

# DEA TORO

Horizontal Arm Coordinate Measuring Machine



# THE EASIEST APPROACH TO SHEET METAL APPLICATIONS

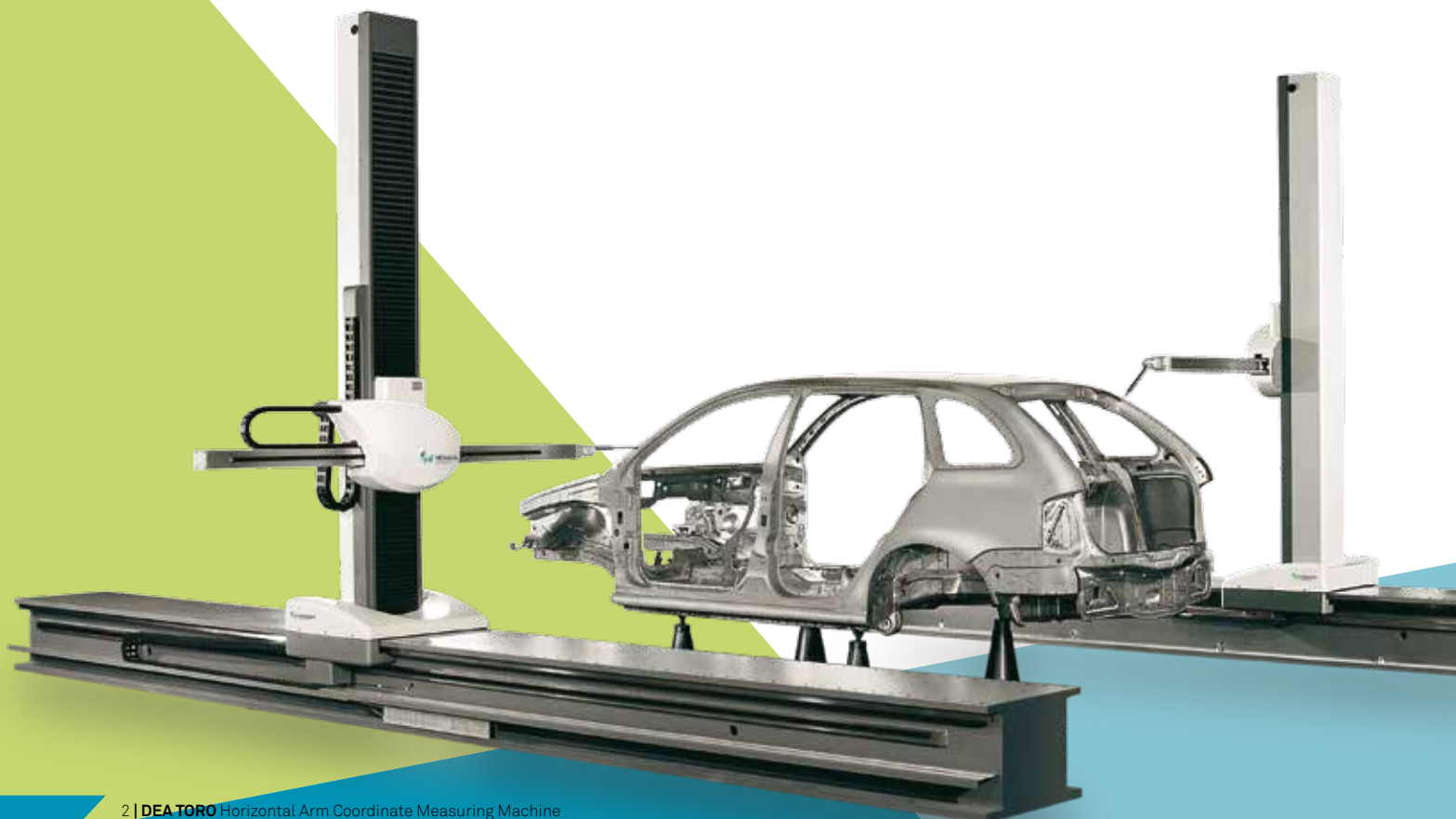
DEA TORO is the line of automatic horizontal-arm measuring machines: it has been designed to satisfy the requirement for efficient tools for the automatic inspection of dimensional quality throughout the entire manufacturing cycle.

The 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.



## DEA TORO AND PC-DMIS A WINNING DUO

DEA TORO is equipped with PC-DMIS, the industrial measuring software that provides a multi-tasking, multi-user environment for 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

## 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.

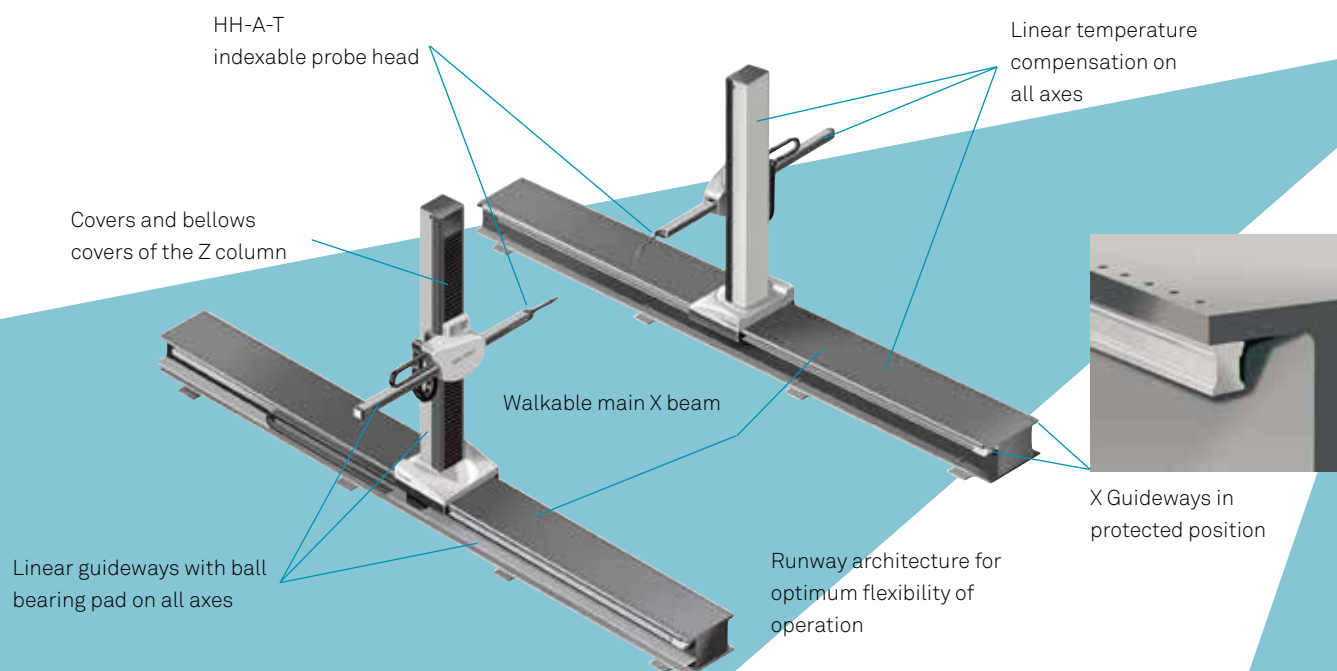
They only need the operator to enter data. The system automatically generates the part program containing the necessary positioning and probing instructions.

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.



# HIGHLIGHTS OF THE DEATORO LINE

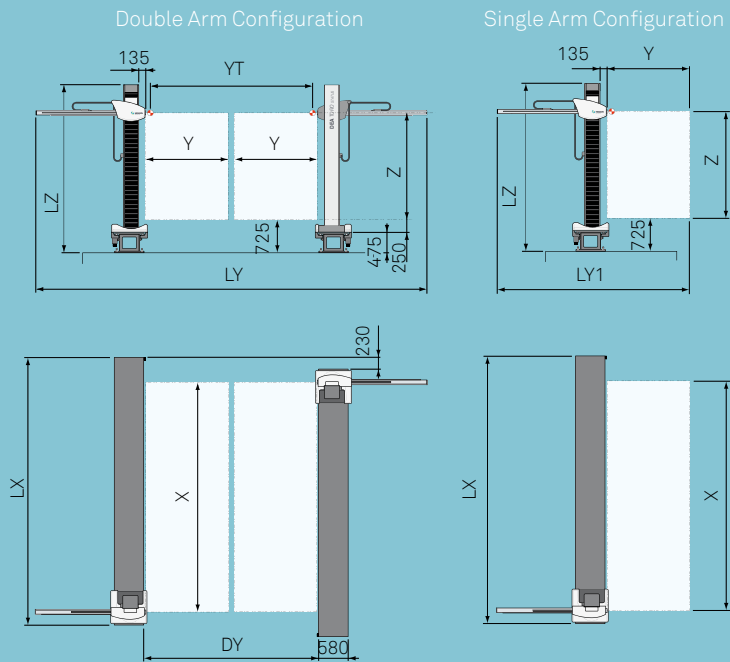
- The use of CAD and FEA design techniques has allowed to develop a highly optimized structure, both light and stiff, essential but extremely functional, allowing to drastically reduce installation and maintenance time.
- Rugged motors combined with a sturdy rack & pinion system on all axes guarantee 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: thanks to the indexable motorized head HH-A-T – with an index step of 5° – the system is able to achieve more than 3024 different positions in the measuring volume, in conjunction with the HP-T-RP probe and the automatic tool changer HR-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

Model	Measuring Strokes (mm)				Standard Temperature Range 16÷24 °C			Overall Dimensions (mm)					Max Part Weight (kg)			
	X	Y	Z	YT	Single Arm		Double Arm		LX	LY	LY1	DY	LZ	Weights (*) (kg)	Single Arm	Double Arm
					MPE <sub>E</sub> (µm)	MPE <sub>P</sub>	MPE <sub>E</sub> (µm)									
60.16.21	6000	1600	2100	3218	30+25	30	50+33		6740	7705	3856	3439	3369	2950	3500	6000
70.16.21	7000	1600	2100	3218	L/1000 ≤ 85		L/1000 ≤ 110		7740	7705	3856	3439	3369	3370	4000	7000
60.16.25	6000	1600	2500	3218	33+27	30	56+35		6740	7705	3856	3439	3769	3000	3500	6000
70.16.25	7000	1600	2500	3218	L/1000 ≤ 92		L/1000 ≤ 124		7740	7705	3856	3439	3769	3420	4000	7000

(\*) Approximate weight, single arm version



Measuring accuracy performances are expressed according to the ISO 10360-2 international standard. MPE<sub>P</sub> is the maximum permissible probing error and MPE<sub>E</sub> is the maximum permissible error of indication for size measurement, where L is the length of the measurement in mm.

## 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.

## 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/s<sup>2</sup>

## Probe Heads and Sensors

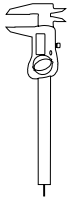
Probe configuration for performance test:

HH-A:

- HP-T / HP-T-RP:

Standard Force, stylus length 10 mm, tip diameter 4 mm

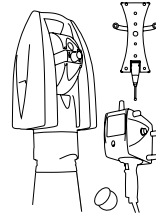
- HP-TM: Standard Module Force, stylus length 20 mm, tip diameter 4 mm



PRECISION MEASURING INSTRUMENTS



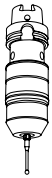
PORTABLE MEASURING ARMS



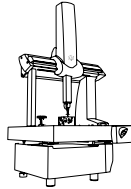
LASER TRACKERS & STATIONS



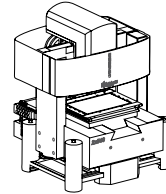
WHITE LIGHT SCANNERS



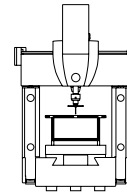
SENSORS



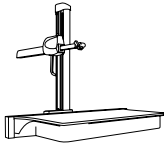
BRIDGE CMMS



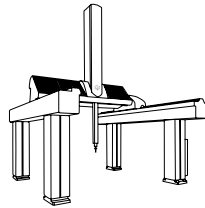
MULTISENSOR & OPTICAL SYSTEMS



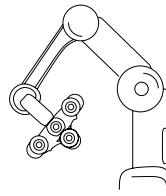
ULTRA HIGH ACCURACY CMMS



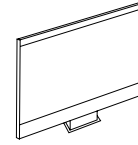
HORIZONTAL ARM CMMS



GANTRY CMMS



AUTOMATED APPLICATIONS



SOFTWARE SOLUTIONS



## HEXAGON METROLOGY

Hexagon Metrology offers a comprehensive range of products and services for all industrial metrology applications in sectors such as automotive, aerospace, energy and medical. We support our customers with actionable measurement information along the complete life cycle of a product – from development and design to production, assembly and final inspection.

With more than 20 production facilities and 70 Precision Centers for service and demonstrations, and a network of over 100 distribution partners on five continents, we empower our customers to fully control their manufacturing processes, enhancing the quality of products and increasing efficiency in manufacturing plants around the world.

For more information, visit [www.hexagonmetrology.com](http://www.hexagonmetrology.com)

Hexagon is a leading global provider of information technologies that drive productivity and quality across industrial and geospatial applications. Hexagon's solutions integrate sensors, software, domain knowledge and customer workflows into intelligent information ecosystems that deliver actionable information. They are used in a broad range of vital industries.

Hexagon (Nasdaq Stockholm: HEXA B) has more than 15,000 employees in 46 countries and net sales of approximately 2.6bn EUR.

Learn more at [www.hexagon.com](http://www.hexagon.com)

© 2015 Hexagon Metrology. Part of Hexagon

All rights reserved. Due to continuing product development, Hexagon Metrology reserves the right to change product specifications without prior notice.

Printed in Germany. May 2015