Hexagon Metrology is a world leading supplier of precision industrial metrology products, ranging from manual gages to coordinate measuring machines and robots, from advanced metrology software to integrated systems for quality assurance.

Hexagon Metrology represents the largest concentration of internationally recognized brands in the dimensional metrology market in terms of product line width, superior technological level, and extended market presence.

Hexagon Metrology’s complete range of Portable CMM solutions includes articulated arms, laser trackers, wireless probes, hand-held contactless scanners and white light scanners.

The CMM product line, the most comprehensive currently on the market from a single supplier, ranges from small manual bridge machines to very large systems for the aerospace industry, to ultra-high precision, sub-micron CMMs. In addition to conventional and Portable CMMs, Hexagon Metrology product line includes but is not limited to sensors (contact and non-contact), software, after-market service and support.

Norbert Hanke
CEO & President Hexagon Metrology
Contents

4  Portable CMMs
Portable measuring arms, Absolute Trackers, "Walk-Around" probes, hand-held scanners, theodolites, laser stations, white light scanners

38  CMMs
Bridge CMMs
Gantry CMMs
Horizontal arm CMMs
Measurement robots
Optical and multisensor systems

Sensors (contact and non-contact)
10  Articulated arms
24  Absolute Trackers
68  CMMs
78  Vision
80  CMMs

Software
12  Articulated arms
28  Absolute Trackers & theodolites
34  White light scanners
94  CMMs

103  After-market service & support

104  Contacts
Coordinate measuring machines for research, development, production and assembly in their most mobile form – this is what ROMER stands for in the global Hexagon Metrology network. The portable measuring arms in which Romer specialises are produced in compliance with stringent quality and environmental standards. ROMER portable measuring arms permit tactile or optical 3D measurement. Stability, low weight and simple operation are their key advantages. ROMER. Metrology to go. www.romer.com
<table>
<thead>
<tr>
<th>Page</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>ROMER Absolute Arm</td>
</tr>
<tr>
<td>9</td>
<td>ROMER Multi Gage</td>
</tr>
<tr>
<td>10</td>
<td>Perceptron ScanWorks V4</td>
</tr>
<tr>
<td></td>
<td>Perceptron ScanWorks V5</td>
</tr>
<tr>
<td>11</td>
<td>ROMER Arm Tube</td>
</tr>
<tr>
<td>12</td>
<td>Software for Portable Measuring Arms</td>
</tr>
<tr>
<td>14</td>
<td>Software for Laser Scanners</td>
</tr>
<tr>
<td>15</td>
<td>Software for Tube Inspection Systems</td>
</tr>
<tr>
<td>103</td>
<td>After-market service &amp; support</td>
</tr>
<tr>
<td>104</td>
<td>Contacts</td>
</tr>
</tbody>
</table>
A portable measuring arm is a good investment. The time required to train users is minimal – even unpracticed personnel will produce reliable measuring results in a short time due to the user-friendliness of the **ROMER Absolute Arm**. Inspection and control throughput is increased dramatically, and because the ROMER Absolute Arm helps to ensure quality, there is a fast return on investment. Increase productivity and minimise off-spec production – in the long term and with absolute efficiency.

**Good for buyers – good for nature**

The ROMER Absolute Arm respects scarce resources – both in tight budgets and the environment. One of the central Hexagon corporate values is corporate responsibility. The ROMER Absolute Arm meets the Hexagon Group standard defined for environmentally compatible cutting-edge technology. The ROMER Absolute Arm stands for a low level of energy consumption. All parts comply with stringent ecological regulations.
ROMER Feature Packs unfold the full potential of a portable measuring arm. These optional feature packs utilise the ROMER Feature Pack Port interface. All extensions are perfectly coordinated with the ROMER Absolute Arm and are part of an integrated system. Several Feature Packs are available for the ROMER Absolute Arm.

The ROMER Absolute Arm has a specific standard for data communication. If required, with the ROMER Feature Pack Port interface, the Absolute Arm can be used as a fully wireless CMM.

RDS is the virtual image of a ROMER measuring arm. This software with its intuitive operation facilitates probe calibration and includes a diagnosis function for checking the measuring accuracy of the arm in compliance with international standards.

**ROMER ergonomics – accuracy made easy.** Carbon fibre structure. Absolute operational safety with SpinGrip and a handle with incorporated mouse function. Illumination of the part and an integrated digital camera are available upon request. Overall weight only 7.7 kg/17 lbs (2.5 m/8.2 ft. arm). The ROMER Absolute Arm is an all-round balanced measuring instrument. Its operation is a matter of routine after only a few hours, even in locations where traditional CMMs would never perform.
ROMER Absolute Encoders
A first in the world of portable measuring arms: The ROMER Absolute Arm features absolute encoders and is therefore the first measuring arm which does not require referencing before measurement. Absolute Encoders simplify the operation: When the arm is turned on, it’s ready to go.

Infinite Rotation
ROMER’s patented infinite rotation of the principal axes allows a comfortable inspection of hard-to-reach areas.

Zero-G counterbalance
An optimized counterbalance reduces operator fatigue and delivers effortless control in all positions, including above and below the centreline.
ROMER Multi Gage is the easy-to-handle portable CMM, with its innovative design and ROMER-exclusive features such as counter-weight, WiFi, plug-and-measure probes, and intuitive Multi Gage software make it the must-have 3D measurement tool for improving your productivity.

Designed exclusively for today’s machine shop, the six-axis ROMER Multi Gage is a portable precision CMM with a 1.2 m measuring volume. The ROMER Multi Gage is used for dimensional control of molds, parts, tooling, castings, and more. Its quickmount system allows the CMM to be setup for on-demand measurement and inspection of parts or assemblies on your machine tool or anywhere on the shop floor.
Perceptron ScanWorks V4 is a scanning solution best suited for reverse engineering and inspection applications. ROMER's 7-axis articulated arm brings the benefits and flexibility of Portable CMM to laser scanning, allowing reverse engineering, real-time surface and geometric inspections of parts and providing access to hard-to-reach work piece areas using the Perceptron 3D scanning probe.

Perceptron ScanWorks V5 captures up to 458,000 points per second, comparing each point scanned to a CAD model in real-time. With so many scanned points, you get far more detailed inspection of both geometric and surface features than with a conventional touch probe. The V5 Laser Scanning Probe can gather up to 25 times more points per second than other laser systems. It’s perfect for quick surface inspection of large, complex areas and generating point clouds for reverse engineering.
ROMER Arm Tube – Non contact tube inspection

The quick non-contact measurement solution for the inspection of benttubes in your work shop. ROMER Arm Tube is the ideal solution especially designed for tube shop and mainly in automotive, aerospace, furniture, air conditioning and subcontracting industries.

The latest technology in non-contact measurement:
- Non contact infrared and laser technology
- No tube deflection during measurement
- Simple and double precision measurement
- Works with 180° bend angles
- Option to move tubes during measurement
- Automatic bender adjustment through network or serial link
- Cost effective solution: no more expensive masters needed
- Minimum down time for new tubes in production
- Optional motorized digital rail for ArmTube for measuring tubes of up to 6m in length
PC-DMIS® Portable

PC-DMIS Portable brings powerful metrology tools to the shop floor. Portable measurement devices have changed the way manufacturers monitor their operations. It’s now possible to take more measurements and do more sophisticated analysis of the results right where parts are made and assembled.

To take full advantage of portable measurement machines requires software to match their unique capabilities. PC-DMIS Portable does just that. It is a precise adaptation of PC-DMIS CMM. Without compromising on usefulness, it makes it easy for shop floor personnel to measure parts with minimal training and maximum effectiveness.

Compatibility – PC-DMIS Portable is available as standard equipment on all Hexagon Metrology’s portable CMMs. It is also available as a retrofit to equipment for other manufacturers.

Sharing Programs and Training – Because it is part of the EMS suite of software products, PC-DMIS Portable can use programs and parts of programs developed on other EMS platforms. This eliminates wasteful duplication of effort and potential for errors. Plus, all EMS measurement products share a common look and feel, greatly reducing the need for costly cross-training and specialization.
ROMER G-Pad Geometric measurement software is the basic, user-friendly geometric measurement package for the ROMER arms. An efficient and quick menu access makes G-Pad easy and intuitive to use. In addition to the basic interface, the package offers advanced inspection functions, automatic and guided measurement procedures, data export and 3D part display.

PowerINSPECT – 3D Geometric measurement & surface inspection software is the reference for higher quality, higher efficiency during the production process. Geometric control and complex 3D parts inspection with CAD files. Standard PowerINSPECT applications: mouldings, prototypes, tools and models.
**PC-DMIS Reshaper** software is a reverse engineering package able to generate surfaces and sections from digitized point clouds. Thanks to efficient and fast surface calculation, reverse engineering times can be dramatically improved.

PC-DMIS Reshaper application for ROMER Portable Measuring Arms & Scanners: a complete 3D point-cloud processing software for users who need to handle rapidly generated point clouds files and obtain high-quality 3D meshes at an affordable price.

**PolyWorks** – The leading software solution for high-end point cloud inspection and reverse engineering applications. Whether you are casting, milling, molding or stamping, you can rely on PolyWorks to provide a complete solution for your process. The PolyWorks software suite is available as a complete package or – with regard to the two main applications – as a point cloud inspection or reverse engineering package.
ROMER G-Tube – The latest technology in non-contact measurement. The quick non-contact measurement solution for the inspection of bent tubes in your work shop. G-Tube is the ideal solution especially designed for tube shop and mainly in automotive, aerospace, furniture, air conditioning and subcontracting industries.

ROMER DOCS Tube Inspection is the premier CAD-based tube inspection software. Designed to revolutionize quality control in the tubing industry, DOCS stands for Data Overlay Camera System and is compatible with ROMER portable measuring arms.

ROMER DOCS can inspect and measure round metallic and non-metallic wire, tubing, and piping used in almost any industry – automotive, aerospace, shipbuilding, medical, machinery, appliance, and more. DOCS can also produce corrected bend data for CNC tube benders.
The Metrology Division of Leica Geosystems is a global supplier of comprehensive hardware and software packages to the industrial metrology market. These products integrate with popular CAD programs, various build-and-inspect tools and reverse-engineering software. Using state-of-the-art laser technology, Leica Geosystems’ industrial measurement products make quality control, part mating, assembly, and construction of large and small parts easier and more accurate than ever.

www.leica-geosystems.com/metrology
Portable measuring systems

18 Leica Absolute Tracker AT401
20 Leica Absolute Tracker AT901
26 Leica TM5100A Industrial Theodolite
27 Leica TDRA6000 Industrial Laser Station

Sensors (contact and non-contact)
24 Leica T-Probe
25 Leica T-Scan
25 Leica T-Mac

Software
28 PC-DMIS Portable
28 emScon
28 PolyWorks
29 Metrolog XG for Leica
29 Microlog XG

After-market service & support

Contacts
The **Leica Absolute Tracker AT401** is a portable coordinate measuring machine (CMM) that allows extreme precision over ultra large distances. It is able to be powered by its own internal battery and is able to work in the most demanding environment, yet maintains the highest level of precision and the largest ever work envelope. The Leica Absolute Tracker AT401 has a unique “All in One” system design that incorporates such needed accessories as built in live video, level to gravity, environmental monitoring and even an integrated IR remote control. By utilizing the integrated Wireless LAN communication the sensor can be used completely wirelessly making this the most portable Absolute Tracker ever.

Especially large structures require highly accurate, flexible and portable metrology equipment. This surrounding is right for the Leica Absolute Tracker AT401. It redefines large scale portable measurement and opens the door for unprecedented metrology applications.
A new level of portability & durability.
The complete measurement system weighs less than 15 kg including the case and in a minimum configuration it will fit into the overhead compartment of most commercial airliners. This is truly the world’s most portable CMM Ready for any environment

Utilizing a completely sealed design that is independently IP54 (IEC 60529) certified means this sensor can be installed in the most unforgiving environments. Spraying coolant, dust, weld splash, nothing is too harsh for this sensor. The Leica Absolute Tracker AT401 is the first laser tracker certified for outdoor use, even in the rain.

PowerLock
Leica Geosystems introduced the world to PowerLock in 2009. This vision technology detects a reflector and automatically locks the laser beam onto it, even when the target is moving. The laser beam moves to the user, not the other way around. In the past operating a laser tracker was almost a "black art". It took time and experience for an operator to learn how to efficiently use the sensor without breaking the beam. PowerLock changed this completely and makes the handling of a laser tracker much easier.
An **Absolute Tracker AT901** from Leica Geosystems is a portable measurement system that relies on a laser beam to accurately measure and inspect in a spherical volume of up to 160 m [525 ft]. The Leica Absolute Tracker can gather 3D coordinates in 4 ways: by following a small mirrored sphere, also known as a reflector; by tracking a Leica T-Probe, a hand-held “Walk-Around” wireless contact probe; by tracking a Leica T-Scan, a contactless high-speed laser scanner; or by tracking a 6DOF device for automated applications such as with machines or robots. Which measurement method you should use will depend on your application.

The Leica Absolute Tracker AT901 is equipped with PowerLock: For the first time in the history of laser trackers, the laser beam moves to the user, not the other way around.
Leica Absolute Tracker AT901-Basic – If your application requires positioning machines, fixtures or jigs, or if you are in the business of installing and aligning machine tools, roll mills, presses or gantry based machines, the Leica AT901-Basic is your tracker. Operating solely with a reflector, it is optimized for inspections within a typical measurement volume of up to 160 m (525 ft), and comes standard with our Leica Absolute Interferometer and PowerLock technologies.
Leica Absolute Tracker AT901-Mid Range –
Since the introduction of the Leica T-Products in 2004, practically all leading automobile manufacturers have joined the ranks of our customers. When a reflector simply won’t cut it because there is no clear line of sight to the part you are trying to inspect, the part is hidden or sunken deep beneath surrounding sheetmetal, or because you need to reverse-engineer a part right there on the spot, the Leica AT901-MR is all you will need. When coupled to the Leica T-Scan, T-Probe, or T-Mac the Leica AT901-MR gives you a measurement volume of up to 18 m (59 ft). Of course, it can also be used with a standard corner cube, in which case its measurement volume goes up to a full 50 m (164 ft). The sensor is designed for large vehicle size objects and of course comes standard with our Leica Absolute Interferometer and PowerLock technologies.
Leica Absolute Tracker AT901-Long Range

– This is the laser tracker that set the new benchmark for aerospace and other large scale precision measurements such as windmill blade inspection or industrial machinery alignment. It gives you hand-held wireless probing (Leica T-Probe), hand-held contactless scanning (Leica T-Scan), and full machine control abilities (Leica T-Mac) in a volume of up to 30 m (98 ft). Of course, it can also be used with a standard corner cube, in which case its typical measurement volume goes past 160 m (525 ft). This is the laser tracker that set new standards for usability with the Leica Absolute Interferometer and PowerLock, and continues to be the best selling 6DoF laser tracker in the world.
Leica T-Probe – Leica T-Probe, the "Walk-Around" armless wireless device for probing of hidden, hard-to-reach points and measuring of up to 9 cars in one setup with minimal setup times, sets new standards by increasing accuracy, offering a ten-fold increase in point acquisition rate and providing user-assignable multi-function buttons. It is small, light, user-friendly, and more accurate than any other hand-held probe in the world.

Leica T-Scan – Leica T-Scan TS50 is a high-speed hand scanner for large-volume portable applications. This second-generation Leica T-Scan is 20 percent lighter and 30 percent smaller than the original Leica T-Scan introduced in 2005. Leica T-Scan requires neither photogrammetric targets nor powdering of object surfaces and is impervious to changing environmental light. Because the laser beam consists of individual dots, their intensity can be adjusted on the fly so surfaces of different reflective properties, from shiny to black, can be scanned in one step with no action required from the operator. Leica T-Scan scans large objects more accurately and 50 percent faster than comparable products.
Leica T-Mac – Leica T-Mac (Tracker-Machine control sensor), the next-generation 6DoF tracking device for automated applications, answers the needs of a growing number of Leica Geosystems customers who have either modified the existing Leica T-Probe for automated measurement applications or have expressed interest in doing so. Leica T-Mac is an off-the-shelf solution that can be custom-tailored to the needs of a specific application. For example, when needed, an interface for precise tool exchange units can be included. Operating specifications and accuracy information, including the maximum range of 30 m (98ft) correspond to those of Leica T-Probe.

Leica Automated Solutions – The Leica Absolute Tracker AT901 turns an ordinary robot into an incredibly accurate metrology device. Leica Automated Solutions are capable to control and inspect large-volume work pieces.
Based on proven technology, unrivalled precision and optics, Leica Geosystems electro-optical Industrial Theodolites & Total Stations have set global standards in practically all industrial alignment applications.

The **Leica TM5100A** is the world’s most accurate Theodolite with the highest angular accuracy, panfocal telescope and autocollimation device. With unrivalled precision and superb optics, the Leica TM5100A has become the standard instrument of choice in the aerospace industry for satellite alignment as well as for system and Heads Up Display alignment for combat aircraft. When the need arises, the system can be expanded to a multi-instrument system.
The **Leica TDRA6000** is the most accurate laser station ever designed for industrial use. It has the ability to automatically target both CCR and tape targets and can even measure without targets maintaining a typical reflectorless accuracy of 1 mm. Optimized for use within 300 meters and combined with the Leica Geosystems PowerSearch module, the new Leica TDRA6000’s tracking performance is simply unbeatable.
PC-DMIS Portable supports the complete Leica Laser Tracker family including T-Probe. The package enables existing PC-DMIS user to utilize one common SW platform across all their CMM’s and portable sensors. The state of the art tracker interface combined with the powerful functionality supports your most demanding measurement tasks. While you do your measurement job, PC-DMIS Portable is automatically creating a program for repetitive tasks.

The new update of emScon enables you to control your Leica Geosystems Laser Trackers with any software platform as well as with a web browser, giving you a perfect integration of the laser tracker with the software you are used to. Providing unparalleled flexibility and with a straight-forward interface design, emScon enhances the profitability of using Leica Geosystems Laser Trackers for coordinate measuring, automation, robot calibration and machine guidance tasks.

Whether you are casting, milling, molding or stamping, you can rely on PolyWorks to provide a complete solution for your process. The PolyWorks software suite is available as a complete package or — with regard to the two main applications — as a point cloud inspection or reverse engineering package. Use high-density point clouds of digitized...
prototype parts & assemblies to quickly identify deformations and to fix problems in the earlier stage of the manufacturing process or approve your manufacturing process by fully inspecting your first-assembled products.

**Metrolog XG for Leica** interfaces with the Leica Geosystems PCMM solutions such as the Laser Tracker and the "Walk-Around" Leica T-Probe. The graphical visualization provides direct interfaces for virtual any neutral and native CAD format.

A powerful feature based measurement tool, a complete GD&T engine, the customizable reporting and a simple, fast programming language all support and simplify your sophisticated assembly and inspection processes.

**Microlog XG** is a custom-made software package for cost-sensitive sensors and Leica Geosystems Total Stations, 3D laser trackers or articulated arms. The software features all the tools required for standard inspection – from importing Reference data to report creation. Microlog XG's user interface is just as simple and intuitive as that of Metrolog XG for Leica.
CogniTens is the leading provider of comprehensive Dimensional Measurement Solutions, focused on improving engineering and manufacturing processes in automotive and other manufacturing industries. Dimensional Measurement is an increasingly significant strategy which allows manufacturing organizations to accelerate product introductions, reach higher product quality, reduce production costs and bring about higher profits for each product.

www.cognitens.com
White light scanners

32  Optigo
33  OptiCell

Software

35  OptiPlan
36  CoreView Pro
37  CoreView Lite
37  Off Line Measurement
37  Dimensional Domain Server

103  After-market service & support

104  Contacts
**Optigo** is a portable, high-Performance dimensional measurement platform used in engineering, production, and assembly processes on the shop floor. Compact for easy handling and access, Optigo's design blends ruggedness with precise instrumentation. Its Performance is not affected by vibrations, industrial lighting, or temperature changes. CogniTens' patented technology guarantees fast throughput and superior accuracy. From prototyping to ramp up and launch, Optigo delivers a comprehensive solution for the full range of automotive metrology challenges.
OptiCell is fully automated dimensional measurement platform with embedded software, which significantly improves the dimensional business process in vehicle development and manufacturing for automotive part production and assembly processes.

OptiCell is a fast, accurate and robust dimensional measurement platform designed for on-line measurements, process control and quality assurance on the production floor. OptiCell offers a highly flexible solution for dimensional measurement of a wide variety of parts and assemblies regardless of size, complexity or geometric features.
The CogniTens Dimensional Measurement Software Suite is comprised of various added value software products which enhance the benefits generated by using CogniTens Optigo and OptiCell dimensional measurement platforms. This software suite along with innovative business processes, allow manufacturers to migrate from traditional methods of costly checking fixtures and other technologies to flexible non-contact dimensional gauging.

Our Dimensional Measurement Software Suite offers numerous Advantages and benefits which allow companies to better leverage our platforms and generate higher returns:
- Improves the utilization and throughput of Optigo & OptiCell platforms
- Supports a distributed working environment including multiple sites
- Accelerates the learning curve for new users
- Enables effortless definition of measurement programs from remote locations
- Provides comprehensive reporting, customization and distribution of measurement information
- Allows you to pinpoint cause and effect of complex engineering problems
- Helps streamline complicated processes such as part approval for production
- Manages dimensional information from across the organization and making it available for end users in real time
Our software products offerings
The Dimensional Measurement Software Suite includes the following products:

**OptiPlan** is a CogniTens software product used for planning, defining and preparing comprehensive dimensional measurement programs for execution by Optigo & OptiCell dimensional measurement platforms. OptiPlan allows planning multiple sets of measurement programs and optimizes utilization of Optigo/OptiCell platforms by providing the operator with the exact information for carrying out the measurement. Using OptiPlan the engineer can easily define measurable features, set multiple alignment guidelines, capture GD&T requirements, and prepare reporting templates for later use.

**CoreView Pro** is a powerful CogniTens software product used for viewing, analyzing and reporting dimensional measurement information. CoreView Pro enables viewing, analysis, reporting and enterprise wide collaboration based on common dimensional measurement information generated by Optigo and OptiCell dimensional measurement platforms. CoreView Pro allows remote viewing and analysis of actual shop floor parts as well as assembly and tool measurements as soon as they are produced. CoreView Pro requires Portable CMM Software.
no post processing of data before use and automatically presents detailed analysis and comparison with nominal data and design intent. CoreView Pro provides various part and process analysis tools to evaluate stability and conformity of manufacturing processes as well as unique engineering tools such as Master Part generation and tolerance adjustment.

CoreView Lite is a free CogniTens software product used for viewing measurement results produced by CogniTens’ Optigo and OptiCell. CoreView Lite empowers a large community of users to leverage rich and meaningful dimensional measurement information to improve quality and overall Performance throughout the design, engineering and manufacturing processes.
**Off Line Measurement** is the CogniTens software product used for off-line computation of collected dimensional data, analysis of results and generation of CoreView files and other standard outputs. The optional Off-Line Measurement allows you to optimize utilization of the Optigo platform and promotes higher overall throughput. An off-line station is used to easily calculate measurements and transform them into meaningful dimensional information which can be analyzed and exported to CoreView Pro. Off-Line Measurement also provides advanced tools for carrying out virtual assembly studies and reverse engineering activities.

**Dimensional Domain Server** is a CogniTens software product that runs on a central server and is designed to fit a customer’s proprietary business processes and methodologies. The Dimensional Domain Server interfaces with various CogniTens platforms and software products and provides a secure and managed environment to collect, store and manage dimensional information generated across the organization. The Dimensional Domain Server answers customer needs to manage dimensional Information throughout the vehicle program lifecycle, efficiently communicates between dimensional business process members in real time and propagates critical shop-floor dimensional information used for decision making, monitoring and ongoing improvement to engineers and managers.
Since 1963, DEA has been one of the world's premier brands in Coordinate Measuring Machine technology. The main facilities are located in the Torino area, Italy, where highly skilled teams of mechanical, electronic and software engineers are committed to the continuous development of state-of-the-art solutions for dimensional quality inspection. DEA products are used by virtually every industry in every geographical market throughout the world.

www.dea.it
Coordinate measuring systems

**Bridge CMMs**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>Micro-Hite DCC</td>
</tr>
<tr>
<td>41</td>
<td>Micro-Hite 3D</td>
</tr>
<tr>
<td>42</td>
<td>ONE</td>
</tr>
<tr>
<td>43</td>
<td>PIONEER</td>
</tr>
<tr>
<td>44</td>
<td>GLOBAL Classic</td>
</tr>
<tr>
<td>45</td>
<td>GLOBAL Performance</td>
</tr>
<tr>
<td>46</td>
<td>GLOBAL Advantage</td>
</tr>
<tr>
<td>47</td>
<td>GLOBAL Advantage ACTIV®</td>
</tr>
<tr>
<td></td>
<td>GLOBAL eXtra</td>
</tr>
</tbody>
</table>

**Gantry CMMs**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>48</td>
<td>ALPHA</td>
</tr>
<tr>
<td>49</td>
<td>DELTA SLANT</td>
</tr>
<tr>
<td>50</td>
<td>LAMBDA SP</td>
</tr>
</tbody>
</table>

**Horizontal arm CMMs**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>51</td>
<td>TORO</td>
</tr>
<tr>
<td>52</td>
<td>MERCURY</td>
</tr>
<tr>
<td>53</td>
<td>BRAVO C</td>
</tr>
<tr>
<td>54</td>
<td>BRAVO HD</td>
</tr>
<tr>
<td>55</td>
<td>BRAVO HP</td>
</tr>
<tr>
<td>56</td>
<td>BRAVO HA</td>
</tr>
</tbody>
</table>

**Flexible fixturing systems**

**Probing Technology**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>68</td>
<td>Leitz</td>
</tr>
<tr>
<td>80</td>
<td>Hexagon Metrology</td>
</tr>
<tr>
<td>86</td>
<td>TESA</td>
</tr>
</tbody>
</table>

**Software**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>96</td>
<td>PC-DMIS</td>
</tr>
<tr>
<td>101</td>
<td>Surfer EVO</td>
</tr>
<tr>
<td>102</td>
<td>QUINDOS</td>
</tr>
</tbody>
</table>

**After-market service & support**

**Contacts**
Micro-Hite, the line of small CMMs featuring excellent performance, is the result of the synergy among Hexagon Metrology companies in research, design and manufacturing. That’s why Micro-Hite boasts the best price/performance ratio in the market.

The automatic version, **Micro-Hite DCC**, features performance and flexibility typical of larger measuring volume CMMs.

---

**Measuring Range (mm)**
from 440 x 500 x 410 to 440 x 700 x 410

**ISO 10360 Performance Specs (µm)**

\[ MPE_E = 2.5 + \frac{L}{256} \]
The manual version, **Micro-Hite 3D**, is ergonomic and easy to use: it is therefore the ideal replacement of hand tools and gages.

---

**Measuring Range (mm)**
from 460 x 510 x 420 to 460 x 710 x 420

**ISO 10360 Performance Specs (µm)**

\[ MPE = \text{from } 3.0 + \frac{L}{250} \]
The **DEA ONE** coordinate measuring machine (CMM) is designed to work in the production environment. It is characterised by an innovative design that incorporates new technology and advanced materials. Its steel guideways and linear recirculating ball bearings eliminate the need for compressed air supply, so that it can be placed close to where you need it, to verify your production processes and product quality. DEA ONE can be optionally equipped with analog probes for feature and free form scanning.

---

**Measuring Range (mm)**
from 700 x 700 x 500 to 700 x 1000 x 650

**ISO 10360 Performance Specs (µm)**
MPEE = from 3.9 + L/250
MPE_{THP} = from 6.5
DEA PIONEER is the perfect fit for manufacturers purchasing their first coordinate measuring machine (CMM), and for large manufacturing operations needing multiple CMMs with maximum price-to-performance ratio.

PIONEER CMMs are used in quality inspection for first and final part acceptance, fixture qualification and process control. PIONEER is the ideal measurement system for handling a variety of dimensional inspection tasks on general mechanic and prismatic components. You can tailor your PIONEER CMM with a complete range of Swiss-made TESASTAR touch probes, probe heads and probe accessories.

Measuring Range (mm)
from 500 x 600 x 400 to 800 x 1200 x 600

ISO 10360 Performance Specs (µm)
MPEE = from 2.8 + 3.5 L/1000
The **DEA GLOBAL Classic** is an affordable all-purpose CMM for the dimensional inspection. The machine can be equipped with touch-trigger probes or scanning probes. GLOBAL Classic CMMs are used in a number of industries for first and final part inspection, fixture qualification and process control. GLOBAL Classic is the ideal measurement system for handling a wide variety of dimensional inspection tasks on general mechanic and prismatic components with good accuracy and productivity.

<table>
<thead>
<tr>
<th>Measuring Range (mm)</th>
<th>from 500 x 500 x 500 to 900 x 2000 x 800</th>
</tr>
</thead>
</table>

| ISO 10360 Performance Specs (µm) | MPE$_E$ = from 1.9 + 3.3 L/1000 | MPE$_{THP}$ = from 3.5 µm/90 s |
DEA GLOBAL Performance brings affordability to multi-sensor technology. It is the best tool for the user who needs to perform a wide variety of metrology operations on a single, flexible, accurate and affordable CMM. The machine can be equipped with both touch-trigger probes and analog scanning probes. CLIMA structural thermal compensation extends this CMM Performance to a wider temperature range. Single-point measurement or scanning, touch probe or optical probe... everything in one system.

**Measuring Range (mm)**
from 500 x 500 x 500 to 1200 x 3000 x 1000

**ISO 10360 Performance Specs (µm)**
MPEE = from 1.5 + 3.0 L/1000
MPE_THP = from 2.9 µm/68 s
DEA GLOBAL Advantage are fast and accurate CMMs that can handle any measurement and inspection task quickly and efficiently. The outstanding dynamics and first-class accuracy make GLOBAL Advantage the ideal tool to keep manufacturing process under close and permanent control. Standard on all Advantage models, CLIMA thermal compensation allows first-rate measuring accuracy even in non-ideal temperature conditions.

Measuring Range (mm)
from 500 x 500 x 500 to 2000 x 4000 x 1500

ISO 10360 Performance Specs (µm)
MPEE = from 1.4 + 3.0 L/1000
MPEHP = from 2.5 µm/68 s

The DEA GLOBAL Advantage is available equipped with ACTIV® Technology (Adaptive Compensation of Temperature Induced Variations) and is the ideal solution for all needs of dimensional inspection in production environments with temperatures ranging from 15 to 30 °C and daily gradients up to 10 °C. Part dimensional data are corrected, based on the readings from a network of sensors placed in critical structural areas of the machine and on the part. Measuring results are corrected in real time by compensating the effects of the structural deformations on the CMM caused by changing environmental thermal conditions. The CMM is protected by additional bellows and guards on the X and Y axes.
DEA GLOBAL eXtra can accommodate large and heavy workpieces without the need for special foundations. The GLOBAL eXtra, designed for measurement in the production environment, features ACTIV structural thermal compensation, protection bellows on X and Y guideways and operating temperatures up to 30°C.

For unlimited access to hard-to-reach features, these larger size GLOBALs can be equipped with DEA exclusive CW43L-mw servo wrist.

Measuring Range (mm)
from 2000 x 3300 x 1500 to 2000 x 4000 x 1800

ISO 10360 Performance Specs (µm)
MPEE = from 12.0 + 18.0 L/1000
DEA ALPHA is an innovative product line of cost-effective medium-capacity CMMs, which combine high throughput and high accuracy with excellent operating reliability and reduced maintenance. It is the ideal system for die and mold manufacturing support.

Measuring Range (mm)
from 2000 x 3300 x 1000 to 2500 x 5000 x 1800

ISO 10360 Performance Specs (µm)
MPE_E = from 4.0 + 4.0 L/1000
MPE_THP = from 6.0 µm/120 s
DEA DELTA SLANT is a range of gantry CMMs that excels in the high-accuracy inspection of large machined parts due to its superior mechanical structure. DELTA SLANT comes in two versions: Classic and Performance. The option "SF-Kit" is available for the installation of both Classic and Performance models in workshop environment.

Measuring Range (mm)
from 2000 x 3300 x 1500 to 3000 x 8000 x 2500

ISO 10360 Performance Specs (µm)
MPEE = from 4.0 + 3.8 L/1000
MPETHP = from 4.5 µm/100 s
DEA LAMBDA SP is the largest CMM line on the market. LAMBDA SP excels in high-speed, high-accuracy inspection of huge components, such as marine engines, aircraft structures, nuclear vessels, or turbines that require open, modular, easily customizable structures with virtually unlimited measuring volumes.

Measuring Range (mm)
from 3000 x 5100 x 2500 to 4000 x 10000 x 3000

ISO 10360 Performance Specs (µm)
MPEE = from 7.0 + 7.0 L/1000
DEA TORO is an innovative line of automatic horizontal-arm measuring machines for dimensional inspection of sheet metal components and large size parts. TORO features an extraordinary price/Performance ratio and is available in the Runway structure with main guideway fixed to the floor.

The machine is supplied with a temperature sensor based linear thermal compensation. The TORO systems are available in single and dual arm configuration.

Measuring Range (mm)
from 4000 x 1600 x 2100 (single arm)
to 7000 x 3000 x 2500 (dual arm)

ISO 10360 Performance Specs (µm)
$MPE_E = \text{from } 30 + 25 \frac{L}{1000}$
Designed to provide maximum flexibility and suitability to a variety of applications, **DEA MERCURY** is available in both manual and automatic versions, as well as in single, double and even multiple-arm configurations. The combination of performance and affordability makes MERCURY the ideal solution for any budget requirement.

**Console** – ideal for mid-size parts. The arm slides on guideways located at the side of the workplate (**MERCURY C** models).

**Runway** – ideal for the measurement of medium, large and very large parts and/or heavy parts. The arms slide on self-standing beams (**MERCURY R** models). As an alternative, the arm can be installed on the top of a worktable (**MERCURY T** models), either supplied with the machine or by the customer.

---

**Measuring Range (mm)**
from 2500 x 1400 x 1600

**ISO 10360 Performance Specs (µm)**
MPE_{E} = from 15 + 20 L/1000
The **DEA BRAVO C** is a technically advanced and cost-effective solution for flexible and accurate dimensional inspection of thin-walled components, ideal for mid-size parts in industrial environments. The guideways located on the side of the machine base (Console architecture) allow the arm to be moved fully outside of the working area. This allows for optimal access to the work area for simple part loading/unloading operations. The cast iron machine table features the exclusive three-point support system, which eliminates the need for costly dedicated foundations, and makes the installation on vibration dampers easier.

---

**Measuring Range (mm)**
from 3000 x 1400 x 1600 to 5000 x 16000 x 2500 (single arm)

**ISO 10360 Performance Specs (µm)**

- \( \text{MPE}_E = \text{from } 4.0 + 3.8 \text{ L/1000} \)
- \( \text{MPE}_{\text{THP}} = \text{from } 18 + 12 \text{ L/1000} \)
DEA BRAVO HD is a line of heavy-duty superior Performance horizontal arm measuring machines, designed and engineered to provide accurate dimensional measurements on automobile bodies, subassemblies and panels in shop environments and metrology rooms. BRAVO HD’s structure has been conceived and engineered in compliance with the most stringent industry standards to ensure accuracy, reliability and ease of use under all operating conditions and for maximum operator safety. All models are direct computer control systems capable of high dynamics, high accuracy and very long measuring strokes, thus providing maximum productivity and higher operating efficiency.

BRAVO HD is available in either a single or a dual arm configuration, equipped with the TESASTAR-m motorized indexable probe head in the standard configuration and with the CW43L-mw continuous servo wrist as an option.

Measuring Range (mm)
from 4000 x 1600 x 2100 (single arm)
to 9000 x 3120 x 3000 (double arm)

ISO 10360 Performance Specs (µm)
MPE E = from 25 + 16 L/1000
**DEA BRAVO HP** is the series of horizontal-arm automatic systems characterized by high performance, and designed to meet in an optimum way the requirements of dimensional inspection and analysis of bodyshells, chassis, and subassemblies on the shopfloor. The BRAVO HP systems are designed to guarantee maximum uncompromising operating flexibility, and for best-in-class dynamic and metrologic Performance. The BRAVO HP systems are available in single and dual arm configuration. They may be equipped both with the TESASTAR-m motorized indexable probe head and with the CW43L-mw continuous servo wrist, also in 3 continuous axes configuration for optimum control of non-contact sensors.

**Measuring Range (mm)**
from 4000 x 1600 x 2100 (single arm)
to 9000 x 3130 x 3000 (double arm)

**ISO 10360 Performance Specs (µm)**
MPEE = from 20 + 13 L/1000
DEA BRAVO HA is an advanced line of measuring and inspection robots for high-speed flexible in-process gaging of car bodies and subassemblies. BRAVO HA are rugged, fast, and highly reliable systems designed to operate in the harshest industrial environments, for production process monitoring and control. The systems are designed to be easily integrated into the production line and can be equipped with exclusive high-speed non-contact measuring heads that allow inspecting sheet metal features in 1/10 of the time currently needed with conventional probing systems.

Measuring Range (mm)
from 6000 x 1400 x 2000 (single arm) to 7000 x 3150 x 2400 (double arm)

ISO 10360 Performance Specs (µm)
MPEE = from 13 + 10 L/1000
Flexible Fixturing Systems

**FIVE U-nique** is an advanced flexible fixturing system that allows program-driven configuration of very accurate part holding fixtures for measurement and inspection applications. The CMM, equipped with a special locating gripper, drives the operator in building the fixture using modular supports and reference devices.

An interactive software program supports rapid production of complete fixturing programs for an unlimited number of part configurations. Benefits: reduction of the costs associated to the development, production, maintenance, and storage of part holding fixtures.
The **Leitz** brand as part of Hexagon Metrology stands for high accuracy coordinate measuring machines, gear inspection centers and probes. Leitz measurement systems master quality assurance tasks equally well both in metrology labs as well as on the shop floor. The development and production are located in Wetzlar, Germany.

For more than 30 years Leitz has been offering its customers the best innovative measurement technology available. The primary goal remains offering modern solutions for demanding measurement tasks.

[www.leitz-metrology.com](http://www.leitz-metrology.com)
### Coordinate measuring systems

<table>
<thead>
<tr>
<th>Page</th>
<th>Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>60</td>
<td>Micra</td>
</tr>
<tr>
<td>61</td>
<td>PMM-C</td>
</tr>
<tr>
<td>62</td>
<td>PMM-C Infinity</td>
</tr>
<tr>
<td>63</td>
<td>Reference HP</td>
</tr>
<tr>
<td>64</td>
<td>Reference Xi/Reference XT</td>
</tr>
<tr>
<td>65</td>
<td>PMM-F</td>
</tr>
<tr>
<td>66</td>
<td>PMM-G</td>
</tr>
<tr>
<td>67</td>
<td>SIRIO SX</td>
</tr>
</tbody>
</table>

### Scanning probes and styli racks

<table>
<thead>
<tr>
<th>Page</th>
<th>Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>68</td>
<td>LSP-X5</td>
</tr>
<tr>
<td></td>
<td>LSP-X3c</td>
</tr>
<tr>
<td>69</td>
<td>LSP-X3t</td>
</tr>
<tr>
<td></td>
<td>LSP-X1c</td>
</tr>
<tr>
<td>70</td>
<td>LSP-X1s/LSP-X1m</td>
</tr>
<tr>
<td>71</td>
<td>Styli racks for LSP-X probes</td>
</tr>
</tbody>
</table>

### Software

<table>
<thead>
<tr>
<th>Page</th>
<th>Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>96</td>
<td>PC-DMIS</td>
</tr>
<tr>
<td>101</td>
<td>Surfer EVO</td>
</tr>
<tr>
<td>102</td>
<td>QUINDOS</td>
</tr>
</tbody>
</table>

### After-market service & support

<table>
<thead>
<tr>
<th>Page</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>103</td>
<td></td>
</tr>
</tbody>
</table>

### Contacts

<table>
<thead>
<tr>
<th>Page</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>104</td>
<td></td>
</tr>
</tbody>
</table>
Leitz Micra is the small Hexagon Metrology measuring machine devised for the dimensional control of small high-accuracy components. It is a perfect blend of design expertise of moving bridge CMMs and scanning sensors. Micra is equipped with a LSP-X1 scanning head, extremely accurate and capable of measuring in point to point mode and to scan at high speed for profiles inspection and form error checking of geometric elements.

Measuring Range (mm)
500 x 400 x 300

ISO 10360 Performance Specs (µm)
MPE_E = 1.0 + L/400
MPE_F = 1.0
MPE_THP = 2.0 µm/90 s
The **Leitz PMM-C** is a fixed bridge/moving table-type coordinate measuring machine. It combines ultra-high accuracy with outstanding speed, thus ensuring a very high throughput. This coordinate measuring machine is fast, affordable and allows to perform all measuring tasks, even the most complex ones.

The Leitz PMM-C is also offered as a Gear Inspection Center. It can accommodate maximum outside diameters up to 1550 mm. Thanks to its LSP-S2 probe system, the CMM fits the requirements of any measuring task in dynamic Single Point Probing, Self-Centering in all axes, and obviously standard High-Speed-Scanning.

---

**Measuring Range (mm)**
from 800 x 1000 x 600 to 2400 x 1600 x 1000

**ISO 10360 Performance Specs (µm)**
MPE\(E\) = from 0.4 + L/1000
MPE\(P\) = from 0.5
MPE\(\text{THP}\) = from 1.4 µm/45 s
For the **Leitz PMM-C Infinity**, Hexagon Metrology drew on the whole of their long-standing experience, optimizing the latest technical developments to create a CMM boasting the highest available accuracy. The Leitz PMM-C Infinity achieves measurement results which are excruciatingly exact. The result is the interplay of different components, giving an absolute accuracy better than 0.3 µm with a reproducibility better than 0.1 µm.

The Leitz PMM-C Infinity is equipped with the 3D-Scanning System LSP-S4 for extremely precise form and profile measurements. LSP-S4 is enhanced by the ultra-low probing force of 0.02 to 0.16 N.

---

**Measuring Range (mm)**

1200 x 1000 x 700

**ISO 10360 Performance Specs (µm)**

\[
\text{MPE}_E = 0.3 + \frac{L}{1000} \\
\text{MPE}_P = 0.4 \\
\text{MPE}_{THP} = 1.2 \text{ µm/59 s}
\]
The Leitz Reference HP (High Precision) is a bridge-type CMM with movable portal – the ideal machine in its class for complex measuring tasks, combining high accuracy with optimum throughput. Available in various sizes it ensures a fast, precise and cost-effective inspection of workpieces.

Equipped with the Leitz 3D probe system, the Leitz Reference HP can accomplish inspection tasks in Single Point Probing, Self-Centering and standard High-Speed-Scanning mode.

The Leitz Reference HP is also offered as a Gear Inspection Center. It can accommodate maximum outside diameters up to 1 150 mm.

---

**Measuring Range (mm)**
from 500 x 400 x 300 to 4500 x 1200 x 900

**ISO 10360 Performance Specs (µm)**
MPE$_E$ = from 0.8 + L/400
MPE$_P$ = from 0.8
MPE$_{HP}$ = from 1.6 µm/40 s
The excellent Leitz Scanning Performance continues to the new CMM series Leitz Reference Xi and Leitz Reference XT. The series scores with a wide range of different probing systems. Accurate measurements are ensured – be it when measuring with indexable or fixed probe heads. Thanks to the multisensor-controller Leitz Reference Xi and Leitz Reference XT are also ready for integration of optical measuring sensors. The name of the Leitz Reference Xi speaks for itself: „Xi“ stands for „fleXiible“. The Leitz Reference XT additionally offers outstanding temperature stability: Within the eXTended temperature range from 15 to 30 degree Celsius the Leitz Reference XT measures reliably thanks to a sophisticated temperature compensation system.

Measuring Range (mm)
from 1000 x 700 x 600 to 2200 x 1200 x 900

ISO 10360 Performance Specs (µm)
MPEE = from 1.2 + L/350
MPEP = from 1.2
MPETHP = from 2.2 µm/45 s
Leitz PMM-F is a high-accuracy monolithic gantry measuring machine for large-size workpieces. It achieves high throughput with highest possible accuracy. The Leitz PMM-F is also available with a large measuring volume of up to 9.6 m³. It does not require costly foundations and can therefore be easily moved. As a standard the Leitz PMM-F offers an active damping system. With its LSP-S2 probe system, it can perform accurate and fast single-point probing as well as High-Speed-Scanning for form and profile measurements.

Measuring Range (mm)
from 3000 x 2000 x 1000 to 3000 x 2000 x 1600

ISO 10360 Performance Specs (µm)

<table>
<thead>
<tr>
<th>temperature range</th>
<th>MPEf</th>
<th>MPEp</th>
<th>MPETHP</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-22 °C</td>
<td>from 1.7 + L/400</td>
<td>from 1.5</td>
<td>from 2.4 µm/68 s</td>
</tr>
<tr>
<td>18-24 °C</td>
<td>from 1.7 + L/300</td>
<td>from 1.5</td>
<td>from 2.4 µm/68 s</td>
</tr>
</tbody>
</table>
The Leitz PMM-G provides highest accuracy and a highly enhanced throughput for large-size XXL workpieces. These workpieces are used for example in aircraft and aerospace industries, ship engine constructions and measurement of large gears used in wind turbines. With this development, the probing frequency, acceleration, maximum speed and scanning Performance are significantly enhanced.

The Leitz PMM-G features an overhead design with integrated U-shaped foundation for highest accuracy and high throughput. As a result, all moving masses have been minimized. The X axis is equipped with dual drive motion system and transducer systems. The Leitz PMM-G is equipped with the Leitz LSP-S2 Scanning Probe system. This probe head measures very precisely even with long and heavy styli. Styli configurations of up to 800 mm and 1 000 g are possible.

Measuring Range (mm)
from 3000 x 2000 x 1200 to 7000 x 4000 x 3000*)

ISO 10360 Performance Specs (µm)
MPE$_E$ = from 2.4 + L/400
MPE$_F$ = from 1.9
MPE$_{THP}$ = from 3.3 µm/68 s

*) other sizes available upon request
For decades the Leitz SIRIO has proven itself as a measuring robot especially in the automotive industry. This coordinate measuring machine is classified as the ideal machine to measure powertrain-components highly accurately within shop floor environments. Now a new generation of Leitz SIRIO is raring to go: Leitz SIRIO SX. This machine is even more accurate, faster and more robust – thus, even more efficient than ever before. One of the highlights of the new Leitz SIRIO SX is the improved temperature resistance. The machine base consists of a special heat-resistant material which allows for constant temperature compensation. For the user this means that there is no climate control necessary within a range from 15 to 40 degrees Celsius. A host of other features enhance the efficiency of Leitz SIRIO SX. This CMM is available towards the end of 2010.

Measuring Range (mm)
600 x 800 x 900

ISO 10360 Performance Specs (µm)
MPEE = from 1.3 + L/400
MPEP = from 1.3
MPEHP = from 1.9 µm/24 s
LSP-X5 — Ultra-precise, full 3D, fixed scanning probe head capable of simultaneously measuring in the X, Y, and Z directions to precisely define the orientation of the workpiece surface. This heavy-duty analog probe features very high and repeatable accuracy even with extra-long probe extensions and heavy styli clusters (up to 500 mm of length and 500 g of weight). It includes a proprietary anti-collision system for extra protection of the head. The LSP-X5 is the ideal tool to verify high accuracy mechanical parts and complex geometries.

LSP-X3c — A compact, cost-effective yet extremely accurate, 3D fixed scanning probe head which can carry up to 360 mm long probing extensions and styli clusters. The LSP-X3 offers fast single-point probing for all standard measuring tasks as well as high-speed scanning for form and profile inspection and is ideally suited for dimensional control of small-to-medium high accuracy prismatic parts and complex geometries.
**LSP-X3t** – A 3D scanning probe for use on an articulated wrist featuring very high and repeatable accuracy. It can rapidly and automatically collect thousands of data points for the complete and precise evaluation of all part features, including form, location and size. LSP-X3t high-speed data collection greatly increases the accuracy, speed and flexibility of measurements.

**LSP-X1c** – Fixed 3D scanning probe head. The LSP-X1c is a cost effective solution with a fixed dove-tail quill mount. This probe head is optimised for stylus lengths up to 115 mm vertically and 50 mm horizontally. All standard measurements such as dynamic single-point inspection, High-Speed-Scanning as well as Self-Centering measurements for highly accurate form and contour inspection are possible.
LSP-X1s/LSP-X1m – scanning probes of the Leitz X-Series that have been specifically designed for CMMs equipped with motorized indexing probe heads. LSP-X1 is available in two different probe modules, each optimized for a specific stylus length range (LSP-X1s: 20-115 mm; LSP-X1m: 120-250 mm). Probe modules can be automatically changed on the TESASTAR-r automatic probe changer rack, while automatic styli change is possible with the LSP-X1 styli changer rack.

LSP-X1 supports all standard probing modes: Single Point Probing, Self-Centering as well as Continuous High-Speed-Scanning for fast, accurate form and profile measurements.

Like all other Leitz Probes, LSP-X1 allows simultaneous, unclamped probing on all axes, always orthogonal to the contact surface.
**Styli racks for LSP-X probes** – The automatic tool changing capability allows styli change within a measuring program without the need for probe requalification. Magnetic or pneumatic clamping of styli on the head permits fast and reliable changes.
Hexagon Metrology is the all-rounder in the world of metrology. With its new brand Optiv, the world's largest metrology group keeps this promise once again. Optiv stands for multi-sensor measuring machines of any kind. The portfolio ranges from benchtop measuring machines to high-accuracy multi-sensor measuring machines which achieve top performances even in the nano range. Multi-sensor measuring machines combine optical and tactile measuring techniques and thus, enable the user to measure all features of a workpiece in one measurement cycle. At the same time Optiv features both: flexibility and accuracy.

Optiv. Optical Performance Technology in Vision.

www.optiv.net
Optical and multi-sensor measuring systems

74 Optiv Classic
75 Optiv Performance
76 Optiv Advantage
77 Optiv Reference

Sensors
78 Vision-Sensor
Through-the-Lens-Laser (TTL-Laser)
79 Chromatic White Light Sensor (CWS)

Software
98 PC-DMIS Vision

103 After-market service & support

104 Contacts
Measuring machines in the **Optiv Classic** line are compact, economical packages. They impress with an excellent price-performance ratio. Thanks to the proven table design, Optiv Classic types are the optimum solution for the 3D measurement of smaller parts. With their robust mechanical bearings and their small footprint, they are very well suited for use in a production environment. These systems provide an economical entry to the world of multisensor technology.

**Measuring Range (mm)**
from 250 x 200 x 150 to 300 x 200 x 150

**ISO 10360-7 Performance Specs (µm)**
MPE$_E$ = from 2.5 + L/150
MPE(EXY) = from 1.5 + L/200
The **Optiv Performance** range can tackle many measuring tasks with its robust design in granite, its axes with mechanical bearings and the complete range of sensors. A table top model and four fixed bridge sizes make the Optiv Performance line the first choice for measuring both smaller and larger parts – also in the production area. Ambient effects in the production environment such as dirt, dust, and floor vibration, are eliminated by the covered guide-ways and integrated damping systems. The effects of temperature in the production environment can further be addressed with optional machine enclosures.

---

**Measuring Range (mm)**
from 250 x 200 x 150 to 920 x 800 x 200

**ISO 10360-7 Performance Specs (µm)**
MPE = from 2.5 + L/150
MPE(EXY) = from 1.5 + L/200
The **Optiv Advantage** line offers the largest range of models. It combines universal multisensor technology with consistent, high measuring accuracy. The principle behind this line: a low-vibration granite construction with fixed bridge and air bearings on all axes. Some models in the Optiv Advantage line have the exclusive Dual-Z-Design. Choose the optimal measuring range in the Z direction: 300 mm, 450 mm or 600 mm. The complete selection of sensors is available for the Optiv Advantage series as is extensive additional equipment such as, for example, motorized indexable probes and various rotary table combinations. As a result the Optiv Advantage line ensures universal adaptation to suit your high accuracy 3D measuring tasks.

**Measuring Range (mm)**
from 450 x 400 x 300 to 1500 x 600 x 450

**ISO 10360-7 Performance Specs (µm)**

\[
\text{MPE}_x = \text{from } 1.5 + \frac{L}{500}
\]

\[
\text{MPE(ExY)} = \text{from } 0.8 + \frac{L}{600}
\]
The premium offering with respect to measuring accuracy and design is the **Optiv Reference** line. It provides high precision 3D measurements with very tight production tolerances. A stiff granite construction with the most advanced design materials, air bearings on all axes and optional vibration dampers provide an unsurpassed solution for your metrology requirements.

The exclusive Optiv Dual-Z-Design is included as standard on all Reference types, as is the complete range of sensors and the extensive additional equipment, for example, motorized, indexable probes and various rotary table combinations. The Optiv Reference line is the optimum solution for complex, high precision 3D part measurements.

### Measuring Range (mm)
from 530 x 400 x 300 to 730 x 600 x 300

### ISO 10360-7 Performance Specs (µm)
MPE\(_e\) = from 1.2 + L/300
MPE(EXY) = from 0.8 + L/400
**Vision-Sensor** – The vision sensor is the image-processing measurement sensor for Optiv measuring machines. It can perform non-contact measurements on the smallest features subject to the tightest tolerances, accomplishing the sort of tasks that could not be accomplished with a probe, while avoiding deformations of the inspected part often caused by mechanical probes. The object being measured is captured through the lens on a matrix camera (CCD camera). The optical signals are converted into a digital image and further processed to calculate the coordinates of the measured points by the imaging processing routines in the PC-DMIS Vision measurement software package.

**Through-the-Lens-Laser (TTL-Laser)** – By coaxially injecting the laser light into the optics, the laser is focussed in the middle of the field of view acquired by the camera (Vision-Sensor). As a result the measuring speed on the simultaneous usage of laser measurement and video measurement in a measuring routine is accelerated.

Example applications for the TTL laser:

- Quick focussing of the Vision-Sensor
- Precise measurements of heights, hole depths and flat surfaces
- Contour and surface scanning
**Chromatic White Light Sensor (CWS)** – A measuring sensor with extremely high resolution is required for measurements in the micron range. Glossy surfaces also represent a challenge in vision metrology. The Chromatic White Light Sensor (CWS) is the ideal choice:

- For the topographical acquisition of microstructures
- For the digitisation of glossy surfaces (e.g. glass, polished metal)
- For the digitisation of transparent materials
Hexagon Metrology offers matching probing systems and styli for all portable and stationary measuring systems, including probing for machine tools.

For coordinate measuring machines the range is a complete offering of touch probes, manual and motorized probe heads, analogue scanning probes, change racks, extensions and styli.

www.hexagonmetrology.com
Hexagon Metrology Probing systems for CMMs

82  CMM-Ve Sensor
    CMS Sensor

83  CW43L-mw
    CW43L-mw AC

103 After-market service & support

104 Contacts
CMM-Ve Sensor

CMM-Ve cameras are designed to be a general purpose image analysis tool for enhancing the measurement capabilities of a CMM. It provides oblique overhead illumination of the feature being inspected. CMM-Ve cameras are very versatile and have many potential applications for the CMM user. Due to their general-purpose nature CMM-Ve cameras are provided with a fixed magnification and are intended for taking data points in a static condition. The CMM-Ve contains a customisable illumination system, which makes it a self contained measuring system, suitable for a wide range of applications.

The CMM-Ve is compatible with the automatic probe changer TESASTAR-r. This system allows the CMM to change the sensor being used, enabling the CMM-Ve to be integrated within multiple sensor part programs, and allows sensor exchanging without the need for any operator intervention.

CMS Sensor

The CMS106 is a laser line scanning probe with two unique features:
- three level zoom offering a 25, 60 or 120 mm laser line
- automatic, real-time laser power adjustment

The CMS106 is available on bridge and horizontal arm coordinate measuring machines. The probe offers rapid non-contact metrology for three key application areas: free form surface inspection, sheet metal feature inspection and reverse engineering.
**CW43L-mw**

CW43L-mw Continuous Wrist is a heavy-duty precision mechanism able to quickly orient the probe to any attitude following precise 3D trajectories. Its speed and motion are continuously controlled by the system controller to reach maximum machine efficiency. Its ability to orient the probe as needed in space (virtually infinite angular positions) along with the possibility to handle exceptionally long probe extensions, allow full access to the part being measured. The CW43L-mw is also available in the configuration with integrated 3rd continuous axis developed for the optimized use of non-contact sensors. The CW43L-mw wrist is compatible with both point-to-point TESA probes and other probes and tip/tool changers, thus enabling measuring both in point-to-point and scanning modes.

**CW43L-mw AC**

CW43L-mw AC is an automatic tool changer that allows fast automatic change of probes and extensions on the CW43L-mw continuous wrist without the need for requalification.
Established in 1941, TESA SA manufactures and markets today more than 5,000 dimensional metrology products, ranging from high-precision hand-held tools to sophisticated measuring systems. CMM products and vision systems for non-contact measurement are now also included. Most of them are produced under the SWISS MADE Label. A worldwide direct sales and distribution network is one of the major assets of the Swiss company whose primary markets are the automotive, aerospace, watch-making and metal processing.

www.tesabs.ch
Probing systems for CMMs

86  TESASTAR-i
   TESASTAR-i M8
87  TESASTAR-m
   TESASTAR-m M8
88  TESASTAR-sm
   TESASTAR-rp
89  TESASTAR-p
   TESASTAR-mp
90  TESASTAR-r
   TESASTAR-pr
   Probe styli

91  TESA CAL IP67 magna µ system
   TESA-HITE magna 400 and 700
92  TESA-SCAN
93  TESA UPD
   TESA electronic probes

103  After-market service & support

104  Contacts
TESASTAR-i Indexable Probe Head
TESASTAR-i is a manual indexable probe head with integrated high-precision touch trigger probe. The indexing capability in increments of 15° in two axes allows the operator to tilt the stylus through a number of positions as high as 168 without the need for requalification. A numeric display on the head shows the angular position of the probe. Axes can be released with one hand using a device located on the main body of the head.

TESASTAR-i M8 Indexable Probe Head
Constantly looking at the users’ needs and mainly concerned with designing components that are not just robust but also efficient and powerful, TESA is definitely focusing on technological innovation. The TESASTAR-i M8, which embodies the latest development from R&D, provides the same functionalities as TESASTAR-i. The key to this version is its ability to accommodate any type of probes or accessories fitted with a M8 threaded connection like all TESASTAR-p, TESASTAR-mp or TESASTAR-rp probes.
**TESASTAR-m Motorised Probe Head**

TESASTAR-m is a motorized articulating probe head capable of indexing in 5° increments for a total of 2,952 possible positions. A new version is available with 7.5° increments for a total of 720 possible positions. The indexing speed of the TESASTAR-m is higher than that of the corresponding products on the market, allowing for dramatically reduced cycle times. This head also features robust construction and rugged design permitting extension rods with lengths up to 300 mm. The TESA kinematic joint allows the direct docking of continuous scanning sensors. Coupled with an M8 adaptor, it can be used with TESASTAR-p touch-trigger probes as well as probes of other makes.

**TESASTAR-m M8 Motorised Probe Head**

Similar to TESASTAR-m, this probe head is fully automated and controlled over PC-DMIS. Due to its compatibility with any accessory having a M8 mounting thread, no adapter is required. Combining robustness with coupling force, this efficient tool further expands the wide range of Swiss-made high-accuracy components designed and produced by TESA.
**TESASTAR-sm Motorised Probe Head**

TESASTAR-sm is a fully motorised probe head that offers excellent positional repeatability. The indexing capability in increments of 5° allows the probe head to rotate through to 180° as well as angles ranging from +90° to -115° to be reached. The total number of positions is as high as 2,952. A new version is available with increments of 7.5° allowing to reach angles ranging from -180° to +180° on the B-axis and 0° to +105° on the A-axis for a total of 720 positions.

Being compactly sized, this probe head can directly be fitted on the Z-axis (65 or 80 mm square section) of nearly all existing CMMs, thus resulting in a noticeable volume increase. Available in two distinct versions, this new model can either be supplied with a kinematic joint or an M8 mounting thread for coupling the needed accessory.

**TESASTAR-p**

Full selection of omni-directional touch-trigger probes. Fitted with a common M8 threaded connection, they can be used with most existing probe heads. These probes are available in 4 choices of trigger force – from 0.55 N to 0.1 N.

For automatic operation, TESASTAR-p is fitted to the TESASTAR M8 automatic joint: this way the automatic change of the probe can be performed with the TESASTAR-r tool changing device. Thanks to the high accuracy of the tool changing system, probe requalification is not required after change.
**TESASTAR-mp**

This probe consists of two main parts, i.e. the mounting module and the probe itself. Both parts are put together by means of a magnetic coupling system ensuring a repositioning repeatable to 0.1 µm while allowing manual or automatic probe changing with no need for recurrent qualification. The four models available have also a varying measuring force contained within 0.055 N and 0.10 N. Their M8 threaded connection permits a direct assembly with nearly all existing measuring heads. Used in conjunction with TESASTAR-pr specially made to handle this type of probes, TESASTAR-mp is the ideal solution for fast and accurate coordinate measurement of part features.

**TESASTAR-rp Probe**

TESASTAR-rp is a rugged and accurate touch trigger probe that can be mounted on many kinds of coordinate measuring systems. This probe can operate in any industrial environment even in the most hostile. Optimized accuracy is ensured through an adjustable trigger force according to the chosen stylus configuration.
**TESASTAR-r Automatic Probe Changer**
Automatic modular probe changer. Available in 3 configurations – with 3, 5 and 9 modules. It allows the automatic change of extensions, sensors and styli without the need for tool requalification. When required, further modules, 40mm or 65mm long, can be added to sensors with particularly large working volume. The probe supplied with the tool changer is generally used for qualification but can also be used for normal measurement tasks.

**TESASTAR-pr Automatic Module Changer**
This model is specially designed for swapping magnetic probes. Available in two sizes (90 or 150 mm), the three main versions include 1, 2 or 3 double modules. Extra modules that are also compatible with TESASTAR-pr can any time be installed.

**Probe styli**, extensions and all other accessories included in the dedicated programme for three-axis measurement have been specially designed by our engineers. Produced at Renens under the SWISS MADE label, each product gives evidence of a consistent family to customers.
TESA CAL IP67 magna μ system
Electronic caliper – The highest degree of protection ever achieved with hand-held tools of this type – Totally immune to the penetration of liquids and particles of metal. Magnetic measuring system – a TESA’s technology guaranteeing full reliability and accuracy, even in the toughest conditions of use – SWISS MADE.

Based on the well-proven TESA technology for more than 25 years, the TESA-HITE magna 400 and 700 are ruggedly built for use even in the most hostile workshop environments due to their environmental sealing protecting against liquids and dust. Each height gauge comes equipped with the patented TESA magna μ system.
The whole **TESA-SCAN** product line belongs to the range of opto-electronic measuring centres that provide users with a complete solution for fast inspection of small round parts. As each center includes several systems such as those usually integrated into profile projectors or microscopes, they provide a more capable alternative to traditional inspection methods. TESA offer a full product family that's able to measure round parts with diameters from 0.3 to 80 mm whose length can reach up to 500 mm.
TESA UPD – The flexible concept that provides distinctive metrological features with substantial savings.

- Permits over 90% of a 122-piece set to be checked using the same Reference gauge block. All nominal lengths of the full gauge set being contained within 0.5 and 25 mm, the measuring span is therefore not exceeded.
- Allows the gauge blocks of same nominal lengths to be measured by comparison.
- Reduces the number of systematic errors through limited length related influences of both the upper probe A and the gauge block to be compared.

TESA Electronic Probes at the Fore Front in Precision Measurement

TESA has been a leading designer, manufacturer and user of inductive probes for more than 40 years. Its high-precision electronic probes are made to withstand the stress sustained in the production environment where they can be constantly used for series inspection. At the same time, these probes are also designed for high-accuracy measurements such as those performed in gauge block calibration.
Together with our industry partners, we at Hexagon Metrology offer you a wide array of customizable software solutions to best complement your industrial metrology application, with the focus on intelligently and effectively collecting, evaluating, managing and presenting your data. Get what you need to reduce scrap, improve throughput and lower costs.

www.hexagonmetrology.com
<table>
<thead>
<tr>
<th>Page</th>
<th>Software</th>
</tr>
</thead>
<tbody>
<tr>
<td>96</td>
<td>PC-DMIS</td>
</tr>
<tr>
<td>98</td>
<td>PC-DMIS Vision</td>
</tr>
<tr>
<td>99</td>
<td>PC-DMIS Inspection Planner Suite</td>
</tr>
<tr>
<td>100</td>
<td>IP Planner</td>
</tr>
<tr>
<td>101</td>
<td>Surfer EVO</td>
</tr>
<tr>
<td>102</td>
<td>QUINDOS</td>
</tr>
</tbody>
</table>

103  **After-market service & support**

104  **Contacts**
PC-DMIS is the world’s leading metrology software for Coordinate Measurement Machines. It has an installed base of over 30,000 and is the foundation of the EMS product suite. PC-DMIS is for manual and DCC machines and comes in three versions: PC-DMIS® PRO, PC-DMIS® CAD and PC-DMIS® CAD++. Each version is carefully tuned to meet differing levels of customer requirements. In addition, a rich set of optional modules enables users to configure PC-DMIS according to their specific needs.

All PC-DMIS products let users:

- Create part programs, inspect parts and report results using a fully configurable GUI (Graphic User Interface) that makes complex operations simple without sacrificing capabilities.
- Define datums, construct features, select geometry and dimension parts with a few mouse clicks, working with a graphical representation of the features.
- Generate reports from a full set of pre-defined templates or customize their output using PC-DMIS’s powerful report-builder module.
- Add macros and high-level language routines to meet specific requirements.
PC-DMIS CAD lets users:

- Import and export CAD models in most standard formats.
- Develop, test, and debug part programs directly on CAD models and extract information directly from the models, eliminating an entire class of errors.
- Compare measured data to the CAD nominals. Report the deviations graphically against the model.
- Simulate program execution on the CAD model, use QuikFixture® to build fixture models into part programs and detect collisions with either parts or fixtures.

For the most demanding applications PC-DMIS CAD++ lets users:

- Scan parts using a wide range of probes including hard, touch trigger, analog, lasers and white light. Take Advantage of seven built-in scanning methods.
- Align the most complex aerospace and automotive parts with iterative alignments that allow for the most accurate 2D and 3D fitting of the part to the CAD geometry.
- Measure thin-wall parts and complex contoured geometries with a powerful library of pre-defined routines.
- Troubleshoot problems with a sophisticated set of analytical tools and reverse engineer even the most complicated parts.
**PC-DMIS® Vision** sets a new standard for Vision Metrology Software. It is the industry's first CAD-based software package, and it is both powerful and easy to use.

This software gives vision metrologists the same capabilities long enjoyed by PC-DMIS CMM users. And because PC-DMIS Vision is part of EMS, all of the systems analytical, reporting and data management capabilities are available.

PC-DMIS Vision lets users:

- Work directly on 3D CAD models to develop, debug and edit programs. Like PC-DMIS CMM, this software extracts information right from the CAD model, eliminating errors of data interpretation and input.

- Program off-line using the CAD drawing and simulate program execution using the unique CADCamera© module, which accurately mimics the operation of the system's camera.

- Reduce the need for the expensive cross-training of operators to use different measurement software and devices.

- Turn a manual machine into a virtual DCC machine using AutoShutter™, which automatically finds and measures features as they come into the camera’s field of view.
- Eliminate hard to “see” areas from the measurement. The Split Feature function gives full control over which parts of a feature the software includes in its evaluation.

- Use an adaptation of the PC-DMIS’s auto feature capability to automatically measure features and create appropriate measurement parameters. Select multiple features to measure by boxing them together.

- Edit inspections sequences easily by changing measurement parameters like point density, edge type and edge strength.

- Share a single screen and toggle between camera and program view with a keystroke.

**PC-DMIS® Inspection Planner Suite** makes “paperless inspection” a reality. It seamlessly links design, manufacturing and metrology operations into a single, lean system.

IP Planner Suite consists of two modules. The first, IP Planner, is CAD based. It lets design engineers build inspection requirements into their models. The second, IP Measure is PC-DMIS based. It reads the inspection plan and converts design intent into measurement programs.
**IP Planner** lets designers:

- Use a CAD model to create a virtual, marked-up blueprint.

- Define the part's datums, dimensions and tolerances off the CAD system's built-in GD&T. This software is an add-in, sharing the look and feel of the host software.

- Electronically close the loop between design, manufacturing and metrology operations and drastically reduce delays and misinterpretations.

- Send inspection plans to any of the PC-DMIS EMS measurement programs.

**IP Measure** lets metrology programmers:

- Automatically turn inspection plans into measurement programs decreasing part programming time by up to 70%.

- Stop manually typing in measurement parameters and minimize data input errors.

- Optimize probe paths for new and existing part programs and detect collisions with both parts and fixtures.

- Use IP Measure without an inspection plan to program feature measurements automatically as well as define and optimize probe movement.
Surfer EVO is a powerful and flexible solution offering a larger number of modules to suit a broad range of inspection, quality control, dimensional analysis, reverse engineering and scanning data processing applications.

Surfer EVO offers dedicated tools for off-line analysis and report generation, including creation of part-to-CAD alignments and optimization of measured data, as well as advanced modules for GD&T analysis of free-form models (profile tolerances on surfaces and curves) and prismatic models (location, orientation, form, dimension, linear and angular distances).

Surfer EVO includes specific solutions for profile and thickness analysis, including measuring, programming, evaluation and reporting. A wide range of CAD interfaces for fast import of large parts and assemblies is provided as well as several interfaces with the most common measuring machines. Surfer EVO offers flexible capabilities for point cloud analysis, including alignments, color maps, automatic feature recognition and advanced reporting.
QUINDOS is the ideal measuring software for the dimensional inspection of complex contoured shapes on CMMs (gears, gear tools, blades, etc.) and accurate prismatic parts.

QUINDOS 7, the latest version, now features a Windows user interface, that can be tailored to your specific needs. It offers a new kind of programming and automatic measuring tools. The common handling of basic and special geometries measured on a CMM improves the ease of use as well as the software efficiency.

Using CAD models and object-oriented design, QUINDOS 7 combines a high degree of automation with easier use. QUINDOS 7 imports 3D models in the most common CAD formats, and allows to generate, view and evaluate measuring points. In addition, QUINDOS 7 allows you to design your own reports including pictures, tables and artwork. Connecting the server version of QS-STAT from Q-DAS, QUINDOS 7 can directly access the statistics package from its user interface.
Hexagon Metrology is part of the Hexagon Group and includes leading metrology brands such as Brown & Sharpe, CogniTens, DEA, Leica Geosystems (Metrology Division), Leitz, Optiv, PC-DMIS, ROMER and TESA.

Hexagon Metrology brands represent an unrivaled global installed base of millions of Coordinate Measuring Machines (CMMs), portable measuring systems and handheld instruments, and tens of thousands of metrology software licenses.

A worldwide, local service organization to support customers from product enquiry to after sales needs.

Systems Consultation
- Our specialists and engineers help select the solution that best suits specific manufacturing and inspection needs.

Skills Training
- Introductory to advanced metrology courses to optimize CMM productivity.

First Part Programming
- Part programs developed by experts for proper start-up of inspection of new components.

Contract Inspection and Programming
- A professional solution to production overload or unique measuring applications.
- Possibility of outsourcing dimensional inspection resources and activities to Hexagon Metrology.

Software Maintenance Agreements
- Periodic software updates to meet any high technology challenge.

Certification and Calibration
- Regular certification and calibration to guarantee the highest levels of system accuracy and repeatability.

System Upgrades and Rebuilds
- Old systems revitalized by combining advanced hardware and software with the existing equipment.

Service and Repair
- Genuine Hexagon Metrology parts and certified factory service to keep systems running in peak conditions.

After-market service & support
Hexagon Metrology Regional Precision Centers

Europe

Austria  Wiener Neudorf  Tel.: +43 2236 860 070
Fax: +43 2236 860 070-11
contact.at@hexagonmetrology.com
www.hexagonmetrology.at

Benelux  Waalre  Tel: +31 40 222 2210
Fax: +31 40 222 1715
contact.nl@hexagonmetrology.com
www.hexagonmetrology.nl

Czech Rep.  Prague  Tel: +420 272 680 830
Fax: +420 272 680 833
info.cz@hexagonmetrology.com
www.hexagonmetrology.eu

France  Paris  Tel: +33 1 69 29 12 00
Fax: +33 1 69 29 00 32
commercial.fr@hexagonmetrology.com
www.hexagonmetrology.fr

Lyon  Tel: +33 4 72 37 90 60
Fax: +33 4 72 37 90 61

Toulouse  Tel: +33 5 34 51 70 95
Fax: +33 5 34 51 79 44

Montoire (ROMER)  Tel: +33 2 54 86 40 40
Fax: +33 2 54 86 40 59
info@romer.fr
www.romer.com

Germany  Wetzlar  Tel: +49 6441 207-0
Fax: +49 6441 207-122
contact.de@hexagonmetrology.com
www.hexagonmetrology.de

Munich  Tel: +49 89 14 98 10 14
Fax: +49 89 14 98 10 59

Italy  Turin  Tel: +39 011 4025 111
Fax: +39 011 4025 472
commerciale.it@hexagonmetrology.com
www.hexagonmetrology.it

Milan  Tel: +39 02 6154 111
Fax: +39 02 6150 473

Bologna  Tel: +39 051 725 254
Fax: +39 051 725 288

Frosinone  Tel: +39 335 7484 562
Fax: +39 0775 270 758

Verona  Tel: +39 335 7622 338
Fax: +39 011 4025 472
Poland
Warsaw
Tel: +48 22 500 28 62
Fax: +48 22 500 28 64
info.pl@hexagonmetrology.com
www.hexagonmetrology.pl

Krakow
Tel: +48 12 647 08 27
Fax: +48 12 647 08 27

Spain
Barcelona
Tel: +34 93 594 69 20
Fax: +34 93 594 69 21
recepcion.spain@hexagonmetrology.com
www.hexagon.es

Sweden
Eskilstuna
Tel: +46 16 16 08 00
Fax: +46 16 16 08 90
info.se@hexagonmetrology.com
www.hexagonmetrology.se

Göteborg
Tel: +46 31 51 40 10
Fax: +46 16 16 08 99
hmc-gbg.se@hexagonmetrology.com

Trollhättan
Tel: +46 520 151 61
Fax: +46 16 16 08 99
hmc-thn.se@hexagonmetrology.com

Switzerland
Crissier
Tel: +41 21 633 50 33
Fax: +41 21 633 50 34
mail.ch@hexagonmetrology.com
www.hexagonmetrology.ch

Aarau-West
Tel: +41 62 737 67 37
Fax: +41 62 737 67 38

Renens (TESA)
Tel: +41 21 633 16 00
Fax: +41 21 635 75 35
tesa-info@hexagonmetrology.com
www.tesabs.ch

Unterentfelden
(Leica Geosystems)
Tel: +41 62 737 67 67
Fax: +41 62 737 68 68
info.metrology@leica-geosystems.com
www.leica-geosystems.com/metrology

Turkey
Ankara
Tel: +90 312 417 14 14
Fax: +90 312 425 58 38

Bursa
Tel: +90 224 441 98 00
Fax: +90 224 441 06 05
info.turkey@hexagonmetrology.com
www.hexagonmetrology.com.tr

UK
Telford
Tel: +44 870 446 2667
Fax: +44 870 446 2668
enquiry.uk@hexagonmetrology.com
www.hexagonmetrology.co.uk
Asia-Pacific

<table>
<thead>
<tr>
<th>Region</th>
<th>City</th>
<th>Phone</th>
<th>Fax</th>
<th>Email</th>
<th>Website</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>Beijing</td>
<td>+86 10 6789 2461</td>
<td>+86 10 6789 2462</td>
<td><a href="mailto:info@chinabnsmc.com">info@chinabnsmc.com</a></td>
<td><a href="http://www.hexagonmetrology.com.cn">www.hexagonmetrology.com.cn</a></td>
</tr>
<tr>
<td></td>
<td>Chengdu</td>
<td>+86 28 8671 6718</td>
<td>+86 28 8671 6730</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Guangzhou</td>
<td>+86 20 3810 7978</td>
<td>+86 20 3810 7979</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nanjing</td>
<td>+86 25 8698 8800</td>
<td>+86 25 8698 8801</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ningbo</td>
<td>+86 574 8737 6262</td>
<td>+86 574 8733 5159</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Qingdao</td>
<td>+86 532 8089 5188</td>
<td>+86 532 8089 5030</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Shanghai</td>
<td>+86 21 6353 1000</td>
<td>+86 21 5106 2273</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Shenyang</td>
<td>+86 24 2334 1690</td>
<td>+86 24 2334 1685</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Shenzhen</td>
<td>+86 755 8602 8088</td>
<td>+86 755 8602 7270</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Suzhou</td>
<td>+86 512 6280 0880</td>
<td>+86 512 6280 0990</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wuhan</td>
<td>+86 27 8792 8428</td>
<td>+86 27 8719 6191</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Xi’an</td>
<td>+86 29 8836 1018</td>
<td>+86 29 8836 1019</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Noida</td>
<td>+91 120 433 4466</td>
<td>+91 120 433 2455</td>
<td><a href="mailto:contact@hexmetindia.com">contact@hexmetindia.com</a></td>
<td><a href="http://www.hexagonmetrology.asia">www.hexagonmetrology.asia</a></td>
</tr>
<tr>
<td></td>
<td>Bangalore</td>
<td>+91 80 4113 0539</td>
<td>+91 80 4113 0489</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pune</td>
<td>+91 20 2729 0114</td>
<td>+91 20 2729 0116</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Chennai</td>
<td>+91 44 2635 0055</td>
<td>+91 44 2635 0056</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Japan</td>
<td>Sagamihara-shi, Kanagawa</td>
<td>+81 42 700 3500</td>
<td>+81 42 700 3511</td>
<td><a href="mailto:info.jp@hexagonmetrology.com">info.jp@hexagonmetrology.com</a></td>
<td><a href="http://www.hexagonmetrology.asia">www.hexagonmetrology.asia</a></td>
</tr>
<tr>
<td>Korea</td>
<td>Seongnam, Gyeonggi-do</td>
<td>+82 31 777 3477</td>
<td>+82 31 777 3478</td>
<td><a href="mailto:korea@hexagonmetrology.com">korea@hexagonmetrology.com</a></td>
<td><a href="http://www.hexagonmetrology.asia">www.hexagonmetrology.asia</a></td>
</tr>
<tr>
<td></td>
<td>Ulsan, Gyeong-nam</td>
<td>+82 52 227 3480</td>
<td>+82 52 227 3481</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Malaysia  Petaling Jaya, Selangor  Tel: +60 3 5632 8900  Fax: +60 3 5632 8955  contact.my@hexagonmetrology.com  www.hexagonmetrology.asia

Singapore  Tel: +65 6463 6242  Fax: +65 6463 8030  contact@hexagon-metrology.com.sg  www.hexagonmetrology.asia

Thailand  Bangkok  Tel: +66 2 361 3695  Fax: +66 2 746 9607  hexagon.thailand@hexagonmetrology.com  www.hexagonmetrology.asia

Vietnam  Hanoi  Tel: +84 4 3936 7935  Fax: +84 4 3936 8069  contact@hexagon-metrology.com.sg  www.hexagonmetrology.asia

North America

USA  Rhode Island, North Kingstown  Tel: +1 800 343 7933 (Toll Free)  Fax: +1 401 886 2000  info@hexagonmetrology.us  www.hexagonmetrology.us

California, Lake Forest  Tel: +1 800 955 5200  Fax: +1 949 727 0167

Illinois, Elgin  Tel: +1 847 931 0100  Fax: +1 847 931 1979

Michigan, Wixom  Tel: +1 248 449 9400  Fax: +1 248 449 7438

North Carolina, Huntersville  Tel: +1 704 947 1250  Fax: +1 704 947 1277

Ohio, Miamisburg  Tel: +1 800 329 4204 (Toll Free)  Fax: +1 937 247 0425  info@hexagonmetrology.com.mx

Tennessee, Nashville  Tel: +1 615 331 0800  Fax: +1 615 331 0875

Texas, Irving  Tel: +1 972 506 8359  Fax: +1 972 506 9162

Washington, Kent  Tel: +1 253 872 2443  Fax: +1 253 872 2579

Wisconsin, Fond du Lac  Tel: +1 920 906 7700  Fax: +1 920 906 7701

Mexico  Apodaca, Nuevo León  Tel: +52 81 1367 0800  Fax: +52 81 1367 0801  info@hexagonmetrology.com.mx  www.hexagonmetrology.com.mx
South America

Brazil  São Paulo  Tel: +55 11 5525 6000  
Fax: +55 11 5687 2101  
vendas.br@hexagonmetrology.com  
www.hexagonmetrology.com.br

Santa Barbara d'Oeste  Tel: +55 19 3455 4516  
vendas.br@hexagonmetrology.com

Paraná - Curitiba  Tel/Fax: +55 41 3015 5661  
vendas.br@hexagonmetrology.com

Minas Gerais - Belo Horizonte  Tel/Fax: +55 31 3234 0067  
vendas.br@hexagonmetrology.com

Argentina  Pilar  Tel: +54 2322 300 060  
Buenos Aires  Fax: +54 2322 300 059  
ventas.ar@hexagonmetrology.com  
www.hexagonmetrology.com.ar

Africa, Central & Eastern Europe, Middle East

Tel: +39 011 4025 111  
Fax: +39 011 7803 254  
info.itex@hexagonmetrology.com  
www.hexagonmetrology.eu

Algeria, Morocco, Tunisia

Tel: +33 1 69 29 12 00  
Fax: +33 1 69 29 00 32  
commercial.fr@hexagonmetrology.com  
www.hexagonmetrology.fr

Customers from all other countries not listed above  
or those looking for general information, please contact:  
info@hexagonmetrology.com

We reserve the right to modify the specifications of this brochure without notice.

© 2010 Hexagon AB. Printed in Switzerland.  
www.hexagonmetrology.com