



## Non-Contact Measuring Systems

For inspection and measurement of 3-dimensional parts

- High repeatable accuracy 3-axis non-contact measurements
- Patented optical image clearly defines edges, offering superb resolution and contrast
- Powerful and intuitive microprocessors deliver simple, fast results
- Optional video edge detection for higher throughput measurements
- Wide range of system configurations and options



Vision Engineering are world leaders in the design and manufacture of precision measurement and inspection systems, from simple bench magnifiers to high accuracy non-contact measuring systems.

The Hawk family of optical and video non-contact measurement systems have been designed for companies who demand the highest levels of manufacturing quality, providing high accuracy, repeatable measurement of complex manufactured components of all materials.

Hawk systems range from simple 2-axis optical measuring microscopes to 3-axis video edge detection measuring platforms, providing a modular and flexible solution for a wide range of measuring requirements.

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# Systems Overview



## **Hawk Systems with QC-200**

*High resolution 3-axis optical measurement of 2-D features, including coloured or transparent plastics, with simple-to-operate data processor and standard reporting capabilities.*



## **Hawk Systems with QC-300 VED**

*Combines both optical and/or video measurement techniques into a simple, 3-axis measuring system, with touch-screen colour display, integral image capture and standard reporting capabilities.*



## **Hawk Systems with QC-5000**

*High resolution 3-axis optical measurement of 3-D features. PC-based metrology software offers powerful data processing and analysis tools, with advanced reporting and input/output capabilities.*



## **Hawk Systems with QC-5000 VED**

*Flexible 3-axis measurement of 3-D features, offering both optical and/or video measurement techniques, advanced PC-based data processing and reporting, with motorised and automated stage options.*



# Optical, Video...or Both?

## Optical Measurement

All Hawk systems utilise Vision Engineering's patented Dynascope™ optical projection technology to provide high contrast, microscope resolution images of complex components. Parts are viewed through an ergonomic, high resolution projection head.

Difficult-to-view features such as low contrast black or white plastics, materials of different colours and textures, or transparent parts may all be viewed in intricate detail - something not always possible with profile projectors or video-based systems. The superb optical clarity also allows detailed visual inspection to be performed simultaneously.

- Optical measurement for highest levels of accuracy, difficult-to-view one-off features, or critical measurements
- High resolution optical images ideal for low contrast, difficult-to-view components, complex features or simultaneous visual inspection

## Video Measurement

Hawk is the first non-contact measuring system to offer the option of both video and/or optical measurement, providing added flexibility with the ability to perform higher volume batch video measurement routines, or high accuracy optical measurements for one-off or critical parts.

*"Not a profile projector, not a video measuring system, just the best of both worlds ..."*

Whatever your measurement requirements, Hawk provides optimum accuracy and flexibility for a wide range of quality inspection routines. Users even have the ability to switch between video and optical measurement within the same measuring routine.

- Video edge detection for enhanced throughput measurements
- Ideal for high contrast components, batch routines, measurement of form features or features both inside and outside the field of view

**“** *Hawk is the ideal piece of metrology equipment for us. It is easy to use and flexible enough to gauge nearly all of our components. The reporting capability allows me to capture a data file for every component we measure, which is vital for component traceability.* **”**

# Patented Dynascope Technology

## Man vs Machine

In the modern era of the computer, it is sometimes assumed that human capabilities cannot compete in a digital world. What can be forgotten is that computers, although capable of many things, rely on pre-programmed parameters to determine results.

Hawk uses a microscope-resolution, pure optical image, together with the best image recognition system known to man - the human brain. Combined together, this provides highly accurate measurements, particularly for difficult-to view components or complex applications, ensuring that you can get accurate results, time after time.



## World Patents

Vision Engineering holds world patents for a number of techniques which optimise the optical and ergonomic performance for a range of mono and stereo microscopes. The patented Dynascope™ technology employed in the Hawk family provides users with many unique benefits, all designed to increase measurement accuracy and productivity and reduce costs.

## See It – Measure It ...

If you can see it, you can measure it! Hawk's Dynascope™ technology enables you to view intricate and low contrast objects with confidence. Black-on-black? White-on-white? Transparent subjects? No problem. Your measurements will be accurate because the image has not been digitised. Video based measurement systems suffer from loss of colour rendition or contrast problems. The most accurate results will come from a pure optical image, especially for difficult-to-view subjects.

## Microscope-Resolution Images

Hawk is a true optical microscope. Light passes through the patented Hawk optics, exiting the single viewing lens as twin (mono) light paths. The large diameter of these exit rays means that users do not need to precisely align their eyes with the viewing lens in order to see the subject. Unprocessed, high resolution, true-colour optical images are viewed through the ergonomic eyepieceless viewing head.





# Company Profile

## Vision Engineering

Vision Engineering has built a reputation of innovative design, excellent optical technology and ergonomically advanced products. The Hawk family of non-contact measurement systems represent the very best in industry-proven solutions and leading-edge technologies.

Vision Engineering also manufacture a range of non-contact measuring systems to complement the Hawk family, as well as a full range of stereo inspection microscopes.

## Company Profile

Vision Engineering was founded in 1958 by Rob Freeman, a toolmaker who had previously worked as a race mechanic with the Jaguar Racing Team. Since its formation, Vision Engineering has become one of the world's most innovative and dynamic microscope manufacturers, with offices across Europe, Asia and North America.

Engineers and scientists worldwide use our systems for a wide range of general magnification, inspection and measurement applications in both industrial and life science markets. More than 300,000 units have been installed worldwide to date.

## Research and Technology

Vision Engineering holds world patents for a number of optical techniques which remove the need for conventional binocular microscope eyepieces. Dynascope™ image projection technology is employed in the Hawk family of non-contact measuring systems and offer users advanced ergonomics, superb optical clarity and reduced eyestrain leading to improved accuracy and productivity. Vision Engineering continues to lead the way in optical innovation and technology with ongoing research and development programmes.



Mantis Stereo Inspection System illustrated



Merlin 2-axis Video Measurement System illustrated

# Quality, Calibration & Support

## Worldwide Training, Service & Support

Vision Engineering has a network of international offices throughout Europe, Asia and North America, supported by a network of over 120 fully trained distributor partners. Full user training, application development, service, calibration and support is available for every Hawk system, ensuring the highest levels of accuracy and productivity are maintained at all times. A dedicated applications development facility is also available to help problem-solve technical or application queries.

Systems can be serviced at your premises to minimise any loss of production or returned to a Vision Engineering main service centre if more complex works are required.

## Measuring Stage Calibration, with NLEC

Measuring stages of all types will naturally display minute mechanical differences due to normal variations in component and manufacturing tolerances. Non-Linear Error Correction (NLEC) is the most accurate correction method available and uses a software algorithm to calculate and correct any errors across the measuring stage. All Hawk measuring stages are factory calibrated with NLEC prior to installation.

Annual measuring system calibration is essential if quality control is to be taken seriously. Measurement to a consistently high level of accuracy can only be achieved if instruments are periodically calibrated against traceable standards.

## Traceability to International Standards

Vision Engineering's measuring stage calibrations are internationally traceable to National Measurement Standards (NMS) through the Mutual Recognition Agreement (MRA), ensuring full compliance with quality standards, including ISO9000.





# Hawk Systems with QC-200 Microprocessor

## System Summary

Available in a wide range of configurations, Hawk systems with QC-200 offer high accuracy measurement in 3-axis of both complex and routine manufactured components. The intuitive QC-200 microprocessor can be used by shift workers or advanced users alike and provides powerful yet simple data processing for routine measurement and reporting requirements.

Hawk with QC-200 utilises Vision Engineering's patented Dynascope™ optical image projection technology to simplify the measurement of complex manufactured component parts of all materials.

- High repeatable accuracy, 3-axis (X, Y, Z) measurements
- Patented optical image clearly defines edges, offering superb resolution and contrast
- Powerful and intuitive microprocessor delivers simple, fast results
- High precision and large capacity measuring stage options
- Image capture and archive option
- Modular and flexible system for future upgrade
- Worldwide training, service & support

## See It – Measure It ...

Difficult-to-view features such as low contrast black or white plastics, materials of different colours and textures, or transparent parts may all be viewed in intricate detail – something not always possible with other measuring devices, ensuring the highest levels of accuracy are achieved. Critical parts can be measured in complete confidence.

## Precision Measuring Stage

Hawk with QC-200 is available with a range of high specification, high performance measuring stage options, providing a measuring range from 150mm x 150mm (6" x 6") up to 400mm x 300mm (16" x 12"). Every measuring stage has factory-completed non-linear error correction (NLEC) calibration to ensure optimum accuracy, which is traceable to national standards for the purposes of ISO9000. Combined with 0.5µm resolution measuring encoders, this provides a system repeatability of up to 2µm for complete confidence in your results.\*

## Intuitive Microprocessor

Data processing is performed by the QC-200 multi-function microprocessor. QC-200 is ideal for measuring common component features, such as circles, angles, lines, arcs and distances and has been designed with ease of operation in mind, featuring an intuitive interface with meaningful visual displays. X, Y and Z measurements are represented in both numerical and graphical form with connectivity through USB and serial ports.



Hawk with QC-200 Microprocessor and 200 x 150mm measuring stage illustrated

## Patented Technology

The Hawk family of non-contact measuring systems draw on over 50 years of optical manufacturing experience to combine Vision Engineering's patented Dynascope™ technology with high precision measuring stages and powerful data processing.

Dynascope™ image projection technology provides unrivalled optical clarity for accurate and efficient measurement.

► Find out more on page 3 ...

\* using 200mm x 150mm measuring stage (x200 system magnification, controlled 20°C, using traceable chrome on glass grid artefact, with intersection points on the standard measuring plane)



The **QC-200** digital microprocessor is the ideal control interface for all routine 2-D measurement and reporting functions with the Hawk non-contact measuring system, providing a powerful combination to empower operators along every step of the measurement process. Patented features reduce repetitive measurements and simplify complex work steps.

### Intuitive User Interface

A consistent, intuitive interface ensures operator accuracy and reduces training time.

### Part Programming

Programme a measurement sequence once and run it back as often as you need. Measure the same number of points per feature, in the identical sequence, part after part.

### Intersections and Constructions

Obtain essential intersection and construction results by selecting from the list of previously measured features, complete with graphics.

### Measure Magic™

To measure, simply probe points and click. QC-200 detects, without the operator's intervention, the feature type being measured.

### Context-Sensitive Help

QC-200 decreases training time and costs with graphics-rich, context sensitive help that guides shop-floor personnel through Quadra Chek interface conventions.

### Options

Get the right tools for the job. Optional remote keypads, footswitches and printers help operators capture the precise measurement data more conveniently while streamlining the work process.

### Languages

As standard, QC-200 can accommodate English, French, German, Italian, Portuguese, Spanish, Swedish, Czech, Polish, Turkish, Chinese and Japanese languages.

### Connectivity

Data output via USB and RS-232 ports.

### Geometric Tolerancing

QC-200's unique graphical representation instantly displays pass/fail performance details for critical part dimensions. Results and important measurement data are displayed in an uncluttered and comprehensive LCD display.

System Variations			
Stage Sizes			
150 x 150mm	200 x 150mm	300 x 225mm	400 x 300mm
Magnification (System Total)			
x10, x20, x50, x100, x200, x500, x1000			

► Full technical specifications available on page 16 ...





# Hawk Systems with QC-300 Video Microprocessor

## System Summary

Hawk systems with QC-300 are the first measuring microscopes to offer the options of both optical and video measurement, providing users with unrivalled flexibility with the ability to perform both higher volume batch video measurement routines, or high accuracy optical measurements for difficult-to-view, one-off or critical parts.

Hawk with QC-300 utilises Vision Engineering's patented Dynascope™ technology together with an advanced touch-screen video microprocessor to provide optimised measurement, whatever the component, making it ideal for high accuracy quality control routines with a wide variety of component features.

- High repeatable accuracy, 3-axis (X, Y, Z) measurements
- Patented optical image clearly defines edges, offering superb resolution and contrast
- Integrated video camera enables both video and optical measurement, for complete flexibility
- High precision and large capacity measuring stage options
- Powerful and intuitive touch-screen video microprocessor
- Modular and flexible system for future upgrade
- Worldwide training, service & support

## Optimised Measurement Routines

From manual, single-feature operation to higher throughput video edge detection measurements, Hawk with QC-300 optimises measurement routines to deliver accuracy and simplicity for a wide range of measuring applications. Users even have the ability to switch between video and optical measurement within the same measuring routine.

## Touch-Screen Video Microprocessor

In addition to optical measurement techniques, the QC-300 video microprocessor includes an array of video measurement tools, including simple crosshair measurement; offset crosshair for difficult-to-find edges; manual or automatic single point detection and multi-point video edge detection. QC-300 features a high resolution colour video touch-screen with intuitive interface and is ideal for measuring common component features, such as circles, angles, lines, slots, arcs and distances.

## Precision Measuring Stage

Hawk with QC-300 is available with a range of high specification, high performance measuring stage options, providing a measuring range from 150mm x 150mm (6" x 6") up to 400mm x 300mm (16" x 12"). Every measuring stage has factory-completed non-linear error correction (NLEC) calibration to ensure optimum accuracy, which is traceable to national standards for the purposes of ISO9000. Combined with 0.5µm resolution measuring encoders, this provides a system repeatability of up to 2µm for complete confidence in your results.\*



Hawk with QC-300 Microprocessor and 150 x 150mm measuring stage illustrated

## Optical Measurement?

- Optical measurement for highest levels of accuracy, difficult-to-view/one-off features, or critical measurements
- Patented high resolution optical images ideal for low contrast, difficult-to-view components, complex features, or simultaneous visual inspection

## Video Measurement?

- Video Edge Detection (VED) for fast, enhanced throughput measurements
- Ideal for high contrast components, batch routines, measurement of form features, or features both inside and outside the field of view

► Find out more on page 3 ...

\* using 200mm x 150mm measuring stage (x200 system magnification, controlled 20°C, using traceable chrome on glass grid artefact, with intersection points on the standard measuring plane)

The **QC-300** video microprocessor provides a powerful and flexible option for the Hawk non-contact measuring system, empowering operators along every step of the measurement process. Ideal for both optical and video 3-axis measurements, QC-300 combines advanced measurement tools with amazing simplicity to simplify complex work steps and reduce operator error.

### Intuitive User Interface

QC-300 features a powerful and intuitive interface which can easily be used by shift workers or advanced users alike. The high resolution touch-screen colour display is exceptionally easy to use and ensures operator accuracy with minimal training time.

### Video Measurement Tools

Switch from simple crosshair measurement to automatic video edge detection for form measurement both inside and outside the field of view. QC-300 provides the user with an array of powerful and flexible video measurement tools to speed up and simplify the measurement process.

### Part Programming

Programme a measurement sequence once and run it back as often as you need. Measure the same number of points per feature, in the identical sequence, part after part.

### Intersections and Constructions

Obtain essential intersection and construction results by selecting from the list of previously measured features, complete with graphics.

### Geometric Tolerancing

QC-300's unique graphical representation instantly displays colour coded pass/fail performance details for critical part dimensions. Results and important measurement data are displayed in an uncluttered and comprehensive display.

### Image Capture and Analysis

QC-300 captures images (in JPEG format) to either internal memory or external memory via the USB port. The image can then be edited or appended with text and measurement data.

### Measure Magic™

To measure, simply probe points and click. QC-300 detects, without the operator's intervention, the feature type being measured. With the patented Measure Magic feature, operators can inspect multiple features without taking their eyes off the part, increasing throughput, improving accuracy and reducing user fatigue.

#### System Variations

##### Stage Sizes

150 x 150mm	200 x 150mm	300 x 225mm	400 x 300mm
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##### Magnification (System Total)

x10, x20, x50, x100, x200, x500, x1000
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➤ [Full technical specifications available on page 16 ...](#)





# Hawk Systems with QC-5000 PC Software

## System Summary

Designed for users who demand the highest performance from their measuring and quality control routine, Hawk systems with QC-5000 PC software allow accurate 3-D measurement of complex manufactured components, from simple manual measurement to multi-feature modelling with advanced data import, export and analysis features.

Hawk with QC-5000 utilises Vision Engineering's patented Dynascope™ optical image projection technology to provide intricate views with enhanced surface definition of even the most difficult-to-view components.

- High repeatable accuracy, fully geometric 3-axis (X, Y, Z) measurements
- Patented optical image clearly defines edges, offering superb resolution and contrast
- Powerful and intuitive PC-based software with advanced data handling capabilities
- High precision and large capacity measuring stage options
- FREE lifetime software updates
- Worldwide training, service & support

## See It – Measure It ...

Black component? White or transparent plastics? No problem. Hawk's patented optics provides high contrast views of complex components of all materials – something not always possible with other measuring devices. Images are viewed through an ergonomic, high resolution optical projection head enabling accurate and repeatable measurements. Critical parts can be measured in complete confidence.

## Powerful PC-Based Software

Hawk's QC-5000 PC software provides a powerful, yet intuitive interface with measurement, document & analysis and reporting features to simplify complex measurement routines and processes. Whether performing intricate, pre-programmed measurement routines, or simple point-to-point measurements, QC-5000 integrates familiar interface conventions with powerful data processing & analysis tools, including Statistical Process Control (SPC) with CAD input/output.

## High Precision Measuring Stages

Hawk systems are available with a range of high specification, high performance measuring stage options, all manufactured to the highest tolerances providing a measuring range from 150mm x 150mm (6" x 6") up to 400mm x 300mm (16" x 12"). Every measuring stage has factory-completed non-linear error correction (NLEC) calibration to ensure optimum accuracy, which is traceable to national standards for the purposes of ISO9000. Combined with 0.5µm resolution measuring encoders, this provides a system repeatability of up to 2µm for complete confidence in your results.\*



Hawk with QC-5000 Microprocessor and 200 x 150mm measuring stage illustrated

## Patented Technology

The Hawk family of non-contact measuring systems draw on over 50 years of optical manufacturing experience to combine Vision Engineering's patented Dynascope™ technology with high precision measuring stages and powerful data processing.

Dynascope™ image projection technology provides unrivalled optical clarity for accurate and efficient measurement.

► Find out more on page 3 ...

\* using 200mm x 150mm measuring stage (x200 system magnification, controlled 20°C, using traceable chrome on glass grid artefact, with intersection points on the standard measuring plane)



**QC-5000** metrology software is the premier system for the measurement and inspection of 2-D and 3-D geometric components, featuring an array of tools to simplify complex work steps and reduce repetitive measurements. With an intuitive interface, including drag-and-drop data fields, macros and database templates, QC-5000 provides a complete solution to both complex and simple measurement tasks.

## Programming & Sequencing

Simplify difficult or repetitive measurement sequences with an easy-to-use and robust programming interface. Programme a measurement sequence once and run it back as often as you need. Measure the same number of points per feature, in the identical sequence, part after part.

Turn on the Record function to enable the software to 'learn' measuring sequences, tolerances and reporting functions for subsequent parts.

## Advanced Calculations

Results fields can be customised for special measurement needs and complex calculations by embedding formulas (e.g. automatically calculate area or circumference dimensions with each circle measurement).

## Tolerance Displays

QC-5000 translates data-intensive reports into informative graphics so operators can quickly see the results of tolerances applied to geometric features. Colour-coded results show green/red for pass/fail.

## Part Image Archive

Record and store graphic measurement results of parts, along with dimensions and other information for up-to-date records for convenient, ongoing quality control and archival reference.

## Data Management

Integrated tools allow capture, archive and retrieval of data in a variety of formats and incorporate custom spreadsheets to simplify the management of complex or non-standard calculations, including full Statistical Process Control (SPC).

Customised reports can be sent to a variety of applications, printers or databases with CAD input/output for simplified part programming or reverse engineering applications.

## Software Training & Support

Full on-site or off-site training is offered with every installation, which can be tailored to individual requirements, plus includes FREE lifetime software updates\*. Additional application support is also available for the development of custom routines and processes.

\* Software version and hardware dependent.

System Variations			
Stage Sizes			
150 x 150mm	200 x 150mm	300 x 225mm	400 x 300mm
Magnification (System Total)			
x10, x20, x50, x100, x200, x500, x1000			

► Full technical specifications available on page 16 ...

**Results Window**  
Displays the measurements of a single feature and can be configured to include all or selected data.

**Parts View Window**  
Allows the features being measured to be viewed as a complete 3-D model.

**Multi Results Window**  
This tabbed display for multi-feature results enables simple report generation and can be as simple or as complex as required. It can also be used to display/edit programmes and generate database information for multi-part runs.





# Hawk Systems with QC-5000 VED PC Software

## System Summary

Power – flexibility – simplicity. Hawk systems with QC-5000 VED PC software combine both patented optical technology with advanced video measurement tools, providing users with the ability to select and optimise measurement and reporting routines, whatever the component, from simple geometric features through to intricate, difficult-to-view components.

The intuitive QC-5000 VED PC software speeds up and simplifies measurement tasks with advanced optical and video measurement tools, for a complete quality control solution.

- High repeatable accuracy, fully geometric 3-axis (X, Y, Z) measurements
- Patented optical image clearly defines edges, offering superb resolution and contrast
- Integrated video camera enables both video and optical measurement, for complete flexibility
- Powerful and intuitive PC-based software with advanced data handling capabilities
- Fully automated (CNC VED) option available in all 3 axis
- FREE lifetime software updates

## See It – Measure It ...

Black component? White or transparent plastics? No problem. Hawk's patented optics provides microscope resolution, high contrast views of intricate components of all materials. Then instantly switch to the advanced video edge detection (VED) tools for higher throughput video measurement of common features, complex shapes, form features, or batch samples, all within the same measurement routine.

## Powerful PC-Based Software

In addition to advanced video measurement tools, Hawk's QC-5000 VED PC software includes a powerful, yet intuitive interface with measurement, document & analysis and reporting features to simplify complex measurement routines and processes. Whether performing intricate, pre-programmed measurement routines, or simple point-to-point measurements, QC-5000 VED integrates familiar interface conventions with powerful data processing & analysis tools, including Statistical Process Control (SPC) plus CAD input/output.

## High Precision Measuring Stages

Hawk systems are available with a range of high specification, high performance measuring stage options, all manufactured to the highest tolerances providing a measuring range from 150mm x 150mm (6" x 6") up to 400mm x 300mm (16" x 12"). Every measuring stage has factory-completed non-linear error correction (NLEC) calibration to ensure optimum accuracy, which is traceable to national standards for the purposes of ISO9000. Combined with 0.5µm resolution measuring encoders, this provides a system repeatability of up to 2µm for complete confidence in your results. \*



Hawk with QC-5000 VED Microprocessor and 200 x 150mm measuring stage illustrated

## Optical Measurement?

- Optical measurement for highest levels of accuracy, difficult-to-view/one-off features, or critical measurements
- Patented high resolution optical images ideal for low contrast, difficult-to-view components, complex features, or simultaneous visual inspection

## Video Measurement?

- Video Edge Detection (VED) for fast, enhanced throughput measurements
- Ideal for high contrast components, batch routines, measurement of form features, or features both inside and outside the field of view

► Find out more on page 3 ...

\* using 200mm x 150mm measuring stage (x200 system magnification, controlled 20°C, using traceable chrome on glass grid artefact, with intersection points on the standard measuring plane)

**QC-5000 VED** metrology software is the premier system for both optical and video measurement of 2-D and 3-D geometric components, featuring an array of powerful video measurement tools to simplify complex work steps, reduce repetitive measurements and increase throughput. With an intuitive interface, including drag-and-drop data fields, macros and database templates, QC-5000 provides a complete solution to both complex and simple measurement tasks.

## Video Measurement Tools

From simple crosshair to automatic video measurement of irregular profiles, QC-5000 VED provides the user with an array of powerful and flexible video measurement tools to speed up and simplify the measurement process. Advanced tools include nearest, furthest and average point features, active crosshair for automatic single point detection and a worm tool to automatically measure irregular profiles.

## Programming & Automation

Simplify difficult or repetitive measurement sequences with an easy-to-use and robust programming interface. Programme a measurement sequence once and run it back as often as you need. Measure the same number of points per feature, in the identical sequence, part after part.

Turn on the Record function to enable the software to 'learn' measuring sequences, tolerances and reporting functions for subsequent parts.

## Advanced Calculations

Results fields can be customised for special measurement needs and complex calculations by embedding formulas (e.g. automatically calculate area or circumference dimensions with each circle measurement).

## Tolerance Displays

QC-5000 VED translates data-intensive reports into informative graphics so that operators can quickly see the results of tolerances applied to geometric features. Colour-coded results show green/red for pass/fail.

## Part Image Archive

Record and store graphic measurement results of parts, along with dimensions and other information for up-to-date records for convenient, ongoing quality control and archival reference.

## Data Management

Integrated tools allow capture, archive and retrieval of data in a variety of formats and incorporate custom spreadsheets to simplify the management of complex or non-standard calculations, including full Statistical Process Control (SPC). Customised reports can be sent to a variety of applications, printers or databases with CAD input/output for simplified part programming or reverse engineering applications.

## Software Training & Support

Full on-site or off-site training is offered with every installation, which can be tailored to individual requirements, plus includes FREE lifetime software updates\*. Additional application support is also available for the development of custom routines and processes.

\* Software version and hardware dependent.

System Variations			
Stage Sizes			
150 x 150mm	200 x 150mm	300 x 225mm	400 x 300mm
Magnification (System Total)			
x10, x20, x50, x100, x200, x500, x1000			
Automation			
Semi and Fully Automated options available			

➤ [Full technical specifications available on page 16 ...](#)



### Video Edge Detection (VED)

Enables high speed multi-point measurement using a high resolution colour image. A variety of tools enable complete measurement of high and low contrast components.



### Toolbars and Buttons

Fully configurable and simple to use tools enabling a variety of tasks at the click of a button including Full Geometric Measurement, Record, Edit and Run Programme, Multi Datum and many more.



### Digital Read Out (DRO)

Displays current position in all 3 axes relative to machine zero or programmed Datum.



# Options and Accessories



## Objective Lenses

A wide range of objective lenses options are available:

Single, quick change high numerical aperture, macro objectives and 4-turret array, quick change micro objectives. Macro objectives include an iris to adjust depth of field.

### Macro Lenses

Objective Lens	Total Magnification	Working Distance	Field of View (mm Ø)	Depth of Field (µm)
x1	10x	84mm	14.2mm	270µm
x2	20x	81mm	7.1mm	67µm
x5	50x	61mm	2.8mm	10µm
x10	100x	32mm	1.4mm	6µm

### Micro Lenses (Short Working Distance)

Objective Lens	Total Magnification	Working Distance	Field of View (mm Ø)	Depth of Field (µm)
x5	50x	20mm	4.4mm	12.22µm
x10	100x	10.1mm	2.2mm	3.06µm
x20	200x	3.1mm	1.1mm	1.3µm
x50	500x	0.66mm	0.44mm	0.3µm

### Micro Lenses (Long Working Distance)

Objective Lens	Total Magnification	Working Distance	Field of View (mm Ø)	Depth of Field (µm)
x10	100x	21mm	2.2mm	4.4µm
x20	200x	12mm	1.1mm	1.72µm
x50	500x	10.6mm	0.44mm	1.10µm
x100	1000x	3.4mm	0.22mm	0.43µm

### Micro Lenses (Super Long Working Distance)

Objective Lens	Total Magnification	Working Distance	Field of View (mm Ø)	Depth of Field (µm)
x20	200x	21mm	1.1mm	2.24µm
x50	500x	15mm	0.44mm	1.36µm



## Measuring Stages

A range of measuring stages is available to cater for a wide variety of measuring requirements.

All stages are manufactured to the highest tolerances with factory-completed NLEC calibration. When choosing the correct stage size, take into account the component dimensions as well as desired accuracy.\*



## Image Capture and Archive

A range of multimedia solutions are available to make light work of acquisition, processing and archiving of your captured images. It's never been easier to share information. Images of non-conforming parts can be marked up and emailed to staff for discussion in no time at all.



Large Capacity Measuring Stage available in two sizes:

- 300 x 225mm
- 400 x 300mm

\* See page 16 for full details.

\*\* Micro objective lenses require episcopic illumination only.



### Surface Illumination

Bright white, multi-point ringlight provides uniform and shadow-free surface illumination of the subject.

Suitable for all routine measuring applications.



### Substage Illumination

Substage illumination provides a sharp edge profile, plus can be used to view through-holes in components, or highlight features in translucent parts.

A thumbwheel iris adjusts the substage light to provide clearly defined edges.



### Episcopic Illumination

Episcopic illumination projects the light through the objective lens, following the same optical path as the image.

Used particularly for higher magnifications where the subject is flat and reflective or to illuminate blind bores or deep surface features.\*\*

Using a thumbwheel, the amount of light can be adjusted for illumination precision.



### Episcopic and Surface Illumination

Combine both surface and episcopic illumination to provide complete flexibility.

Modular design provides full compatibility between surface and episcopic illumination units.



Precision Measuring Stage  
150 x 150mm

High Precision Measuring Stage  
200 x 150mm

### Other Options Available

- Custom designed pre-centred graticule
- Coloured filters for enhanced profile viewing





## Hawk Systems with QC-200

Measurement		150mm x 150mm	200mm x 150mm	300mm x 225mm	400mm x 300mm
Measuring Range (X,Y)		202mm - 255mm	202mm - 255mm	40mm - 89mm*	40mm - 89mm*
Measuring Range (Z) †					
Measuring Uncertainty		$U_{95}2D = 4+(5.5L/1000)\mu m^{**}$	$U_{95}2D = 2+(4.5L/1000)\mu m^{**}$	$U_{95}2D = 15+(6.5L/1000)\mu m^{**}$	$U_{95}2D = 15+(8.5L/1000)\mu m^{**}$
Stage Repeatability	(X)	0.002mm	0.002mm	0.010mm	0.010mm
	(Y)	0.002mm	0.002mm	0.010mm	0.010mm
	(Z)	0.008mm	0.008mm	0.010mm	0.010mm
Maximum Load (glass plate)		15 kgs	20 kgs	25 kgs	25 kgs
Encoder Resolution	(X)	0.001mm	0.0005mm	0.001mm	0.001mm
	(Y)	0.001mm	0.0005mm	0.001mm	0.001mm
	(Z)	0.0005mm	0.0005mm	0.001mm	0.001mm
Optics					
Magnification Options (Macro)		x10, x20, x50, x100	x10, x20, x50, x100	x10, x20, x50, x100	x10, x20, x50, x100
Magnification Options (Micro)		x50, x100, x200, x500, x1000	x50, x100, x200, x500, x1000	x50, x100, x200, x500, x1000	x50, x100, x200, x500, x1000
Measuring Sensor		Optical	Optical	Optical	Optical
Illumination Type					
Surface Illumination		●	●	●	●
Episcopic Illumination		○	○	○	○
Sub-Stage Illumination		●	●	●	●
Illumination Control					
Manual		●	●	●	●
Remote		-	-	-	-
CNC		-	-	-	-
Accessories					
Camera Take-Off		○	○	○	○
Data Processor					
Data Processor		QC-200	QC-200	QC-200	QC-200
Geometry		2-D and Z	2-D and Z	2-D and Z	2-D and Z
Measurement Functions		Point Line Circle/Arc Distance Angle	Point Line Circle/Arc Distance Angle	Point Line Circle/Arc Distance Angle	Point Line Circle/Arc Distance Angle
Tolerance		●	●	●	●
Data Export & Connectivity		Serial Port Parallel Port USB Port	Serial Port Parallel Port USB Port	Serial Port Parallel Port USB Port	Serial Port Parallel Port USB Port
Drag and Drop		-	-	-	-
Import File		-	-	-	-
Database		-	-	-	-
Image Capture		-	-	-	-
Data Cloud		Simple	Simple	Simple	Simple
Custom Formula		-	-	-	-
Datum		Two	Two	Two	Two
Datum Plane		-	-	-	-
Settings Back-Up		●	●	●	●
Automation					
Semi Automated		○ (Z only)	○	○	○
Fully Automated		-	○	○	○
Software Capability					
Data Input		Button	Button	Button	Button
Display		B&W LCD	B&W LCD	B&W LCD	B&W LCD
Graphic Display		1 Feature	1 Feature	1 Feature	1 Feature
Graphics		2-D	2-D	2-D	2-D
Point Filtration		-	-	-	-
Auto Program		-	-	-	-
Runs Database		-	-	-	-
NLEC Calibration		●	●	●	●

† configuration dependent (min. based on using 1x macro lens and max. based on using ringlight and 5x macro lens).

● = Standard

○ = Optional

- = Not applicable

\* Distance can be increased with the addition of a stand extension.

\*\* Where L = measured length in mm (x200 system magnification, controlled 20°C, using traceable chrome on glass grid artifact, with intersection points at the standard measurement points).

Note: Although we aim to provide you with the most up to date information, Vision Engineering reserves the right to change Technical Data without notice and cannot be held responsible for the accuracy, completeness, and/or reliability of the contents of the information provided herein.



# Technical Specifications

Hawk Systems with QC-300 VED				Hawk Systems with QC-5000			
150mm x 150mm 202mm - 255mm	200mm x 150mm 202mm - 255mm	300mm x 225mm 40mm - 89mm*	400mm x 300mm 40mm - 89mm*	150mm x 150mm 202mm - 255mm	200mm x 150mm 202mm - 255mm	300mm x 225mm 40mm - 89mm*	400mm x 300mm 40mm - 89mm*
U <sub>95</sub> 2D = 4+(5.5L/1000)µm**	U <sub>95</sub> 2D = 2+(4.5L/1000)µm**	U <sub>95</sub> 2D = 15+(6.5L/1000)µm**	U <sub>95</sub> 2D = 15+(8.5L/1000)µm**	U <sub>95</sub> 2D = 4+(5.5L/1000)µm**	U <sub>95</sub> 2D = 2+(4.5L/1000)µm**	U <sub>95</sub> 2D = 15+(6.5L/1000)µm**	U <sub>95</sub> 2D = 15+(8.5L/1000)µm**
0.002mm 0.002mm 0.008mm	0.002mm 0.002mm 0.008mm	0.010mm 0.010mm 0.010mm	0.010mm 0.010mm 0.010mm	0.002mm 0.002mm 0.008mm	0.002mm 0.002mm 0.008mm	0.010mm 0.010mm 0.010mm	0.010mm 0.010mm 0.010mm
15 kgs	20 kgs	25 kgs	25 kgs	15 kgs	20 kgs	25 kgs	25 kgs
0.001mm 0.001mm 0.0005mm	0.0005mm 0.0005mm 0.0005mm	0.001mm 0.001mm 0.001mm	0.001mm 0.001mm 0.001mm	0.001mm 0.001mm 0.0005mm	0.0005mm 0.0005mm 0.0005mm	0.001mm 0.001mm 0.001mm	0.001mm 0.001mm 0.001mm
x10, x20, x50, x100 x50, x100, x200, x500, x1000 Optical/Video	x10, x20, x50, x100 x50, x100, x200, x500, x1000 Optical/Video	x10, x20, x50, x100 x50, x100, x200, x500, x1000 Optical/Video	x10, x20, x50, x100 x50, x100, x200, x500, x1000 Optical/Video	x10, x20, x50, x100 x50, x100, x200, x500, x1000 Optical	x10, x20, x50, x100 x50, x100, x200, x500, x1000 Optical	x10, x20, x50, x100 x50, x100, x200, x500, x1000 Optical	x10, x20, x50, x100 x50, x100, x200, x500, x1000 Optical
● ○ ●	● ○ ●	● ○ ●	● ○ ●	● ○ ●	● ○ ●	● ○ ●	● ○ ●
● - ○	● - ○	● - ○	● - ○	● ○ ○	● ○ ○	● ○ ○	● ○ ○
○	○	○	○	○	○	○	○
QC-300 2-D and Z Point Line Circle/Arc Distance Angle Slot ● Serial Port USB Port	QC-300 2-D and Z Point Line Circle/Arc Distance Angle Slot ● Serial Port USB Port	QC-300 2-D and Z Point Line Circle/Arc Distance Angle Slot ● Serial Port USB Port	QC-300 2-D and Z Point Line Circle/Arc Distance Angle Slot ● Serial Port USB Port	QC-5000 3-D Point Line Circle/Arc Distance Angle Slot ● Serial Port USB Port Parallel Port Ethernet	QC-5000 3-D Point Line Circle/Arc Distance Angle Slot ● Serial Port USB Port Parallel Port Ethernet	QC-5000 3-D Point Line Circle/Arc Distance Angle Slot ● Serial Port USB Port Parallel Port Ethernet	QC-5000 3-D Point Line Circle/Arc Distance Angle Slot ● Serial Port USB Port Parallel Port Ethernet
- - - ● Simple Colour - Single ● ●	- - - ● Simple Colour - Single ● ●	- - - ● Simple Colour - Single ● ●	- - - ● Simple Colour - Single ● ●	● ● ● - Colour Coded ● Multi ● ●	● ● ● - Colour Coded ● Multi ● ●	● ● ● - Colour Coded ● Multi ● ●	● ● ● - Colour Coded ● Multi ● ●
○ (Z only) -	○ ○	○ ○	○ ○	○ (Z only) -	○ ○	○ ○	○ ○
Touchscreen Colour 1 Feature 2-D ● - - ●	Touchscreen Colour 1 Feature 2-D ● - - ●	Touchscreen Colour 1 Feature 2-D ● - - ●	Touchscreen Colour 1 Feature 2-D ● - - ●	Windows Format PC Monitor All Features 3-D (rotate) - From CAD File ● ●	Windows Format PC Monitor All Features 3-D (rotate) - From CAD File ● ●	Windows Format PC Monitor All Features 3-D (rotate) - From CAD File ● ●	Windows Format PC Monitor All Features 3-D (rotate) - From CAD File ● ●

uring plane).  
ossible for the



## Hawk Systems with QC-5000 VED

150mm x 150mm 202mm - 255mm	200mm x 150mm 202mm - 255mm	300mm x 225mm 40mm - 89mm*	400mm x 300mm 40mm - 89mm*
$U_{95}2D = 4+(5.5L/1000)\mu m^{**}$	$U_{95}2D = 2+(4.5L/1000)\mu m^{**}$	$U_{95}2D = 15+(6.5L/1000)\mu m^{**}$	$U_{95}2D = 15+(8.5L/1000)\mu m^{**}$
0.002mm 0.002mm 0.008mm	0.002mm 0.002mm 0.008mm	0.010mm 0.010mm 0.010mm	0.010mm 0.010mm 0.010mm
15 kgs	20 kgs	25 kgs	25 kgs
0.001mm 0.001mm 0.0005mm	0.0005mm 0.0005mm 0.0005mm	0.001mm 0.001mm 0.001mm	0.001mm 0.001mm 0.001mm
x10, x20, x50, x100 x50, x100, x200, x500, x1000	x10, x20, x50, x100 x50, x100, x200, x500, x1000	x10, x20, x50, x100 x50, x100, x200, x500, x1000	x10, x20, x50, x100 x50, x100, x200, x500, x1000
Optical/Video	Optical/Video	Optical/Video	Optical/Video
● ○ ●	● ○ ●	● ○ ●	● ○ ●
● ○ ○	● ○ ○	● ○ ○	● ○ ○
○	○	○	○
QC-5000 3-D Point Line Circle/Arc Distance Angle Slot	QC-5000 3-D Point Line Circle/Arc Distance Angle Slot	QC-5000 3-D Point Line Circle/Arc Distance Angle Slot	QC-5000 3-D Point Line Circle/Arc Distance Angle Slot
● Serial Port USB Port Parallel Port Ethernet	● Serial Port USB Port Parallel Port Ethernet	● Serial Port USB Port Parallel Port Ethernet	● Serial Port USB Port Parallel Port Ethernet
● ● ● ●	● ● ● ●	● ● ● ●	● ● ● ●
Colour Coded	Colour Coded	Colour Coded	Colour Coded
● Multi	● Multi	● Multi	● Multi
● ●	● ●	● ●	● ●
○ (Z only) -	○ ○	○ ○	○ ○
Windows Format PC Monitor All Features 3-D (rotate)	Windows Format PC Monitor All Features 3-D (rotate)	Windows Format PC Monitor All Features 3-D (rotate)	Windows Format PC Monitor All Features 3-D (rotate)
● From CAD File	● From CAD File	● From CAD File	● From CAD File
● ●	● ●	● ●	● ●

## General Specifications

### Hawk with 150mm x 150mm stage

	Width	Depth	Height
Footprint	540mm	700mm	780mm
Weight		Packed	Unpacked
	Stage	20 Kgs	13.5 Kgs
	Head	5.5 Kgs	4 Kgs
	Stand	37 Kgs	28.5 Kgs

### Hawk with 200mm x 150mm stage

	Width	Depth	Height
Footprint	750mm	700mm	780mm
Weight		Packed	Unpacked
	Stage	45.5 Kgs	32 Kgs
	Head	5.5 Kgs	4 Kgs
	Stand	37 Kgs	28.5 Kgs

### Hawk with 300mm x 225mm stage

	Width	Depth	Height
Footprint	1100mm	980mm	700mm
Weight		Packed	Unpacked
	Stage	29 Kgs	20 Kgs
	Head	5.5 Kgs	4 Kgs
	Stand & Arm	33.5 Kgs	26.5 Kgs

### Hawk with 400mm x 300mm stage

	Width	Depth	Height
Footprint	1200mm	1020mm	700mm
Weight		Packed	Unpacked
	Stage	39.75 Kgs	27.75 Kgs
	Head	5.5 Kgs	4 Kgs
	Stand & Arm	34.75 Kgs	27.75 Kgs

### Microprocessors and PC Systems

Weight		Packed	Unpacked
	QC-200	7 Kgs	6 Kgs
	QC-300	7 Kgs	6 Kgs
	QC-5000	29 Kgs	22 Kgs
	QC-5000 VED	33 Kgs	26 Kgs

### Optical

- Twin pupil monoscopic, infinity corrected optical system utilising patented Dynascope™ technology.
- Pre-centred crossline graticule to both eyes.

### Video Camera

- 1/3" CCD (795 x 596 resolution) interline image sensor
- Composite video 1 Vp-p 75ohm unbalanced
- Selectable backlight compensation
- Low light sensitivity – 4.0 LUX at F1.2
- Power supply – DC +10.8~13.2v (12v±10%)

# Introducing Vision Engineering's Non-Contact Measurement Family...

## Kestrel

Vision Engineering's Kestrel 2-axis measuring microscope provides fast, simple and accurate measurement of precision component parts, in a configuration that is ideally suited to shop-floor use.



From simple, single-feature operation to more complex component part measurements, Kestrel combines microscope-resolution images with an intuitive microprocessor to deliver accuracy and simplicity for a wide range of measuring applications.

## Merlin

The Merlin 2-axis video measuring system combines a state-of-the-art touch-screen video microprocessor with amazing simplicity, to deliver superb accuracy and repeatability, no matter how many operators use the system.



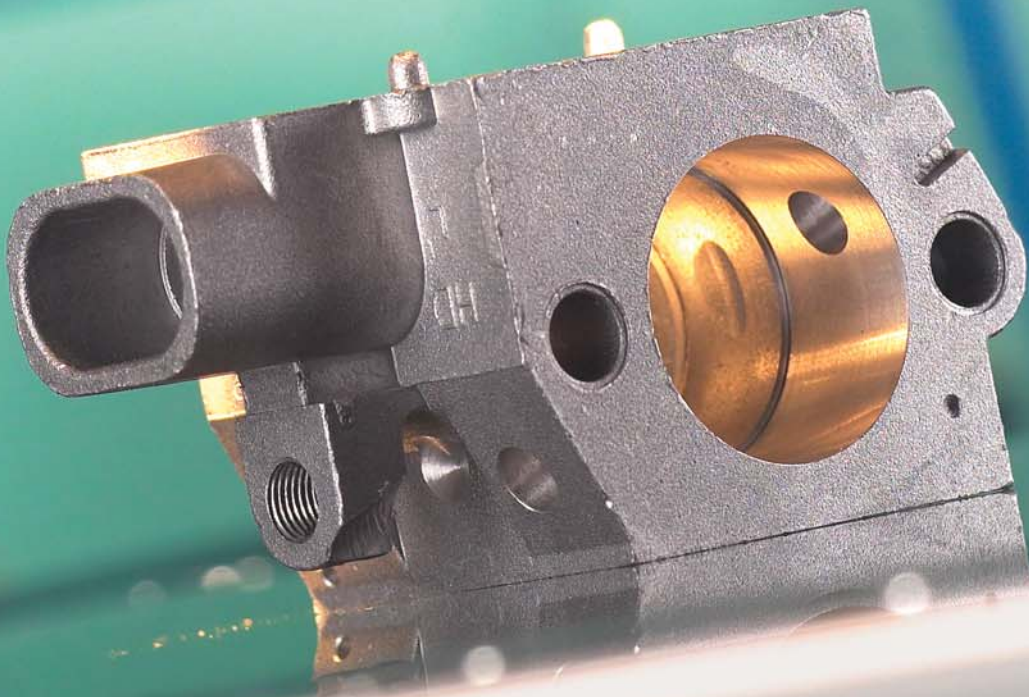
Suitable for both shop-floor quality control and manufacturing inspection applications, Merlin is ideal for measuring 2-D features of small, intricate parts and includes a range of powerful video edge detection tools for fast, repeatable measurement.

## Peregrine

The Peregrine 2-axis non-contact measuring microscope utilises Vision Engineering's patented optical technology together with an advanced touch-screen video microprocessor to provide the benefits of both optical and video measurement.



Peregrine optimises measurement routines to deliver flexibility, accuracy and simplicity for a wide range of applications, including difficult-to-view, one-off features and higher volume batch measurement routines.





Vision Engineering manufactures a comprehensive range of ergonomic stand-alone mono and stereo microscopes as well as a complete line of non-contact measuring systems.

## For more information...

Vision Engineering has a network of offices and technical distributors around the world. For more information, please contact your Vision Engineering branch, local authorised distributor, or visit our website.

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