

# ROMER

HEXAGON METROLOGY



## ROMER

Portable Coordinate Measurement Systems



## **ROMER portable coordinate measuring machines are unlike traditional CMMs.**

Designed with inherent flexibility and versatility that stationary CMMs simply can't match, ROMER portable CMMs are ideal for dimensional inspection, measurement and reverse engineering applications on the shop floor or in the metrology lab. They're the perfect answer for workpieces that are impractical or impossible to measure on a frame CMM. Available in six- and seven-axis configurations, ROMER portable CMMs provide measuring ranges from 4' to 15' (1.2m to 4.6m). ROMER measuring equipment is used worldwide in the automotive, aerospace and general manufacturing industries. In addition to portable CMMs, ROMER offers a complete selection of software and accessories to provide total metrology solutions.



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**ROMER portable CMMs and accessory systems offer the ideal metrology solution for large, unwieldy workpieces.**

Here, the patented ROMER GridLOK® measuring system and INFINITE™ portable CMM combine in an economical, easy-to-use dimensional inspection system that provides high volumetric accuracy in an extremely large measuring area.



# INFINITE™ Portable CMM

The INFINITE CMM is the most accurate and versatile articulating arm ROMER has ever made – patented infinite rotation, quick-change probes, exclusive wireless connectivity and battery power provide *INFINITE* portability. ROMER provides system verification “in the field” with a NIST-traceable calibrated length standard with every arm. This allows the operator to easily verify and document system performance for ISO or vender requirements.



*Back view of base*

## INFINITE seven-axis laser scanning/hard probe CMM

Provides real-time laser scanning capability for inspection and reverse engineering applications. Infinite rotation and internal cable design enables access to those difficult-to-reach places. Accommodates third-party scanner hardware.



**1.** Patented infinite rotation of principle axes allows inspection in difficult-to-reach areas.

**2.** Integrated Wi-Fi wireless communication (WIFI 8.02.11b) allows the operator to position

the computer where it is most convenient.

**3.** A Li-Ion battery is ideal for on-site inspection when AC power is not available or where cables are a problem. A new patent-pending environmentally sealed battery cover prevents contamination of the battery compartment or accidental dislodging of the battery.

**4.** Universal magnetic mounting system for a smaller footprint and simplified set-up.

**5.** Heidenhain encoders, manufactured to our specifications, and our "wide-track" bearing support design enhances performance.

**6.** Low-profile Zero-G counterbalance reduces fatigue and provides ergonomic handling.

**7.** Advanced carbon fiber arm tubes are strong, light weight, dimensionally stable and feature a lifetime warranty.

**8.** Carbon fiber probes feature automatic probe recognition.

**9.** An integrated digital USB camera works with special software applications and allows the operator to graphically document a setup.

The INFINITE CMM features next-generation electronics with on-board diagnostics. WinRDS™ and HighRES™ software is standard, along with 15mm ball, 6mm ruby tip and point tip carbon fiber shaft probes. Arm lengths for 4', 6', 8', 9', 10' and 12' (1.2m, 1.8m, 2.4m, 2.8m, 3.0m and 3.6m) measuring envelopes are available.



# STINGER Ili™ Portable CMM

The **NEW** STINGER Ili brings ROMER's patented infinite rotation portable CMM technology within your reach. It's the versatile, lower-cost solution for hundreds of inspection, measurement and reverse engineering applications. You can take a STINGER Ili to virtually any large part or fixture and begin inspection quickly and easily. STINGER Ili's compact design, weighing just 8 to 10 lbs. (3.6 to 4.5 kg), lets you move it easily throughout a job site.



- Patented Infinite Rotation of the principle axes allows easy inspection of hard-to-reach areas.
- Intelligent quick-change probes can be changed on-the-fly without tools or recalibration.
- Integrated ZERO-G counterbalance offsets arm weight, allowing one-handed operation.
- Carbon graphite composite arms are strong, light weight and dimensionally stable. ROMER's carbon graphite arm tubes feature a lifetime warranty.
- System verification capability – ROMER arms provide verification “in the field” with our NIST-traceable calibrated length standard.
- Available in measuring ranges from 8' to 12' (2.4m to 3.6m) to meet any measurement challenge.



STINGER Ili options include a laptop or desktop computer, PC-DMIS®, PowerINSPECT™ or PowerINSPECT Lite™ software (see page 11), magnetic base, portable stands and a wide range of probes.

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## STINGER II™

The original STINGER II offers the benefits of ROMER portable CMM technology at the lowest cost, providing a light weight arm that matches the accuracy specifications of the **NEW** STINGER III. For applications that don't require infinite rotation, or the accuracy of an INFINITE CMM arm, the STINGER II is your ideal solution. Available in measuring ranges from 6' to 15' (1.8m to 4.6m).



## ROMER's Laser Scanning Inspection system . . .

. . . combines portable CMM flexibility with laser scanning to provide real-time surface inspection.

The Laser Scanning Inspection system collects and analyzes more than 23,000 points per second, comparing each point scanned to a CAD model in real-time. Plus, with so many scanned points, you get far more detailed inspection of both geometric and surface features than with a conventional touch-trigger probe.

- Non-contact laser scanning avoids marring of sensitive surfaces or deflection of thin and/or soft materials.
- Real-time inspection enables rapid identification of errors, allowing quick correction.
- Data can be used for more detailed off-line analysis and reporting via a wide range of editing options.
- It's ideal for generating point clouds for reverse-engineering applications. The point-cloud file can be output to CAD applications in a variety of formats.
- Data management is simplified by combining laser scan data with original CAD data, the sequence of operations, and inspection reports in a single file.

A Laser Scanning Inspection system includes a six- or seven-axis portable CMM, a laser scanning probe, and PowerINSPECT full-featured geometric and surface inspection software — all in one affordable, turnkey package.



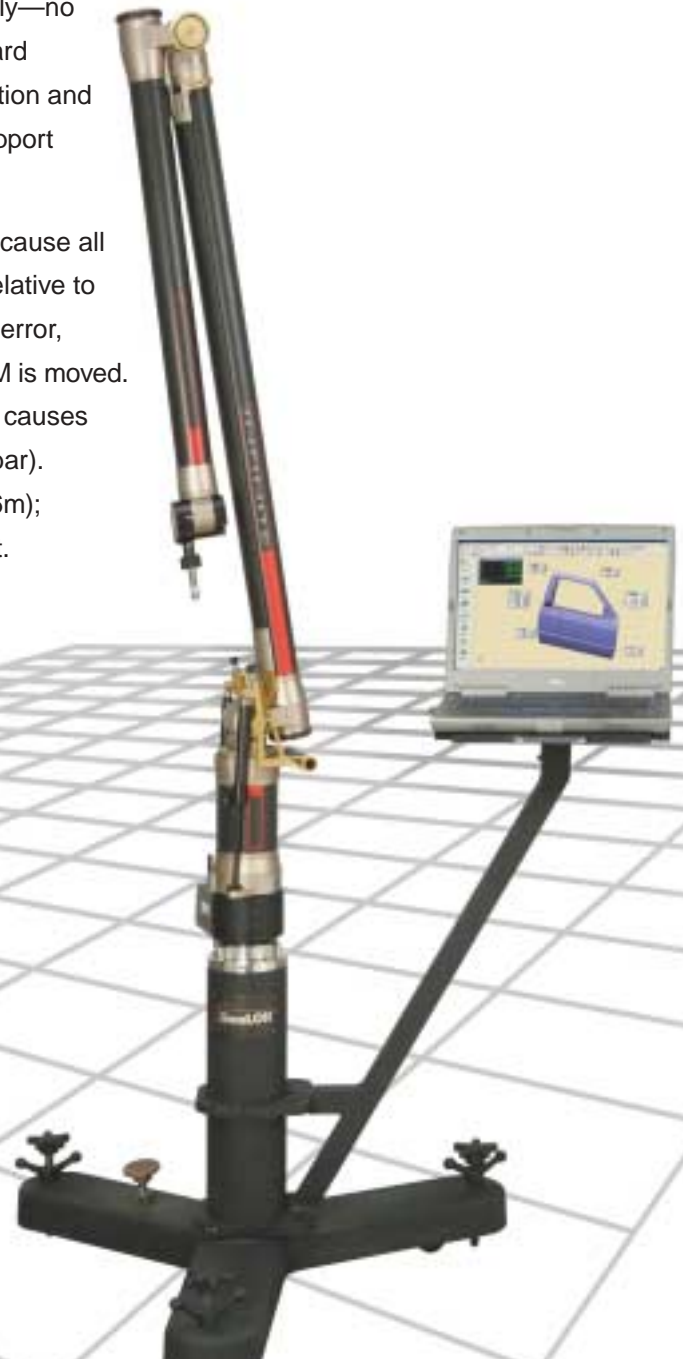
# GridLOK<sup>®</sup>

The GridLOK measurement system combines with a ROMER portable CMM to create a giant CMM — one that covers a remarkably large inspection envelope. Unlike large stationary or gantry CMMs, GridLOK's patented design lets you measure anywhere you need, including inside, behind, and underneath large workpieces. With GridLOK, you can handle inspection tasks easily, quickly and economically.



GridLOK lets you establish an absolute reference point for any point within its 3D area. It consists primarily of a grid system with conical seats installed in a concrete floor or steel plate. Simply touch the ball probe into three different conical seats forming a right angle and the portable CMM is locked-in automatically—no program interruption, button pushing or keyboard selections. GridLOK includes software, installation and certification of the grid, and a portable CMM support stand with laptop holder.

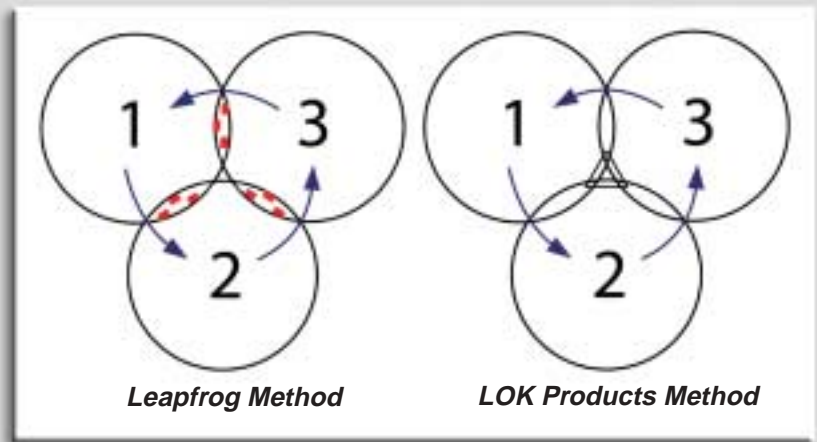
GridLOK enhances measurement accuracy because all measured points are in absolute dimensions relative to the same part origin—there's no accumulative error, regardless of how many times the portable CMM is moved. This replaces the old "leapfrog" method, which causes accumulative accuracy deterioration (see sidebar). Standard measuring volume is 13' x 20' (4m x 6m); other measuring volumes quoted upon request.



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## Avoid “Leapfrogging”

The circles in the figures illustrate three measuring volume “leaps” of a portable CMM as it moves around a large workpiece. The old “leapfrog” method requires a new reference point each time the CMM moves (shown by the red targets); measuring uncertainty compounds with each leap. ROMER SpaceLOK (shown) and GridLOK systems establish an absolute reference point, so measuring uncertainty doesn’t accumulate.



## SpaceLOK™

SpaceLOK multiplies the volumetric measuring area of your ROMER portable CMM without increasing arm measuring uncertainty. SpaceLOK enhances measuring accuracy since all point locations are known and there is no accumulated error when relocating within the measurement volume (such as with the “leapfrog method”).

SpaceLOK is easy to use—after referencing the ROMER arm to one of the three SpaceLOK facets, the user repositions the arm, touches off three points, and the system automatically relocates. No user interface needed and nothing additional required for operation. Simply set-up and begin measuring your large-volume applications.



## TooLOK™

Automated inspection and set-up of fixtures, tools and parts is easy with TooLOK—just contact three pre-qualified points on a workpiece with the CMM probe, and TooLOK automatically recognizes and aligns the fixture, tool or part, and loads the CAD file and inspection routine. With TooLOK you can

- Dramatically reduce set-up time and eliminate searching through hundreds of files.
- Ensure consistency between operators via programmed inspection routines. A simple-to-use TooLOK wizard allows users to generate a “LOK” for a workpiece. Once the LOK is established, a repeatable inspection routine is easily stored for recall.



# DOCS™ Tube Inspection

The DOCS (Data Overlay Camera System) software package allows inspection of a tube's surface features, providing true tube surface data – not a hypothetical reconstruction. DOCS combines tube and geometric measurement in a single software solution; there's no need to run multiple applications to measure with contact and non-contact probes.



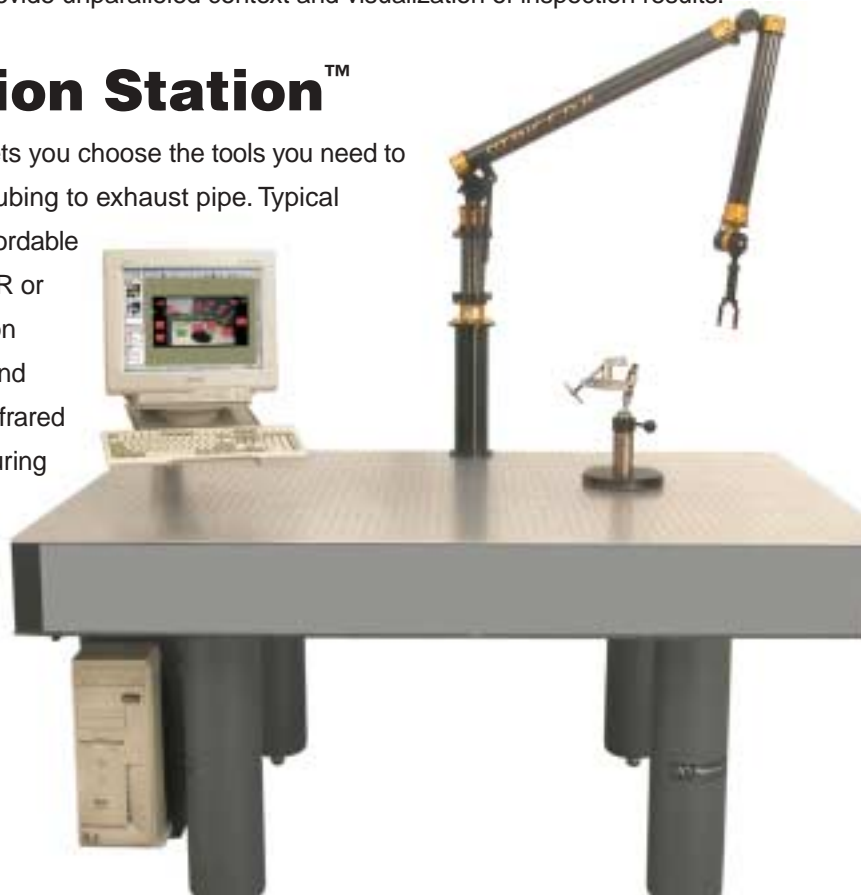
With DOCS, you can

- Group multiple tubes in one part file.
- Inspect all the parts of a tube in real-time, including bends and fittings, as well as locate brackets, tabs, flanges, and fittings.
- Import CAD files and extract all tube geometry and bend data.
- Generate HTML-formatted, industry-standard reports, including complete graphics.
- Extract from a tube file the individual cylinders, inspection points and end planes with a single click.

DOCS can communicate with CNC tube benders via Tube Shop Manager (required bender interface not included). Plus, you can use TransProjection™ and the digital camera built into ROMER's INFINITE portable CMM to overlay inspection geometry onto digital photos of the inspected part. The merged measured data and photographs provide unparalleled context and visualization of inspection results.

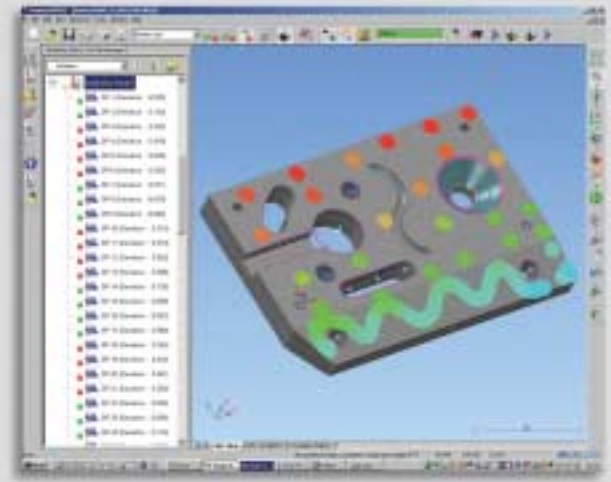
## Tube Inspection Station™

The Tube Inspection Station (TIS) lets you choose the tools you need to inspect everything from hydraulic tubing to exhaust pipe. Typical equipment needed for accurate, affordable tube inspection includes a STINGER or INFINITE portable CMM, inspection table, computer, DOCS software and various accessories. Non-contact infrared tube probes are available for measuring wire to 150mm tubes. An optional magnetic base allows the operator to bring tube inspection capability to where it is required.



## PowerINSPECT™ is a powerful inspection and reverse-engineering software package.

PowerINSPECT compares a part or tool against a 3D CAD model, highlighting discrepancies using color-coded graphics for immediate validation of each data point. Operators can visualize a part with shaded view rendering and colored data points showing tolerance values. Reports are output in easily customizable HTML format. For applications that don't require CAD-to-part comparison, PowerINSPECT Lite™ is a low-cost solution offering much of PowerINSPECT's functionality.




## PC-DMIS® Portable

With the world's largest installed base of any measurement and inspection software, PC-DMIS is the ideal match for ROMER portable CMMs. PC-DMIS Portable makes it easy for operators to inspect parts and generate clear, concise CAD-to-part reports.

- **Quick Start GUI** – Operators can make full use of frequently used capabilities without being overwhelmed with detail. When they are needed, PC-DMIS's full capabilities are only a couple of mouse clicks away.
- **Any-Order Measure™** – Lets operators probe parts in the most convenient and efficient order without having to follow the steps of an inspection routine. The software keeps track of what is measured and only evaluates dimensions when all of the necessary information is available.
- **Aligning contoured parts** – PC-DMIS Portable quickly aligns even the most complex parts. An optional CAD++ configuration includes a range of algorithms for best fit and iterative alignments.
- **Sheetmetal measurements** – PC-DMIS Portable offers an optional library of sheetmetal measurement routines. During probing the software automatically switches between using the probe tip and shank measurement as necessary.
- **Free interactive portable tutorials** – PC-DMIS Portable includes a complete, interactive tutorial to reinforce concepts learned during software training.
- **Compatibility with numerous file types and CAD systems** – PC-DMIS has translators for nearly any CAD format. Also available are optional direct CAD interfaces, so that files do not need to be translated for use in PC-DMIS. This reduces programming time and improves accuracy.
- **Customizable reporting tools** – Interface with commonly-used standards such as Microsoft Excel™, PDF and RTF files.





Responding to needs throughout industry for portable, flexible solutions to measurement and inspection applications, ROMER® began in 1973 with the patenting and marketing of the first multi-axis articulated arm for tube inspection.

Since then, ROMER has continued to lead the field with technological innovations such as our infinite rotation arm design (patented in 1998), Wi-Fi wireless connectivity, integrated USB camera and battery operation. Advanced dimensional inspection products have included the 1000 Series portable CMM, Linear Rail System, 3000i™ portable CMM, GridLOK® 3D large volume measurement system, STINGER II™ and INFINITE™ series CMMs.

Factory authorized Service Centers throughout the world support ROMER portable CMMs with complete training, maintenance, repair, applications assistance and other dimensional measurement services.

#### **Hexagon Metrology™**

The Hexagon Metrology group of Hexagon AB (Sweden) is the world's largest manufacturer of precision dimensional measurement equipment and software, with ten manufacturing facilities on four continents and more than sixty sales and support locations worldwide. The group consists of metrology brands Brown & Sharpe®, CE Johansson, DEA®, Leica Geosystems, Leitz™, PC-DMIS®, ROMER®, Sheffield Measurement®, and TESA®. Together, the group is the world market share leader in coordinate measurement systems.

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