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 colored 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 color 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 motorized and automated stage options.
Optical, Video...or Both?

Optical Measurement

All Hawk systems utilize 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 colors 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 optimize 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 digitized. Video based measurement systems suffer from loss of color 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-color 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.
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 minimize 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 utilizes Vision Engineering’s patented Dynascope™ optical image projection technology to simplify the measurement of complex manufactured component parts of all materials.

See It – Measure It …
Difficult-to-view features such as low contrast black or white plastics, materials of different colors 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.

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.

* using 200mm x 150mm measuring stage (x200 system magnification, controlled 20°C, using traceable chrome on glass grid artifact, 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.

**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.

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<th>System Variations</th>
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<tbody>
<tr>
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</tr>
<tr>
<td>x10, x20, x50, x100, x200, x500, x1000</td>
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</tbody>
</table>

**Intuitive User Interface**
A consistent, intuitive interface ensures operator accuracy and reduces training time.

**Part Programming**
Program 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.
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 utilizes Vision Engineering’s patented Dynascope™ technology together with an advanced touch-screen video microprocessor to provide optimized measurement, whatever the component, making it ideal for high accuracy quality control routines with a wide variety of component features.

Optimized Measurement Routines

From manual, single-feature operation to higher throughput video edge detection measurements, Hawk with QC-300 optimizes 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 color 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.*

- 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

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 artifact, 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 color 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**
Program 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 color 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.

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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 utilizes 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.

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.*

- 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

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 artifact, 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. Program 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 customized 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. Color-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).

Customized 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.

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Full technical specifications available on page 16...
System Summary

Power – flexibility – simplicity. Hawk systems with QC-5000 VED PC software combine patented optical technology with advanced video measurement tools, providing users with the ability to select and optimize 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.

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.*

- 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

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 artifact, 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. Program 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 customized 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. Color-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). Customized 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.

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<tr>
<td>Automation</td>
<td>Semi and Fully Automated options available</td>
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**Video Edge Detection (VED)**

Enables high speed multi-point measurement using a high resolution color 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.

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**Full technical specifications available on page 16 …**
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

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<tr>
<th>Objective Lens</th>
<th>Total Magnification</th>
<th>Working Distance</th>
<th>Field of View (mm Ø)</th>
<th>Depth of Field (µm)</th>
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<tr>
<td>x1</td>
<td>10x</td>
<td>84mm</td>
<td>14.2mm</td>
<td>270µm</td>
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<td>x2</td>
<td>20x</td>
<td>81mm</td>
<td>7.1mm</td>
<td>67µm</td>
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<td>x5</td>
<td>50x</td>
<td>61mm</td>
<td>2.8mm</td>
<td>15µm</td>
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<tr>
<td>x10</td>
<td>100x</td>
<td>32mm</td>
<td>1.4mm</td>
<td>6µm</td>
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Micro Lenses (Short Working Distance)

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<tr>
<th>Objective Lens</th>
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<th>Working Distance</th>
<th>Field of View (mm Ø)</th>
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<tr>
<td>x5</td>
<td>50x</td>
<td>20mm</td>
<td>4.4mm</td>
<td>12.22µm</td>
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<td>100x</td>
<td>10.1mm</td>
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<td>3.06µm</td>
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<td>x20</td>
<td>200x</td>
<td>1.1mm</td>
<td>1.1mm</td>
<td>1.3µm</td>
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<tr>
<td>x50</td>
<td>500x</td>
<td>0.66mm</td>
<td>0.44mm</td>
<td>0.3µm</td>
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Micro Lenses (Long Working Distance)

<table>
<thead>
<tr>
<th>Objective Lens</th>
<th>Total Magnification</th>
<th>Working Distance</th>
<th>Field of View (mm Ø)</th>
<th>Depth of Field (µm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>x10</td>
<td>100x</td>
<td>21mm</td>
<td>2.2mm</td>
<td>4.4µm</td>
</tr>
<tr>
<td>x20</td>
<td>200x</td>
<td>12mm</td>
<td>1.1mm</td>
<td>1.72µm</td>
</tr>
<tr>
<td>x50</td>
<td>500x</td>
<td>0.66mm</td>
<td>0.44mm</td>
<td>1.10µm</td>
</tr>
<tr>
<td>x100</td>
<td>1000x</td>
<td>0.2mm</td>
<td>0.044mm</td>
<td>0.43µm</td>
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</tbody>
</table>

Micro Lenses (Super Long Working Distance)

<table>
<thead>
<tr>
<th>Objective Lens</th>
<th>Total Magnification</th>
<th>Working Distance</th>
<th>Field of View (mm Ø)</th>
<th>Depth of Field (µm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>x20</td>
<td>200x</td>
<td>21mm</td>
<td>1.1mm</td>
<td>2.24µm</td>
</tr>
<tr>
<td>x50</td>
<td>500x</td>
<td>15mm</td>
<td>0.44mm</td>
<td>1.36µm</td>
</tr>
</tbody>
</table>

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.

* See page 16 for full details.
** Micro objective lenses require episcopic illumination only.

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Large Capacity Measuring Stage available in two sizes:
- 300 x 225mm
- 400 x 300mm
Surface Illumination
Bright white, multi-point ringlight provides uniform and shadow-free surface illumination of the subject.
Suitable for all routine measuring applications.

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.

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 and Surface Illumination
Combine both surface and episcopic illumination to provide complete flexibility.
Modular design provides full compatibility between surface and episcopic illumination units.

Surface Illumination
- Bright white, multi-point ringlight provides uniform and shadow-free surface illumination of the subject.
- Suitable for all routine measuring applications.

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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.

Other Options Available
- Custom designed, pre-centered graticule
- Colored filters for enhanced profile viewing

High Precision Measuring Stage
200 x 150mm

Precision Measuring Stage
150 x 150mm
### Hawk Systems with QC-200

#### Technical Specifications

**Measurement**

<table>
<thead>
<tr>
<th>Measuring Range (X, Y)</th>
<th>150mm x 150mm</th>
<th>200mm x 150mm</th>
<th>300mm x 225mm</th>
<th>400mm x 300mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring Range (Z)</td>
<td>202mm - 255mm</td>
<td>202mm - 255mm</td>
<td>40mm - 89mm*</td>
<td>40mm - 89mm*</td>
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**Measuring Uncertainty**

<table>
<thead>
<tr>
<th>Stage Repeatability (X)</th>
<th>0.002mm</th>
<th>0.002mm</th>
<th>0.010mm</th>
<th>0.010mm</th>
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<tbody>
<tr>
<td>Stage Repeatability (Y)</td>
<td>0.002mm</td>
<td>0.008mm</td>
<td>0.010mm</td>
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**Maximum Load (glass plate)**

<table>
<thead>
<tr>
<th>Maximum Load</th>
<th>15 kgs</th>
<th>20 kgs</th>
<th>25 kgs</th>
<th>25 kgs</th>
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</table>

**Encoder Resolution**

<table>
<thead>
<tr>
<th>Encoder Resolution (X)</th>
<th>0.001mm</th>
<th>0.001mm</th>
<th>0.008mm</th>
<th>0.002mm</th>
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<td>Encoder Resolution (Y)</td>
<td>0.001mm</td>
<td>0.0005mm</td>
<td>0.008mm</td>
<td>0.002mm</td>
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</tbody>
</table>

**Optics**

**Magnification Options (Macro)**

- x10, x20, x50, x100

**Magnification Options (Micro)**

- x50, x100, x200, x500, x1000

**Stage Repeatability (Z)**

<table>
<thead>
<tr>
<th>Stage Repeatability (Z)</th>
<th>0.002mm</th>
</tr>
</thead>
</table>

**Maximum Load (glass plate)**

<table>
<thead>
<tr>
<th>Maximum Load</th>
<th>15 kgs</th>
<th>20 kgs</th>
<th>25 kgs</th>
<th>25 kgs</th>
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**Encoder Resolution**

<table>
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<th>0.0005mm</th>
<th>0.001mm</th>
<th>0.001mm</th>
<th>0.001mm</th>
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</table>

**Tolerance**

| Tolerance | ● | ● | ● | ● |

**Data Export & Connectivity**

<table>
<thead>
<tr>
<th>Data Export &amp; Connectivity</th>
<th>Serial Port</th>
<th>Parallel Port</th>
<th>Serial Port</th>
<th>Parallel Port</th>
<th>Serial Port</th>
<th>Parallel Port</th>
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</table>

**Automation**

<table>
<thead>
<tr>
<th>Automation</th>
<th>Semi Automated</th>
<th>Fully Automated</th>
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<tbody>
<tr>
<td></td>
<td>○ (Z only)</td>
<td>○ ○ ○ ○ ○ ○ ○</td>
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</tbody>
</table>

**Software Capability**

<table>
<thead>
<tr>
<th>Software Capability</th>
<th>Data Input</th>
<th>Display</th>
<th>Graphic Display</th>
<th>Graphics</th>
<th>Point Filtration</th>
<th>Auto Program</th>
<th>Runs Database</th>
<th>NLEC Calibration</th>
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<tr>
<td></td>
<td>Button</td>
<td>B&amp;W LCD</td>
<td>1 Feature</td>
<td>2.0</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>●</td>
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</table>

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 liable for accuracy, completeness, and/or reliability of the contents of the information provided herein.

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

Technical Data may be subject to change without notice.

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## Technical Specifications

<table>
<thead>
<tr>
<th>Hawk Systems with QC-300 VED</th>
<th>Hawk Systems with QC-5000</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dimensions</strong></td>
<td><strong>Dimensions</strong></td>
</tr>
<tr>
<td>150mm x 150mm</td>
<td>150mm x 150mm</td>
</tr>
<tr>
<td>200mm - 255mm</td>
<td>200mm - 255mm</td>
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<tr>
<td>QC-300 VED</td>
<td>QC-5000 VED</td>
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<tr>
<td>2D and Z</td>
<td>3-D</td>
</tr>
<tr>
<td>Point</td>
<td>Point</td>
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<tr>
<td>Line</td>
<td>Line</td>
</tr>
<tr>
<td>Circle/Arc</td>
<td>Circle/Arc</td>
</tr>
<tr>
<td>Distance</td>
<td>Distance</td>
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<td>Angle</td>
<td>Angle</td>
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<tr>
<td>1 Feature</td>
<td>1 Feature</td>
</tr>
<tr>
<td>Color</td>
<td>Color</td>
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<tr>
<td>Windows Format</td>
<td>Windows Format</td>
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<tr>
<td>From CAD File</td>
<td>From CAD File</td>
</tr>
<tr>
<td><strong>Dimensions</strong></td>
<td><strong>Dimensions</strong></td>
</tr>
<tr>
<td>300mm x 225mm</td>
<td>300mm x 225mm</td>
</tr>
<tr>
<td>QC-300 VED</td>
<td>QC-5000 VED</td>
</tr>
<tr>
<td>2D and Z</td>
<td>3-D</td>
</tr>
<tr>
<td>Point</td>
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<tr>
<td><strong>Dimensions</strong></td>
<td><strong>Dimensions</strong></td>
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<tr>
<td>400mm x 300mm</td>
<td>400mm x 300mm</td>
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<tr>
<td>QC-300 VED</td>
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<td>2D and Z</td>
<td>3-D</td>
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<td>Windows Format</td>
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<tr>
<td>From CAD File</td>
<td>From CAD File</td>
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</table>

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### Technical Specifications

#### Hawk Systems with QC-5000 VED

<table>
<thead>
<tr>
<th>Stage Size</th>
<th>Width (mm)</th>
<th>Depth (mm)</th>
<th>Height (mm)</th>
<th>Footprint (mm)</th>
<th>Weight Stage (Kgs)</th>
<th>Head (Kgs)</th>
<th>Stand &amp; Arm (Kgs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>150mm x 150mm</td>
<td>340</td>
<td>300</td>
<td>410</td>
<td>540</td>
<td>20.0</td>
<td>5.5</td>
<td>37.0</td>
</tr>
<tr>
<td>200mm x 150mm</td>
<td>450</td>
<td>300</td>
<td>410</td>
<td>750</td>
<td>45.5</td>
<td>5.5</td>
<td>37.0</td>
</tr>
<tr>
<td>300mm x 225mm</td>
<td>1100</td>
<td>980</td>
<td>700</td>
<td>1100</td>
<td>29.0</td>
<td>5.5</td>
<td>33.5</td>
</tr>
<tr>
<td>400mm x 300mm</td>
<td>1200</td>
<td>1020</td>
<td>700</td>
<td>1200</td>
<td>39.75</td>
<td>5.5</td>
<td>34.75</td>
</tr>
</tbody>
</table>

#### General Specifications

**Hawk with 150mm x 150mm stage**

- **Width**: 150mm
- **Depth**: 150mm
- **Height**: 200mm
- **Footprint**: 400mm x 225mm
- **Weight**:
  - Stage: 15 Kgs
  - Head: 5.5 Kgs
  - Stand: 37 Kgs

**Hawk with 200mm x 150mm stage**

- **Width**: 200mm
- **Depth**: 150mm
- **Height**: 200mm
- **Footprint**: 400mm x 225mm
- **Weight**:
  - Stage: 20 Kgs
  - Head: 5.5 Kgs
  - Stand: 37 Kgs

**Hawk with 300mm x 225mm stage**

- **Width**: 300mm
- **Depth**: 225mm
- **Height**: 300mm
- **Footprint**: 500mm x 300mm
- **Weight**:
  - Stage: 45.5 Kgs
  - Head: 5.5 Kgs
  - Stand & Arm: 33.5 Kgs

**Hawk with 400mm x 300mm stage**

- **Width**: 400mm
- **Depth**: 300mm
- **Height**: 400mm
- **Footprint**: 500mm x 300mm
- **Weight**:
  - Stage: 70 Kgs
  - Head: 5.5 Kgs
  - Stand & Arm: 34.75 Kgs

#### Microprocessors and PC Systems

**QC-200**

- **Weight**: 7 Kgs
- **Packaged**: 6 Kgs
- **Unpackaged**: 6 Kgs

**QC-300**

- **Weight**: 7 Kgs
- **Packaged**: 6 Kgs
- **Unpackaged**: 6 Kgs

**QC-5000**

- **Weight**: 29 Kgs
- **Packaged**: 22 Kgs
- **Unpackaged**: 26 Kgs

**QC-5000 VED**

- **Weight**: 33 Kgs
- **Packaged**: 26 Kgs
- **Unpackaged**: 26 Kgs

#### Optical

- Twin pupil monoscopic, infinity corrected optical system utilizing 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 (12±10%)

---

**Hawk Systems with QC-5000 VED**

<table>
<thead>
<tr>
<th>Stage Size</th>
<th>150mm x 150mm</th>
<th>200mm x 150mm</th>
<th>300mm x 225mm</th>
<th>400mm x 300mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width (mm)</td>
<td>150</td>
<td>200</td>
<td>300</td>
<td>400</td>
</tr>
<tr>
<td>Depth (mm)</td>
<td>150</td>
<td>150</td>
<td>225</td>
<td>300</td>
</tr>
<tr>
<td>Height (mm)</td>
<td>200</td>
<td>200</td>
<td>300</td>
<td>400</td>
</tr>
</tbody>
</table>

**Footprint (mm)**

- 150mm x 150mm: 400 x 225
- 200mm x 150mm: 400 x 225
- 300mm x 225mm: 500 x 300
- 400mm x 300mm: 500 x 300

**Weight**

- Stage: 15 Kgs
- Head: 5.5 Kgs
- Stand: 37 Kgs

---

**General Specifications**

**Hawk with 150mm x 150mm stage**

- **Width**: 150mm
- **Depth**: 150mm
- **Height**: 200mm
- **Footprint**: 400mm x 225mm
- **Weight**:
  - Stage: 15 Kgs
  - Head: 5.5 Kgs
  - Stand: 37 Kgs

**Hawk with 200mm x 150mm stage**

- **Width**: 200mm
- **Depth**: 150mm
- **Height**: 200mm
- **Footprint**: 400mm x 225mm
- **Weight**:
  - Stage: 20 Kgs
  - Head: 5.5 Kgs
  - Stand: 37 Kgs

**Hawk with 300mm x 225mm stage**

- **Width**: 300mm
- **Depth**: 225mm
- **Height**: 300mm
- **Footprint**: 500mm x 300mm
- **Weight**:
  - Stage: 45.5 Kgs
  - Head: 5.5 Kgs
  - Stand & Arm: 33.5 Kgs

**Hawk with 400mm x 300mm stage**

- **Width**: 400mm
- **Depth**: 300mm
- **Height**: 400mm
- **Footprint**: 500mm x 300mm
- **Weight**:
  - Stage: 70 Kgs
  - Head: 5.5 Kgs
  - Stand & Arm: 34.75 Kgs

**Microprocessors and PC Systems**

**QC-200**

- **Weight**: 7 Kgs
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- **Unpackaged**: 6 Kgs

**QC-300**

- **Weight**: 7 Kgs
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- **Unpackaged**: 6 Kgs

**QC-5000**

- **Weight**: 29 Kgs
- **Packaged**: 22 Kgs
- **Unpackaged**: 26 Kgs

**QC-5000 VED**

- **Weight**: 33 Kgs
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- **Unpackaged**: 26 Kgs

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- 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 (12±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 utilizes 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 optimizes 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.

Visit our multi-lingual website:

www.visioneng.com