

FARO® QUANTUM^S FAROARM® & FARO® QUANTUM^S SCANARM HD

The Global Standard for Arm Technology

FARO®

FARO® Quantum^S Arm

Overview

The FARO Quantum^S Arm is the world's most innovative portable coordinate measuring machine (PCMM) that allows manufacturers easy verification of product quality by performing 3D inspections, dimensional analysis, CAD comparison, tool certifications, reverse engineering, and more.

The Quantum^S is the first Arm to meet the new and most rigorous ISO 10360-12:2016 international measurement quality standard. The Quantum^S sets a new industry benchmark and extends the FARO tradition of maximum measurement consistency and reliability in every working environment.

The FARO Quantum^S is available in four working volumes and it is the most intuitive, ergonomic and accurate FaroArm® ever delivered. Perfectly suited for high accuracy measurement tasks, it helps manufacturers meet their most demanding specifications on parts and assemblies.



Features & Benefits



Innovative Design for Highest Performance & Reliability

An all-new design ensures superior performance and confidence in measurement results in most working environments, delivering high consistency and reliability, while the FAROBlu™ Laser Line Probe HD ensures best-in-class scanning capability (**5x faster laser scanning than previous FARO generations**).



Excellent Ergonomics & Usability

New ergonomic design and overall weight optimization is combined with new features, including FARO kinematic intelligent probes, which allow you to quickly and easily switch probes during inspection.



Compliance with International Standard

The Quantum^S is the only Arm in the market that is verified against the international certification standard, ISO 10360-12:2016, setting an industry benchmark and ensuring maximum measurement consistency and reliability in a wide range of work environments.



High Speed Wireless Operation (Robust Wi-Fi)

New sophisticated and robust electronic design delivers superior reliability and guarantees optimal wireless operation for scanning and probing.



Extended Battery Use

Dual hot swappable batteries support prolonged cable-free operation of the device, making it easy to go to the part without the need for external power.

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FARO® Quantum^S ScanArm – with FAROBlu™ Technology

Overview

The Quantum^S combined with the FAROBlu™ Laser Line Probe HD delivers unparalleled non-contact measurement capabilities by integrating the best laser scanner available in the market.

Through simple plug-and-play, users can attach the FAROBlu™ to the Quantum^S, creating an all-in-one measurement solution.

The hard probe and the Laser Line Probe can digitize interchangeably without having to remove either component. Users can digitize simple features with the Arm's hard probe and seamlessly scan across diverse surface materials regardless of contrast, reflectivity or part complexity without any special coatings or target placement.

The FAROBlu™ utilizes blue laser technology, a state-of-the-art camera and optics to provide best-in-class scanning capability, enabling fast scanning speed for high productivity. It allows operators to scan challenging surfaces, including dark and reflective materials, and provides users with high resolution and high accuracy.

The extra wide scan stripe and fast frame rate boost productivity by increasing coverage and reducing scanning time. Intricate components can be captured in fine detail — as a result of the 600,000 points per second scan rate and the FAROBlu™ laser featuring noise reduction technology. The cross-hair feature and LED Rangefinder functionality provide real-time scanning feedback thereby allowing users to dramatically reduce required training time.



Features & Benefits



Blue Laser

The FAROBlu™ Laser Line Probe HD leverages an optically-superior blue laser technology. The blue laser has a short wavelength, which delivers improved scanning results with higher resolution thanks to its greater ability to discover small details in an object compared to red laser. The blue laser also provides a 50% reduction in speckle noise compared to red laser.



Advanced Sensor

The FAROBlu™ camera uses the most advanced CMOS technology to deliver fast frame rate (i.e. the number of times per second that the camera gathers new data on the part being scanned) of up to 300 frames per second (fps).



Custom Optics

The FAROBlu™ boasts superior, large-diameter, custom optics that collect more light and more data to deliver better accuracy and sharper and brighter images. Utilizing a larger sweet spot, it supports a wider laser line width that scans a larger area, providing faster, more productive scanning.



Laser Line Width

The FAROBlu™ features laser line width of 150mm. The extensive line width scans a larger area, delivering fast and efficient scanning. Additionally, the Laser Line Probe HD features a solid, blue laser beam generated without the use of moving components which can be sensitive to vibration and risk inducing errors in accuracy and impacting productivity by forcing repeat scans.

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FARO®

Common Applications & Industries

Applications

- ▶ Alignment
- ▶ Dimensional Analysis
- ▶ CAD-Based Inspection
- ▶ First Article Inspection
- ▶ Incoming Inspection
- ▶ In-Process Inspection
- ▶ On-Machine Inspection
- ▶ Part Inspection
- ▶ Final Inspection
- ▶ Reverse Engineering
- ▶ Tool Building & Setup



Industries

Aerospace

Part inspection and certification, alignment, tooling & mold certification, and reverse engineering

Automotive

Tool building & certification, alignment, part inspection, and reverse engineering

Metal Fabrication

On-Machine Inspection, First Article Inspection, Periodic Part Inspection

Molding / Tool & Die

Mold and die inspection, prototype part scanning

Woodworking

Certification, alignment, tooling, part inspection, and reverse engineering

Plastics

Certification, alignment, tooling, part inspection, and reverse engineering

Toy Manufacturing

Certification, alignment, tooling, and part inspection



Performance Specifications

Contact Measurement (Arm)* (mm)										
Measurement range (m/ft)	SPAT ¹		E _{UNI} ²		P _{SIZE} ³		P _{FORM} ⁴		L _{DIA} ⁵	
	6 axis	7 axis	6 axis	7 axis	6 axis	7 axis	6 axis	7 axis	6 axis	7 axis
Quantum ^s 1.5m (4.9ft)	0.012	-	0.023	-	0.008	-	0.015	-	0.027	-
Quantum ^s 2.5m (8.2ft)	0.018	0.020	0.028	0.030	0.010	0.012	0.020	0.025	0.035	0.048
Quantum ^s 3.5m (11.5ft)	0.036	0.045	0.056	0.070	0.020	0.024	0.040	0.045	0.070	0.100
Quantum ^s 4.0m (13.1ft)	0.045	0.055	0.068	0.085	0.024	0.030	0.045	0.050	0.086	0.120

Contact Measurement (Arm)* (Inches)										
Measurement range (m/ft)	SPAT ¹		E _{UNI} ²		P _{SIZE} ³		P _{FORM} ⁴		L _{DIA} ⁵	
	6 axis	7 axis	6 axis	7 axis	6 axis	7 axis	6 axis	7 axis	6 axis	7 axis
Quantum ^s 1.5m (4.9ft)	0.0005	-	0.0009	-	0.0003	-	0.0006	-	0.0011	-
Quantum ^s 2.5m (8.2ft)	0.0007	0.0008	0.0011	0.0012	0.0004	0.0005	0.0008	0.0010	0.0014	0.0019
Quantum ^s 3.5m (11.5ft)	0.0014	0.0018	0.0022	0.0028	0.0008	0.0009	0.0016	0.0018	0.0028	0.0039
Quantum ^s 4.0m (13.1ft)	0.0018	0.0022	0.0027	0.0033	0.0009	0.0012	0.0018	0.0020	0.0034	0.0047

Non-Contact Measurement (ScanArm)** (mm)	
Measurement range (m/ft)	L _{DIA} ⁵
Quantum ^s 2.5m (8.2ft)	0.048
Quantum ^s 3.5m (11.5ft)	0.080
Quantum ^s 4.0m (13.1ft)	0.092

Non-Contact Measurement (ScanArm)** (Inches)	
Measurement range (m/ft)	L _{DIA} ⁵
Quantum ^s 2.5m (8.2ft)	0.0019
Quantum ^s 3.5m (11.5ft)	0.0031
Quantum ^s 4.0m (13.1ft)	0.0036

All values represent MPE (Maximum Permissible Error)

* Contact Measurement (Arm): In accordance with ISO 10360-12

** Non-Contact Measurement (ScanArm): Full System performance in accordance with ISO 10360-8 Annex D

¹ SPAT – Single Point Articulation Test

² E_{UNI} – Distance Error between two points comparing measured versus nominal values

³ P_{SIZE} – Sphere Probing Size Error comparing measured versus nominal values

⁴ P_{FORM} – Sphere Probing Form Error

⁵ L_{DIA} – Sphere Location Diameter Error (Diameter of the spherical zone containing the centers of a sphere measured from multiple orientations)

Hardware Specifications

- ▶ Operating Temp Range: 10°C - 40°C (50°F - 104°F)
- ▶ Temperature Rate: 3°C/5min. (5.4°F/5min.)
- ▶ Operating Humidity Range: 95%, noncondensing
- ▶ Power Supply: Universal worldwide voltage; 100-240VAC; 47/63Hz

Laser Line Probe Specifications

- ▶ Accuracy: ±25µm (±0.001")
- ▶ Repeatability: 25µm, 2σ (0.001")
- ▶ Stand-off: 115mm (4.5")
- ▶ Depth of field: 115mm (4.5")
- ▶ Effective scan width: Near field 80mm (3.1"); Far field 150mm (5.9")
- ▶ Points per line: 2,000 points/line
- ▶ Minimum point spacing: 40µm, (0.0015")
- ▶ Scan rate: 300 frames/second, 300 fps x 2,000 points/line = 600,000 points/sec
- ▶ Laser: Class 2M
- ▶ Weight: 485g (1.1lbs.)

Accuracy and repeatability specified at Full Field of View (FOV)

QUANTUM^S

There's a Reason Why the FaroArm[®] Is the World's Best Selling Measurement Arm



- ▶ **The FARO Quantum^S is the most accurate FaroArm ever produced** and delivers a high level of accuracy that meets the most challenging tolerances.
- ▶ The system delivers best-in-class performance for both hard probing or laser scanning applications. Combined with the newest FAROBlu™ Laser Line Probe HD, the Quantum^S ScanArm **allows you to scan 5X faster than previous generations** and provides unparalleled non-contact capabilities, offering high-speed pointcloud capture, superior resolution and high accuracy — all in a compact and easy-to-use system.
- ▶ The Quantum^S is the right choice for advanced manufacturing, **providing more efficiency** across highly demanding factory environments like automotive, aerospace and others. The Quantum^S features FARO kinematic smart probes, enabling advanced ergonomics and allows you to quickly and easily switch probes without the need to recalibrate. In addition, the Quantum^S leverages robust WiFi, a new industrial grade wireless capability that delivers the best accessibility in a shop-floor environment.
- ▶ The Quantum^S provides a safeguard to the **highest quality standards for the world's leading automotive manufacturers** and the demanding product tolerances for the world's global aerospace providers. It also ensures that manufacturers of any size in almost any industry can optimize their manufacturing processes. The Quantum^S provides an **improvement to internal manufacturing processes**.
- ▶ The Quantum^S allows manufacturers to work faster and smarter, delivering better quality products and a significant reduction in rework and scrap. The Quantum^S is also equipped with dual, hot swappable batteries, which allow you to leverage your FaroArm for multiple applications, and extends its impact and efficiency anywhere it is needed on the factory floor, without the additional requirement for external power.
- ▶ The Quantum^S helps manufacturers stay ahead of their competitors in an increasingly global manufacturing marketplace by empowering better quality assurance and ensuring customer confidence in their products and processes. This focus can be shared by your entire production team, as the Quantum^S is the **most intuitive and easy-to-use FaroArm ever built**.

Certifications: Meets OSHA requirements, NRTL TÜV SÜD C-US Listed, Complies with Electronic Code of Federal Regulations 47 CFR Part 15.247 - WLAN and Bluetooth, 17 CFR Parts 240 and 249b – Conflict Material, 21 CFR 1040 Performance standards For Light-Emitting Products, and 10 CFR Part 430 – Department of Energy; Energy Conservation for External Power Supplies.

Complies with the following EC Directives: 2014/30/EU Electromagnetic Compatibility; 2017/35/ EU Low Voltage Directive; 2014/53/EU Radio Equipment Directive; 2011/65/EU RoHS2; 2002/96/EC WEEE; 2006/66/EC Batteries and Accumulators; 2009/125/EC Ecodesign requirement.

Conforms to the following standards: EN 61010 / CSA-C22.2 No. 61010-1; EN 61326; ETSI EN 300 328; ETSI 301 489-1; EN 62311 IEEE 802.11 b/g; Japanese Ordinance of MPT No. 37 (MIC classification WW); UN/DOT 38.3 IEC 60825 / ANSI Z136.1-2007; EN 50581:2012; 21 CFR 1002 (Records & Reports); 21 CFR 1010 (Performance Standards)

Shock and Vibrations Testing per International Electrotechnical Commission (IEC)

Standards: IEC 60068-2-6; IEC 60068-2-64; IEC 60068-2-27

Extreme Temperature Cycling (-20C to 60C). Based on: IEC 60068-2-1; MIL-STD-810G; ISTA



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