

LEICA ABSOLUTE TRACKER AT960

ABSOLUTE SPEED. ABSOLUTE ACCURACY. ABSOLUTE PORTABILITY.







MAKING HIGH-END TECHNOLOGY TRULY PORTABLE

The Leica Absolute Tracker AT960 from Hexagon Manufacturing Intelligence is the first fully portable dynamic six degrees of freedom (6DoF) laser measurement system. A robust solution to even the most challenging large-scale metrology applications, the AT960 is the definition of absolute speed, accuracy and portability.

Offering sophisticated high-speed dynamic measurement as standard and compatible with Hexagon's best-in-class metrology accessories, the system represents a single-unit solution for 6DoF reflector, probe and non-contact scanner measurement, as well as 7DoF real-time machine-controlled inspection.

Combining high-end performance with unmatched usability, this is the ideal solution for applications spanning aerospace, automotive, shipbuilding, manufacturing and many more sectors. The AT960 sets a new standard in the world of portable industrial metrology.



We are keen on increasing the efficiency of our power plants as well as making technical improvements. Thanks to the portability of the Leica Absolute Tracker AT960, we are able to carry out many measurements with installed components and without plant shutdown.”

Ralf Laufer

Department Manager Metrology, Vorarlberger Illwerke AG

ABSOLUTE SPEED

Unmatched speed of use and measurement across a range of standard metrology methodologies is the hallmark of the AT960. Designed to slip seamlessly into the production process, whether in the quality room or inline, manually operated or robot-mounted and fully automatic, this is a system with the potential to improve efficiency like no other.

The Leica Absolute Interferometer (AIFM) enables the AT960 to measure a moving target at a data rate of 1000 points per second with a maximum distance uncertainty of just 10 microns. The well-established PowerLock function provides intelligent targeting effective across the full working range of the tracker to automatically locate the point of measurement, including instantaneous re-establishment of an interrupted beam with no user intervention.

ABSOLUTE ACCURACY

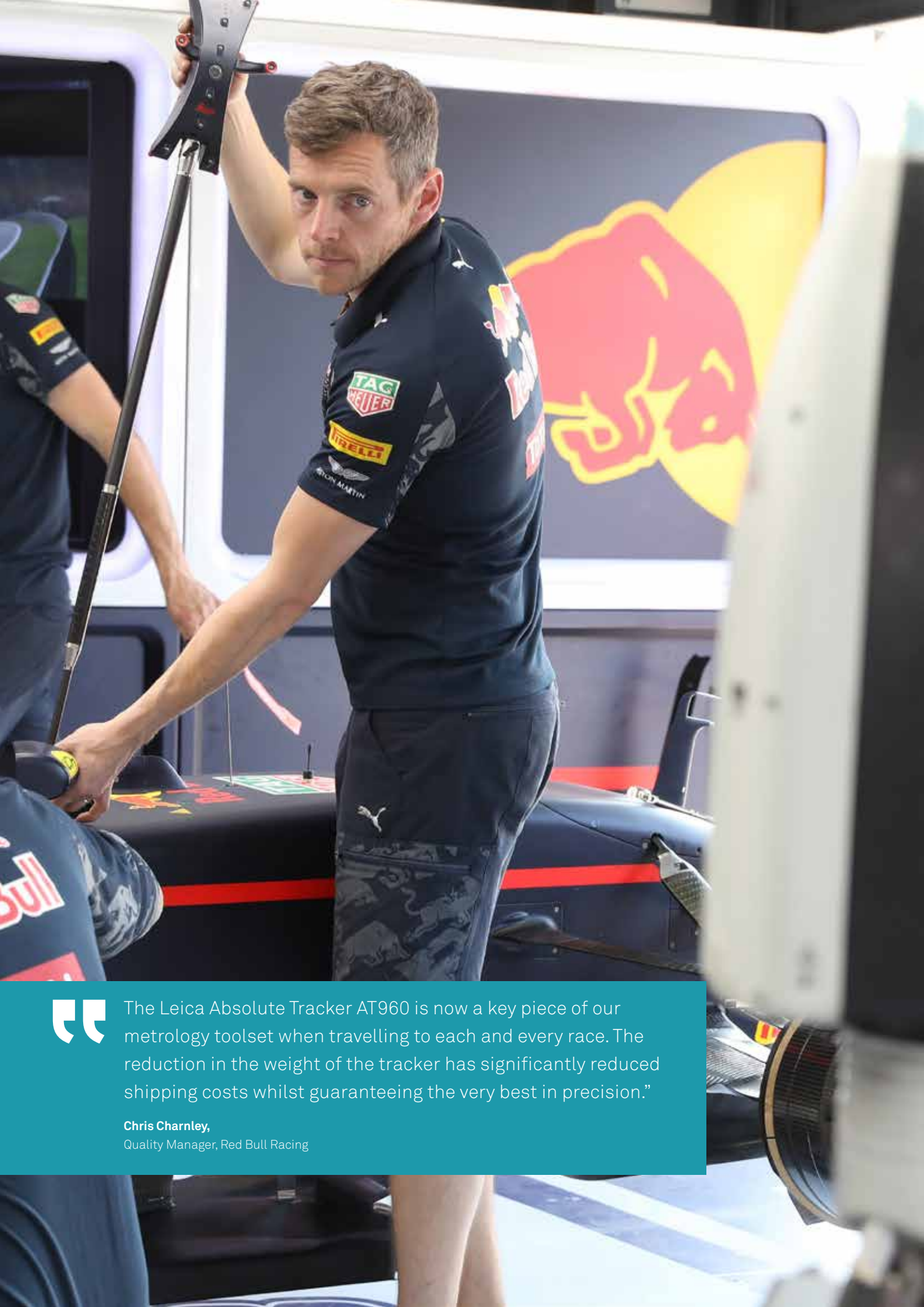
Driven by the absolute distancing capabilities of the AIFM, the AT960 offers the flexibility to deliver exceptional accuracy across several inspection methods. Built-in mini variozoom technology provides 6DoF measurement as standard, making the AT960 compatible with the latest Hexagon probing and scanning solutions as well as traditional reflectors.

Reflector measurement is accurate to within just 15 microns, while probe measurement retains accuracy to within 35 microns. Scanning accuracy with the Leica Absolute Scanner LAS is as low as 50 microns for sphere radius measurement components and as low as 60 microns for spatial length measurement components.

ABSOLUTE PORTABILITY

Designed to slot into a single flight case, accessories included, the revolutionary integrated design of the AT960 places it at the pinnacle of ultra-portable measurement technology. Featuring optional battery operation and WiFi as standard, it's never been easier to take metrology where it needs to go.

An enhanced quick-release mechanism, robust shock resistance and an in-built tilt detection system make mounting the tracker on the fly hassle-free. And with integrated levelling equipment, IP54 protection and a system weight of less than 14 kilograms, the AT960 is ready to go almost anywhere.



“

The Leica Absolute Tracker AT960 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, Red Bull Racing

APPLICATIONS UP TO EVERY CHALLENGE

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

From high-definition surface scanning and feature extraction to automation and machine control; from hidden-point probing to traditional dynamic 3D reflector measurement: the AT960 is the first-choice laser tracker system in a wide range of industries.





AUTOMATION THE KEY TO ROBOTIC EFFICIENCY

In conjunction with the Leica T-Scan 5 or Leica T-Mac, the AT960 is a fully capable automated metrology and machine guidance solution.

The addition of the Real-Time Feature Pack enables the AT960 to meet the deterministic measurement data-delivery requirements of high-end automated installations. Built on the industry-proven EtherCAT protocol, it enables the delivery of 6DoF measurement data with accurate timestamps at an output rate of up to 1000 Hertz.

Known as '7DoF' measurement data, this enables real-time machine control in even highly-dynamic robotic setups.

DEFINING FEATURES

The unmatched speed, accuracy and portability of the Leica Absolute Tracker AT960 is based on a foundation of innovative technologies that make it the pinnacle of high-performance metrology on the move.



All-in-One Design

From integrated wireless connectivity, environmental monitoring and all-day battery power, to overview camera and ergonomic carry handle, every need is built in.



MeteoStation

Integrated environmental unit monitors conditions including temperature, pressure and humidity to compensate for changes and ensure accurate measurements regardless of external factors.



1 kHz Data Output

Real-time architecture with dynamic performance gives a measurement rate of up to 1000 points per second.



PowerLock

Automatically re-establishes interrupted line of sight within a wide field of view with no user interaction required.



Overview Camera

High-resolution colour OVC offers remote view of the tracker's entire field of vision for fast and accurate targeting.



Single-Box 6DoF

Full tracker system and accessories contained in a single highly portable case.



Battery Power

Independent hot-swappable battery power supply allows for quick and easy cable-free setup and all-day wireless operation.



Orient-to-Gravity

Enables measurement with the Z-axis aligned to gravity, ideal for levelling and alignment tasks.



Measurement Volume

Large 360° measurement volume of up to 160 metres (∅) without repositioning.



Smart Connectivity

Built-in WiFi functionality delivers single-user operation through simple PC setup and remote control options via laptops, tablets or smartphones.



Absolute Interferometer

Innovative combination of Absolute Distance Meter and an interferometer ensures unmatched speed and accuracy.



Hexagon Guarantee

Full 12-month factory warranty and guaranteed ten years of serviceability.



IP54

The IEC-certified sealed unit guarantees ingress protection against dust and other contaminants, enabling effective measurement in even the harshest environments.



Integrated Mini Variozoom

Delivering a constant field of view under any light conditions to ensure consistent 6DoF measurement capabilities.



Real-Time Feature Pack

Enhance the AT960 with 7DoF data collection to enable the possibilities of real-time machine guidance.

THE RIGHT TOOL FOR THE JOB

The AT960 is available in several models suited to a range of applications and budgets: Short Range* (SR), Medium Range (MR), Long Range (LR) and Extra-Long Range (XR).

Every one of these versions offers full-performance speed, accuracy and portability, while varying in maximum measurement volume, allowing a better value proposition for those with less expansive metrology needs.

Models	3D measurement volume (∅)	6DoF measurement volume (∅)
AT960-SR*	12 m	10 m
AT960-MR	40 m	20 m
AT960-LR	160 m	40 m
AT960-XR	160 m	60 m

* AT960-SR only available bundled with a Leica Absolute Scanner LAS or Leica T-Scan 5 portable handheld scanner.

MODES OF MEASUREMENT

The Leica Absolute Tracker AT960 is compatible with Hexagon's leading portable measurement accessories, bringing unbeatable speed and accuracy to hidden-point, non-contact and automated inspection.



HANDHELD SCANNING

Hexagon laser scanners offer a faster, more accurate and less damaging alternative to scrubbing a reflector over a surface to record the multiple data points needed for the production of detailed point-cloud imagery. They digitise at a rate of up to 210 000 points per second, measure shiny metallic or dark surfaces with no powdering required, require minimal measurement preparation time and feature automatic adjustment to ensure the best possible readings in a single pass.



HANDHELD PROBING

Small, light and accurate, the Leica T-Probe is a wireless battery-operated probing solution for measuring even the most hard-to-reach data points. It features user-assignable multi-function buttons, integrated measurement feedback, automatically recognised changeable styli and functionality within a measurement volume of up to 60 metres in diameter.



INTEGRATED SOLUTIONS

With the Leica T-Scan 5 and Leica T-Mac come tactile and non-contact robotic inspection capabilities as well as machine control and robotic guidance for production process improvement. These accessories can take metrology fully in-line with production, generating positional, pitch, roll and yaw data while recording up to 1000 measurements per second with the real-time synchronisation and correction functionality of the Real-Time Feature Pack



REFLECTOR MEASUREMENT

With optical centring accuracy of ± 3 microns, Hexagon reflectors offer a highly accurate solution for line-of-sight measurements in volumes of up to 160 metres in diameter.

SPECIFICATIONS

Accuracy

Reflector*	$U_{(x,y,z)} = \pm 15 \mu\text{m} + 6 \mu\text{m/m}$
AIFM Absolute Distance Performance	$\pm 0.5 \mu\text{m/m}$
Absolute Angular Performance	$\pm 15 \mu\text{m} + 6 \mu\text{m/m}$
Dynamic lock on	$\pm 10 \mu\text{m}$
Orient to Gravity (OTG)	$U_{z(\text{OTG})} = \pm 15 \mu\text{m} + 8 \mu\text{m/m}$

*All accuracies specified as Maximum Permissible Errors (MPE) and calculated per ASME B89.4.19-2006 and ISO10360-10:2016 using precision Leica 1.5" Red Ring Reflectors at up to 60 m distance unless otherwise noted.

Leica T-Probe**	$U_{(x,y,z)} = \pm 35 \mu\text{m}$
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**Additional Leica T-Probe uncertainty to be added according to ISO/IEC Guide 98-3:2008 to the existing Leica Absolute Tracker AT960 "U_{x,y,z}" uncertainty for a complete "U_{x,y,z}" uncertainty at up to 25 m distance.

Leica Absolute Scanner LAS	$U_L = \pm 60 \mu\text{m}$ 150 000 points/s
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Leica T-Scan 5	$U_L = \pm 60 \mu\text{m}$ 210 000 points/s
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Leica T-Mac***	$15 \mu\text{m} + 6 \mu\text{m/m}$
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Typical rotation accuracy	$\pm 0.01^\circ$
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Accuracy of timestamp	$< 5 \mu\text{s}$
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***All accuracies specified as Maximum Permissible Errors (MPE). Typical results are half of MPE.

Environmental

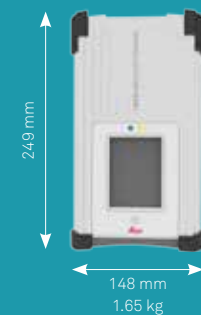
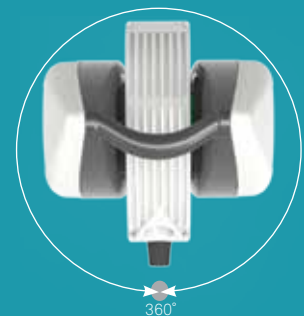
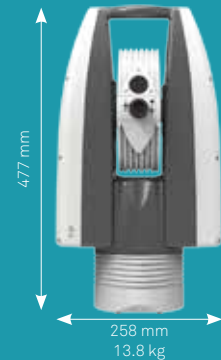
Dust/Water	IP54 (IEC 60529)
Operating Temperature	0°C to 40°C
Relative Humidity	max. 95% (non-condensing)
Environmental Monitor	Temperature, pressure and humidity

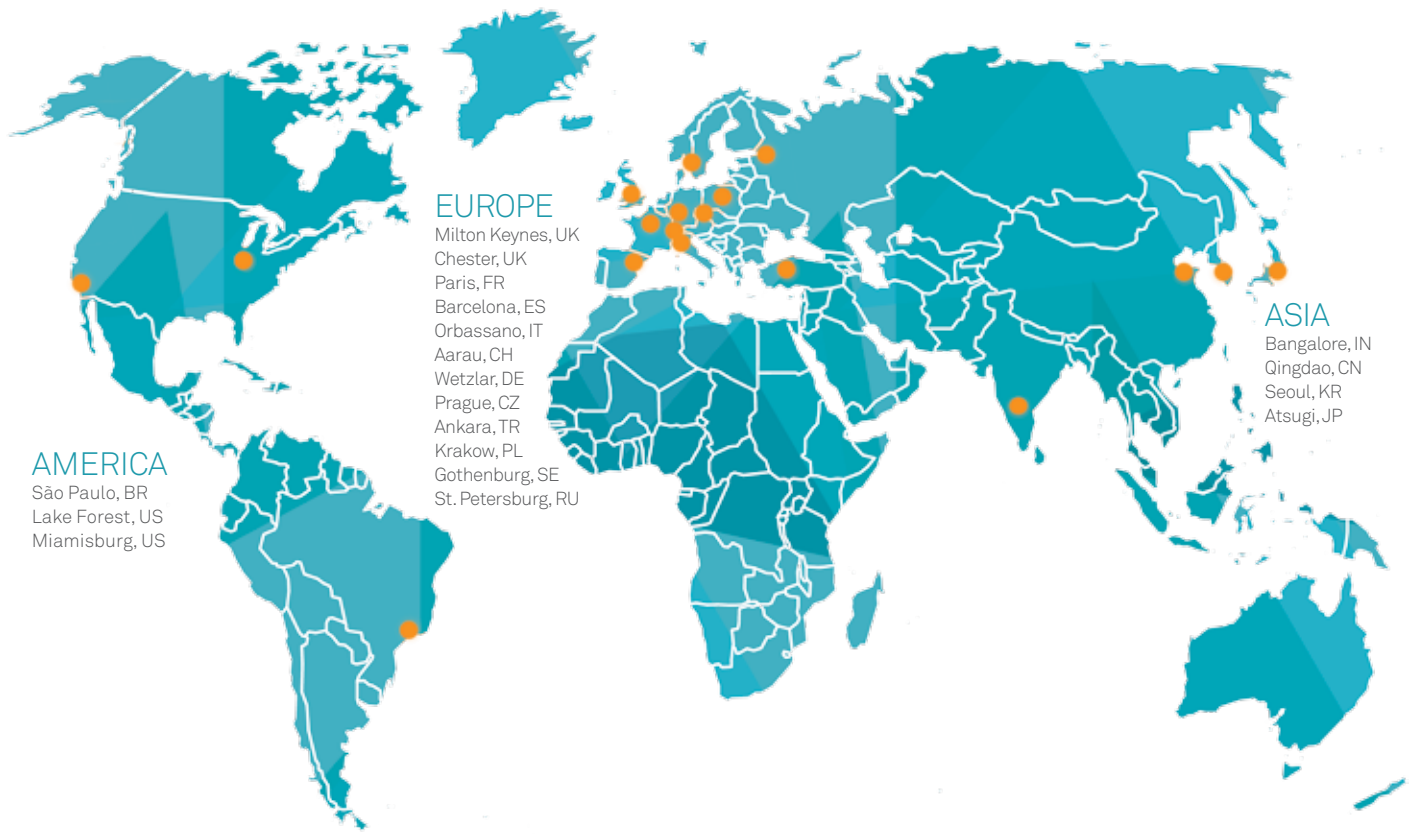
Interface

Cable	TCP/IP (Cat5)
Wireless	WLAN (IEEE 802.11 n)

General Information

Overview Camera	4:3 IR enhanced image $\approx 10^\circ$ FOV
Power	AC power supply Lithium-ion battery with 8-hour typical runtime
Laser	Class 2 Laser Product in accordance with IEC 60825-1 Second Edition (2014-05)





QUALITY ACROSS THE GLOBE

LEADING TOOLS WITH LEADING SUPPORT

Drawing on over 25 years of research and development, the Leica Absolute Tracker AT403 is the latest in a long line of outperforming technological innovations from Hexagon Manufacturing Intelligence. Deriving quality from experience to drive productivity is what keeps Hexagon in front and able to deliver for industries around the world.

The international presence of Hexagon guarantees comprehensive aftersales support and services across the globe. With the largest dedicated service team of any metrology equipment manufacturer and an emphasis on locally delivered solutions, Hexagon is unmatched from service, repair, certification and calibration through operator training and software maintenance and upgrades.

And with the Leica Absolute Tracker AT960, along with the assurance of ten years of serviceability, customers will benefit from a full 12-month factory warranty – our guarantee that our technology will always meet the needs of our users.






Hexagon Manufacturing Intelligence helps industrial manufacturers develop the disruptive technologies of today and the life-changing products of tomorrow. As a leading metrology and manufacturing solution specialist, our expertise in sensing, thinking and acting – the collection, analysis and active use of measurement data – gives our customers the confidence to increase production speed and accelerate productivity while enhancing product quality.

Through a network of local service centres, production facilities and commercial operations across five continents, we are shaping smart change in manufacturing to build a world where quality drives productivity. For more information, visit HexagonMI.com.

Hexagon Manufacturing Intelligence is part of Hexagon (Nasdaq Stockholm: HEXA B; hexagon.com), a leading global provider of information technologies that drive quality and productivity across geospatial and industrial enterprise applications.

-  COORDINATE MEASURING MACHINES
-  3D LASER SCANNING
-  SENSORS
-  PORTABLE MEASURING ARMS
-  SERVICES
-  LASER TRACKERS & STATIONS
-  MULTISENSOR & OPTICAL SYSTEMS
-  WHITE LIGHT SCANNERS
-  METROLOGY SOFTWARE SOLUTIONS
-  CAD / CAM
-  STATISTICAL PROCESS CONTROL
-  AUTOMATED APPLICATIONS
-  MICROMETERS, CALIPERS AND GAUGES
-  DESIGN AND COSTING SOFTWARE