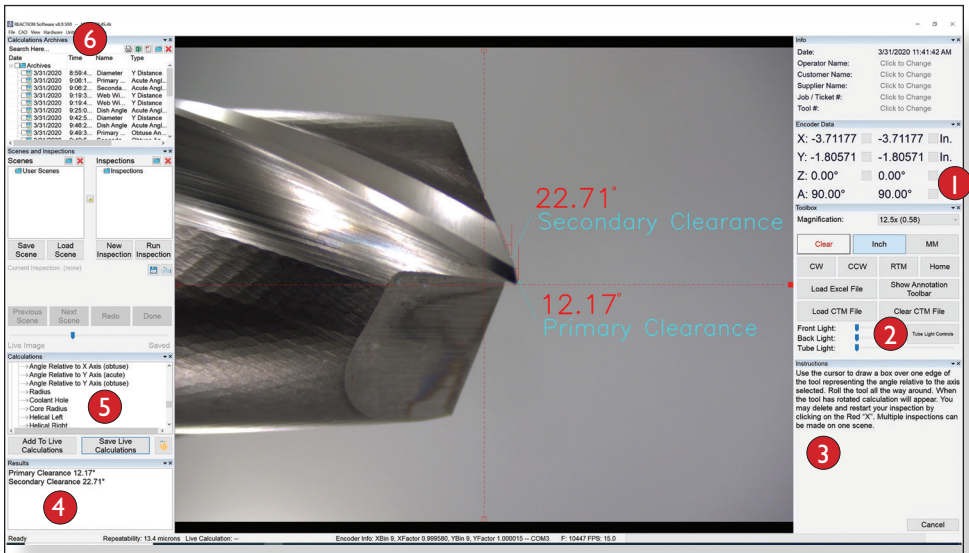
Primary and Secondary Clearance Angle at 12.5X zoom

| 1 | Data from all encoder/ axis displayed | 2 | Light controls | 3 | On screen instructions |
| 4 | Calculation results | 5 | Calculations available | 6 | Saved calculations for PDF reporting |

## Specifications

Scope Magnification:				Recommended Tool Size:	Camera:	Computer:
PG1000-400						
12.5x	50x	90x	130x	0.025 - 3.00'' (0.635 - 75mm) flute up to 7.5''L	5MP color camera	High performance w/ REACTION software preinstalled
20x	60x	110x	**145x**			
30x	70x	120x				
40x	80x	125x				
PG1000-400-1.0X						
25x	100x	180x	260x	0.010 - 0.40'' (0.254 - 10mm) flute up to 7.5''L	5MP color camera	High performance w/ REACTION software preinstalled
40x	120x	220x	**290x**			
50x	140x	240x				
80x	160x	250x				
PG1000-400LT						
8x	36x	65x	93x	0.075 - 5.00'' (1.91 - 125mm) flute up to 13.4''L	5MP color camera	High performance w/ REACTION software preinstalled
14x	43x	72x	**100x**			
20x	50x	80x				
30x	58x	86x				

Scales:	Power:	Language:	
Fagor 1µ	110Vac 60Hz (220Vac 50/60Hz optional)	English Spanish Chinese	German Japanese

| Accuracy/ Repeatability:	Measuring Range:	Dimensions (LxWxH): Weight:
+/-0.0002'' (5µ) at maximum magnification	**400 or 400-1.0X** Vertical: 3.35'' (85mm) Horizontal: 7.87'' (200mm) **400LT** Vertical: 5.30'' (135mm) Horizontal: 13.87'' (350mm	**400 or 400-1.0X** 24''x19''x18'' 140lbs **400LT** 30''x21''x20'' 175lbs
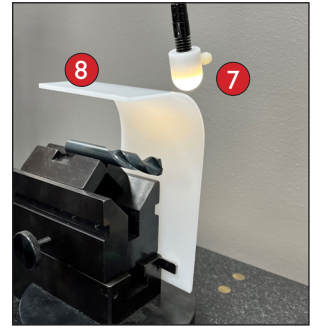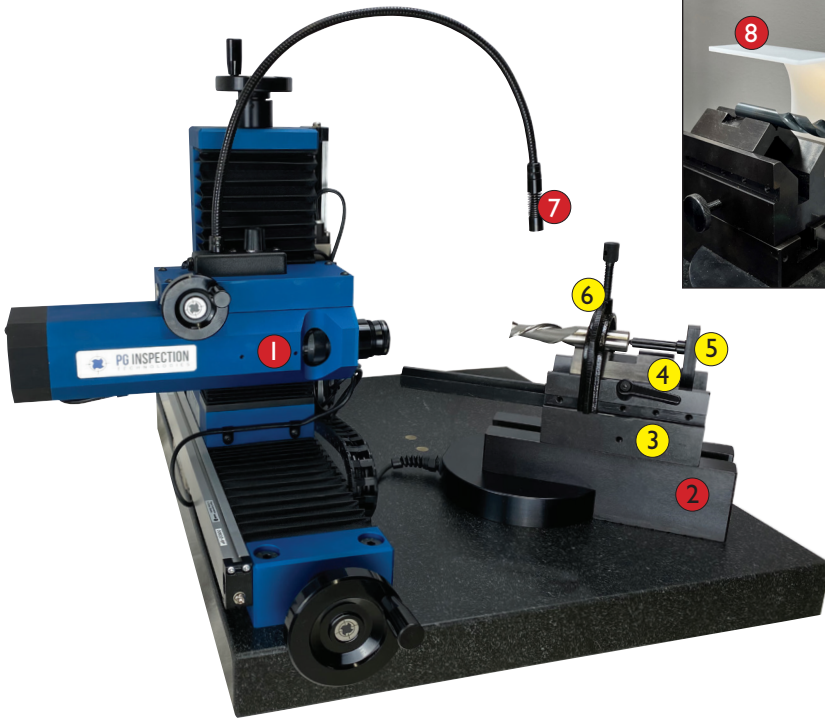
1 PG1000-400 gage
2 Pivoting base block for tool holding fixtures
*3 V block, 5'' (127mm)
*4 V block insert with notch, 3.15'' (80mm)
*5 Carbide tipped backstop assembly
*6 Top/tool clamp
7 Flexible LED light w/diffuser cap
8 Curved magnetic diffuser plate
9 High performance PC
10 REACTION software
11 27'' 4K Ultra HD monitor

***Note:** V block assembly (#3-6) can optionally be deducted if only a concentricity fixture is required. Concentricity fixtures are sold separately.*

Auto sync the microscopes magnification setting within the software

With the magnification (M) encoder the magnification setting within the software will automatically change as the user changes the magnification thumbwheel setting on the microscope. This makes the user's job easier and ensures that there will be no sizing mistakes because of the microscope and software settings not matching.
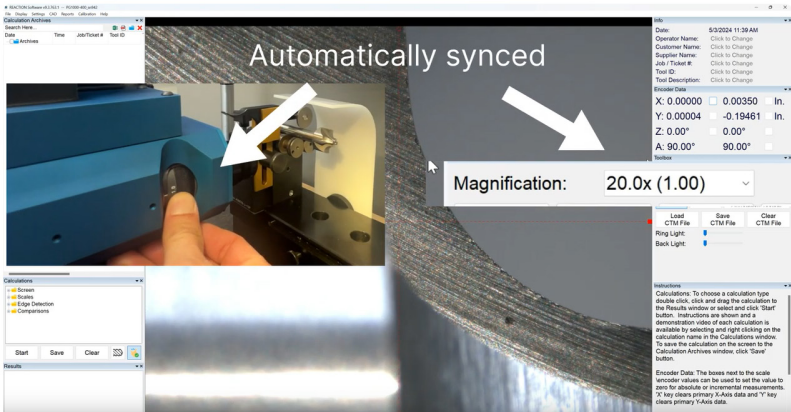
Without the magnification encoder the user would have to manually select the correct microscope magnification setting within the software. If the correct setting is not selected in the software the sizing on the screen will be incorrect.
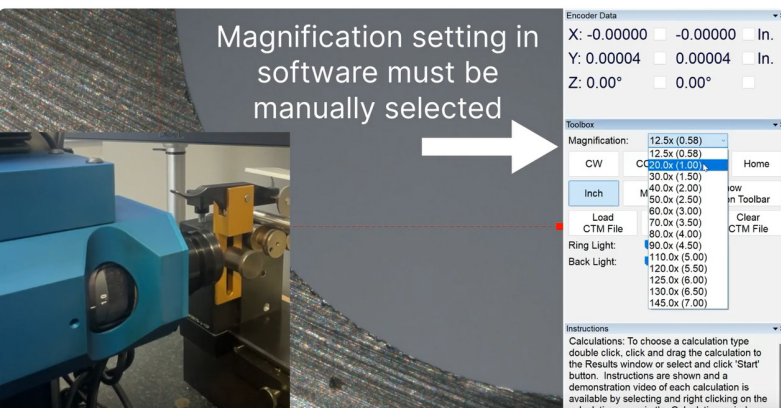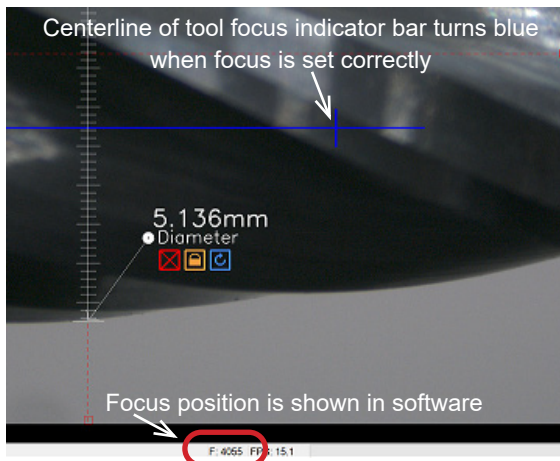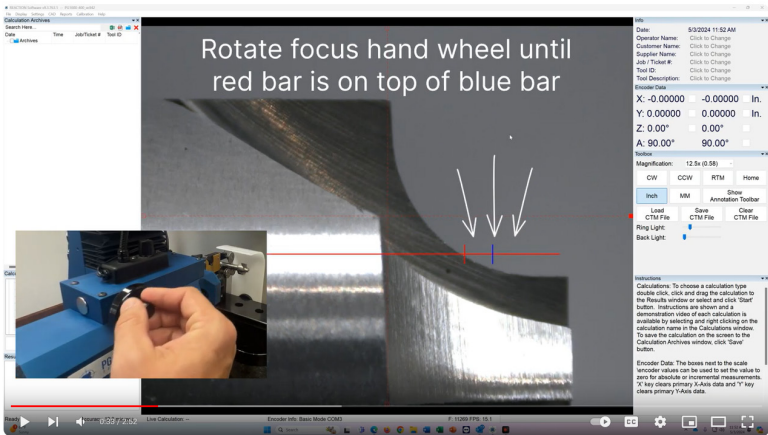
Focus (F) Encoder

Quickly find the centerline of the tool at each magnification

With the focus (F) encoder the user can quickly and accurately find the correct focus setting for the centerline of the tool. This is very helpful when measuring diameters, radius, and other profile measurements. When the focus encoder is installed a focus bar will be shown on the screen. Simply line up the red hashmark with the blue hashmark and the user is focused on the centerline of the tool. The focus encoder assures consistent focus settings between users and more accurate measurements.

The focus encoder is factory calibrated for each magnification setting.

Rotate focus hand wheel until red bar is on top of blue bar

Centerline of tool focus indicator bar turns blue when focus is set correctly

5.136mm
Diameter

Focus position is shown in software

F: 4065 FPS: 15:1

Without the focus encoder you will have less accurate diameter, radius and other profile measurements, especially at lower magnifications.

Tool Rotation (A) Encoder

Track the tool rotation down to .01 degrees!

With the tool rotation (A) encoder installed on the base block the user can accurately position the tool within .01 degrees of accuracy. This will lead to more accurate measurements. If the A Axis encoder is ordered the user will have the option to use the manual plunger with hard stops at -90°, 0° and 90° as well.

Tool position displayed in degrees or minutes
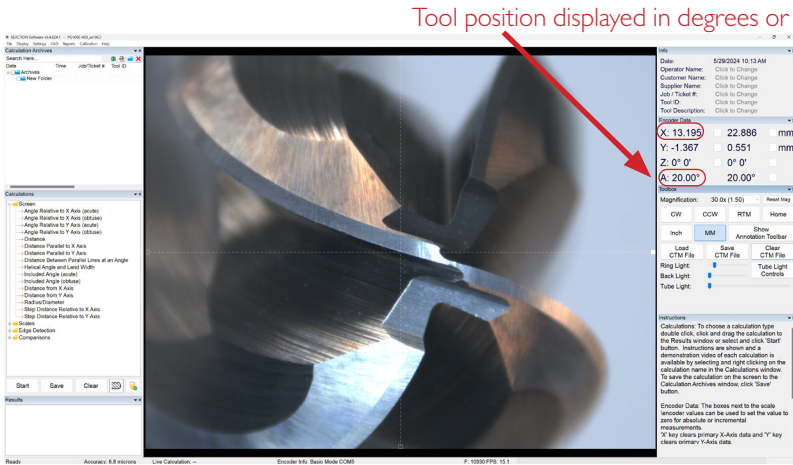
Without the tool rotation (A) encoder there is a manual plunger with hard stops at -90°, 0° and 90° as well as a protractor decal. Tool position accuracy is within 1° with the manual plunger.

Without the A encoder there will be a protractor decal showing the tool position through a window
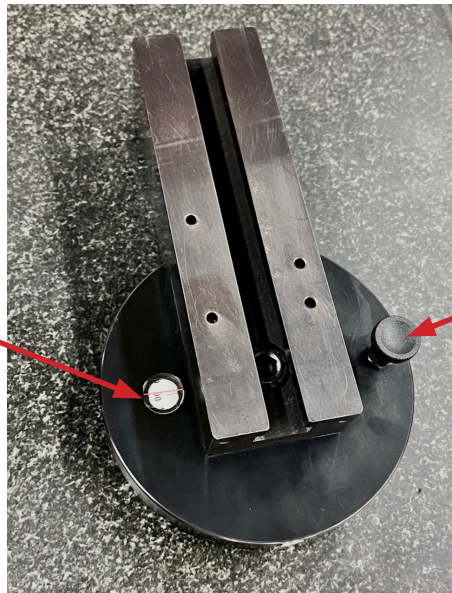
Manual plunger with hard stops at -90°, 0° and 90° is included with or without the A encoder

Software Designed for Cutting Tool Inspection

The PG1000 REACTION software was developed by PG Inspection Technologies for the exclusive purpose of cutting tool inspection. The word **REACTION** is an acronym for **REA**ltime **C**utting **T**ool **I**nspectI**ON.**

Our software digitally analyzes five million pixels, sorting over sixteen million colors at a rate of fifteen times per second to find patterns and shapes, overlooking the excessive glare from too much direct light, shadows, irregular or broken shapes.

REACTION software does not electronically enhance, crop, or magnify tool images in any way. What you see is exactly what the camera captures.

Easy to Use Inspection Software

Our goal is to help enhance your cutting tool inspection. That's why the PG software development team listened to you. In fact, our software incorporates a significant amount of feedback received from customers over the years. The end result is a robust, made-in-the-USA system that is easy to understand and highly adaptable to user preferences.

We also provide a complete series of training videos to accelerate your understanding of our software. See Resources page at www.pg1000.com.

| 1 | Data from all encoders/axis displayed | 2 | Light controls | 3 | On screen instructions |
| 4 | Calculation results | 5 | 50+ Calculations/Measurements to choose from | 6 | Inspection archives: for report generation |

13

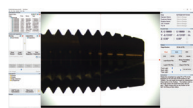### *Ring Light*
p/n 1000-661-1

The LED ring light provides shadow free illumination. The light intensity is controlled through the REACTION software.

Backlight
p/n 1000-662

The 6'' x 6'' LED backlight panel is an ideal lighting accessory for capturing a profile image. The light intensity is controlled through the REACTION software.
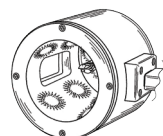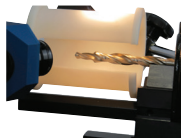
Illumination Tube
p/n 1000-648

The eight quadrant LED illumination tube supplies a controllable light environment for precise tool inspections. The light intensity for each quadrant is controlled individually through the REACTION software.

Light Diffuser Tube
p/n 1000-515

The light diffuser tube can be used with the LED spotlight to help reduce hotspots on the tool.
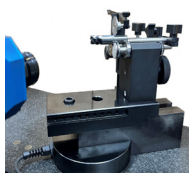
Gun Drill Fixture
p/n 1000-650

The PG gun drill fixture can accommodate gun drill lengths up to 24''.

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. The REACTION software includes 3 roller edge detection calculations which require the use of a concentricity fixture.   All precision concentricity fixture are certified to be accurate within 2μ over the rollers.

p/n 1000-571
Concentricity fixture with quarter 'zero-style' plain precision rollers, top roller and backstop for small/ micro tools. Shank/tool size range: 0.010'' - 1.2''+

p/n 1000-572
Concentricity fixture with precision rollers, top roller and backstop for large tools. Shank/tool size range: 0.375'' - 2.0''

p/n 1000-573
Concentricity fixture with quarter plain precision rollers, top roller and back-stop. Shank/tool size range: 0.125'' - 1.5''
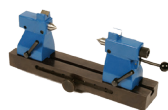
Center Fixtures
The PG center fixtures include hardened and precision ground male centers to minimize runout between centers.

p/n 1000-501
12''L center fixture assembly for tools up to 6'' long / 2''DIA.

p/n 1000-502
19''L center fixture assembly for tools up to 12'' long.

V Block Assemblies

p/n 1000-026-5''-ASS
p/n 1000-209-10''-ASS
p/n 1000-209-15''-ASS

5'', 10'', 15'' V block assemblies with p/n 030-1M V block insert, backstop, and tool clamp.

V Block Inserts

p/n 030-1M

V block insert with notch, 3.15'' (80mm). Included with V block assembly.
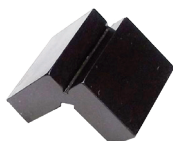
p/n 030-2M

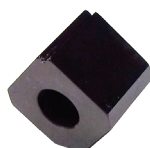Matched set of (2) notched 030-1M V block inserts for inspecting longer tools, 3.15'' (80 mm).

p/n 030-3M

Short V block insert for small/short tools, 1.5'' (38mm).
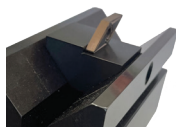
p/n 257-1M

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

p/n 271-1M

Step gage for flat parts or inserts

p/n 663-1M

Magnetic insert holder 1''DIA

Calibration Reticles

The PG1000 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.

p/n 1000-443

Standard calibration reticle supplied in mounting bracket and foam-lined Pelican brand case.

p/n 1000-645-1

Linear segmented calibration reticle supplied in mounting bracket and foam-lined Pelican brand case.

p/n 1000-645-2 (PG1000-400LT only)

Linear segmented calibration reticle supplied in mounting bracket and foam-lined Pelican brand case.

PG1000 Workbench

Includes: adjustable height, 1 ¾'' solid maple top with rounded front edge, 14''D shelf on bottom (for PC and misc. storage), lockable drawer, back and side ledges, leg outlet and workbench mat.

Castor wheels shown optional