

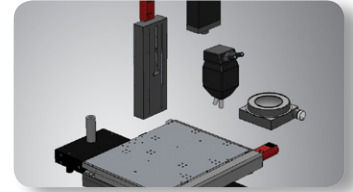
## AV350 | AV350+ VIDEO MEASURING SYSTEM



# Starrett®

[www.starrett-precision.co.uk](http://www.starrett-precision.co.uk)





## Starrett - Total Solution Provider

With Starrett Metrology products, the system is only a part of the whole package. From application analysis, system specification, installation and training, to post-installation field services, the excellence of our products is matched by the quality and comprehensive range of our services.

## Committed to Quality

We recognize that reliable operation and dependable accuracy are essential to your quality and manufacturing operations. As part of our commitment to quality, we have established first generation NIST traceable documentation for all calibration artifacts and standards for all Vision Systems, UKAS traceable documentation for all calibration artifacts and standards for all Optical Projectors is also available. Our metrology professionals are available to assist you with whatever you need to keep your system on the job.

## Complete Pre and Post Purchase Support

Our factory trained experts are available to perform calibration, preventive maintenance, repairs, upgrades and system retrofits. We offer in-house training, custom programming and measurement process development. Our field technicians are trained to ensure that the same calibration and validation methods utilised in the factory are used in the field.

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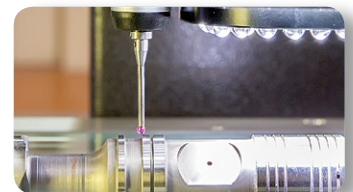
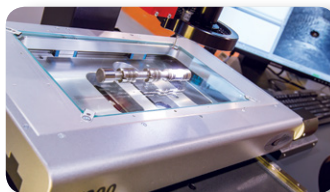
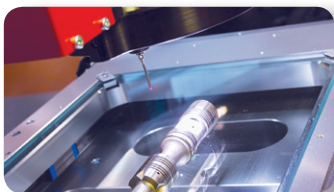
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## Starrett Vision Systems

**The unbeatable combination of precision mechanics, powerful and intuitive software, and extensive pre and post purchase support, ensure that Starrett Vision Systems take video-based, multi-sensor measuring systems to the next level.**

Starrett Vision Systems combine high-resolution images with robust, precision mechanical platforms to deliver superb accuracy and repeatable measurement results for a wide range of metrology applications. Systems are available with a choice of Heidenhain IK5000 software or Metlogix metrology readout.

Starrett Metrology Systems provide quick Return-On-Investment through increased product quality, user time savings and alternative equipment reduction.



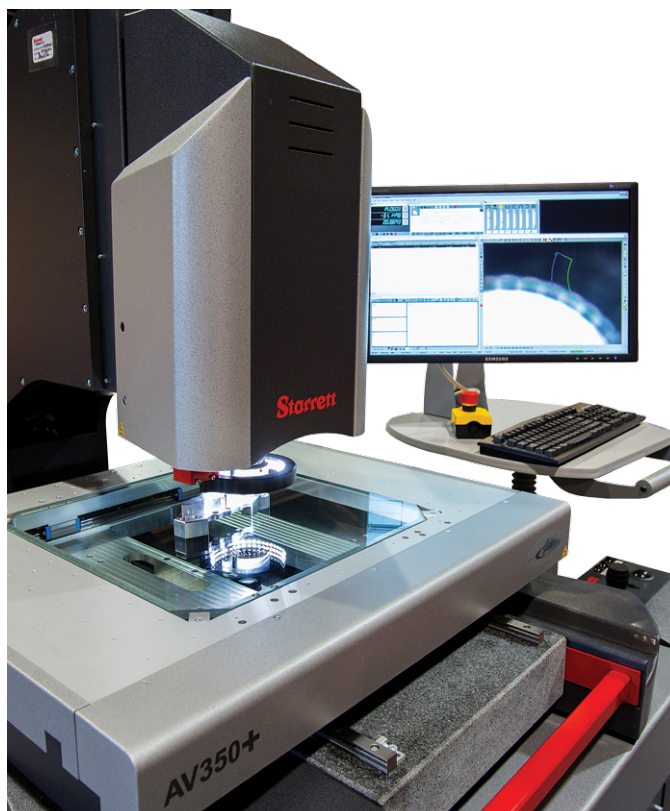




The **Galileo AV350** combines high resolution images with the latest software and a precision mechanical platform to deliver 350 x 350 x 200mm of superb accuracy for a wide range of measuring applications. Galileo systems are easy to use, versatile, and accurate. With a variety of options you can configure a Galileo system that's just right for your application and budget.

## Features

- Measurement Volume: 350mm x 350mm x 200mm (14" x 14" x 8")
- Accuracy\*: (X-Y) E2=1.9+5L/1000 - CNC Mode (Z) E1=2.5+5L/1000
- Encoder Resolution\*: 0.5 µm (0.00002")
- Video Camera: Colour CCD, digital USB interface (1024 x 768 res)
- Maximum Workload: (Evenly distributed) 18 kg (40 lbs)
- Heidenhain IK5000 (AV350+) or Metlogix M3 CNC / M3 FOV (AV350) software.
- Optics: On IK5000 System Navitar® 12:1 ratio zoom, programmable magnification range from 15x to 550x with auxiliary lenses.
- Choice of fibre optic or LED 2 or 3-channel output illumination
- Flat panel LCD video display.
- X/Y/Z Stepper drives with dual speed joystick / trackball control.
- One year warranty with extensions available
- Power supply 110 / 120 / 230 / 240 / 250V AC 50 / 60Hz.



## AV350 - SPECIFICATIONS AND OPTIONS

X-Y-Z Measuring Range (mm)	350 x 350 x 200
X-Y-Z Measuring Range (inch)	14 x 14 x 8
X-Y Accuracy in µm	E2=1.9+5L/1000
Z accuracy in µm	E1=2.5+5L/1000
Control System / Software	IK5000 / M3 CNC
Zoom Optics	12.0:1
S Video Colour Camera	Supplied as standard
Digital Video Colour Camera	Supplied with IK5000
Surface Ring Illumination	LED or Fi-O
Transmitted Illumination	LED or Fi-O
Coaxial Illumination	Supplied as an option
Dark Field Quadrant Illumination (L.E.D. only)	Supplied as on option
Auxiliary Lenses (Optional)	.5x, 2.0X
Rotary Table Compatible (1)	Supplied as an option
Renishaw Touch Probe (1)	Supplied as an option
Workstation	Supplied as standard
Part Fixturing	Supplied as an option
Video Pixel Calibration Standards	Supplied as an option
Calibration Standards	Supplied as an option
(1)	Rotary table and touch probe are only available with the IK5000 software option.



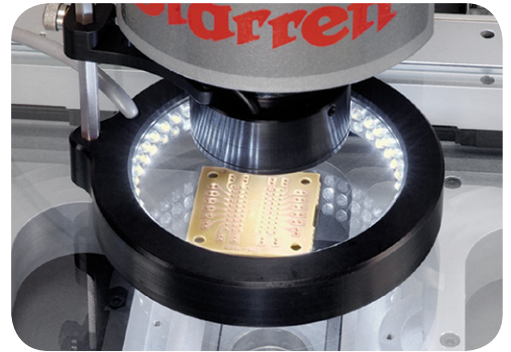
## Solutions, Not Products

Starrett Metrology Systems can be configured with a comprehensive range of accessories, all designed to ensure that our systems are not just a measurement product, but are the solution to your measurement application.

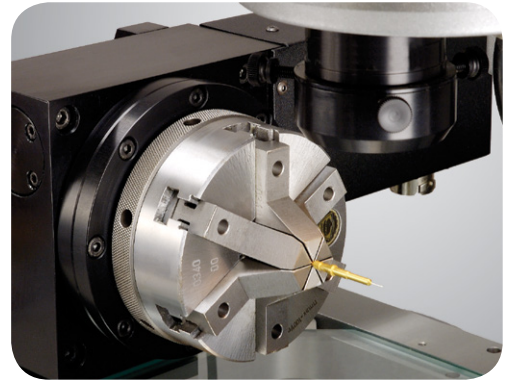
Where there is a requirement for an accessory or option not shown in this literature, please contact us for detailed technical advice and support.

Accessories available include:

- **Touch Probe:** Touch trigger probe is available with a range of force modules for different applications.
- **Light Ring:** Multi point ring light provides bright white, shadow free uniform illumination of the workpiece.
- **Rotary Stages:** Starrett rotary stages are available in two sizes and come complete with stepper motor, bi directional limits, tooling plate, enclosure and connectors.
- **Calibration Standards**
- **Part Fixturing**



**LED Light Ring**



**Starrett Rotary Table**

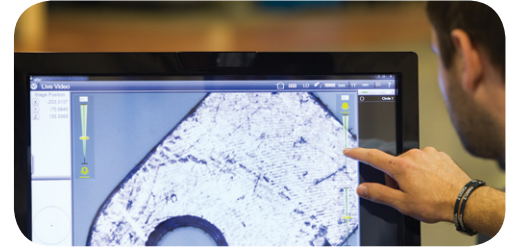


**Glass calibration standard**



## Metrology Software

The Galileo AV350 is available with a range of metrology software choices from Metlogix and Heidenhain, offering further opportunities to precisely tailor your system to the needs of your application



### M3 Metrology Software - Measuring Solution Features

**Designed for Multi-Touch software control:** In addition to the conventional mouse interface, expanded Multi-Touch logic allows for one-touch feature measurements as well as versatile pan and zoom of the live video image and the active part view.

**Advanced video probe toolbox:** The custom EyeMeasure™ probe captures complex edges by creating a custom “tool zone” according to the finger path drawn on your touch screen enabled system.

**Support up to 8 channels of programmable light control:** On-screen controls let you adjust Coaxial, Substage, and Quadrant Ring light output accommodating a wide range of measuring requirements.

**Advanced Edge Teach:** Improve edge detection performance under a variety of image and lighting conditions.

**Graphics-based “Part View” constructions:** Generate popular construction types, like Distances and Tangent Lines, from within the graphical part view itself.

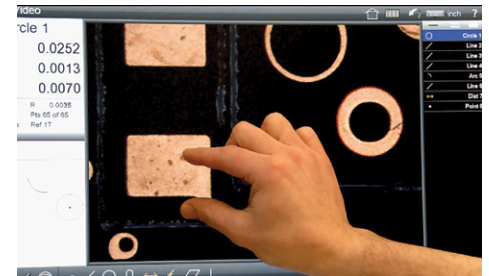
**Quick Annotate and Markup:** Gain access to instant feature markup tools using the part view “Gesture Menu”. Add customized feature data to your live video image or part view displaying only the desired coefficients. You may annotate one or several features simultaneously with the smart marquee feature selection.

**Geometric tolerancing:** Measure features, set nominals, apply tolerances and view deviation results with only a few quick clicks. You may also apply a variety of popular tolerance types to features in the standard “feature-to-feature” fashion, or utilize the “place tolerancing” system for applications where tolerances are specified in a block tolerance style call out.

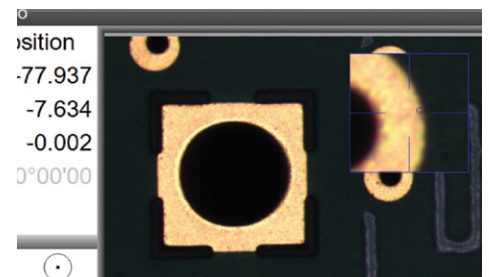
**Feature Detail Graphics:** Individual feature views provide you with informative drawings displaying point cloud distributions, as well as nominal deviations, and tolerance results.

**Part programs and playback:** Playback or edit groups of measured, constructed, and created features from your saved part program file. Part program files, when loaded, will prepare the M3 software to repeat a sequence of feature measurement steps, printed reports, and exported measurement data. The playback guidance mechanism features helpful on-screen instruction for successful playback of your part programs.

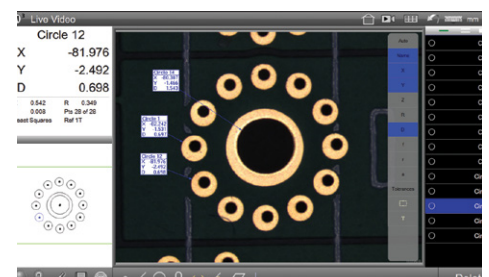
**Flexible Report Content and Formatting:** M3 software supports full customisation of the data format, header information, and header and footer graphics. Part view graphics, time and date stamps, and operator information can all be included for any report type. Reports can be viewed, printed, or exported at the conclusion of a single inspection routine, or they can be included in a part program to support repetitive or automated measurement and reporting.



Feature measurements may be performed using common touchscreen operations such as pan and pinch zoom, in addition to conventional mouse operations.



Features with poor edge contrast or difficult spacing can be captured easily with the M3 software’s manual teach feature.



Add customised feature data to your live video image or part view.



## M3 Metrology Software - CNC Features

**Get Automated using CNC Playback:** The “always recording” feature and “quick programme conversion” capability of the manual Metlogix systems can be combined with full CNC playback giving an automated solution with programmable options including zoom positions, light control and auto focus.

**Unified “GoTo” Command Interface:** Execute a variety of “GoTo” commands easily using the simple view management system already part of the Metlogix software. Quickly specify a part position, coordinate location, or feature location using the unified “GoTo” tool.

**DXF Auto Programming:** You can easily convert .dxf drawing files into part programs using the DXF import and Auto Program modules. Its fast and easy:

1. Open the desired .dxf file
2. Trim out any unwanted .dxf features or elements
3. Perform your datum operations on the .dxf features;
4. Press play
5. Your program is generated.

The Group tolerancing feature lets you quickly apply tolerance values to entire groups of features.

**Palletise Program Mode:** Take advantage of being able to quickly duplicate part programs for CNC playback within our palletised fixture.

Pallet program generation is achieved quickly and simply using a pallet grid setup window.

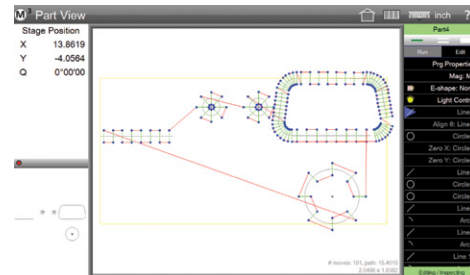
1. Specify the desired number of pallet rows and columns
2. Select the row and column spacing and create your pallet program with a single click.

**Pattern Recognition Capability:** Teach specific image patterns for automatic detection in M3 program playback. Added support for rotated pattern detection allows for more consistent playback in random fixturing scenarios.

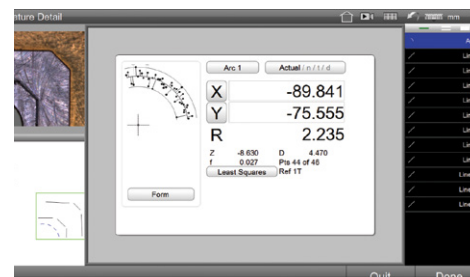
Increase the speed and efficiency of program playback through the “soft-fixture” part positioning system using the pattern detection mechanism.

**CNC Auto Focus and Focus Measurements:** Perform focus mode measurements using any of the powerful M3 measuring probes. Just enable focus mode and perform your feature measurement, the system will automatically focus and measure. Build an Auto Focus region of interest, by setting the size and position of the standard Auto Focus probe, or utilize the EyeMeasure™ capability to focus on a specific edge region. Hardware frame latching and a digital camera interface provide extremely accurate and repeatable auto focus results.

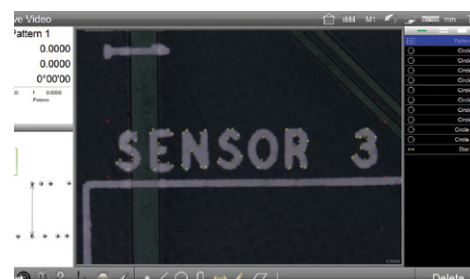
**Auto-probing for Optical Edge-enabled Measuring System:** The M3 CNC optical edge software introduces the ability to automatically add probe points to a line, circle or arc measurement. Probe the required seed points for your feature and press the Auto Probe button. Additional points, preconfigured by feature type, will be automatically probed on your feature under CNC control. This Auto-probe points function can be paired with the existing EdgeLogic™ feature, to quickly start, and complete, feature measurements with minimal operator effort.



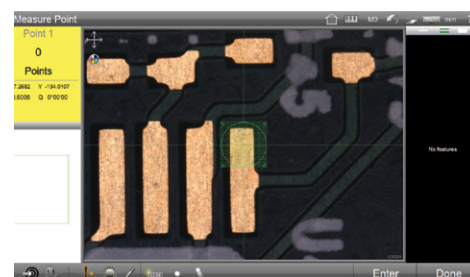
Combine the CNC playback feature with your M3 system’s “always recording feature” to increase measurement productivity and efficiency.



Individual feature views provide informative drawings with point cloud distributions, nominal deviations and tolerance results.



Increase the speed and efficiency of program playback using the pattern detection mechanism.



Automatically focus and measure your part with the CNC Auto Focus feature.



## M3 Metrology Software - Field of View / DXF Features

**Expand your M3 software with DXF video overlay functionality, DXF export, pattern recognition, and more!**

**Encoded and “Fixed” Stage support:** The new M3 FOV software option pack is available for both encoded (moveable) and fixed stage systems. All of the new features and functions included with the FOV software option are available regardless of system type.

**Import DXF files for image overlay:** The new DXF file import system allows for the display of DXF files, as an overlay on the live video image. Translate, rotate, and change the color of your DXF import for fit against the live video image.

**Export features to DXF:** Features measured, constructed, or created within the M3 software can be exported to the industry standard DXF file format for use with other software tools.

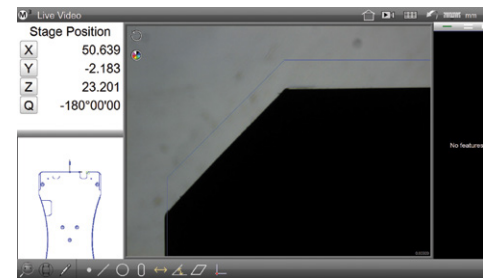
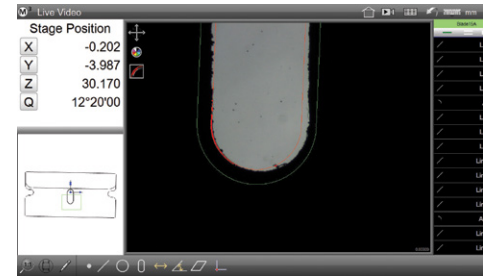
**Pattern teach and recognition:** Teach specific image patterns for automatic detection in programme playback. Increase the robustness and efficiency of program playback through the “soft-fixture” part positioning system using the pattern detection mechanism.

**Creating feature-based video overlays:** Use the existing feature creation mechanism to create on-screen video chart tools for quick comparison of measured features to a predefined tolerance zone. The ability to create circle, line, slot, rectangle, and angle overlay features provides the flexibility to support a wide range of applications.

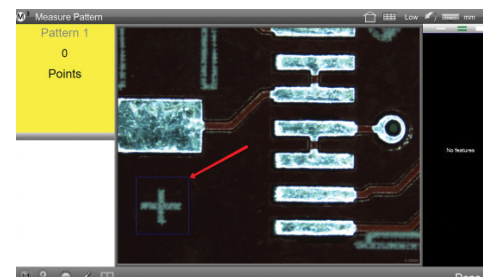
**Custom DXF Crosshair:** Design your own DXF-based crosshair graphic for use in the M3 software. Use the custom crosshair to measure features by translating or rotating the on-screen crosshair. A color toggle button is available to quickly change the crosshair color to accommodate for various image and lighting conditions.

**Support for all current industry standard software methodologies for Stage and Camera calibration.**

**Industry leading Operating System platform:** The Windows® 7 operating system represents the current enterprise solution for computer software operating systems.



Individual feature views provide informative drawings with point cloud distributions, nominal deviations and tolerance results.



Increase programme playback efficiency using the soft fixture part positioning system's pattern detection mechanism.

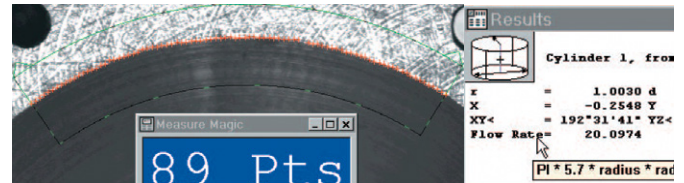


## Galileo AV350+

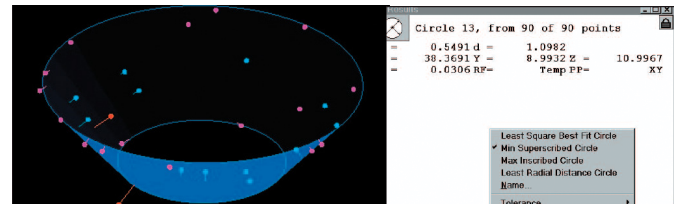
### Heidenhain IK5000 Metrology Software

IK5000 is the market leading software programme for multi-axis dimensional measurement of 2D and 3D parts.

- A huge selection of programming options within the software allows complex and difficult measurements to be simplified and repetitive tasks to be automated, saving time and increasing accuracy and repeatability.
- Colour coded pass or fail tolerance displays are presented in a graphical format, allowing the user to instantly see the effects of any applied tolerance.
- Data can be generated, stored and retrieved in a range of styles and formats and custom spreadsheets can be created for specific or detailed data. Compatibility with CAD system file formats can reduce time spent for part programming and provides options for reverse engineering requirements.
- Software training is offered as a part of every installation. Where necessary, assistance can also be provided in the creation of bespoke programmes.



Measure Magic



Data Cloud

Alternate Fits

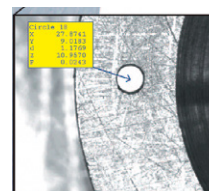
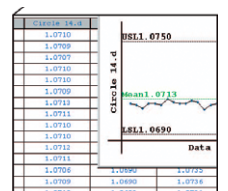


Image View

MMC Tolerance Results

Position	Nominal	Actual	Error
X	22.5620	22.5618	
Y	-0.0700	-0.0698	0.0002
Z	10.9466	10.9466	
Size	Nominal	Actual	Deviation
D	1.0660	1.0657	-0.0003

Tolerance



Integrated Database

## Features & Specifications

- Powerful yet intuitive video edge detection tools
- Auto-Focus
- "XY" 2D measurements with optional "Z" axis for height measurements
- Image capture with drag and drop data reporting
- Image processing tools
- Continuous edge mode
- Patented measure magic
- Alternative algorithms
- Auto program from CAD files
- Pattern recognition
- Integrated runs database
- Geometric tolerancing
- Advanced calculation
- Data cloud analysis
- 3D measurement set
- 3D offset alignments
- Screen layouts
- Multiple reference frames
- 3D part view
- Renishaw touch probe interface
- Optional laser sensor
- Vector probing
- Multiple language support
- 3D Measure Magic
- Advanced calculations
- 3D data clouds
- Alternate algorithms
- Drag and drop report generator
- Data export to a wide variety of applications

**Optimax**  
Imaging Inspection Measurement

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