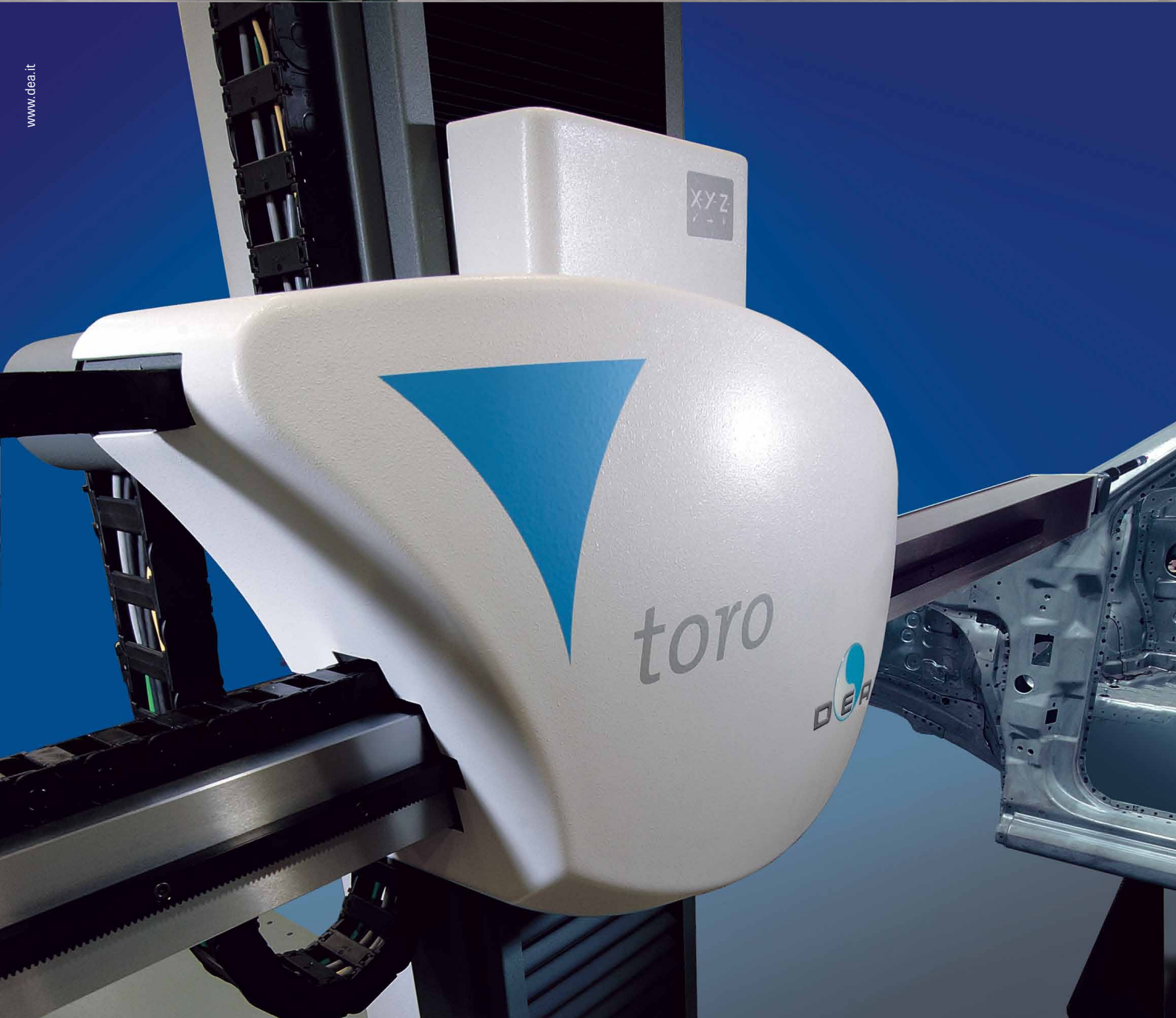


DEA TORO
Horizontal-Arm Coordinate Measuring Machines



Serving Metrology Worldwide

www.dea.it



 **HEXAGON**
METROLOGY



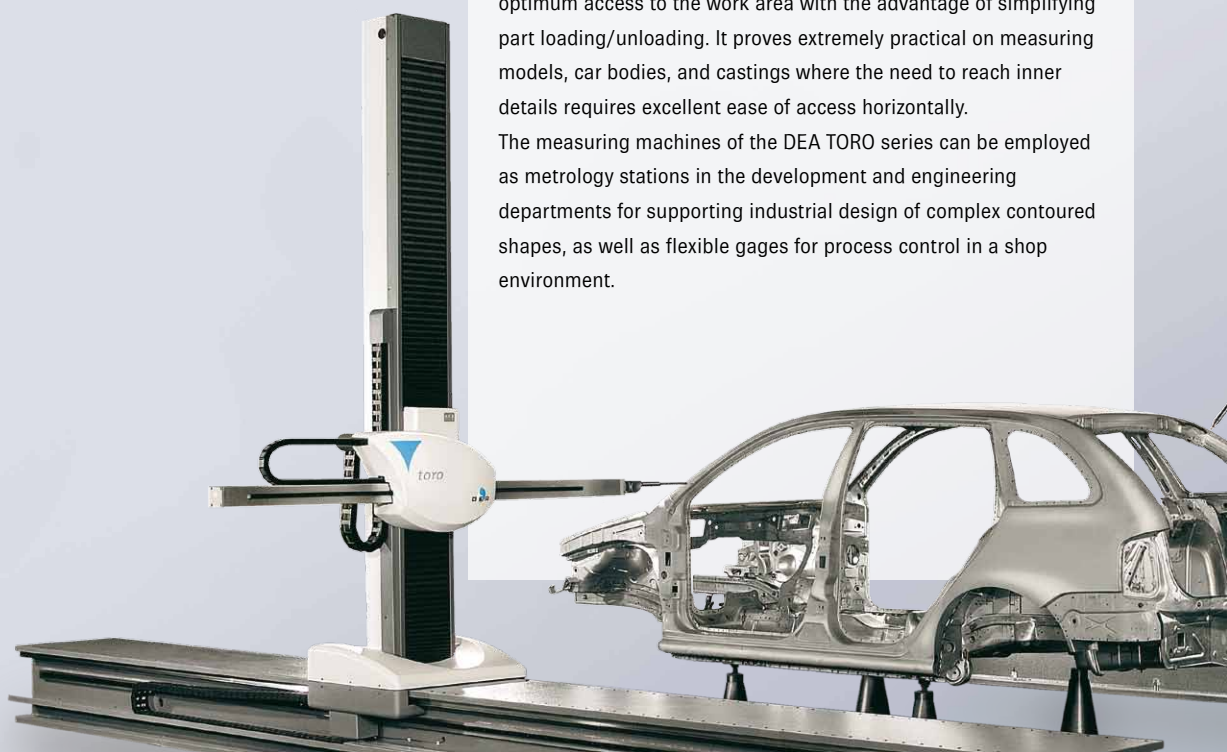
DEA TORO is the line of automatic horizontal-arm measuring machines: it has been designed to satisfy the requirement for efficient tools for the automatic inspection of dimensional quality throughout the entire manufacturing cycle.

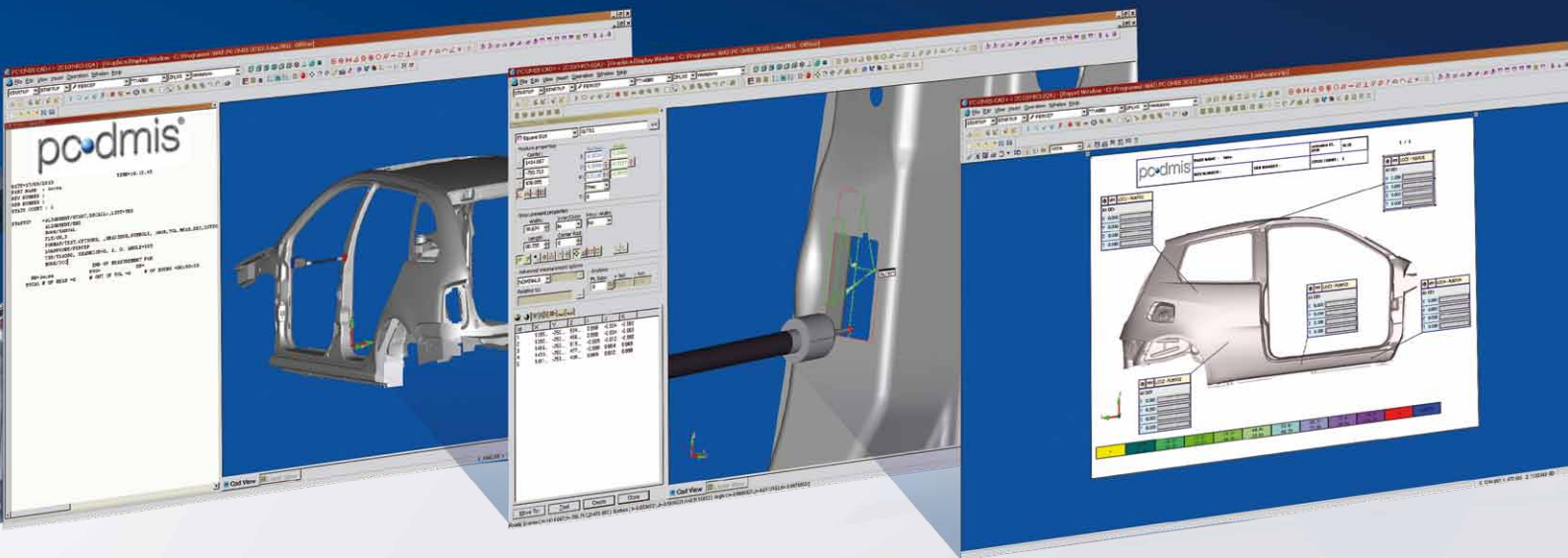
The Easiest Approach to Sheet Metal Applications

The DEA TORO series is available in the Runway type architecture (the main guideway is floor-mounted). It is extremely modular and easy to configure thus combining flexibility and programmability that are typical of CMMs, with the speed and intuitive use of traditional measuring gages.

The open structure of horizontal-arm architecture guarantees optimum access to the work area with the advantage of simplifying part loading/unloading. It proves extremely practical on measuring models, car bodies, and castings where the need to reach inner details requires excellent ease of access horizontally.

The measuring machines of the DEA TORO series can be employed as metrology stations in the development and engineering departments for supporting industrial design of complex contoured shapes, as well as flexible gages for process control in a shop environment.





Powerful Sheet Metal Routines Optimize System Performance

PC-DMIS includes powerful point-and-click sheet metal measuring routines for the automatic inspection of thin-walled components, and the presentation of results for intuitive interpretation. The sheet metal routines are efficient software tools that simplify and speed up part programming.

They only need the operator to enter data. The system automatically generates the part program containing the necessary positioning and probing instructions.

At run time, automatic and self-adaptive search routines overcome element mispositioning. If the element is not present, automatic skip cycles allow the machine to continue the part program.

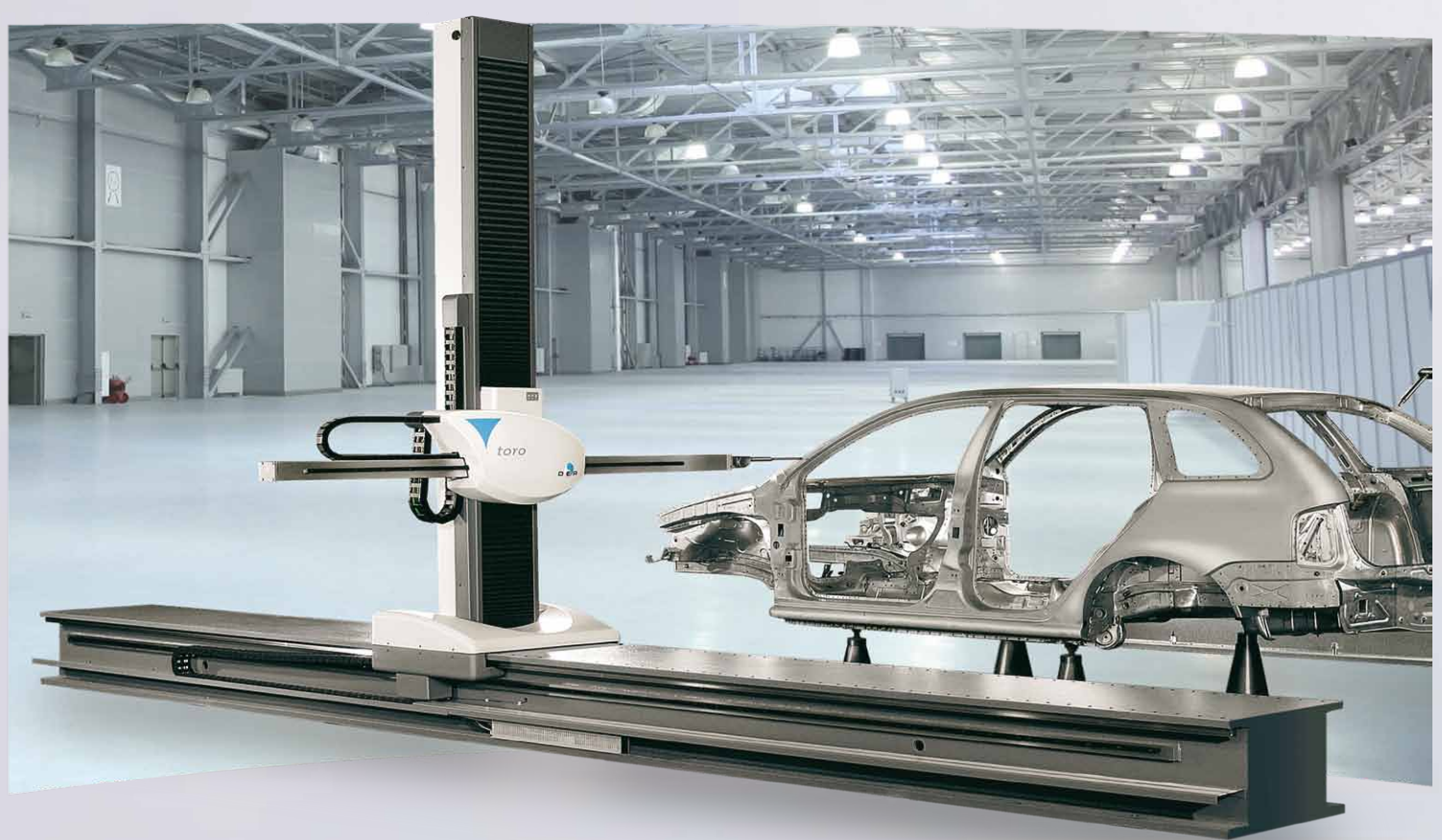


DEA TORO and pc•dmis a Winning Duo

DEA TORO is equipped with PC-DMIS, the industrial grade measuring software that provides a multi-tasking, multi-user environment to inspection operations.

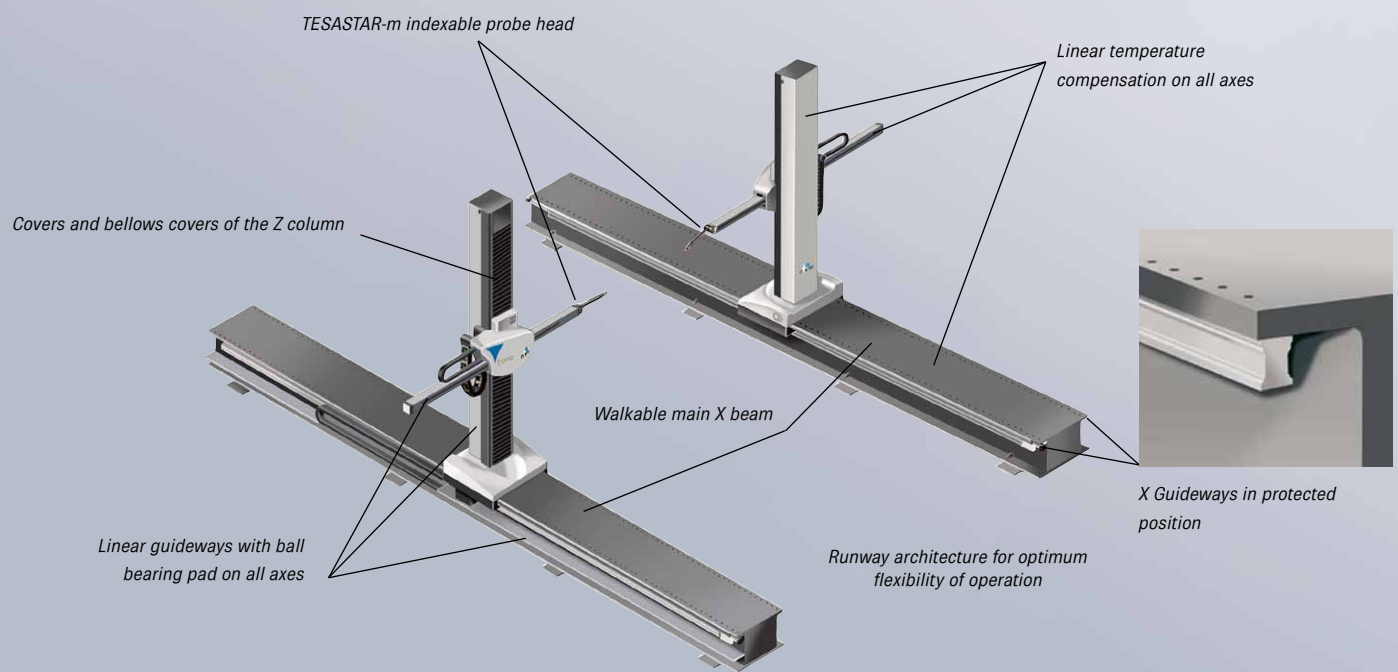
Main Features

- User-friendly Windows operating system
- Customizable 3D graphics-based operator interface
- Direct CAD Interface (DCI)
- IN/OUT DMIS
- Direct part measurement using original CAD data
- Direct measurement without the help of a CAD model, with automatic recognition of part shapes and features
- Management of non-contact measuring probes
- DCC program-driven measurement
- Reverse engineering functionality
- Management of continuous scanning probes
- Off-line part programming supported by original CAD design data and graphical simulations
- On-line part programming (Self-Teach)
- Advanced tools for program proofing, fine tuning, and debugging
- Flexible graphical and analytical reporting
- Advanced SPC and process monitoring options
- Management of multi-arm measuring systems



Highlights of the DEA TORO Line

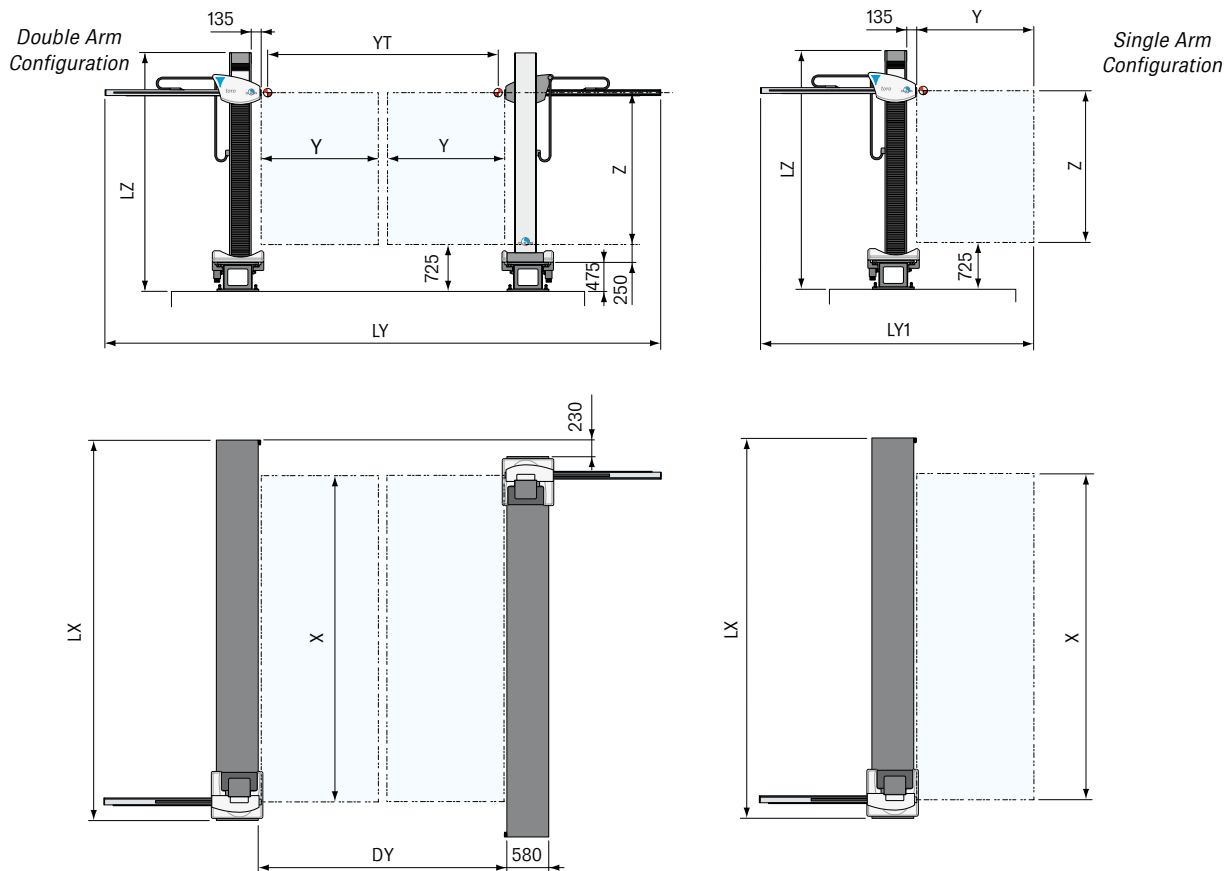
- The use of CAD and FEA design techniques has allowed to develop a highly optimized structure, both light and stiff, essential but extremely functional, allowing to drastically reduce installation and maintenance time.
- Rugged motors combined with a sturdy rack & pinion system on all axes guarantee repeatable positionings over time. No slip due to wear.
- All machine axes move on stiff ball bearing pads that slide on a pair of ground and induction-hardened precision guideways, thus, ensuring ideal resistance and functional dependability in industrial environments.
- The sliding systems of all axes rest on 3 points so as to optimize installation times and prevent mechanical alignment errors between cartesian axes.
- The Z axis guideways are protected by a stiff bellow cover against contaminants in the environment.
- The guideways on the X beam in a protected position and the exclusive design of the mobile carriage make the traditional walkable covers or bellows covers for the upper surface of the main beam unnecessary.
- High Flexibility Usage: thanks to the indexable motorized head TESASTAR-m – with an index step of 5° – the system is able to achieve more than 2,950 different positions in the measuring volume, in conjunction with the new TESASTAR-rp probe and the automatic tool changer TESASTAR-r.
- Advanced systems for geometric errors mapping and linear temperature compensation ensure high constant measurement accuracy in the shop floor.
- The mobile carriage counterbalance system takes advantage of an innovative backlash-free, safety device located inside the Z machine ram.



Technical Characteristics, Strokes, Dimensions and Weights

| Models | Strokes (mm) | | | | Standard Temperature Range 16 ÷ 24 °C | | | Overall Dimensions (mm) | | | | | Weights (*) (kg) | Max. Part Weight (kg) | |
|----------|--------------|------|------|------|--|------------------|-------------------------|-------------------------|------|------|------|------|---------------------|-----------------------|------------|
| | | | | | Single Arm | | Double Arm | LX | LY | LY1 | DY | LZ | | Single Arm | Double Arm |
| | X | Y | Z | YT | MPE _E | MPE _P | MPE _E | | | | | | | | |
| 60.16.21 | 6000 | 1600 | 2100 | 3218 | 30 + 25 L/1000 ≤ 85 μm | 30 | 50 + 33 L/1000 ≤ 110 μm | 6740 | 7705 | 3856 | 3439 | 3369 | 2950 | 3500 | 6000 |
| 70.16.21 | 7000 | 1600 | 2100 | 3218 | | | | 7740 | 7705 | 3856 | 3439 | 3369 | | | |
| 60.16.25 | 6000 | 1600 | 2500 | 3218 | 33 + 27 L/1000 ≤ 92 μm | 33 | 56 + 35 L/1000 ≤ 124 μm | 6740 | 7705 | 3856 | 3439 | 3769 | 3000 | 3500 | 6000 |
| 70.16.25 | 7000 | 1600 | 2500 | 3218 | | | | 7740 | 7705 | 3856 | 3439 | 3769 | | | |

(*) Approximate weight, single arm version



Guideways: Z column and X beam made of stabilized steel, X carriage made of stabilized cast iron, Y/Z carriage made of light alloy, Y ram made of steel

Sliding System: Dual linear guides with recirculating ball bearings on all axes

Measuring System: METALLUR® linear optical transducers. System resolution: 0.5 μm

Thermal Compensation: Linear temperature compensation on all models, 1 sensor on each axis + 1 part sensor (manual probing)

Ram Counterbalance: Internal counterweight using belt multiwire system

Bellows and Covers: Z axis protected by system of bellows and covers
Floor mounted walkable X axis beam

Environment: Temperature range for compliance to metrological specifications: 16 ÷ 24 °C, 1.5 °C/h - 3 °C/24h, 0.5 °C/m
Operating temperature: 10 ÷ 45 °C
Relative humidity: 90 % non-condensing

Dynamics: Max. 3D Speed: 346 mm/s
Max. 3D Acceleration: 346 mm/s²

Probe Heads and Sensors: **Probe configuration for performance test:**
TESASTAR-m: • TESASTAR-p/TESASTAR-rp: Standard Force, stylus length 10 mm, tip diameter 4 mm
• TESASTAR-mp: Standard Module Force, stylus length 20 mm, tip diameter 4 mm

Measuring accuracy performances are expressed according to the ISO 10360-2 international standard. MPE_P is the maximum permissible probing error and MPE_E is the maximum permissible error of indication for size measurement, where L is the length of the measurement in mm.



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.

info.dea@hexagonmetrology.com

www.dea.it

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