QVI ogp

SmartScope

Multisensor Measurements for Manufacturing Professionals

SMARTSCOPE SP

663

Why Multisensor?

Certain features are easier to measure with one sensor than another. For example, consider the features illustrated in Figure 1. Video can easily measure diameters B, C and D. However, to measure the surfaces between B, C and D with video would be difficult. A laser scan is the best tool for this measurement job because it can acquire data across surfaces, not just from edges. With its small spot size and rapid data acquisition speed, laser scans provide sufficient data points, so the resultant profiles can be analyzed with software to measure the angles of the chamfers.

Bore D presents a different type of measurement challenge. Video can measure the diameter at the top of the bore but will not be able to resolve possible variations in the walls of the bore. Nor can video tell if bore D is perpendicular to surface A. Laser scanning will not work either because D presents no surface to reflect the laser light. In this case, a touch probe is the right sensor. It can extend into the bore and acquire data points anywhere on bore D.

Finally, the bottom of the bore E, may be beyond the focus range of video or laser. A touch probe can reach the surface.

In Figure 2., Video sensors are fast and accurate. They are ideal for distinct edges as well as features too small or too malleable to probe. Laser sensors gather massive data and are ideal for surfaces, contours and profiles. Tactile sensors are best for features not accessible by optics or laser.

Figure 1.
Side View   Top View

Figure 2.
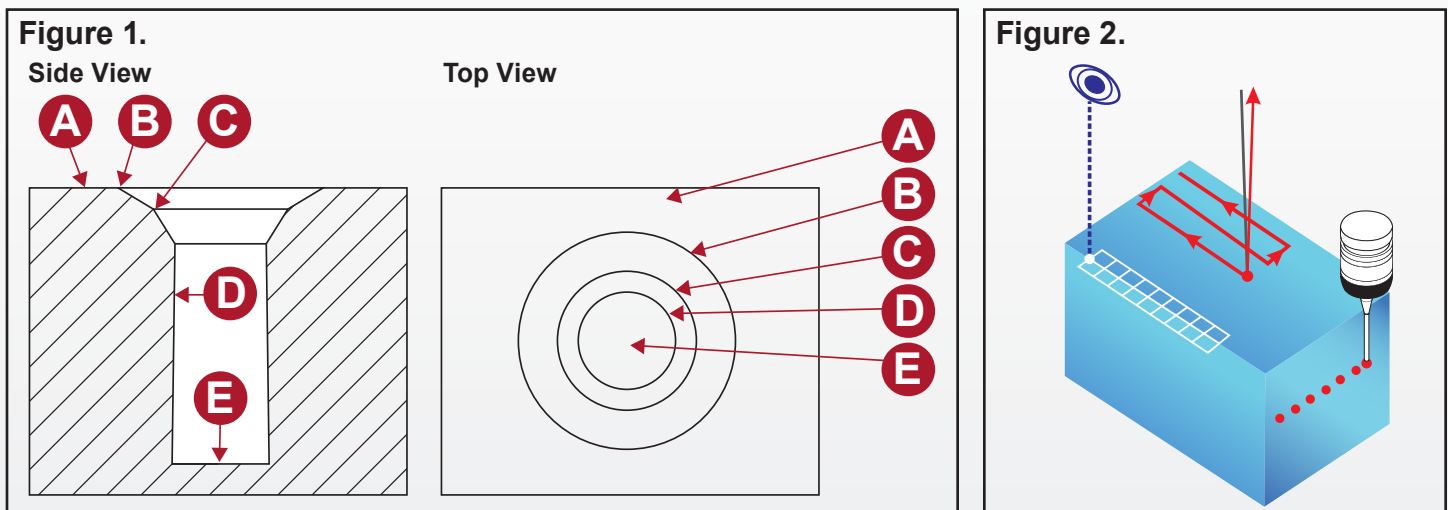
Multisensing provides complete 3D measurement data from a single measuring machine.

Video, contact probes, laser and micro-probes combine for total part characterization, with better accuracy, in a fraction of the time it would take to do on separate measuring systems.
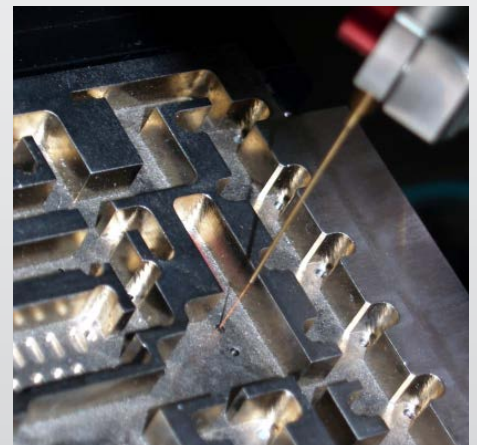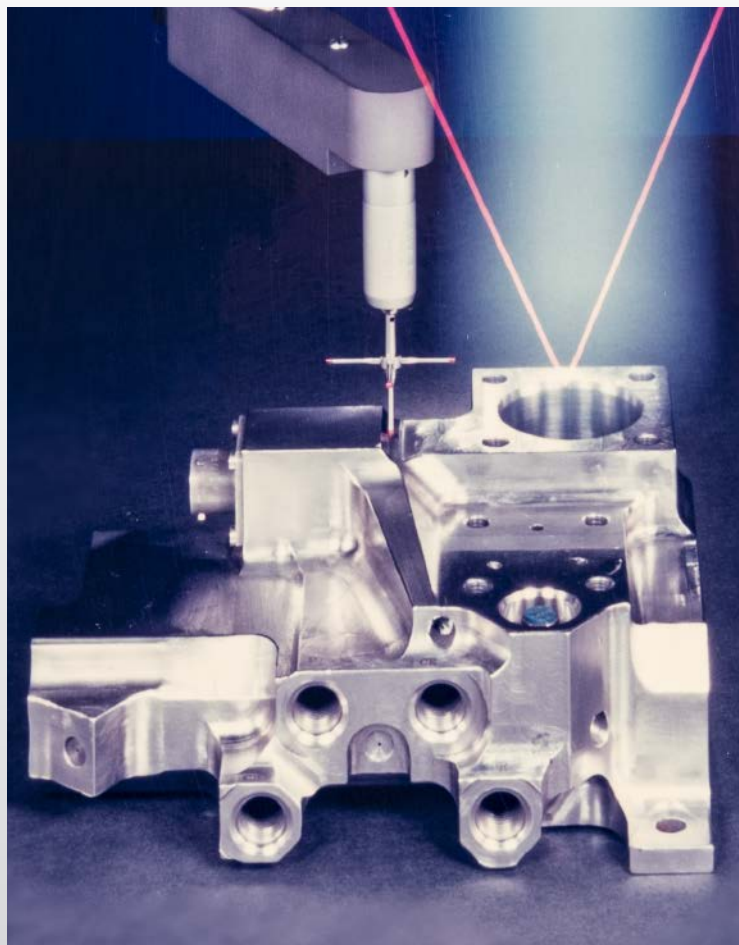
The Multisensor Advantage

Multisensor metrology systems offer significant advantages in measurement speed and accuracy. By using the best type of sensor for individual dimensions, multisensor systems measure parts faster, more thoroughly, and more accurately.

OGP® pioneered multisensor measurement, introducing the IQ-2000 multisensor system with vision, touch probe and laser sensors in 1986. Since then, OGP has consistently led the industry with a succession of innovative systems and sensors to tackle the most difficult measurement challenges.

OGP SmartScope® systems are designed as multisensor systems from the ground up. All sensors are integrated seamlessly with the system mechanics and software, simultaneously calibrated and available for use at any step in the measurement routine.

In 1982, OGP Pioneered Contour Projectors with Video

OGP Established the Multisensor Measurement Systems Segment with the Introduction of the IQ-2000 in 1986
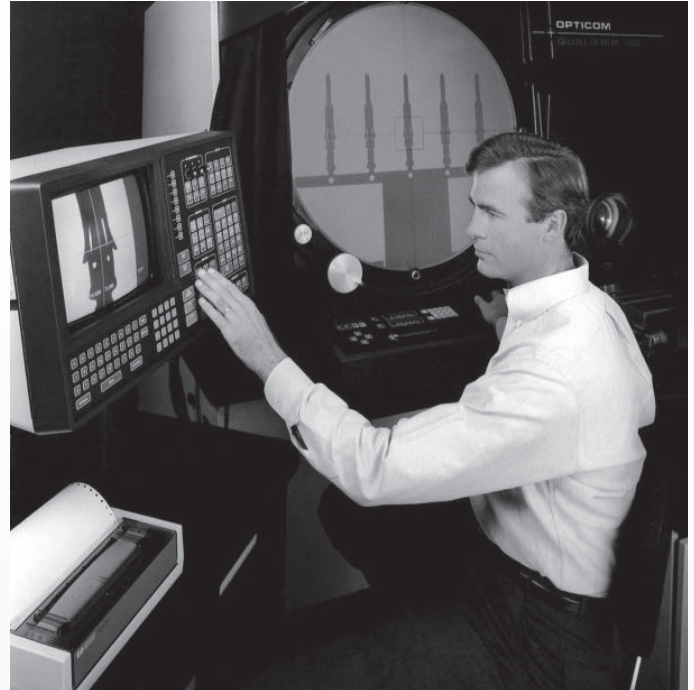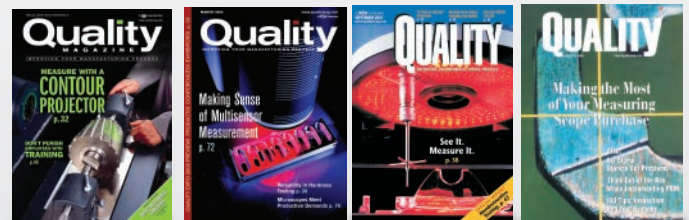
OGP has been featured in *Quality Magazine* for 40+ Years

2018   2016   2009

2009   2003   2001   1999
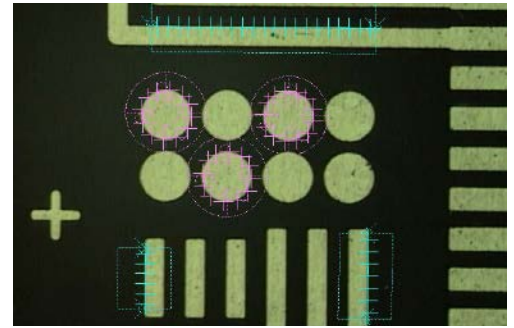
1996   1991   1988   1977

The SmartScope Multisensor Lineup

Video Sensors

Fast, non-contact video measurement provides high accuracy and repeatability for defined dimensions. ZONE3® software offers a wide variety of image analysis tools for feature detection, part orientation, and measurement for edges and surfaces.


Grid Projector

Mirror-polished and transparent parts have no surface structure to bring into focus. The available Grid Projector uses an LED source to project an easily focused pattern onto the surface of a part. Systems are designed so the surface of the part can be in focus when the projected grid pattern is in focus.
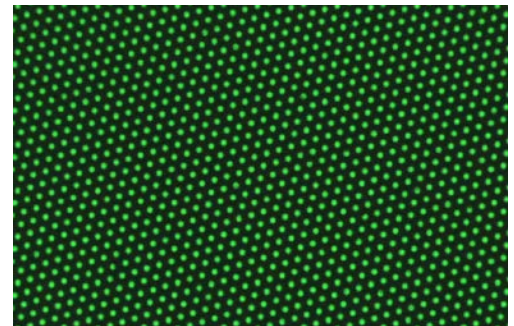
Touch Trigger Probe (TP20/TP200)

Single point touch trigger probing extends the measurement versatility of the SmartScope system. A touch trigger probe measures features that are difficult to image, or surface boundaries that are inaccessible to optics. To increase versatility of a measurement system, add a 2, 4, or 6 position change rack to hold the most used probes.
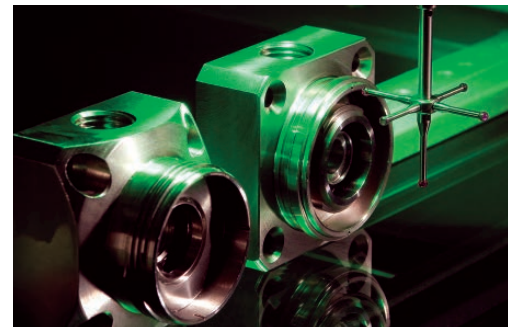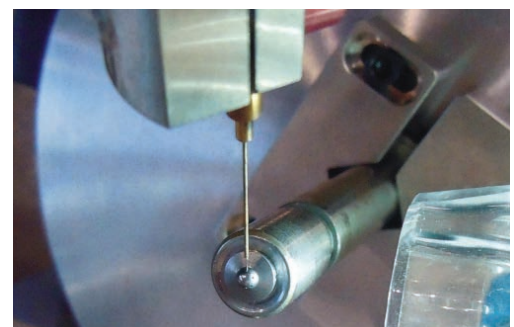

Scanning Probe (SP25M)

Add continuous contact scanning capability to a SmartScope system with the SP25M scanning probe. Easy to use, simply select a start and end point and the scanning probe follows the part profile between those points. Both programming and measurement times are greatly reduced compared to single point probing. Add a 3 or 6 port change rack for automated changing of scanning modules and stylus holders.

Feather Probe™

Feather Probes use a specific sensing technology to determine when a resonating stylus has come close enough to a surface to dampen its resonance. This sensor can acquire a data point with only milligrams of force. Its small size makes it perfect for measuring micro-miniature or fragile components.

Articulating Probe Head (PH10M PLUS)

For the ultimate in probing flexibility use either a touch trigger or scanning probe with a PH10M PLUS articulating head. Available on SmartScope Quest™ 450, 650 and 800 models with 400 mm Z, the articulating head increases throughput by adding the capability of program-controlled probe re-orientation.


Triangulation Laser Sensors

Laser sensors excel at fast, accurate Z-axis point acquisition. Use a laser for height, depth and planar measurements, or for surface profiling on complex curves and surfaces. Laser sensors may be through-the-lens (TTL) or off-axis (DRS™).
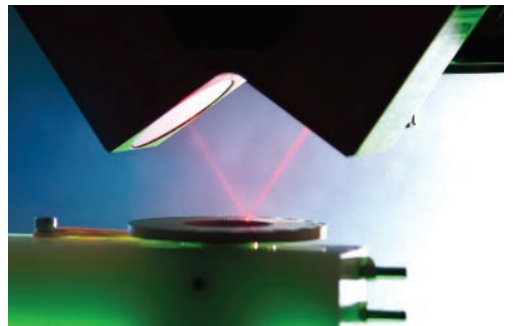
TeleStar® Interferometric Sensors

TeleStar interferometric sensors measure by analyzing the interference of projected and reflected laser light. Long working distances and shallow return angles allow measurements deep inside bores and blind holes. TeleStar sensors may be through-the-lens (TTL) or off-axis (TeleStar Probe).
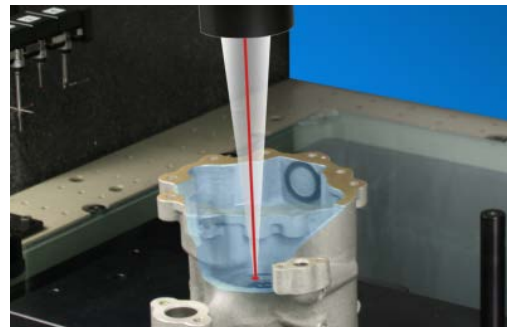

Rainbow Probe™

Chromatic white light sensors analyze the optical spectrum of reflected white light to measure surface height changes on transparent, translucent, fragile or liquid surfaces.

Rotary Indexers (4th & 5th Axis)

Symmetric parts and parts with important features on many sides can be fully characterized on a SmartScope system with a rotary indexer. Available with different capacities and resolutions, rotaries allow complete measurement in a single setup. Dual-axis rotaries, comprised of two rotaries mounted together, provides full 5-axis capabilities.
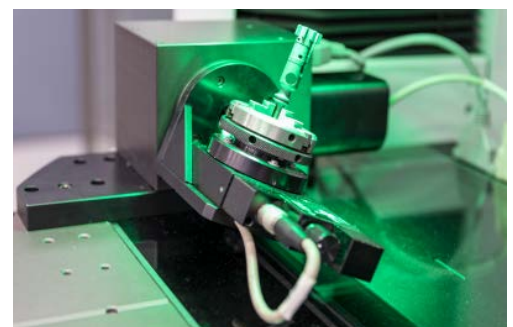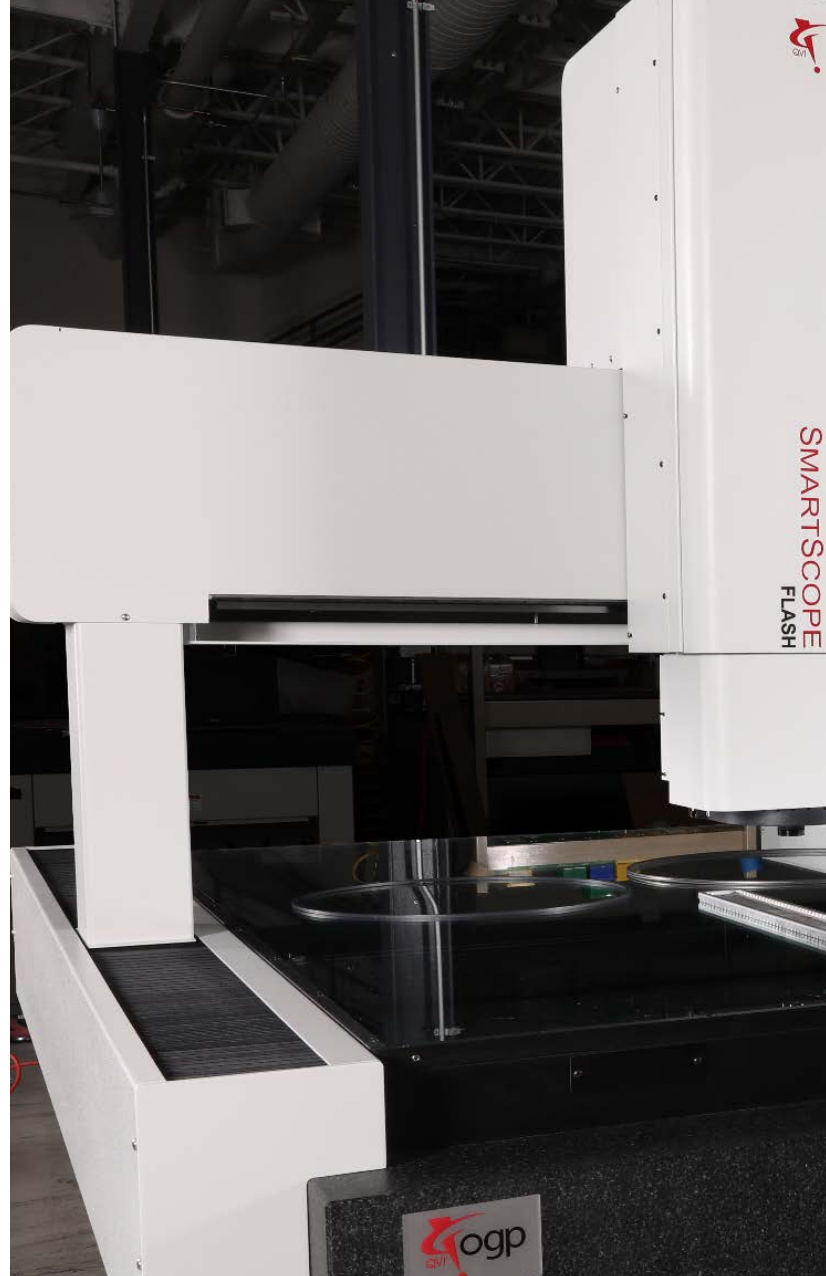
SmartScope Flash

General Purpose Multisensor Measurement

SmartScope Flash systems are versatile "all-in-one" multisensor measuring systems built to handle a wide variety of measurement tasks. The Flash product line offers the largest range of XYZ machine travels, from 200x200x150 mm to 650x1200x400 mm, as well as models with expansive XY travels up to 1500x2000 mm, to easily accommodate very large parts.

A 12:1 zoom metrology lens features patented AccuCentric® that auto-compensates itself after every magnification change. Flash offers a range of innovative illumination sources for video measurements. Substage profile light, coaxial surface light, and the SmartRing™ white LED oblique illuminator are standard on all Flash systems.

SmartScope Flash can be configured as an economical yet capable multisensor metrology system, with numerous combinations of touch probes, scanning probes, micro-probes, and lasers. SmartScope Flash systems are extremely popular, with thousands in service worldwide.

SmartScope Flash Benchtop Systems

SmartScope Flash 200

- Benchtop, Elevating Bridge
- 200x200x150 mm
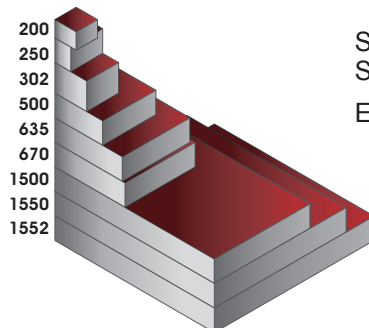- Options: touch probe, scanning probe, TTL laser, Feather Probe™
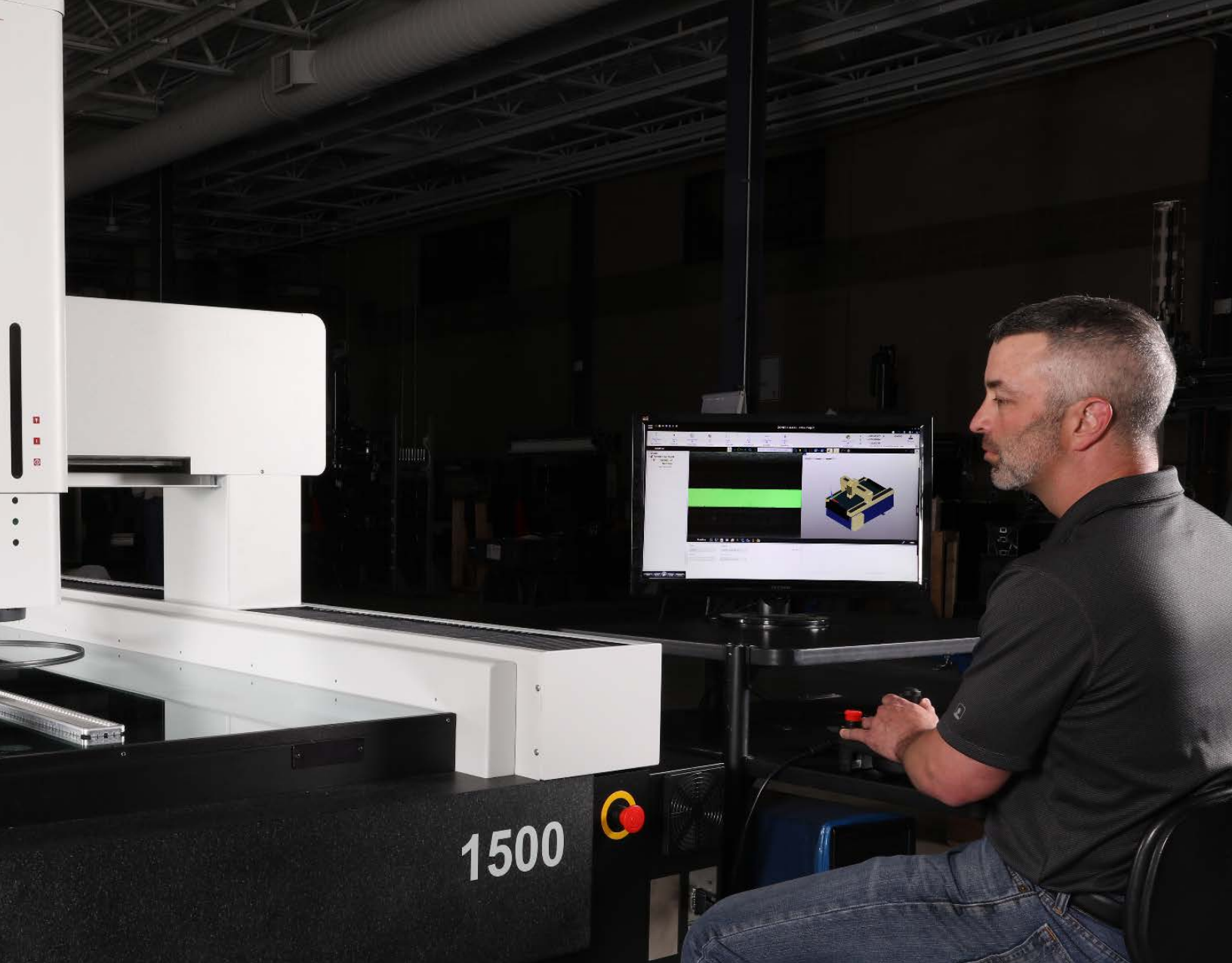
SmartScope Flash 250

- Benchtop, Compound Stage
- 300x150x200 mm
- Options: touch probe, scanning probe, TTL or DRS™ laser, Feather Probe™, Rainbow Probe™

SmartScope Flash 302

- Benchtop, Elevating Bridge
- 300x300x250 mm
- Options: touch probe, scanning probe, TTL laser, Feather Probe™

200
250
302
500
635
670
1500
1550
1552

Stage Travel (mm) for all SmartScope Flash Models.

Extended travels available.

All sizes reflect stage travel.

SmartScope Flash Floor Models

SmartScope Flash 500

- Floor Model, Fixed Bridge
- 500x450x200 mm, Ext Y 610 mm (opt), Ext Z 300 or 400 mm (opt)
- Options: touch probe, scanning probe, TTL or DRS™ laser, Feather Probe™, Rainbow Probe™

SmartScope Flash 635

- Floor Model, High Velocity Moving Bridge
- 635x635x200 mm, Ext Y 850 mm (opt)
- Options: touch probe, scanning probe, TTL or DRS™ laser, Feather Probe™, Rainbow Probe™

SmartScope Flash 670

- Floor Model, Moving Bridge
- 650x660x200 mm, Ext Y 1200 mm (opt), Ext Z 300 or 400 mm (opt)
- Options: touch probe, scanning probe, TTL or DRS™ laser, Feather Probe™, Rainbow Probe™

SmartScope Flash 1500/1550/1552

- Floor Model, Moving Bridge
- 900x1500x200 mm,
  1550 Model: 1240x1500x 200 mm,
  Ext Y 1800/2000 mm (opt)
  1552 Model: 1500x1500x200 mm,
  Ext Y 1800/2000 mm (opt)
- Options: touch probe, TTL or DRS™ laser, Rainbow Probe™*

* Subject to application review

7

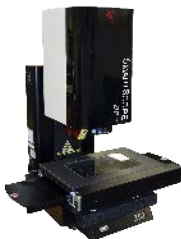# SmartScope ZIP

Entry Level to High End Multisensing

SmartScope ZIP systems offer superior optical performance and a range of machine travels to deliver reliable performance. Available in three model families, SmartScope ZIP features the proven performance of AccuCentric® auto-compensating 7:1 zoom optics.

SmartScope ZIP systems are available in a range of XYZ measurement volumes, from 250x150x200 mm to 800x820x300 mm. Multiple illumination sources – including monochromatic substage LED profile, white LED TTL surface, SmartRing™ white LED ring light, and optional VuLight™ oblique illuminator – are available to illuminate your toughest measurement challenges.

All ZIP models excel at video measurement and multisensor versatility for the highest productivity. Lite models provide ZIP benefits in value configurations. Advance models are specially configured for the toughest applications and support the optional TeleStar® Probe.

SmartScope ZIP Benchtop Systems

SmartScope ZIP Lite 250/300*

- Benchtop, Compound Stage
- 250 model: 250x150x150 mm
  Ext X 300 mm (opt)
  300 model: 300x300x150 mm
- Options: touch probe, DRS™ laser

SmartScope ZIP/ZIP Advance 250

- Benchtop, Compound Stage
- 250x150x200. Ext X 300 mm (opt)
- Options: touch probe, scanning probe, TTL or DRS™ laser, Feather Probe™, Rainbow Probe™, Telestar® Probe**

250 Lite
250 ZIP/Advance
300 Lite
300 ZIP/Advance
450
635
800
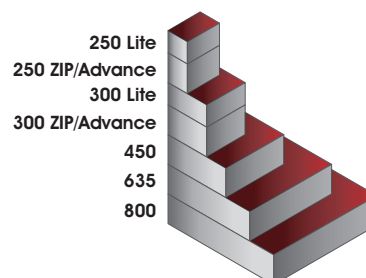
Stage Travel (mm) for all SmartScope ZIP Models.

Extended travels available.

* Grid projector not available on Zip Lite models.
**TeleStar Probe available on Zip Advance models only.

All sizes reflect stage travel.

SmartScope ZIP Floor Models

SmartScope ZIP/ZIP Advance 300

- Floor Model, Compound Stage
- 300x300x200 mm, Ext Z 300 mm (opt)
- Options: touch probe, scanning probe, TTL or DRS™ laser, Feather Probe™, Rainbow Probe™, Telestar® Probe**

SmartScope ZIP/ZIP Advance 450

- Floor Model, Fixed Bridge
- 450x450x200 mm, Ext Y 610 mm (opt), Ext Z 300 mm (opt)
- Options: touch probe, scanning probe, TTL or DRS™ laser, Feather Probe™, Rainbow Probe™, Telestar® Probe**

SmartScope ZIP 635

- Floor Model, High Velocity Moving Bridge
- 635x635x200 mm Ext Y 850 (opt)
- Options: touch probe, scanning probe, TTL or DRS™ laser, Feather Probe™, Rainbow Probe™

SmartScope ZIP/ZIP Advance 800

- Floor Model, Fixed Bridge
- 800x820x200 mm, Ext Z 300 mm (opt)
- Options: touch probe, scanning probe, TTL or DRS™ laser, Feather Probe™, Rainbow Probe™, Telestar® Probe**

SmartScope Quest

The Ultimate Multisensor System

SmartScope Quest systems are designed to provide the best performance and the highest accuracy in three-dimensional multisensor measurement. Its patented TeleStar® 10:1 zoom lens is completely telecentric and automatically calibrated throughout its zoom range, for distortion-free, high fidelity images. Generous working distances make it easy to measure large parts with machine travels from 300x150x200 mm to 790x815x400 mm. Multiple illumination sources, including substage profile light, coaxial surface light, and the SmartRing™ green LED oblique illuminator are standard on all Quest systems.

The combination of sensor tools offered by SmartScope Quest allows complete measurement of complex parts in a single setup to handle the toughest measurement challenges.

SmartScope Quest Benchtop Systems

SmartScope Quest 250

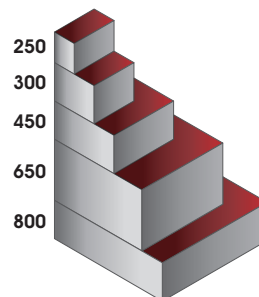- Benchtop, Compound Stage
- 300x150x200 mm
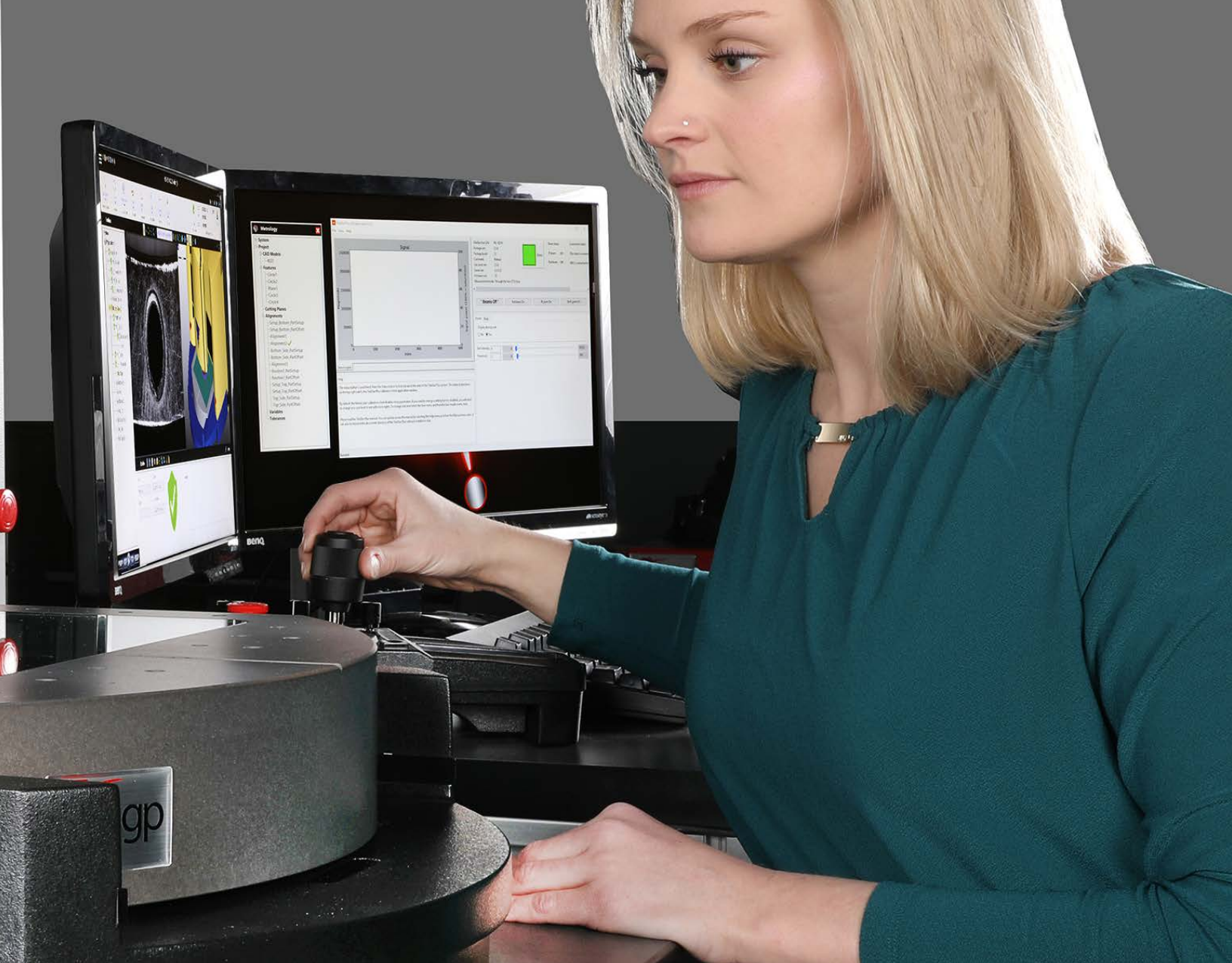- Options: touch probe, scanning probe, TeleStar® TTL or DRS™ laser, Feather Probe™, Rainbow Probe™

SmartScope Quest 300

- Benchtop, Elevating-Bridge, Air-Bearing Z-axis
- 300x300x250 mm
- Options: touch probe, scanning probe, TeleStar® TTL laser or Feather Probe™

All sizes reflect stage travel.

Stage Travel (mm) for all SmartScope Quest Models.

Extended travels available.

250
300
450
650
800

SmartScope Quest Floor Models

SmartScope Quest 450

- Floor Model, Fixed Bridge
- 450x450x250 mm, Ext Y 610 mm (opt), Ext Z 300 or 400 mm (opt)
- Options: touch probe, scanning probe, articulating probe head*, TeleStar® TTL or DRS™ laser, Feather Probe™, Rainbow Probe™

SmartScope Quest 800

- Floor Model, Fixed Bridge
- 790x815x250 mm, Ext Z 300 or 400 mm (opt)
- Options: touch probe, scanning probe, articulating probe head*, TeleStar® TTL or DRS™ laser, Feather Probe™, Rainbow Probe™

SmartScope Quest 650

- Floor Model, Fixed Bridge
- 610x660x400 mm
- Options: touch probe, scanning probe, articulating probe head, TeleStar® TTL or DRS™ laser, Feather Probe™, Rainbow Probe™

* Requires 400 mm Z axis

SmartScope SP

Optimum Scanning Probe Performance

SmartScope SP systems are designed for optimum scanning probe performance. Starting with a rigid base structure, the system mechanics are designed to optimize dynamic data acquisition critical to scanning probe performance. Most performance specifications for SP models are according to ISO 10360 standards.

SmartScope SP optics combine a wide field objective lens, digital zoom, and 5- megapixel monochrome digital camera, providing a distortion-free 16 mm diagonal field of view at low zoom, with high resolution at high zoom. Careful design of both optics and illumination sources ensure accurate imaging at all zoom levels.

SmartScope SP systems are high performance multisensor measurement systems. SmartScope SP systems are available in a range of XYZ machine travels, 300x300x200 mm to 650x660x300 mm.

The SP25M scanning probe is included as standard with all SmartScope SP models.

The optional TeleStar Plus laser offers very long working distance with sub-micron resolution. The on-axis and through-the-lens design allows laser measurement over the full measuring range of the system.
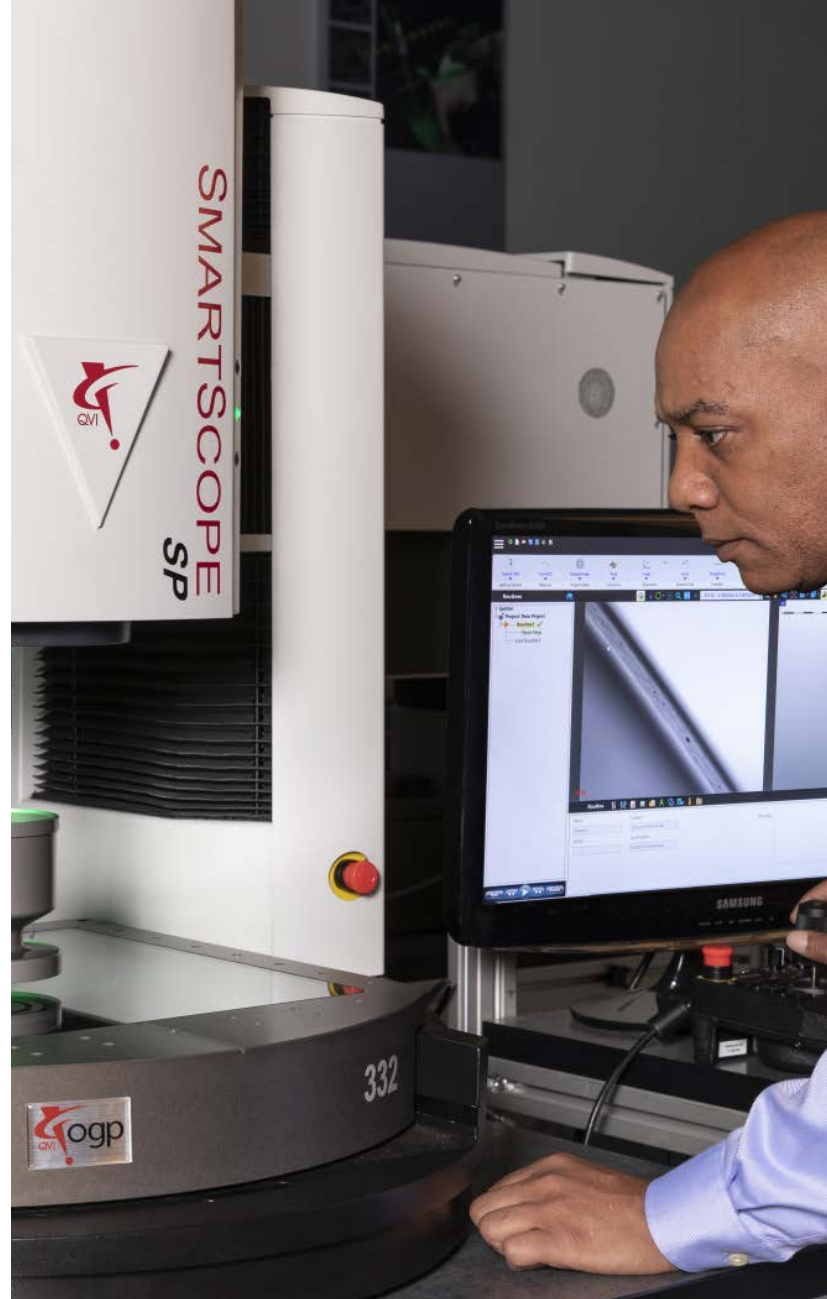
SmartScope SP Systems

SmartScope SP 332

- Benchtop, Elevating-Bridge, Air-Bearing Z-axis
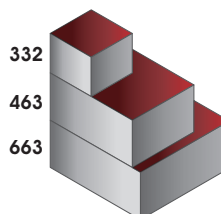- 300x300x250 mm
- Options: Telestar® TTL laser

SmartScope SP 663

- Floor Model, Moving Bridge
- 650x660x300 mm
- Options: Telestar® TTL laser

SmartScope SP 463

- Floor Model, Moving Bridge
- 450x610x300 mm
- Options: Telestar® TTL laser

332
463
663

Stage Travel (mm) for all SmartScope SP Models.

All sizes reflect stage travel.

A Size for Every Solution

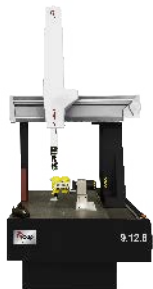
Additional Multisensor Systems from OGP

Fusion™

Fusion systems are innovative multisensor measurement system that combines a unique large field-of-view (LFOV) optical system with tactile and laser sensors to form a uniquely productive multisensor metrology system.

FlexPoint™

FlexPoint floor model systems are true multisensor systems supporting tactile (TP20/TP200 or SP25) and non-contact sensors such as the optical video probe and TeleStar interferometric laser all powered by ZONE3®. The VersaFlex™* multisensor head offers up to three simultaneously available sensors on an articulating probe head. With several sensors simultaneously available, there is no down time while individual sensors are exchanged from a change rack, and no need to recalibrate each time a sensor is used.

SNAP™

Floor model SNAP systems use a large field-of-view (LFOV) optical system with expansive XY stage travel to measure dimensions of large parts with critical details or numerous small parts automatically. Off-axis DRS laser and touch probe can optionally added for Z-axis measurements.


SprintMVP™

SprintMVP systems set the standard for fully automatic 3-axis measurement performance. Rugged granite construction, precision motorized stages and flexible zoom optics handle a wide range of measurement needs. Optional off-axis DRS laser and touch probe make SprintMVP's true multisensor systems.

SparkMVP™

SparkMVP systems offer fully automatic 3-axis CNC operation. Solid granite bases, high speed motorized stages and precision scales create a stable foundation for the high-resolution optics. Optional TTL laser, focus grid projector and touch probe extend SparkMVP's capabilities to a broad range of applications.

*US Patent Number 10 222 207 B2
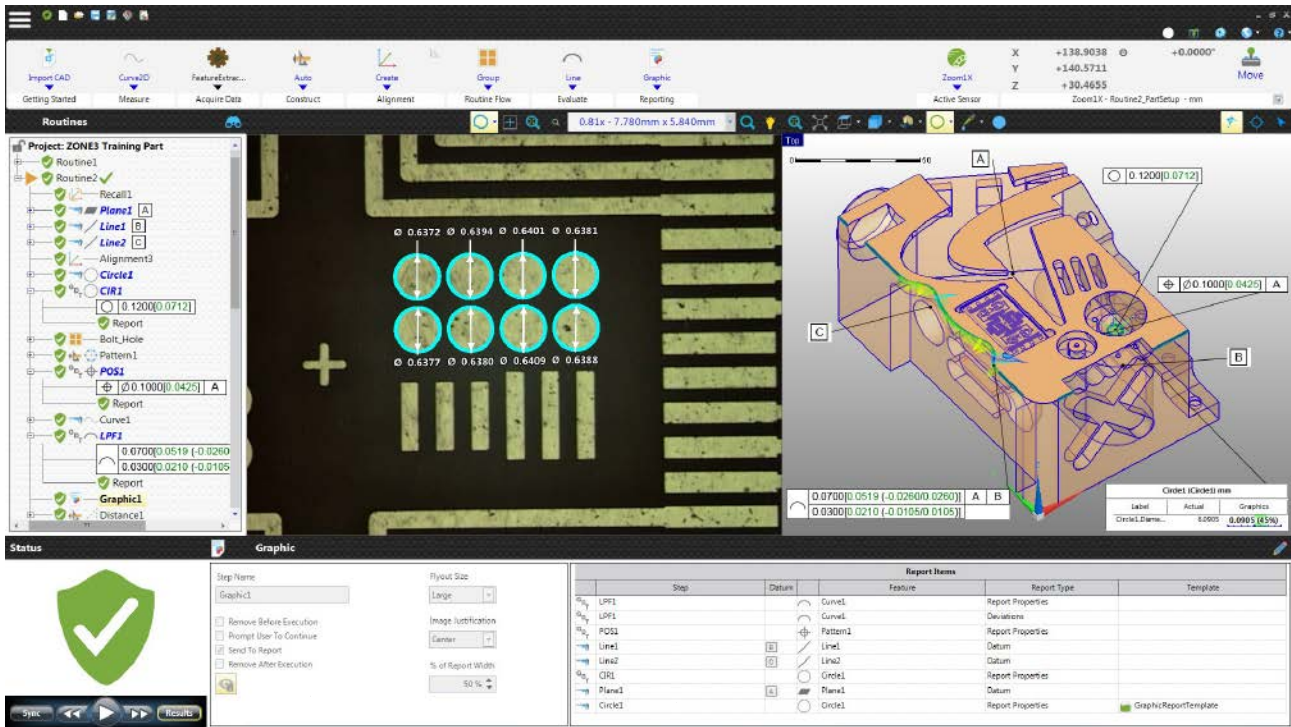
ZONE3 metrology software puts the power of OGP's 30+ years of multisensor experience into your measurement system for faster, easier and more productive measurements than ever before.

- **ZONE3 is fast.** Synchronous, full field image processing and high-speed cameras allow entire scenes to be measured instantly.

- **ZONE3 is capable.** Full multisensor capability, including scanning laser and scanning probe support, GD&T and custom scripting.

- **ZONE3 is easy to learn.** Regardless of which member of the ZONE3 family you use — Express, Prime, Pro or Offline — alignments, measurements and constructions are shown graphically in real time. The same procedures are used for all sensors. Learn one, you've learned them all.

ZONE3 integrates seamlessly with other OGP metrology applications through the Portal. You can retain a library of MeasureMind® 3D and Measure-X® routines and continue to run them from within their native applications, while taking advantage of new and advanced capabilities by adding ZONE3 to your SmartScope® multisensor system.

MeasureMind3D to ZONE3 Translator

ZONE3 offers a time-saving method to convert a MeasureMind3D routine into a ZONE3 project. You can open a MeasureMind3D routine file (.rtn) in ZONE3, examine the generated part routine consisting of converted steps, edit the steps as needed, and save the resulting ZONE3 project file (.qpf).
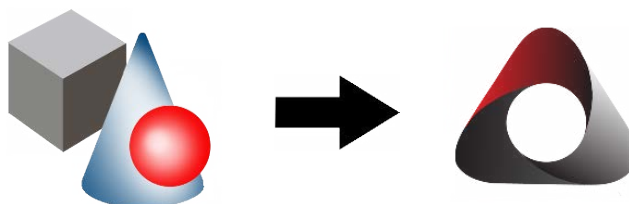
Manual Measurement
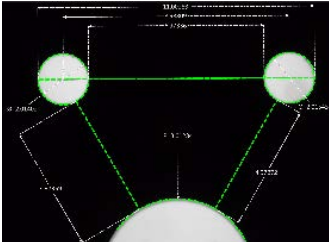
Use manual targets to make quick and easy walk up measurements.

- No need to set up a part or import a CAD file.
- Manual measurements can be read directly off the DRO.

Use **FeatureExtractor** to automatically identify and measure features visible within the FOV.

- With one click, all prominent features are displayed as flyouts in the video window.
- Interactively hover over features to see relationships to other geometries.

Automatic Edge Analysis Tools
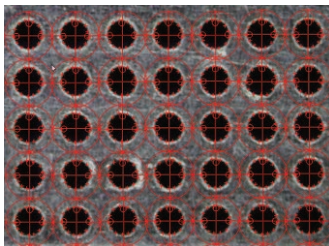
FeatureFinder™ enables you to measure practically any kind of edge quickly and easily. When you select an edge from the video image, it automatically finds the points along the selected geometric shape (line, arc or circle), performs all the edge analyses, and displays the measurements.

SnapShot Parallel Processing combined with intelligent routine **Optimization** allows the simultaneous measurement of as many features as can be seen.

Visual Validation: Guiding You Through the Measurement Process

ZONE3 previews offer visual validation of each operation before it's executed. You get immediate visual feedback so common errors and unintended consequences are avoided.
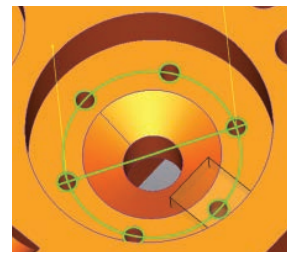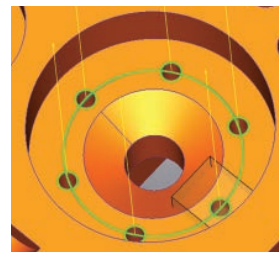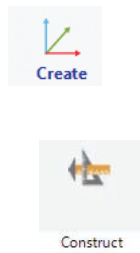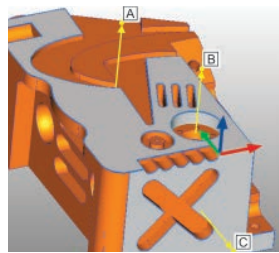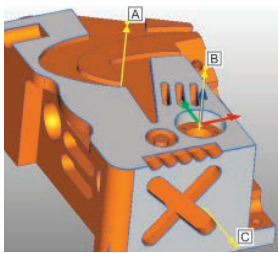
Two different outcomes based on the user's selection of Datums A-B-C (left), or A-C-B (right).

Constructions of bolt hole circle and maximum distance between two holes in that circle.

Path Generation

ZONE3 AutoPath uses CAD nominals to automatically create an optimal path for each measurement. AutoPath is fully multisensor capable. Use AutoPath with any sensor.

Video   Touch Probe   Laser
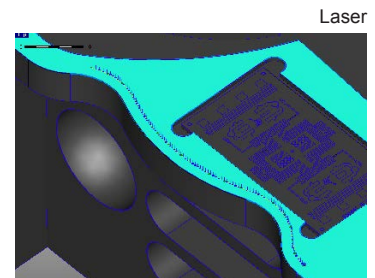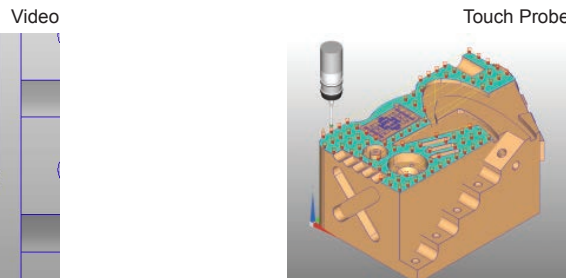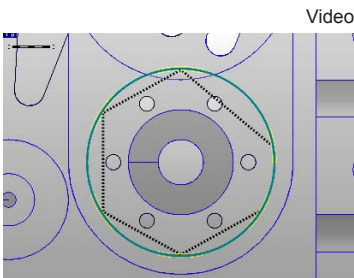
Reporting

- ZONE3 recognizes ASME Y14.5 and ISO 1101 standards for GD&T.
- Animated tolerance zones* allow you to visualize the specified tolerance condition.
- Specialized modules are available for Roughness, Gear, and Thread Evaluation
- Results can be output to PDF, Excel, or graphically to truly visualize the result.

*US Patent Number 8 793 097 B2

Global Sales & Support Offices

North and South America
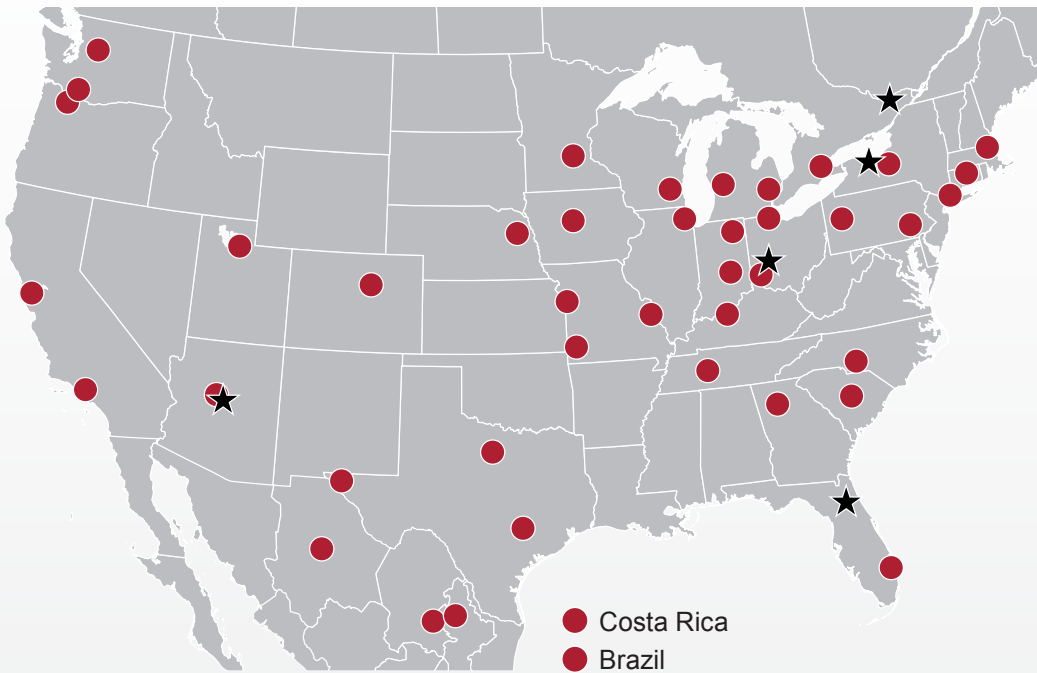
Support Office Locations:

Americas
- Rochester, NY, USA
- Dayton, OH, USA
- Gainesville, FL, USA
- Tempe, AZ, USA
- Ottawa, Canada

Europe
- Budapest, Hungary
- Hofheim-Wallau, Germany
- Turin, Italy

Asia
- Beijing, Shanghai, Suzhou, Xi'an, China
- Bengaluru & Pune, India
- Singapore
- Tokyo, Japan

★ Support Offices
● Sales Representatives
● Agents

● Costa Rica
● Brazil

Europe and Africa

● Israel
● South Africa

Asia

● Australia
● Indonesia

Confidence. When Results Matter.