



# LEICA ABSOLUTE TRACKER AT960

Absolute portability. Absolute speed. Absolute accuracy.





# ABSOLUTE ◀PORTABILITY▶

## QUALITY AND PRODUCTIVITY ON THE MOVE

The Leica Absolute Tracker AT960 from Hexagon Metrology is the first truly portable dynamic six degrees of freedom (6DoF) laser measurement system, providing a robust, all-in-one solution to even the most challenging large-scale metrology requirements.

With customers seeking better productivity while still demanding technical excellence, Hexagon Metrology offers pioneering solutions. The AT960 brings together the functionality of the hugely successful Leica Absolute Tracker AT901 and T-Cam with the usability of the compact Leica Absolute Tracker AT402, creating an ultra-portable coordinate measuring machine that fits in a single box.

Featuring optional battery operation and Wi-Fi as standard, the AT960's revolutionary integrated-technology design makes lengthy setup a thing of the past. With built-in levelling equipment, IP54 protection and a system weight of less than 14 kg, the AT960 can be taken almost anywhere.



“ The Leica Absolute Tracker is now a key piece of our metrology toolset when travelling to each and every race. The reduction in the weight of the tracker has significantly reduced shipping costs whilst guaranteeing the very best in precision. ”

Chris Charnley, Quality Manager, Infiniti Red Bull Racing



# ABSOLUTE ◀SPEED▶

## DYNAMIC FEATURES TO MEASURE AND GO

**Metrology equipment should help complete a task quickly, not slow down the process.**

**The Leica Absolute Tracker AT960 offers high-speed probing, scanning and machine control solutions as well as reflector measurements so inspections can be made using the most efficient method for the job, while intuitive controls save time in training and operations.**

### **Automatic target lock**

PowerLock provides intelligent targeting to automatically locate the reflector or probe for the easiest laser tracker operation yet. Now in its third generation, this patented active vision technology allows the AT960 to instantly re-establish an interrupted beam and continue the measurement with no user intervention. Effective within the maximum working range of the tracker, PowerLock leaves operators to simply measure.

### **High-speed dynamic measurement**

The Leica Absolute Interferometer (AIFM) enables the AT960 to measure a moving target with the fastest speed possible. In combination with a true real-time operating system, the AIFM and PowerLock allow the AT960 to continue measuring with a maximum uncertainty of just 10 µm after beam interruption and deliver a data rate of 1 000 points per second.

### **Easy-to-use controls**

The wireless AT960 with battery option takes the difficulty out of setup, while colour touch-screen controls enable operators to prepare the tracker without worrying about how to correct any problems. Proven Leica TrackerPilot check and compensation architecture means basic adjustments can be made in the field, while robust design guarantees on-specification operations with minimal calibration and servicing.



“ The portable Leica Absolute Tracker has enabled us to grow our metrology capabilities at the circuit, no matter where in the world we’re racing. Not only has it improved the precision of the car build, but it has also saved valuable time during the inspection processes. ”

Chris Charnley, Quality Manager, Infinity Red Bull Racing



# ABSOLUTE < ACCURACY >

THE RIGHT WAY TO MEASURE  
WHATEVER THE APPLICATION

**Driven by the absolute distancing capabilities of the AIFM, the Leica Absolute Tracker AT960 is capable of exceptionally accurate readings across several inspection methods. This flexible functionality and customisable operation allows operators to select the best method for each application and never compromise accuracy.**

Built-in variozoom technology provides 6DoF measurement as standard, making the AT960 compatible with the latest Leica T-Product range as well as traditional reflectors to offer the right way to measure every time. These four methods of measurement, along with versatile quick-release mounting options including inclined and inverted operations, ensure that the accuracy of the AT960 can always be applied to the task. With a completely sealed unit certified to IP54 and integrated environmental monitoring, the AT960 delivers reliable results in even the harshest conditions.

“ Microns and milliseconds are intrinsically linked. Using portable Leica Absolute Trackers to ensure the accuracy of car build on both sides of the garage results in increased quality and reliability for the car on track. ”

Chris Charnley, Quality Manager, Infiniti Red Bull Racing

## Reflector measurements

With optical centring accuracy of  $\pm 3 \mu\text{m}$ , Leica reflectors offer a highly-accurate solution for line of sight measurements. Automatically located and tracked by PowerLock, reflectors allow high-speed dynamic measurement in volumes of up to 120 m ( $\emptyset$ ). Available in a range of types and sizes for various applications, they are compatible with any Leica Absolute Tracker including the AT960.



## Hand-held probing solutions

Small, light and accurate, the Leica T-Probe is a wireless battery-operated probing solution for measuring even the most hard-to-reach points. Featuring user-assignable multi-function buttons and integrated measurement feedback along with automatically recognised changeable styli, it sets the benchmark for operator-friendly measurement applications in volumes of up to 40 m ( $\emptyset$ ).



## Hand-held scanning solutions

The faster, more accurate and less damaging alternative to scrubbing a reflector over a surface to record multiple points, the Leica T-Scan laser scanner records over 200 000 points per second even on shiny metallic or dark surfaces. With no powdering required, preparation time is cut to the minimum, while automatic adjustments ensure the best possible readings in a single pass.



## Automated solutions

A machine control sensor for automated 6DoF applications, the Leica T-Mac can be customised for specific purposes including tactile and non-contact inspection, monitoring and correcting robotic systems or controlling automated production elements. Generating not just positional data, but also the pitch, roll and yaw of an object, it can deliver up to 1 000 measurements per second.





# HIGH-END ◀ TECHNOLOGY ▶

## IN ULTRA-PORTABLE FORM

With a longstanding commitment to research and development, Hexagon Metrology provides innovative solutions that help customers to maximise and maintain productivity. The Leica Absolute Tracker AT960 – designed for quicker, more accurate results and a better user experience – is the latest product of this approach.

Augmenting proven technology with new innovations, in the AT960 Hexagon Metrology has created a sophisticated yet user-friendly walk-around CMM that fits in just one flight case.

Offering high-speed dynamic measurement as standard, the AT960 is a single-unit solution for 6DoF probing, scanning and machine controlled inspection. With the complete range of Leica laser tracker accessories built into the device, the AT960 can be transported easily, unpacked quickly and powered up in minutes to measure in any location.

Combining portability with usability, the AT960 makes operation intuitive, reducing user workload to minimise the margin for error and save time, effort and money. With applications spanning aerospace, automotive, shipbuilding, manufacturing and many more sectors, the AT960 is the new standard in portable industrial metrology.



### FEATURES AND BENEFITS

-  **All-in-one design**  
With all the equipment for measurement to a reflector, Leica T-Probe, Leica T-Scan or Leica T-Mac built in, the compact all-in-one unit is ultra-portable for easy transportation to measure anywhere.
-  **PowerLock**  
Interrupted line of sight is automatically re-established in a +/-5 degree field of view with no user interaction required for ease of use and exceptional performance in even the most crowded measurement volumes.
-  **Battery power**  
Independent hot-swap battery power supply allows a quick and easy cable-free setup in almost any location for better portability, offering a flexible solution that lasts up to a day's shift – wherever the tracker is needed.
-  **Wi-Fi**  
Built-in Wi-Fi enables simple setup and communication with the PC for truly wireless operations, also providing remote control options via laptops, tablets or smartphones so the tracker can be operated by a single user.
-  **IP54**  
The IEC-certified sealed unit guarantees ingress protection against dust and other contaminants, enabling the tracker to measure effectively in even the harshest environments.
-  **MeteoStation**  
Integrated environmental unit monitors conditions including temperature, pressure and humidity to compensate for changes and ensure accurate measurements regardless of external factors.
-  **Overview camera (OVC)**  
High-resolution colour OVC enables operators to remotely view the tracker's field of vision, locating targets to measure to fixed reflectors – including multi-spot handling in a single image – ideal for static hidden point devices or to supplement documentation.
-  **Orient to gravity (OTG)**  
The OTG function enables users to measure with the Z-axis aligned to gravity, ideal for levelling and alignment tasks such as build and inspect of tool and jig fixturing.
-  **Absolute Interferometer (AIFM)**  
The AIFM single distancing unit combines the accuracy of an absolute distance meter and the speed of an interferometer to give readings quickly and accurately with no need for a home point.
-  **1 kHz data output**  
Real-time architecture with dynamic performance gives a measurement rate of up to 1 000 points per second, enabling more detailed data capture, more quickly.
-  **Integrated mini variozoom**  
With a constant field of view in any light conditions, mini variozoom provides 6DoF measurement capabilities for accurate probing, scanning and machine control applications.

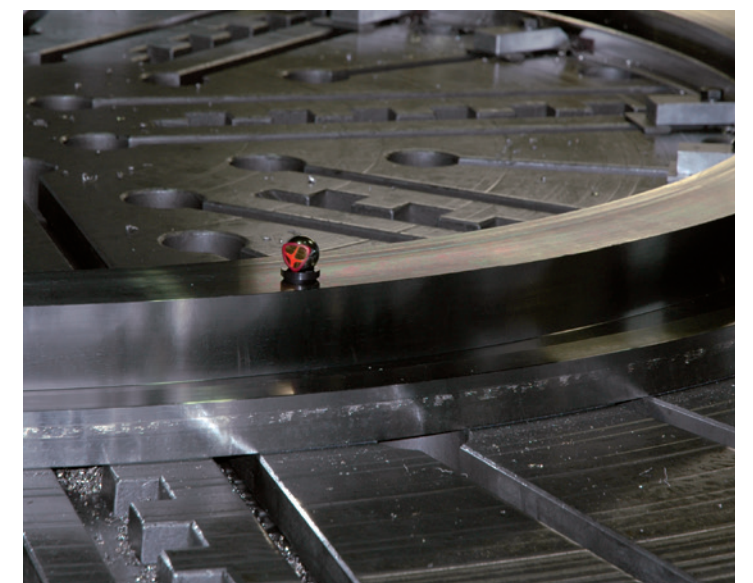
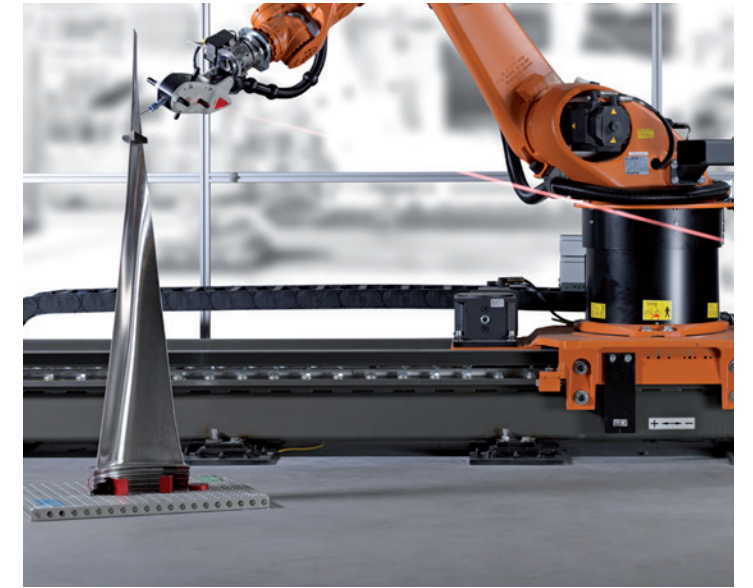
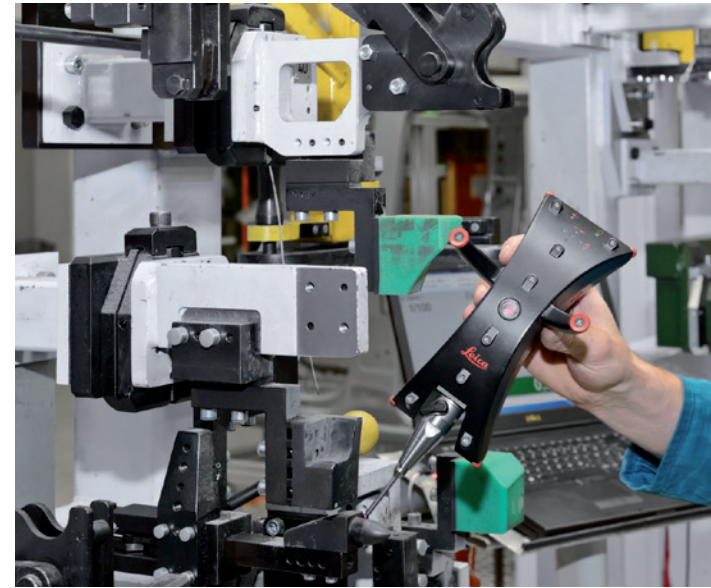


# ◀VERSATILE AND RELIABLE▶

## FOR ANY INDUSTRY

Every industry has specialist metrology requirements. Yet the simple setup and adaptable operation of the Leica Absolute Tracker AT960 make it an outstanding solution for a whole host of applications.

With Hexagon Metrology's specialist software suites, the AT960 can be optimised for use in a huge range of industries – offering a full-system solution to make complicated measurement tasks quick and easy. For high-definition surface scanning and feature extraction, automation and machine control, hidden point probing or traditional dynamic 3D reflector measurements, the AT960 is the go-to laser tracker system.





# SPECIFICATIONS

Accuracy \*  $U_{x,y,z} = +/-15 \mu\text{m} + 6 \mu\text{m/m}$

\* All accuracies are specified as maximum permissible errors (MPE) and calculated per ASME B89.4.19-2006 & draft ISO10360-10 using precision Leica 1.5" Red Ring Reflectors up to 60 m distance unless otherwise noted.

Angle accuracy  $+/-15 \mu\text{m} + 6 \mu\text{m/m}$   
 Distance accuracy AIFM  $+/-0.5 \mu\text{m/m}$   
 Dynamic lock on  $+/-10 \mu\text{m}$

Orient to Gravity (OTG)  $U_{z(OTG)} = +/-15 \mu\text{m} + 8 \mu\text{m/m}$

Environmental working conditions  
 Dust/Water IP54 (IEC 60529)  
 Operating temperature  $0^{\circ}\text{C}$  to  $+40^{\circ}\text{C}$

Data output rate 1 000 points/sec

Laser safety Class 2  
 IEC 60825-1 (2014-05) "Safety of laser products"  
 EN 60825-1 (2007-10) "Safety of laser products"

Leica T-Probe  $U_{x,y,z} = +/-35 \mu\text{m}^*$

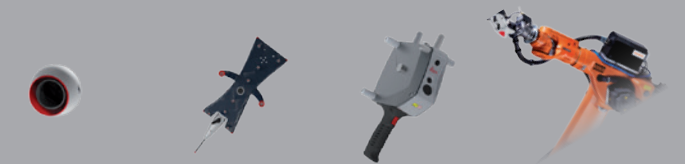
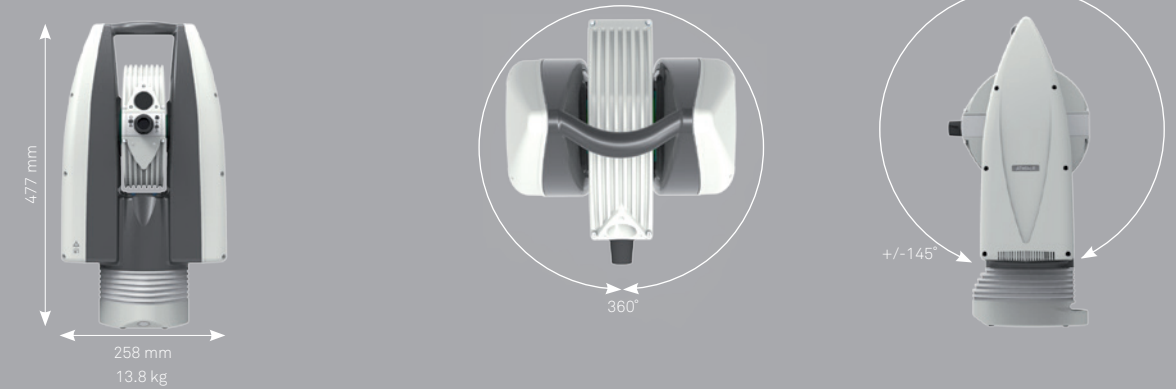
\* Additional T-Probe uncertainty to be added according to ISO/IEC Guide 98-3:2008 to the existing Leica Absolute Tracker AT960 " $U_{xyz}$ " uncertainty for a complete " $U_{xyz}$ " uncertainty up to 25 m distance.

Leica T-Scan 5  $U_{x,y,z} = +/-60 \mu\text{m}$   
 210 000 points/sec

Leica T-Mac \*  
 Position accuracy  $+/-15 \mu\text{m} + 6 \mu\text{m/m}$   
 Typical rotation accuracy  $+/-0.01$  degree \*\*  
 Rotation accuracy of timestamp  $< 5$  microseconds

\* All accuracies are stated in maximum permissible error (MPE). Typical results are half of MPE.

\*\* Typical accuracy



Measurement volume (Ø)

<b>AT930</b>	160 m*	-	-	-
<b>AT960-MR</b>	40 m	20 m	20 m	20 m
<b>AT960-LR</b>	160 m*	40 m	40 m	40 m
<b>AT960-XR</b>	160 m*	60 m*	60 m*	60 m*

\*typical measurement volume (Ø)



# GLOBAL PRESENCE

## FOR FAST LOCAL RESPONSE

Hexagon Metrology's increasing global presence gives customers guaranteed aftersales support and services, wherever they are in the world. With the largest dedicated service team of any metrology equipment manufacturer, the customer experience does not end at purchase.

Committed to providing local services that minimise costs and downtime for customers, a growing network of operations centres and partners on five continents enables Hexagon Metrology to offer a complete range of aftermarket support including servicing and repairs, certification and calibration, software maintenance and upgrades, contract inspection and programming, system upgrades and operator training.



# DRIVING INNOVATION

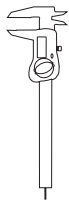
## FOR OVER 25 YEARS

The Leica Absolute Tracker AT960 is the latest innovation in Leica laser trackers. Drawing on mature technology from over 25 years of research and development to raise the bar once again, it offers the most advanced and accurate Leica portable tracker system ever to help customers measure their world in increasing detail.

Leica has an unrivalled pedigree for laser tracker technology, having introduced the original shop-floor tracker system to the market in 1990. Since then, Leica products have continued to revolutionise the technology, creating the first absolute distance meters, 6DoF trackers, absolute interferometers and the PowerLock active vision system. This continuing desire for progress ensures the Leica name always stands for quality.



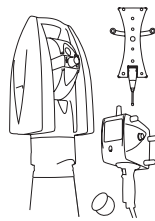




PRECISION MEASURING INSTRUMENTS



PORTABLE MEASURING ARMS



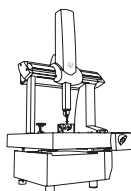
LASER TRACKERS & STATIONS



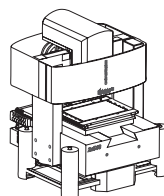
WHITE LIGHT SCANNERS



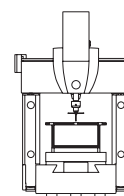
SENSORS



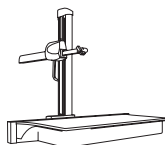
BRIDGE CMMS



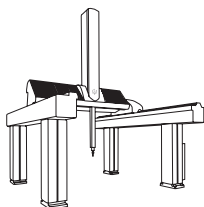
MULTISENSOR & OPTICAL SYSTEMS



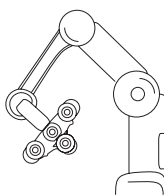
ULTRA HIGH ACCURACY CMMS



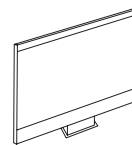
HORIZONTAL ARM CMMS



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)

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Printed in Germany, July 2015

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