Portable precision, detail & productivity
Ultra-fast high-definition 3D scanning

Nikon Metrology’s premium ModelMaker H120 laser scanner and MCAx S 7-axis articulated portable CMM arm form a leading-edge 3D measurement solution, enabling users to accelerate their time-to-market and streamline their manufacturing processes.

ModelMaker H120 innovations such as bespoke Nikon optics, advanced calibration and patented automatic optimisation of settings for every single measured point with no reduction in speed, guarantee high productivity and superior non-contact measurement of freeform and geometric surfaces without compromising on small details – no matter the size or material.

The MCAx S arm range comprises three performance levels at six different sizes and is compatible with tripods and magnetic bases for use in the metrology lab, on the shop floor or in the field. Unrestricted reach in and around parts at extreme precision while delivering high speed wireless scanning provides versatility, simple operation and efficiency in any environment.

System certification to the comprehensive ISO quality standards alongside seamless integration and workflow with many leading metrology software suites drives user confidence that the measurement results are the highest quality for their application, regardless of industry.

DETAIL, ACCURACY, PRODUCTIVITY
ModelMaker H120 | MCAX S
Laser scanner and portable CMM arm system

The MCAX S arm and ModelMaker H120 laser scanner combine to optimise production workflow through rapid, reliable and accurate analysis of product dimensions, both freeform and geometric.

Unprecedented levels of detail and precision for a portable, shop floor suited solution – regardless of user experience.

CLASS LEADING HANDHELD SCANNING
Seamless high performance inspection is realized through the class-leading capabilities of the ModelMaker H120 scanner to measure small details with high accuracy on large parts in a short timeframe. The accuracy, ease-of-use and flexibility of the 7-axis MCAX S arm delivers precise probing in parallel to scanning.
✓ Measure sharp edges and tiny details
✓ Inspect large surface areas with speed
✓ Freeform or geometric surfaces
✓ Scan around and even inside large complex shapes

MEASURE ANY MATERIAL
Nikon’s innovative and proven dynamic laser power control allows for almost any combination of materials to be scanned together without expert user knowledge. Paired with the MCAX S arm’s ability to have scanner and probe available simultaneously, tactile inspection of hidden details is possible.
✓ ESP real-time laser optimisation for every point
✓ Scan matte, reflective, black, near-transparent and multi-coloured surfaces at the same time
✓ No speed reduction for difficult materials

STABILITY AND PORTABILITY
With quick connection to a variety of mountings, users can define exactly where and for what application the system is used. Taking the system to the part that will be measured or production line saves valuable time and organization, allowing users to get the results they need quickly.
✓ Use in any industrial environment
✓ Thermally stability and zero warm up
✓ Easy transportation
✓ Wireless full speed scanning
✓ Choice of tripods, bases and stands

PRECISION MEASURING
To provide total confidence in the solution, every delivered combination of ModelMaker H120 and MCAX S arm receives a system certification of the scanning performance according to ISO 10360-8 Annex D.
✓ Class-leading real-life measurements
✓ Full productivity measuring difficult materials
✓ System accuracy from 0.041 mm
✓ ISO certification
✓ Leading software integrations
The ModelMaker H120 handheld laser scanner’s precise imaging resolution, zero-compromise speed and class-leading accuracy gives users greater understanding of the most detailed aspects of their parts in the shortest timeframe.

UNCOMPROMISING PERFORMANCE

The ModelMaker H120 guarantees fast data collection over a large area with no compromise on small details – offering great flexibility in a single solution even when cycle time is critical, no matter the type of parts measured.

The MCAx S arm further enhances the user experience by adding the ability to scan truly cable-free, through high-speed Wi-Fi connectivity and battery power with absolutely no reduction in productivity.

SIMPLE SETUP
Integrated repeatable quick-release locking connector
Plug & play – no network configuration needed

DETAIL AND SPEED
450 Hz frame rate
2,000 points per line
35 μm point spacing
120 mm laser line
0.007 mm accuracy

MULTI-PROBING READY
Large probe clearance
Intelligent auto-switching between scanner and probe

INSTANT PRODUCTIVITY
Zero warm up
Temperature compensated

DATA COVERAGE
Low noise blue laser
ESP4 real-time laser optimisation

INNOVATION
Premium Nikon lens
Contrasting full FoV red laser range finder

ENHANCED USER EXPERIENCE
Innovative functionality such as thermal compensation, integrated locking connector, contrasting full field of view projector, excellent tactile probe clearance and a compact size give the user all the feedback and assurance needed to concentrate purely on the measurement task.

Superior accuracy ensures the ModelMaker H120 stands far apart from similar technology, further pushing the accepted boundaries of handheld laser scanners.

START MEASURING IMMEDIATELY
Simple system set-up, immediate boot-up and no need for scanner warm-up; combined with the structural rigidity, thermal stability and absolute encoder technology of the MCAx S arm allows users to switch on and start confidently collecting accurate data straightaway.

MEASURE THE MOST CHALLENGING MATERIALS

Refined over many years and proven in all Nikon laser scanners, ESP4 gives the benefits of per point laser optimisation found in flying-spot scanners in a sensor with no moving parts that could suffer from acceleration effects which is not limited by poor point resolution and slow frame rates.

ESP4 does not rely on combining scan data points derived from several full frame images taken at different exposures and at slightly different positions. Making it more accurate than competing HDR technologies, which themselves often require reduced frame rates to operate.

Expertly crafted bespoke in-house lens design enables the smallest structural resolution and lowest noise measurements in handheld scanning.

The specially-developed Nikon optics and hand-assembled low-speckle blue laser source technology provide incredible details such as surface texture, very sharp edges and even dust, scratches and abrasions.

Nikon does not use interpolation techniques to increase data rates…

…Every point is an optically measured point.

Patented Enhanced Sensor Performance (ESP4) provides automatic real-time adjustment of the laser intensity for every single point in the same image frame.

✓ Ensures full data across materials with completely different optical properties.
✓ Measure high contrast reflectivity changes, absorptive coatings, near-mirrored finishes and near-transparency.
✓ No reduction in data rate, even when scanning wirelessly.

Intelligent reflection control allows measurement of very shiny or polished materials while unwanted reflections are removed.

The incredible dynamic range and pin sharp optics combine with the flexibility of movement and accuracy of the MCAx S arm to provide insight other solutions cannot deliver.

Geometric features are more exact than ever due to the clarity of data on thin-walled parts, giving more reliable feature fitting or trim edge extraction than can be achieved using tactile CMM technology.

This reveals a level of detail far beyond traditional position, size and orientation – even revealing how a part was machined or stamped.
MCAx S
Portable CMM arm

MCAx S is a precise, reliable and easy-to-use 7-axis portable articulated coordinate measuring arm able to measure around and even inside large parts without constraints. It is the perfect partner for the industry leading ModelMaker H120 laser scanner and has seamless integrations to a variety of industry accepted metrology software suites.

This solution's accuracy, capability and portability make it the optimal measurement companion in the metrology lab, on the shop floor or in the field.

The arm can be equipped with a wide range of tactile probes alongside laser scanning for a variety of tasks. Its flexibility makes this measurement arm the ideal solution for the widest range of measurement tasks.

**FLEXIBILITY**

The MCAx S ranges in size from 2.0 to 4.5 m and three performance levels for user choice of the optimal system configuration for the application.

S suits entry-level metrology and budget, S+ mixes high performance with value and S++ gives no-compromise accuracy.

- MCAx S++ Ultra-high accuracy
- MCAx S+ High accuracy
- MCAx S Standard accuracy

**STRESS-FREE**

Infinite joint rotation, low resistance rotating grips and integrated counterbalance deliver lightweight freedom of movement with minimal user fatigue.

**INSTANT PRECISION**

High performance specifications such as length accuracy from 0.029 mm and feature size from 0.010 mm can be realised without waiting for the system to reach working temperature.

Absolute encoders remove the need to reference every axis and simple plug and play connectivity means there is no need to reconfigure default PC Ethernet or Wi-Fi network settings.

Carbon fibre materials along with rigid structural design offer temperature stability and long-term mechanical strength in any environment.

**INTELLIGENT MULTI-PROBING**

Seamless integration of the ModelMaker H120 laser scanner provides a high-performance scanning solution.

Automatic pre-selection and switching between scanner and probe enhances productivity. Simply choose to scan a feature and the system automatically selects the connected probe. Choose to probe and the system automatically selects the scanner.

Integrated LED wrist screen, multi-functional buttons and repeatable scanner and touch probe mounting.

For tactile versatility a large range of probes is available to complement the system’s three standard probes. All probes are automatically recognised:

- Straight probes up to 350 mm long
- Angled probes for hard-to-reach places
- Touch-trigger
- Build-your-own probe kits and adapters

**WIRELESS SCANNING**

With the optional Wireless Control Pack, Wi-Fi connectivity and dual hot-swappable batteries augment the system true cable-free usage.

Scan wirelessly for up to 4 hours using the ModelMaker H120 with no reduction in data speed or quality.

Standard Control Pack connectivity included with every system gives robust single cable Ethernet Gigabit data transfer and AC power.

**USER FEEDBACK**

Bluetooth® external audio connectivity along with integrated visual, audio and haptic indicators for clear system feedback.

**ISO CERTIFICATION**

Precision is defined by system scanning and arm probing accuracy certified to the comprehensive ISO 10360-8 Annex D and ISO 10360-12 standards to meet modern industry expectations.

Each system is provided with artefacts for interim user verification to confirm confidence in measurements.

**CONVENIENCE**

Incorporating all the essential hardware elements needed for set up, measurement and accuracy verification, the precision cut foam inside the shock-proof wheeled flight case gives optimal protection to both the scanner and arm.

**CONFIDENCE**

Secure locking of the arm for reassurance during repositioning between measurements.

Optimised wrist docking for a safe but ready-to-measure position protects the scanner and probe.

**MOUNTING VERSATILITY**

The integrated 3.5 in x 8 adapter gives freedom to choose exactly the right mounting for the application, providing secure installation within seconds:

- Both-down, magnetic or vacuum bases for table-tops
- Heavy duty mobile or fixed stands for shop floors
- Portable tripods for measurement on different sites
Applications

Used to optimise production workflow through rapid, reliable and accurate analysis of product dimensions – both freeform and geometric – this solution has proven to be an invaluable tool across many industries and workplaces from the shop floor to the metrology lab.

Able to robustly measure almost any material and with the flexibility to inspect parts of sizes ranging from a few millimetres to several metres and more allows the solution to span almost any industry or educational need.

In combination with comprehensive industry accepted point cloud inspection or reverse engineering application software of your choice - time for measurement, analysis and design is compressed by rapidly diagnosing production issues. This enables delivery of your products faster and with greater confidence by meeting the highest quality standards.

Specifications

### MODELMAKER H120

| Accuracy 1 | 0.007 mm |
| Max. stripe width | 120 mm |
| Measuring range | 100 mm |
| Min. stand-off | 80 mm |
| Min. point resolution | 0.035 mm |
| Max. frame rate | 450 fps |
| Max. points per stripe | 2,000 (non-interpolated) |
| Laser power adjustment | ESF4 real-time per point |
| Warm up time | 0 s |
| Weight | 0.5 kg |
| Laser power | Class 2, 450 nm |
| Field of View indicator | Full FoV |
| Compliance | CE |
| Arm attachment | Integrated |

### MODELMAKER H120 WITH MCAx S

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### ISO 10360-B:2013 Annex D

Every Modelmaker H120 and MCAx S system is tested in combination according to this standard to give a clear understanding of the system scanning performance.

1 Certified laser scanner (sensor) accuracy is determined by scanning a plane from various directions, each time using the entire sensor field of view depth, width and diagonal. The result is the maximum 1σ deviation of the scan data to a fitted plane feature.

2 System weight including scanner.