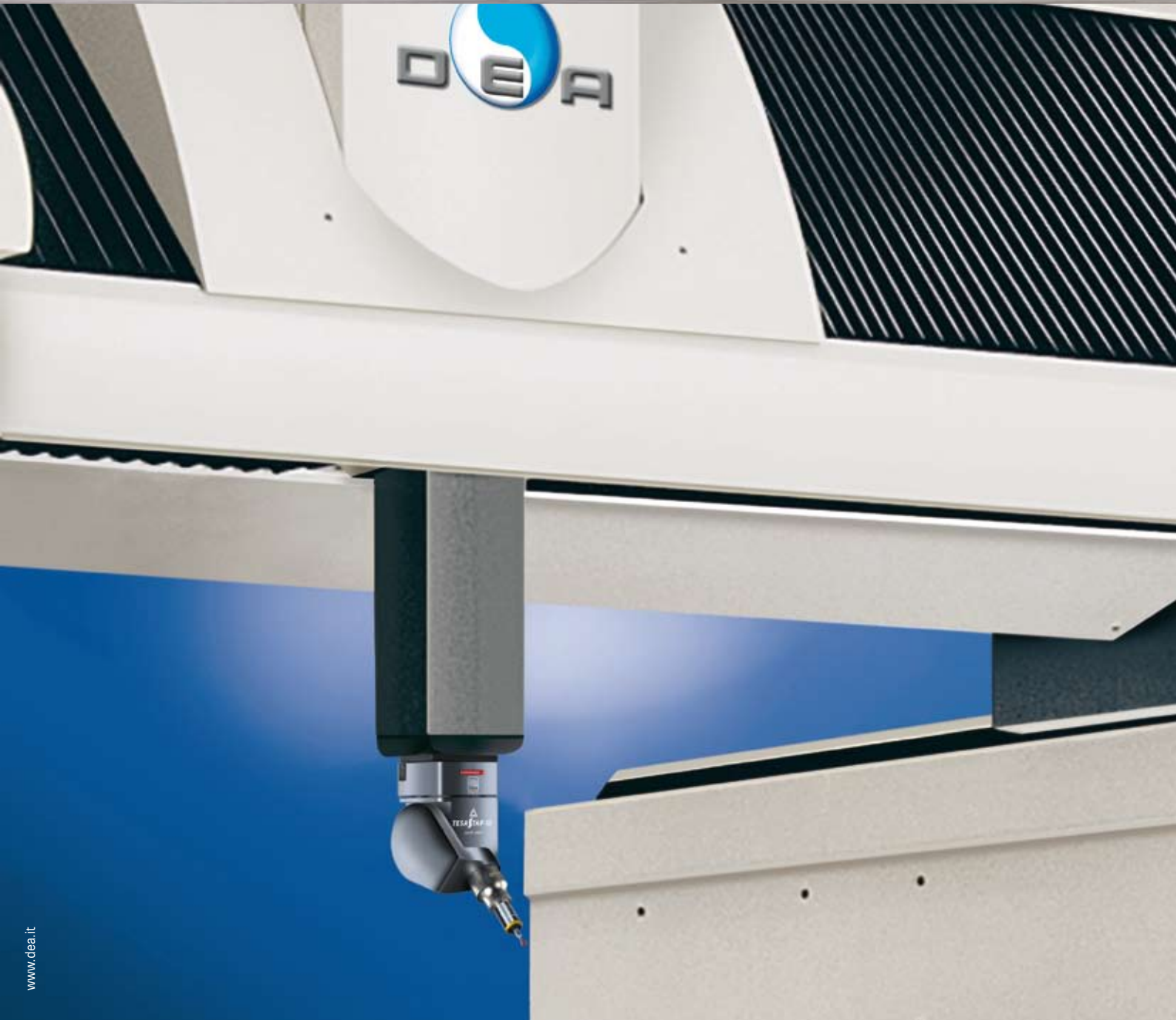




ALPHA, DELTA, LAMBDA  
Gantry Coordinate Measuring Machines



Serving Metrology Worldwide

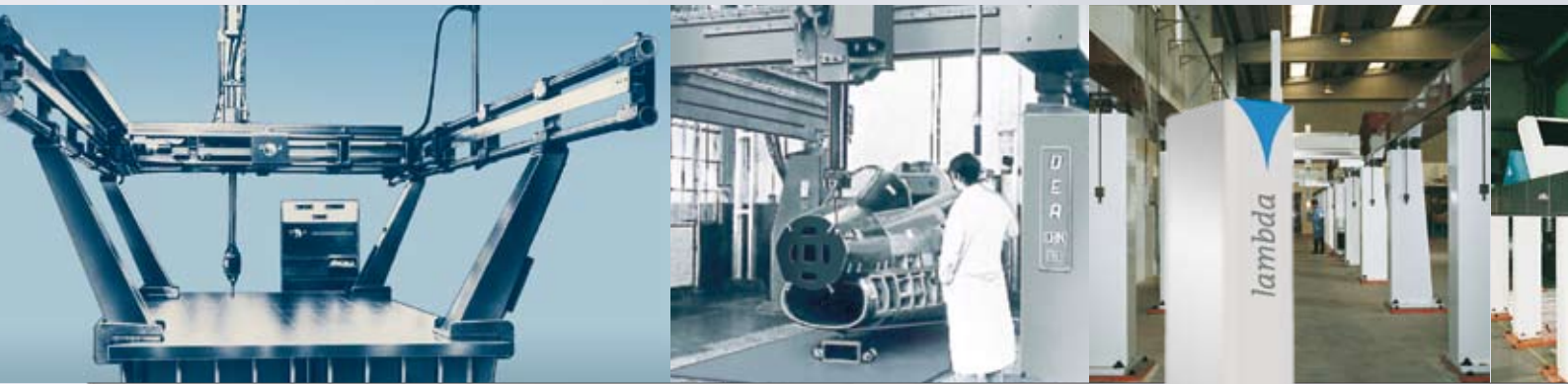


 **HEXAGON**  
METROLOGY

*Hexagon Metrology's success is due to the quality of the design, and to the superior mechanical structure of the machines, backed by the most advanced computer technology, and by an extensive and reliable service and support organization.*

# gantry cmm

Uncommon Expertise  
in Large Size CMMs



*R-evolutionary through the years since the '60s*



## An abridged list of DEA Gantry CMM customers:

- Active tool
- Aermacchi
- Aerospace Dynamics
- Aerospatiale
- AG International
- Airbus
- Alcoa
- Alenia
- Alfa Romeo
- Allison Gas
- Ansaldo
- Atom mash
- Audi
- Austin Morris
- Autolatina
- Avion Complex
- Becker
- Bell Helicopters
- Benteler
- Berardi
- Beretta
- BMW
- Bisiach & Carru
- B.O.C.
- Boeing
- Bofors
- BP Chemicals
- BPD
- Brenner Tools
- Brittain
- Cadillac Motors
- Candemat
- Caterpillar
- CFAN
- Chengdu Aircraft
- Chrysler
- China National Aero Technology
- China National Erzhong Group
- Chongqing
- Citroën
- Comau
- Cone Blanchard
- Contraves
- CPC
- Csepel
- Cummins
- Daimler Benz
- Dacia
- Daewoo
- Danieli
- Devlieg
- Dismodel
- Dostel Makina
- EADS (Casa Espacio)
- Exco
- Famer
- Fasa Renault
- FIAT
- First Autoworks
- Ferrari FMC
- Fokker
- Ford
- Fuji Heavy
- GEC Alsthom
- General Electric
- General Motors
- Giddings & Lewis
- Hal Bangalore
- Hebei
- Hes Makina Sanayi
- Hispano Bugatti
- Honda
- Hongdu Aviation
- Hyundai
- Ideal Tool
- Induplan
- Isotta Fraschini
- Italdesign
- Italstampi
- Janar Tool
- John Deere
- Jupasa
- Kalt
- Kamaz
- Kempton Heavy Ind.
- Korean Airlines
- Kodak
- Laepple
- Laser Die
- Liaoni
- Lockheed
- Mack Trucks
- Magna
- Major Tool & Machine
- Mares
- Mazda
- MBB
- McDonnell Douglas
- Milford
- Mitsubishi
- Modelmaster
- Modelos Aparicio
- MTU
- NCR Datong Electric Locomotive
- Nissan
- Ningbo
- Northrop
- Nuovo Pignone
- Nurtanio
- Off. Mecc. Vecchiato
- Ogihara
- Oto Melara
- Pegaso
- Peugeot
- Pininfarina
- Plastic Omnium
- Pratt & Whitney
- PSA
- Radiation System
- Ratier
- Renault
- Rockwell
- Rolls Royce
- Rover
- Rust International
- SAAB Skania
- Sabca
- Sanyo
- Saturn
- SEAT
- Sebewaing
- Sermati
- Sevel
- Shin Meiwa
- Siemens
- Sikorsky
- Skoda
- Soko
- Stola
- Teledyne
- Three-M Tool & Machine
- Thyssen
- Tianjing Auto
- Works
- Toyota Motorsport
- Transwerk
- Uspo
- Unipres
- VAZ
- Vikram
- Volkswagen
- Volvo
- Vought
- Weingarten
- Westland
- World Aerospace
- Xian Aero Engine
- Ynuma Machinery
- ZAZ
- ZCZ
- ZIL



## Hexagon Metrology: The Big Name in Gantry CMMs



*Forty years of experience in designing, manufacturing and marketing CMMs and an installed base of over 1450 gantry machines in 42 countries has secured DEA's position of world leadership in large size CMMs.*



alpha

Bridging the Price-Performance  
Gap in Gantry CMMs



*An innovative product line of cost-effective, medium capacity multi-sensor gantry CMMs, which combines high throughput and high accuracy with excellent operating reliability and reduced maintenance. ALPHA is available in two versions.*

**ALPHA STATUS** is an all-purpose flexible CMM for the dimensional inspection of large castings and machined parts. ALPHA STATUS, equipped with high-productivity 3D scanning laser head and continuous servo wrist options, can rapidly acquire millions of data points from complex contoured shapes, and is the ideal system for die and mold manufacturing support.



**ALPHA IMAGE** is a high performance gantry CMM, which incorporates several unique design features and state-of-the-art components, such as a high-resolution dual scale system on the Y axis, and a high rigidity ceramic spindle.

A linear thermal compensation makes ALPHA IMAGE an extreme performer, easy to use under all operating conditions.

All ALPHA models can be supplied equipped with optional bellows and covers, which offer machine protection for airborne shop contaminants.

*Bellows and covers (option)*

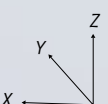
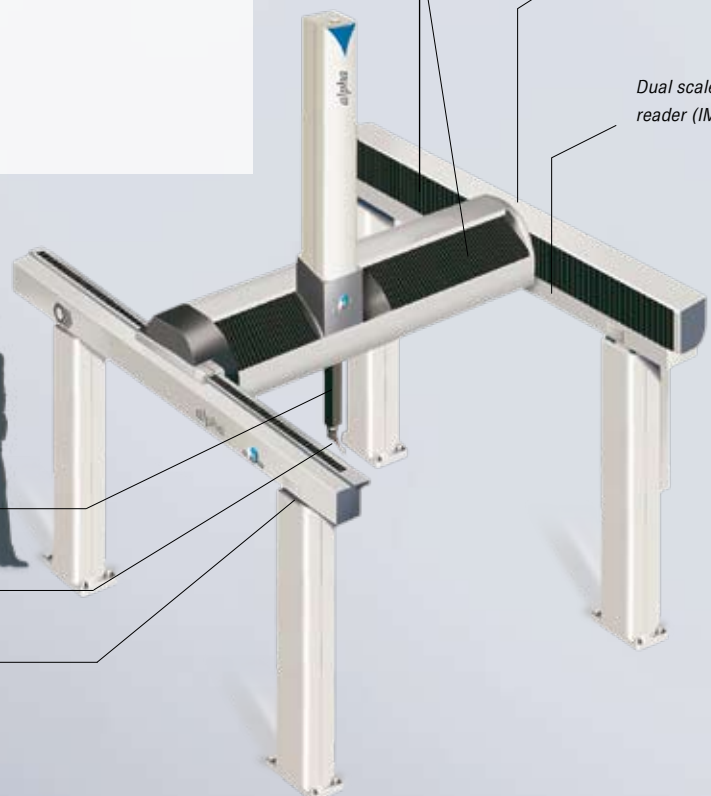
*Linear thermal compensation (IMAGE)*

*Dual scale/dual reader (IMAGE)*

*Ceramic Z spindle (IMAGE)*

*Optional continuous wrist*

*Y beams free to expand*



# delta slant

## The Performance Standard in Gantry CMMs

**DELTA SLANT** is a mid to large sized gantry measuring machine that is the outcome of the many years' experience offered by Hexagon Metrology in the design and construction of gantry measuring machines.

Thanks to substantial improvements, DELTA SLANT now offers even higher accuracies and dynamics at an unbeatable price/performance ratio. DELTA SLANT adopts the latest technological innovations of the Group like the X main traverse beam made of extruded aluminium with patented TRICISION® design, dual reader on the Y cross members, as well as the most advanced automatic compensation system for geometric errors, that handles 26 different parameters (Performance version).

All DELTA SLANT models are equipped with the ACTIV® structural multisensor temperature compensation.

DELTA SLANT is available in the two versions Classic and Performance.

The DELTA SLANT Classic is a flexible measurement system combining excellent dynamic and metrology

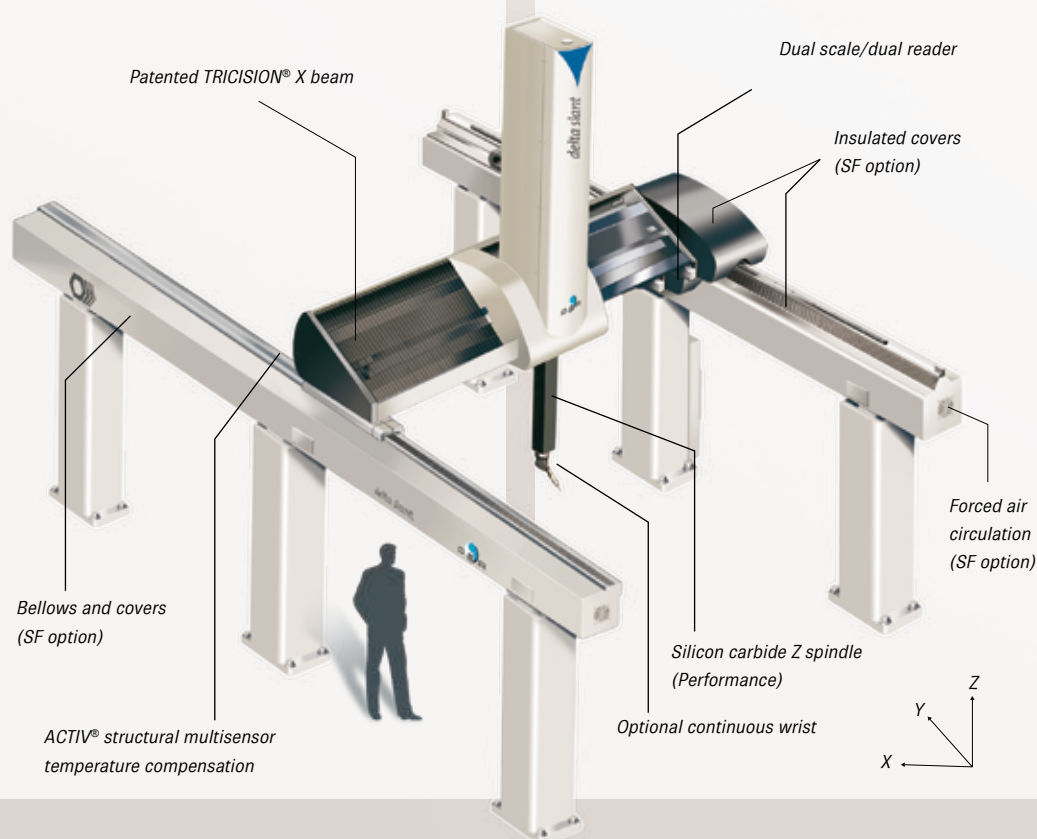
performance, with an affordable price.

DELTA SLANT Performance is the ideal system for applications requiring higher accuracies and shorter measurement cycles.

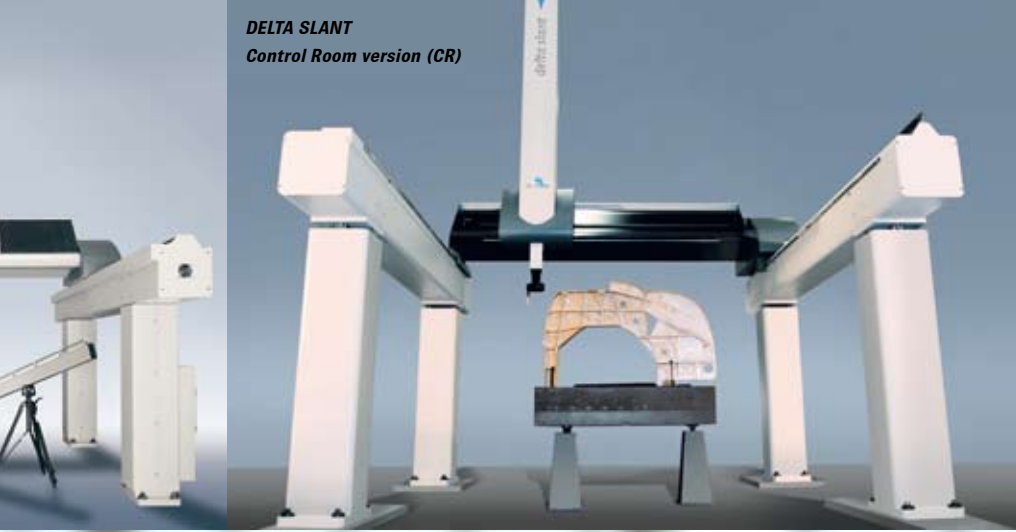
The typical applications of DELTA SLANT are mid-large sized components of the automotive, aerospace, heavy transport, railway, wind energy and die and mould industry.

DELTA SLANT has the whole range of Hexagon Metrology probes and probe heads available – from the versatile effective TESASTAR range through the Leitz LSP-X fixed continuous scanning heads, to the CW43L-continuous wrists.

To allow the use of DELTA SLANT systems in industrial environments without air-conditioned enclosures, all models may be configured in the SF version (Shop Floor). This exclusive kit consists of covers and bellows for the whole machine structure, including the forced ventilation along longitudinal beams.



**DELTA SLANT**  
**Control Room version (CR)**



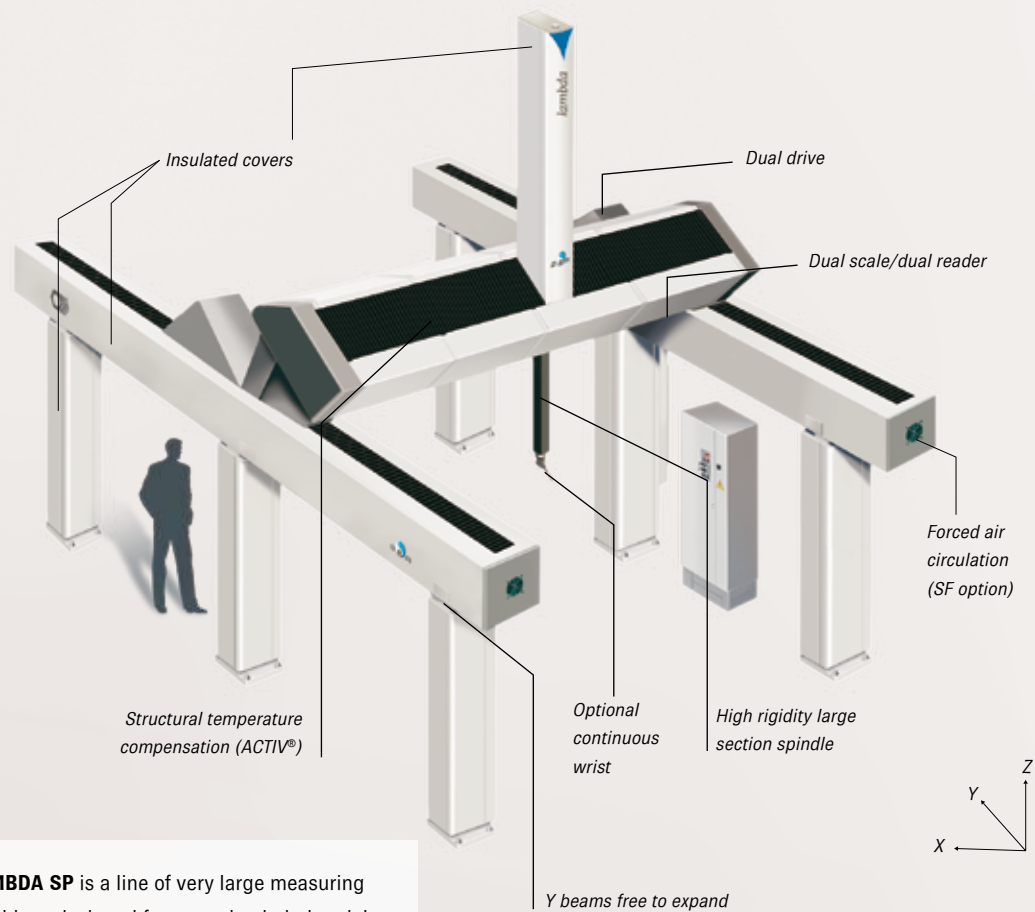


# lambda sp

The Hi-Tech Giant CMMs







**LAMBDA SP** is a line of very large measuring machines designed for operation in industrial environments.

They excel in the high-speed, high-accuracy inspection of huge components, such as marine engines, aircraft structures, turbines, etc., that require open, modular, easily customizable structures with virtually unlimited measuring volumes.

A proprietary dual drive/dual encoder system on the Y-axis simulates a virtual single axis located at the center of the carriage. Carriage yawing and structure deformations during motion are monitored by a distributed sensor system and compensated in real time. This unique configuration prevents the yawing of the carriage ensuring higher dynamics and superior measuring accuracy.

All axes and pillars are protected by wrap-around thermally insulated covers and bellows. Internal forced air circulation eliminates temperature stratification.

An advanced multi-sensor temperature compensation system (ACTIV®) ensures nominal measuring accuracy over an extended ambient temperature range.

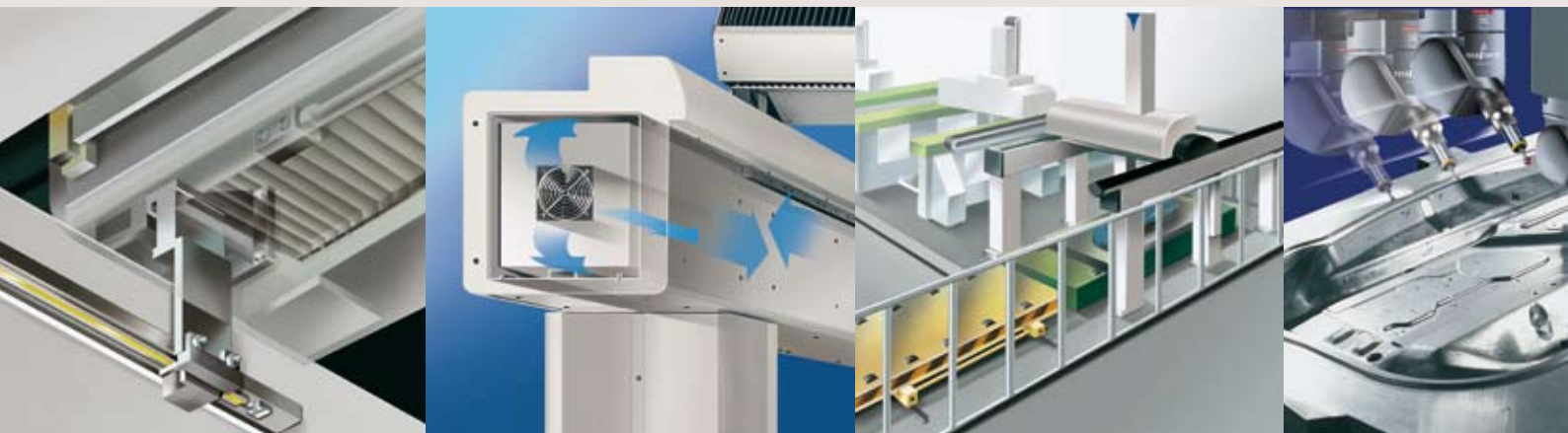
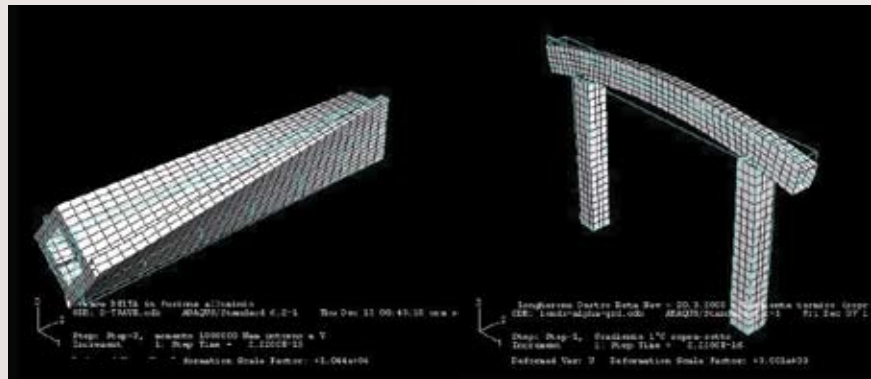
High performance servo wrist options handle exceptionally long probe extensions for full accessibility to all part features.



# Sophisticated Technology

## Superior Long-term Accuracy

- conservative FEA design reduces structural deflections
- dual drive/dual scale versions eliminate carriage yawing
- real time correction of up to 26 geometrical parameters (DELTA SLANT Performance)
- extra large bearing proportions and generous stiffness/mass ratio
- high-rigidity large section Z-spindle
- high resolution scales
- vibration isolation options



## Excellent Productivity and Flexibility

- low-mass aluminum alloy moving members
- maximum velocity and acceleration – control of jerk
- continuous axes motion interpolation (FLY)
- automatic optimized tuning of servo parameters
- high throughput non-contact sensor options
- optional servo wrist rotates while the machine moves
- integrated flexible fixturing options

## Reliable Design for Effective Integration

- lower maintenance requirements
- high calibration stability
- reduced field adjustments
- easy access to all machine components
- wear- and damage-free use

## Extended System Availability

- heavy duty proven machine design
- multiple enclosure versions
- partial/full covers
- internal forced air circulation
- thermally insulated
- pneumatic safety brake on the Z-spindle
- reduced number of parts
- industry standard compliance

## Safe Operation in Workshop Environments

- Y axis guideways are free to expand without distorting
- scales with certified coefficient of temperature expansion
- thermally stabilized machine versions
- thermally insulated enclosure versions
- high efficiency temperature compensation options:
  - linear
  - structural (ACTIV®)

# The diverse fields of application of the gantry measuring machines.

## Die and Mold Manufacturing

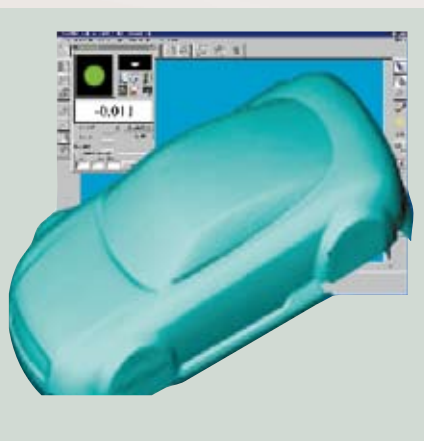
DEA gantry machines provide an advanced tool for model making, die prove-out, inspection analysis and failure analysis.

- High accuracy, high productivity surface mapping capabilities are supported by automatic tactile scanning systems and ultra-high speed non-contact scanning head options that acquire millions of data points from the model real surface.
- Efficient CAD interfaces allow exporting the processed surface point files to CAD/CAM systems for the generation of machining tool paths.

## Surface Design & Metrology

An interactive computer graphic environment for the dimensional verification and CAD modeling of free form surfaces, streamlines:

- Reverse engineering operations, for the creation, maintenance, and modification of CAD models directly from actual parts.
- the efficient incorporation of design and manufacturing changes back into the CAD database
- the quick and complete verification of complex free form shapes and features directly from their nominal CAD geometry.



## Dimensional Inspection

DEA gantry machines excel in inspecting, with superior accuracy, large and very large mechanical parts, high precision machined components, large automotive and aerospace structures.

The application is supported by:

- a complete metrology CAM package: bi-directional direct CAD interfaces allow establishing common manufacturing practices driven from CAD databases.
- an interactive graphic user interface, that includes a 3D animation of the full machine kinematics including part and fixtures, and flexible graphical reporting functions.
- advanced scanning options that increase data point density and improve feature dimension, location, and form analysis, while enhancing system throughput.



# Probing the Difference!

## A wide range of high-performance probe heads and measurement sensors

### LSP-X3

A compact, cost-effective but 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, it is ideally suited for dimensional control of small-



to-medium high-accuracy prismatic parts and complex geometries.

An automatic tool changing capability allows styli change within a measuring program without the need for probe requalification. Magnetic clamping of styli on the head permits fast and reliable changes.

### LSP-X5

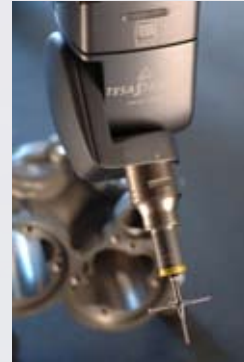
Ultra-precise, full 3D, fixed scanning head capable of simultaneously measuring in the X, Y, and Z directions to precisely define the orientation of the workpiece surface. This heavy-duty analog probe features very high and repeatable accuracy even with extra-long probe extensions and heavy styli clusters (up to 500 mm of length and 500 g



of weight). It features 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. An automatic tool changing capability allows styli change within a measuring program without the need for probe requalification. Pneumatic clamping of styli on the head permits fast and reliable changes.

### TESASTAR-m Indexable Probe Head – Always the Right Attitude!

TESASTAR-m is a motorized articulating probe capable of rotating about two axes in 5° increments, which translates to a total of 2,952 possible positions. The particular asymmetrical shape of the indexing arm and the lateral indexing capability allow to use the full measurement volume. The TESASTAR-m also features high speed



indexing with faster index changes than similar products, and thus shorter time cycles. The robust aluminum construction and rugged design permits extension rods with lengths over 300 mm. The TESASTAR kinematic joint connection allows direct docking with the continuous scanning probes, or coupled with an M8 adaptor, can be used with TESASTAR-p touch trigger probes as well as probes of other manufacturers.

### LSP-X1

The LSP-X1 is a high-accuracy 3D scanning sensor, that can take thousands of points quickly and automatically.

The LSP-X1 allows a thorough evaluation of the measured geometric features, including form, position and size error. It is offered in two different probe types, LSP-X1s and LSP-X1m, each optimized for specific



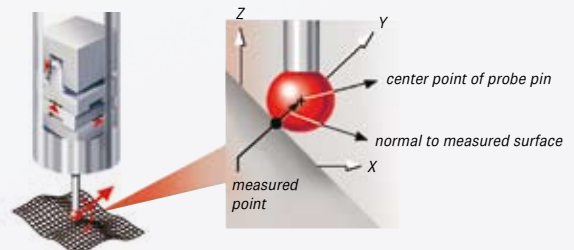
styli length ranges. This sensor uses the same technology adopted for other probe heads in the LSP-X range.

Thanks to the TESA TKJ adapter, LSP-X1 can be changed using the TESASTAR-r probe changer rack, while fast and repeatable styli changes are possible with the LSP-X1 styli changer rack due to the stylus magnetic holder.

### The measuring machine within the measuring machine

On contact with the part surface, the LSP-X heads automatically measures normal to the part surface. Probing deflections are measured via high-resolution Linear Variable Differential Transducers (LVDT), allowing an accurate compensation of the probe bending, even when using long extensions. This capability reduces cosine errors and is vital when inspecting complex geometries such as gears, rotors and blades, since it ensures a higher measuring accuracy and throughput.

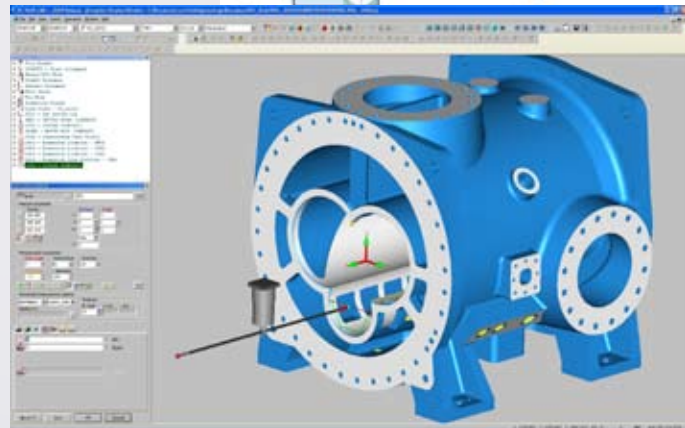
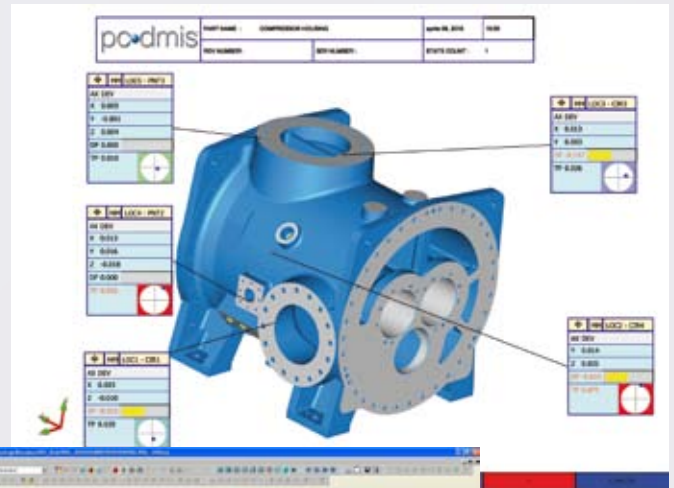
The LSP-X probe heads are of an extremely rugged construction and require only minimal maintenance. In addition the lack of motors eliminates any source of heat.





## Leading-edge measurement software

*Available in three different versions and with a number of optional packages, PC-DMIS measurement and inspection software provides the most comprehensive solution to any kind of metrology applications.*



### Full-featured Metrology Software

PC-DMIS PRO® provides the basic intuitive graphic user interface (without CAD), including a suite of wizards to help operators quickly learn and manipulate key inspection functions.

Features include:

- A full programming environment including high level programming functions.
- Customisable menus.
- Quick Start routines for probe qualifications, part alignments and hyper-reporting functions.
- A full suite of customisable reporting and advanced Hyper- Reporting tools.
- Intuitive Probe and Go to automatically recognize feature types and create interactive graphical part representations.



### Adds the Ability to Import CAD Files

PC-DMIS CAD includes all PC-DMIS PRO functionalities, plus:

- Full 3D animation capability including digitised images of parts and fixtures on the machine so operators can visually verify the set-up and program prior to actual part inspection.
- Unknown part documentation to generate computer models for reverse engineering applications.
- Native download of VDAFS, IGES, DXF, DWG, STEP, XYZIJK, STL, DES, and DMIS formats.
- A Direct CAD Interface (DCI) option to create part programs directly from CAD models utilizing the native CAD system algorithms and tools.
- A Direct CAD Translator (DCT) option allows the use of a native CAD model even when the specific CAD system is not owned by the user.



### Adds Scanning and Thin-walled Parts

In addition to all PC-DMIS PRO and PC-DMIS CAD functionalities, PC-DMIS CAD++ incorporates scanning and digitising functions that allow fast and efficient measurement of complex shapes such as turbine blades, dies, models, sheet metal components and other curved shapes.

Features include:

- Rotary, patch, linear open and closed loop scanning.
- Perimeter, section, UV and edge point scanning.
- Complete probe simulation.
- Full thin-wall feature measurement suite.

# The choice is yours!

DEA offers a full selection of models to suit all requirements.



ALPHA							
Series	Strokes			Overall Dimensions			Weight (kg)
	X (mm)	Y (mm)	Z (mm)	Length (mm)	Width (mm)	Height (mm)	
20.33.10	2000	3300	1000	4200	3640	3555	3130
20.33.15	2000	3300	1500	4200	3640	4555	3450
20.50.15	2000	5000	1500	5900	3640	4555	4870
25.33.15	2500	3300	1500	4200	4140	4555	3480
25.50.15	2500	5000	1500	5900	4140	4555	4900
25.33.18	2500	3300	1800	4200	4140	4860	3490
25.50.18	2500	5000	1800	5900	4140	4860	4910



DELTA SLANT							
Series	Strokes			Overall Dimensions			Weight (kg)
	X (mm)	Y (mm)	Z (mm)	Length (mm)	Width (mm)	Height (mm)	
20.33.15	2000	3300	1500	4704	3867	4840	4700
20.51.15	2000	5100	1500	6504	3867	4840	6330
25.33.15	2500	3300	1500	4704	4367	4840	4800
25.51.15	2500	5100	1500	6504	4367	4840	6430
25.63.15	2500	6300	1500	7704	4367	4840	7030
25.33.20	2500	3300	2000	4704	4367	5640	5050
25.51.20	2500	5100	2000	6504	4367	5640	6800
25.63.20	2500	6300	2000	7704	4367	5640	7400
30.51.20	3000	5100	2000	6504	4867	5640	6900
30.63.20	3000	6300	2000	7704	4867	5640	7500
30.80.20	3000	8000	2000	9400	4867	5640	9490
30.51.25	3000	5100	2500	6504	4867	6640	6900
30.63.25	3000	6300	2500	7704	4867	6640	7500
30.80.25	3000	8000	2500	9400	4867	6640	9490

## LAMBDA SP

Series	Strokes			Overall Dimensions			Weight (kg)
	X (mm)	Y (mm)	Z (mm)	Length (mm)	Width (mm)	Height (mm)	
40.51.30	4000	5100	3000	7530	6345	8290	11800
40.63.30	4000	6300	3000	9000	6345	8290	12400
40.80.30	4000	8000	3000	10600	6345	8290	15300
40.100.30	4000	10000	3000	13200	6345	8290	16950
50.51.35	5000	5100	3500	7530	7345	8790	13000
50.63.35	5000	6300	3500	9000	7345	8790	13600
50.80.35	5000	8000	3500	10600	7345	8790	16500
50.100.35	5000	10000	3500	13200	7345	8790	18150
60.51.40	6000	5100	4000	7530	8345	9290	14200
60.63.40	6000	6300	4000	9000	8345	9290	14800
60.80.40	6000	8000	4000	10600	8345	9290	17700
60.100.40	6000	10000	4000	13200	8345	9290	19350



# A Standard of Quality Second to None

The quality and reliability of DEA gantry CMMs result from the accuracy of the manufacturing techniques and total quality control procedures adopted, and the rational interaction of skilled workers with high technology production equipment.

## Full Machine Performance Certification

The performance of all machines is checked and certified through the most rigorous application of the test procedures specified by stringent international standards for CMMs (ISO, ASME, VDI/VDE).

The tests include:

- The verification of the maximum permissible error of indication for size measurement.
- The verification of the maximum permissible probing error.
- The verification of the maximum permissible scanning probing error.



## A Commitment to Quality

The company's exclusive Quality Information System (SIQ) monitors in real time the quality of each machine produced and its compliance with the specified standard.

All aspects of the activity carried on by DEA, from product design and manufacturing to delivery and customer service have been reviewed and found to meet internationally accepted quality standards (ISO 9001 and VDA 6.4).





## DEA

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.

## Hexagon Metrology

Hexagon Metrology is part of the Hexagon group and brings leading brands from the field of industrial metrology under one roof.

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