

# ABSOLUTE ARM

USABILITY | VERSATILITY | PRODUCTIVITY | BY DESIGN





# The Absolute Arm (MULTI) FUNCTIONAL BY DESIGN

With the Absolute Arm, it's all in the design. Design for high measurement productivity, so other manufacturing processes can stay on schedule. Design for practicality, so users can measure in almost any industrial environment. Design for flexibility, to meet the demands of any metrology challenge, anywhere.

And flexibility is at the core of the Absolute Arm product range. Flexibility in configuring the arm's wrist for the needs of the application and the comfort of the operator. Flexibility in swapping probes or scanners without having to stop work and calibrate. Flexibility in having measurement results displayed where they're needed. Flexibility in a product range of 42 different configurations across three types, seven sizes and three accuracy levels. Flexibility in finding the right solution for every measurement need.

With the Absolute Arm there's no need to compromise, no need to settle for second best. Whatever, wherever and however we want to measure, the right choice is right there, by design.



# ABSOLUTE ARM ALL IN THE DESIGN

Built on a platform of advanced technology, the Absolute Arm makes high-accuracy portable measurement effortless. Every part has been designed with practicality, usability and stability in mind. The product of over 35 years of experience in developing articulated measuring arms, it combines a clear picture of the future of portable metrology with the features that users have always wanted to see.

**Encoders**

The Absolute Encoders within every articulated joint are exclusive to Hexagon and make the Absolute Arm the only portable measuring arm that has completely eliminated warm-up times and encoder referencing before use.

**Movement**

The unique Zero-G Counter Balance system and low-friction rotating grips reduce user fatigue and maximise accuracy by minimising inertia.

**Materials**

High-tech carbon-fibre tube construction ensures strength and thermal stability under any environmental conditions.

**Measurement**

Multi-functional control buttons and a convenient OLED wrist display screen put measurement control directly in the user's hand, while a range of probes and laser scanners deliver flexible measurement functionality.

**Security**

The HomeDock and SmartLock features allow the arm to be stowed and locked in place between measurements, for greater security during transport, set-up and station moves.

**Feedback**

Easy user interaction in even the harshest industrial environments through visual, acoustic and haptic feedback functions, now augmented with Bluetooth technology.

**Customise**

Easily interchangeable Control Packs deliver WiFi connectivity and battery power, for completely portable wireless measurement – no more messy cables on the shop floor.





# USABILITY BY DESIGN

The Absolute Arm was designed from the ground up with usability in mind. The goal is to deliver consistent, reliable and accurate results, whatever the experience level of the user.

**Accuracy**

The Absolute Arm range offers probing accuracy as fine as only 6 microns and scanning system accuracy to within 43 microns.

**Speed**

The RS6 Laser Scanner offers unmatched speed in 3D laser scanning by combining a wide laser scan line – 150 millimetres at mid-range – with an always-on scanning speed of 300 Hertz.

**Portability**

Even the largest Absolute Arm weighs less than 11 kilograms, making set up and repositioning a quick and easy process.

**Resilience**

The robust and shock-resistant carry case keeps the arm properly protected and in perfect condition wherever and however it's transported.

**Productivity**

SHINE – Systematic High-Intelligence Noise Elimination – technology raises the scanning performance of the RS6 Laser Scanner to a new level of productivity while still guaranteeing excellent scan data quality on parts made of any material.

**Repeatability**

A patented kinematic probe joint minimises downtime by allowing all probes to be swapped on the fly with no need for recalibration.

**Monitoring**

The SMART – Self-Monitoring Analysis and Reporting Technology – system provides full diagnostic monitoring for comprehensive measurement reliability.

**Compatibility**

An established and reliable software interface that is compatible with and supported by all major portable metrology software packages.

**Verification**

Every Absolute Arm is supplied with a CMM-certified measurement artefact, allowing users to verify the performance of their arm at any time.

**Certification**

Probing accuracy certified according to ISO 10360-12 as standard, along with full scanning system accuracy specification according to ISO 10360-8 Annex D.



# VERSATILITY BY DESIGN

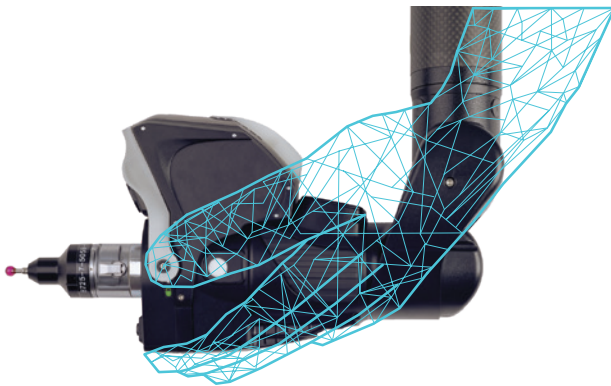
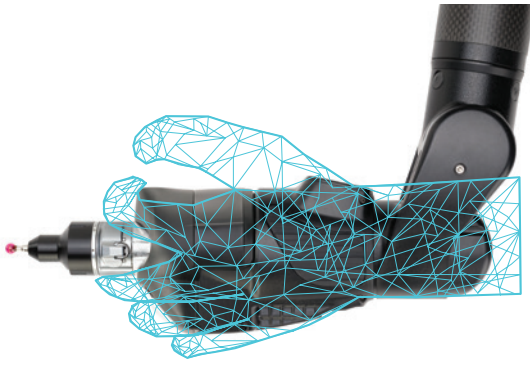
The unique modular wrist of the Absolute Arm is all about versatility. It makes it easier to get more done by adapting to the specific needs of each user.

- Pistol grips available in three different sizes – choose the most comfortable fit for the user.
- Remove the grip completely to measure hard-to-reach areas such as holes and cavities.
- Quickly switch between laser scanning and touch probing without interrupting the measurement process.
- Even a mounted laser scanner can be quickly and easily removed by the user for easier measurement in the tightest areas.
- All probes and scanners can be remounted without recalibration, allowing for immediate measurement.

Whatever the use case, the flexible modular design of the Absolute Arm makes it instantly adaptable and always ready to measure.









# PRODUCTIVITY BY DESIGN

Laser scanners for the Absolute Arm are more than just bolted-on accessories. They're designed to be integral parts of the arm system, guaranteeing increased measurement throughput and reliable accuracy without compromising on the simple usability at the core of the Absolute Arm design.

With the RS6 Laser Scanner, there are no compromises. There's no need to reduce scanning speed to achieve best-quality data; no sacrificing usability and productivity in the search for better quality. Just premium engineering that guarantees reliable, high-accuracy results.

# RS6 LASER SCANNER

## KEY FEATURES

- High-quality scan data collected at full speed, whatever the part.
- Scan 99 percent of surface types with default exposure settings thanks to SHINE technology.
- Extra-wide scan line for faster part coverage.
- High-quantity data collection without sacrificing data quality.
- Easily removed from the arm for better usability while probing.
- Remountable in seconds with no time-wasting recalibration.
- Horizontally oriented scan line for more comfortable measurement.
- Projected laser range finder makes correct scanner positioning simple.
- Full System Scanning Certification defined according to ISO 10360-8 Annex D.

The RS6 is a productivity machine that makes the Absolute Arm more powerful than any other portable measuring arm on the market. With the RS6, users get more done and they do it better; it's as simple as that.



## DESIGNED TO SHINE

Built on unique SHINE technology, the RS6 Laser Scanner always delivers full scanning performance, even on the most challenging part surfaces.

Whether faced with glossy black plastic automotive body parts or moulded carbon-fibre components, this innovative exposure mode allows the RS6 to scan with no reduction in quality or productivity. Full frame rate and full laser line width, without spray and without the forced performance reductions that are a hallmark of other scanners.

That's the power of SHINE – full performance laser scanning, all of the time.

# ESTABLISHED SCAN TECH

The RS5 Laser Scanner is a general-purpose 3D scanner ideal for less-challenging applications like design modelling, tube or casting measurement, product benchmarking or virtual assembly.

Retaining the trademark flexibility of the Absolute Arm range, the RS5 can be removed for easier handling and measuring in tight spaces just like the flagship RS6 Laser Scanner, and likewise is also quickly remountable with no need for recalibration.

Built on reliable technology, the RS5 Laser Scanner is a more affordable alternative to a premium laser scanner.





## PORTABLE PROBING

The Absolute Arm is the absolute standard when it comes to reliable high-accuracy point probe measurement, delivering market-leading probing accuracy.

Every arm is supplied with three pre-calibrated touch probes, so measurement can begin immediately. The established TESA kinematic joint for repeatable probe mounting means probes can be hot-swapped quickly and easily, with no need for recalibration between changes.

With some 100 probes available within the Absolute Arm accessory range, there's one that suits every measurement need. Straight probes, angled probes, trigger probes, tube probes – all are available at various lengths and tip diameters. Take a look at the comprehensive Absolute Arm Accessories Catalogue for more details.

### A PROBING SPECIALIST, BY DESIGN

The Absolute Arm is also available in a 6-axis model. These dedicated probing systems are built on well-established measurement technology and intended for applications where laser scanning is less important. The Absolute Arm 6-Axis offers the same probing functionality as the full 7-axis models while delivering improved probing accuracy to within just 8 microns. It's also fully upgradeable to entry-level laser scanning with the addition of the HP-L-8.9 Laser Scanner from the Absolute Arm accessories range.







# THE WORLD'S MOST ACCURATE PORTABLE MEASURING ARM

Combining ultra-high accuracy with small size, the Absolute Arm Compact is designed for optimum results in tight spaces.

Featuring an integrated base and a unique counter-weight balancing system for improved ease-of-use, the Absolute Arm Compact can be placed anywhere, even inside a machining centre for part alignment. This is high accuracy, guaranteed where it's needed most. The Compact is also fully compatible with WiFi and battery-operation Control Pack options, as well as the HP-L-8.9 Laser Scanner.

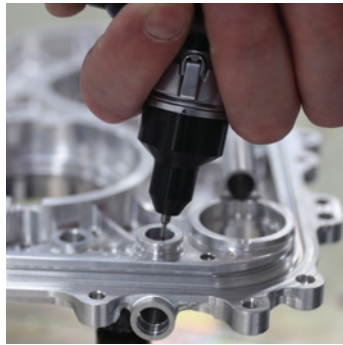
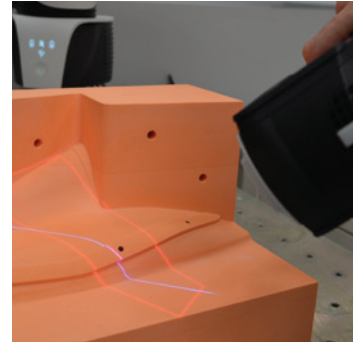
Put simply, the Absolute Arm Compact is still the world's most accurate portable measuring arm, with accuracy achievable to within just 6 microns. It's an incredible package of advanced portable technology that represents the perfect choice for measuring small-to-medium parts with absolute accuracy.

## COMPLEMENTARY, BY DESIGN

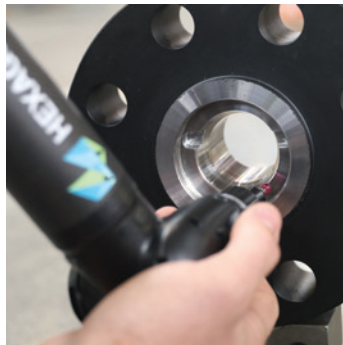
The ultra-high-accuracy measurement capabilities and extreme portability of the Absolute Arm Compact make it the perfect companion in CMM applications that require occasional measurements in hard-to-reach areas. That's why we offer the option to supply the Compact arm with full ISO 10360-2 certification, allowing users to maintain certification consistency while benefiting from its unique combination of portability and accuracy.

# ABSOLUTE ARM APPLICATIONS

The Absolute Arm range is a single solution to measurement challenges across a wide range of industries and applications. From quality control to reverse engineering, from sheet metal production to engine components, there's an Absolute Arm for every measurement need.



JIG AND FIXTURE  
BUILD AND INSPECT  
TUBE AND WIRE

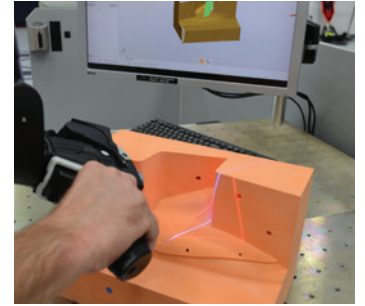


SHEET METAL  
MOULD AND DIE  
SHOP FLOOR

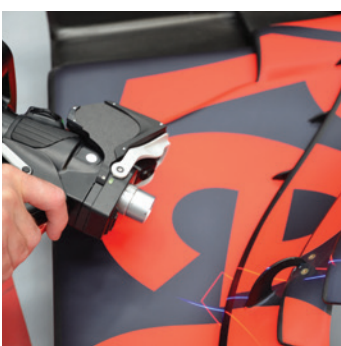




COMPOSITE INSPECTION  
IN-PROCESS CHECKS  
DIGITISING



CAD-TO-PART  
REVERSE ENGINEERING  
VIRTUAL ASSEMBLY



GEAR MEASUREMENT  
ON-MACHINE  
VERIFICATION  
MAINTENANCE AND  
REPAIR

# ABSOLUTE ARM SERIES AND SIZES

The three types of Absolute Arm are available in three different accuracy levels and seven model sizes, with measurement volume diameters from 1.2 to 4.5 metres, for a total of 42 individual configurations.



**87 SERIES**  
ULTIMATE SOLUTION  
FOR PORTABLE  
HIGH-ACCURACY  
MEASUREMENT



**85 SERIES**  
PERFECT BALANCE  
BETWEEN VALUE FOR  
MONEY AND ACCURATE  
MEASUREMENT



**83 SERIES**  
ENTRY-LEVEL  
MEASUREMENT  
ACCURACY





Measurement Volume

	1.2 m	2.0 m	2.5 m	3.0 m	3.5 m	4.0 m	4.5 m
83	✓	✓	✓	✓	✓	✓	✓
85	✓	✓	✓	✓	✓	✓	✓
87			✓	✓	✓	✓	✓



MEASUREMENT VOLUME



MAXIMUM REACH

# ABSOLUTE ARM ACCESSORIES

All Absolute Arm models are compatible with a wide range of functional and effective accessories, from scanners and probes to mounting and volume expansion systems. Discover the full range in the Absolute Arm Accessories Catalogue.



## APODIUS VISION SYSTEM 3D

The APODIUS Vision System 3D is a dedicated carbon-fibre analysis tool that combines the advanced 3D part modelling of the Absolute Arm with the high-definition fibre analysis capabilities of APODIUS Vision technology.

## PROBES

From infrared non-contact probes for measuring tubes of different diameters, to angled probes for measuring difficult to access features, the Absolute Arm is compatible with almost 100 versatile probing options.



## MOUNTING OPTIONS

A selection of bases, tripods and stands is compatible with every Absolute Arm, including a convenient vacuum mount, all attachable through the specially designed Mounting Ring.

## HP-L-8.9 LASER SCANNER

Accessible and user-friendly, the HP-L-8.9 Laser Scanner can turn Absolute Arm 6-Axis and Compact systems into simple laser scanning solutions.



## LARGE-VOLUME MEASUREMENT

Volume expansion accessories allow the Absolute Arm to measure parts and objects beyond its standard reach.

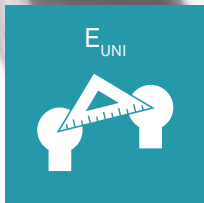
Extended measurement can be achieved with a Leap Frog Kit that allows the arm to measure from different stations. For more demanding applications, the GridLOK system creates an expanded measurement arena within which the arm can be repositioned anywhere with no undue loss of accuracy.



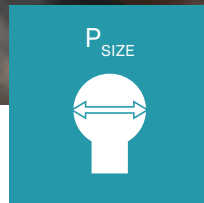
# CERTIFYING ABSOLUTE ACCURACY

All Absolute Arm systems are delivered with fully traceable internationally recognised accuracy certifications, giving users complete confidence in the reliability of their measurements. As standard, certification is in line with the rigorous ISO 10360-12 test for defining the probing accuracy of portable measuring arms.

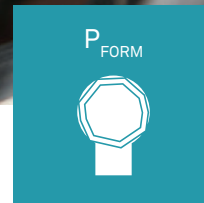
This is an extremely demanding and internationally recognised standard that requires certified length and sphere artefacts be measured multiple times in different positions within the arm measurement volume with a touch probe. The results of these measurements provide four accuracy results that together represent the arm's overall accuracy for contact measurement.



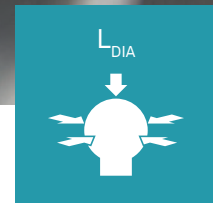
The  $E_{UNI}$  value is the maximum permissible error for unidirectional length measurements. It therefore most closely reflects most measurement needs.



The  $P_{SIZE}$  value is the maximum permissible error for measuring the diameter of a sphere. It therefore signifies the accuracy of feature measurements.



The  $P_{FORM}$  value is the maximum permissible error for the form of a sphere. This is a value that defines the dispersion accuracy of the arm.



The  $L_{DIA}$  value is the maximum permissible error for the articulation location. It therefore represents the repeatability of the arm.

## SCANNING SYSTEM ACCURACY

A full system scanning accuracy certification in line with the ISO 10360-8 Annex D standard is supplied with every Absolute Arm scanning system. This represents the global accuracy of the arm and scanner together. The test involves measuring a certified sphere artefact with five different arm articulations, in different locations throughout the arm measurement volume. A certified sphere artefact is supplied with every Absolute Arm scanning system.

## ISO 10360-2 CERTIFICATION

The Absolute Arm Compact is available with optional ISO 10360-2 certification. This is a CMM-type certification that quotes the arm accuracy according to a variable 'L', where 'L' is equal to the length of measurement that is being performed. A higher L-value denotes a larger measurement distance, such that ISO-certified accuracy increases with lower L-values. This is a useful option for users who plan to use their Absolute Arm Compact in conjunction with a bridge, gantry, vision or horizontal-arm CMM.

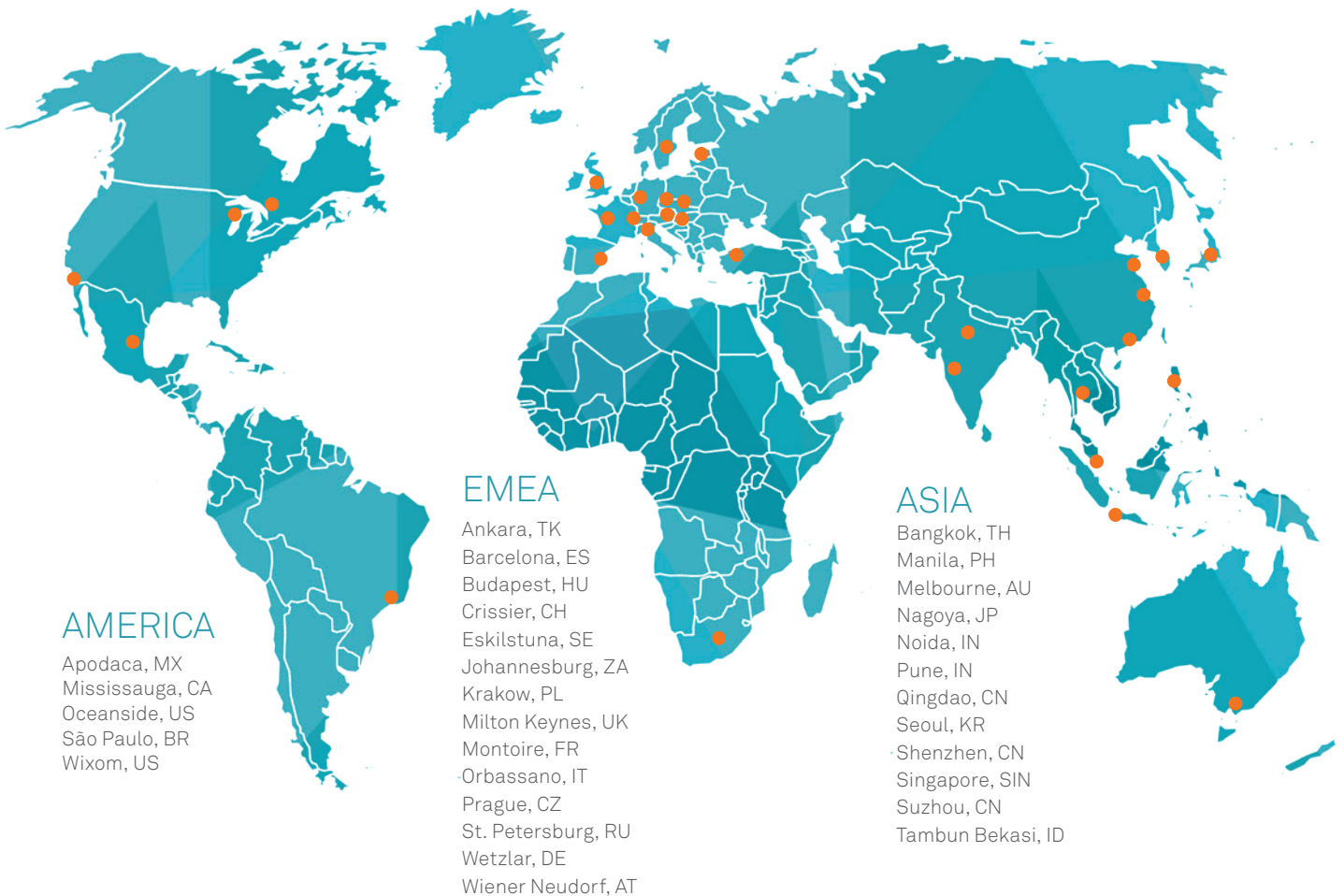


# MAINTAINING ABSOLUTE ACCURACY

Hexagon’s leading products are backed by a leading support network. Any time it’s required, users can be sure to have access to global quality support, delivered locally. With over 30 Service Centres around the world, there’s always one nearby.

- System certification to ISO 10360-12 and ISO 10360-2
- System calibrations
- All trouble-shooting and repairs

To avoid unnecessary service downtime, every Absolute Arm system comes with appropriate certified artefacts. These allow users to self-verify that their equipment remains within the expected measurement parameters defined during certification and calibration, for transparent peace of mind and confident measurement.



# ABSOLUTE ARM SPECIFICATIONS

## ABSOLUTE ARM 7-AXIS ACCURACY AND SIZE SPECIFICATION

	Model	E <sub>UNI</sub> <sup>1</sup>	P <sub>SIZE</sub> <sup>2</sup>	L <sub>DIA</sub> <sup>3</sup>	P <sub>FORM</sub> <sup>4</sup>	RS6 SSA <sup>5</sup>	RS5 SSA <sup>5</sup>	Weight <sup>6</sup>	Max. reach
83 series	8320-7	0.043 mm	0.016 mm	0.054 mm	0.033 mm	0.059 mm	0.062 mm	8.8 kg	2.48 m
	8325-7	0.048 mm	0.023 mm	0.060 mm	0.043 mm	0.065 mm	0.068 mm	9.1 kg	2.98 m
	8330-7	0.078 mm	0.034 mm	0.090 mm	0.058 mm	0.082 mm	0.092 mm	9.4 kg	3.48 m
	8335-7	0.092 mm	0.042 mm	0.115 mm	0.067 mm	0.099 mm	0.105 mm	9.7 kg	3.98 m
	8340-7	0.114 mm	0.051 mm	0.140 mm	0.084 mm	0.118 mm	0.122 mm	10.0 kg	4.48 m
	8345-7	0.158 mm	0.078 mm	0.168 mm	0.106 mm	0.163 mm	0.172 mm	10.3 kg	4.98 m
85 series	8520-7	0.029 mm	0.010 mm	0.038 mm	0.021 mm	0.041 mm	0.045 mm	9.0 kg	2.48 m
	8525-7	0.031 mm	0.012 mm	0.048 mm	0.025 mm	0.047 mm	0.048 mm	9.3 kg	2.98 m
	8530-7	0.057 mm	0.020 mm	0.083 mm	0.038 mm	0.064 mm	0.066 mm	9.6 kg	3.48 m
	8535-7	0.069 mm	0.024 mm	0.099 mm	0.045 mm	0.078 mm	0.080 mm	9.9 kg	3.98 m
	8540-7	0.084 mm	0.030 mm	0.120 mm	0.050 mm	0.089 mm	0.091 mm	10.2 kg	4.48 m
	8545-7	0.113 mm	0.048 mm	0.140 mm	0.065 mm	0.141 mm	0.148 mm	10.5 kg	4.98 m
87 series	8725-7	0.029 mm	0.011 mm	0.044 mm	0.023 mm	0.043 mm	0.044 mm	9.3 kg	2.98 m
	8730-7	0.053 mm	0.018 mm	0.076 mm	0.035 mm	0.056 mm	0.058 mm	9.6 kg	3.48 m
	8735-7	0.064 mm	0.022 mm	0.092 mm	0.041 mm	0.068 mm	0.071 mm	9.9 kg	3.98 m
	8740-7	0.078 mm	0.028 mm	0.110 mm	0.046 mm	0.080 mm	0.082 mm	10.2 kg	4.48 m
	8745-7	0.104 mm	0.044 mm	0.125 mm	0.060 mm	0.121 mm	0.127 mm	10.5 kg	4.98 m

## LASER SCANNERS SPECIFICATION

	RS6	RS5	HP-L-8.9
Accuracy	0.026 mm (2σ)	0.028 mm (2σ)	0.04 mm (2σ)
Point Acquisition Rate	up to 1.2 million points/s	752 000 points/s	45 000 points/s
Points per Line	max. 4000	max. 7520	750
Line Rate	max. 300 Hz	max. 100 Hz	60 Hz
Line Width (mid)	150 mm	115 mm	80 mm
Standoff	165 +/- 50 mm	165 ± 50 mm	135 +/- 45 mm
Minimum Point Spacing	0.027 mm	0.011 mm	0.08 mm
System Scanning Certification	yes	yes	no
Laser Class	2	2M	2
Operating Temperature	5–40°C	5–40°C	5–40°C
Weight	0.4 kg	0.4 kg	0.32 kg

## ABSOLUTE ARM 6-AXIS ACCURACY AND SIZE SPECIFICATION

	Model	$E_{UNI}^1$	$P_{SIZE}^2$	$L_{DIA}^3$	$P_{FORM}^4$	Weight	Max. reach
83 series	8312-6	0.024 mm	0.010 mm	0.021 mm	0.018 mm	12.0 kg	1.49 m
	8320-6	0.040 mm	0.013 mm	0.042 mm	0.026 mm	7.8 kg	2.23 m
	8325-6	0.046 mm	0.020 mm	0.053 mm	0.038 mm	8.1 kg	2.73 m
	8330-6	0.067 mm	0.029 mm	0.071 mm	0.054 mm	8.4 kg	3.23 m
	8335-6	0.085 mm	0.038 mm	0.090 mm	0.063 mm	8.7 kg	3.73 m
	8340-6	0.100 mm	0.046 mm	0.105 mm	0.077 mm	9.0 kg	4.23 m
	8345-6	0.120 mm	0.052 mm	0.110 mm	0.086 mm	9.3 kg	4.73 m
85 series	8512-6	0.019 mm	0.006 mm	0.016 mm	0.012 mm	12.2 kg	1.49 m
	8520-6	0.023 mm	0.008 mm	0.030 mm	0.017 mm	8.0 kg	2.23 m
	8525-6	0.028 mm	0.010 mm	0.035 mm	0.020 mm	8.3 kg	2.73 m
	8530-6	0.042 mm	0.015 mm	0.053 mm	0.030 mm	8.6 kg	3.23 m
	8535-6	0.055 mm	0.020 mm	0.069 mm	0.040 mm	8.9 kg	3.73 m
	8540-6	0.067 mm	0.024 mm	0.085 mm	0.045 mm	9.2 kg	4.23 m
	8545-6	0.080 mm	0.028 mm	0.102 mm	0.050 mm	9.5 kg	4.73 m
87 series	8725-6	0.026 mm	0.009 mm	0.032 mm	0.018 mm	8.3 kg	2.73 m
	8730-6	0.039 mm	0.014 mm	0.048 mm	0.028 mm	8.6 kg	3.23 m
	8735-6	0.052 mm	0.018 mm	0.064 mm	0.037 mm	8.9 kg	3.73 m
	8740-6	0.063 mm	0.022 mm	0.079 mm	0.041 mm	9.2 kg	4.23 m
	8745-6	0.074 mm	0.026 mm	0.094 mm	0.046 mm	9.5 kg	4.73 m

## ABSOLUTE ARM COMPACT 10360-2 ACCURACY SPECIFICATION

Model	$MPE_p^7$	$MPE_e^8$
8312	0.008 mm	5+L/40 <0.018 mm
8512	0.006 mm	5+L/65 <0.015 mm

## ABSOLUTE ARM TECHNICAL SPECIFICATION

Operating Temperature	+5° to +40°C
Storage Temperature	-30° to +70°C
Operational Elevation	2000 m
Relative Humidity	10–90% non-condensing
Marks of Conformity	CE – FCC – IC
Power Requirement	110–240 V

<sup>1</sup>  $E_{UNI}$  Maximum permissible longitudinal error of measurement – according to ISO 10360-12:2016

<sup>2</sup>  $P_{SIZE}$  Maximum permissible probe deviation, size – according to ISO 10360-12:2016

<sup>3</sup>  $P_{FORM}$  Maximum permissible probe deviation, shape – according to ISO 10360-12:2016

<sup>4</sup>  $L_{DIA}$  Maximum permissible probe deviation, position – according to ISO 10360-12:2016

<sup>5</sup> SSA Scanning System Accuracy:  $L_{DIA}$  according to ISO 10360-8 Annex D

<sup>6</sup> Weight Weight without scanner

<sup>7</sup>  $MPE_p$  Maximum permissible error, probing – according to ISO 10360-2

<sup>8</sup>  $MPE_e$  Maximum permissible error, length measurement – according to ISO 10360-2



**HEXAGON**  
MANUFACTURING INTELLIGENCE

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](http://HexagonMI.com).

Hexagon Manufacturing Intelligence is part of Hexagon (Nasdaq Stockholm: HEXA B; [hexagon.com](http://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

