AS

VISION SYSTEMS AND
OPTICAL COMPARATORS

MV300, MV350

MVR200, MVR300

AV300, AV350

AVR200, AVR300

AV300+, AV350+, AV300+ MICRO

LF303, LF463, LF713, LF963, LF1273

HDV300, HDV400

KINEMIC - KMR, KINESCOPE

SPECIALS

SPECIFICATIONS AND OPTIONS

SOFTWARE

VISION

With the unbeatable combination of precision mechanics, powerful and intuitive software, and support from the most respected name in measurement, Starrett Metrology Systems take video-based and multi-sensor measuring systems to the next level.

Our broad range of metrology systems are ideal for use in QC labs, research, engineering, and manufacturing environments where small to large scale high-precision measurement is critical.

Many systems are available in either manual or CNC configurations.

The "Plus" and "LF" systems are multi-sensor instruments combining larger capacity with CNC and the capability to measure 2D or 3D geometry with powerful metrology software utilizing optional touch probes and laser sensors in addition to standard zoom optics.

Starrett vision systems combine high-resolution images with robust, precision mechanical metrology platforms to deliver superb accuracy and repeatable measurement results for a wide range of measurement applications. Systems are available with a choice of MetLogix™ or Quadra-Chek® software.

Starrett Metrology Systems provide quick Return-On-Investment through increased product quality, user time savings and alternative equipment reduction. Whether you are looking to solve a specific application or for a general purpose measurement tool, consider a system from Starrett!

Starrett

MANUAL VISION METROLOGY SYSTEMS

MV

MV300 AND MV350

MV metrology systems are easy-to-use, general purpose, and video-based with position control via hand wheels. Available with zoom optics, X and Y dimensions are measured by moving the stage horizontally. Z height is measured by moving an optical video probe vertically to maintain focus. A highly stable mechanical design and precision linear bearings achieve superb performance. The MV machines are ideal for QA, parts inspection, and short runs.

The operator interface is an M3-equipped PC. The part image, measuring marks, and readings are displayed on a color touch-screen. Video edge detection (VED), single and multi-point measurements of 2D geometries, and report generation are standard.

FEATURES

- Zoom optics 6.5:1
- MetLogix M3 control system software
- Video edge detection
- Easy manual X-Y-Z positioning
- Fiber Optic or LED illumination
- All in-one-PC with 21.5" (55cm) color touch-screen
- Windows® 7 Professional operating system
- Sub-stage bottom illumination and ring light surface illumination
- X-Y-Z travel for MV300: 12" x 6" x 5.5" (300 x 150 x 135 mm)
- X-Y-Z travel for MV350: 14" x 14" x 8" (350 x 350 x 200 mm)
- Manual X-Y-Z positioning via hand wheels on MV300, Motorized Z axis on MV350.
- Machine stand and control cart is standard with MV350

OPTIONS

- Workstation
- 0.5x, 1.5x, and 2.0x auxiliary lenses for zoom optics
- Coaxial LED surface illumination
- Calibration standards
- DXF/FOV option pack for automatic comparison to CAD designs
- Modular workstation for MV300

VISION SYSTEMS

MV350

MV300

WEIGHT AND DIMENSIONS

|	MV300	MV350
Net Weight	115lbs	900lbs
	53kg	409kg
Shipping Weight	345lbs	1,275lbs
	157kg	579kg

MANUAL VISION METROLOGY SYSTEMS

MVR

MVR200 AND MVR300

The MVR manual vision metrology systems are ideal for individual measurements or short runs. They are available with dedicated 6.5:1 zoom optics or a quick-change bayonet lens mount which accepts zoom optics or telecentric lenses for micron-level resolution and optical distortion down to 0.001% for accurate field-of-view (FOV) measurements. These can encompass an entire small part up to 2.00" x 1.50" or a feature of a larger part and be seamlessly integrated with stage motion to measure parts with a length up to 8" (MVR200) or 12" (MVR300). The operator interface is a 21.5" all-in-one touch screen PC which runs MetLogix M3 FOV software under Windows® 7 Professional. The screen displays a live video image of the part plus geometry tools and digital readings. The image of the part can be resized using zoom, and measurements can be taken by simply tapping a feature on the screen.

MVR hardware features include a granite base for maximum stability, recirculating ball linear guides for smooth and precise stage motion, and a motorized Z-axis with variable speed control.
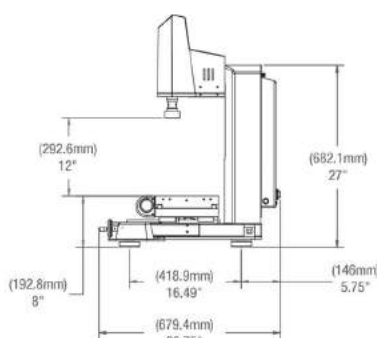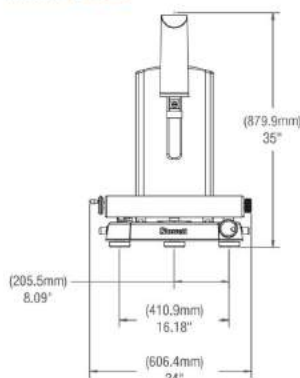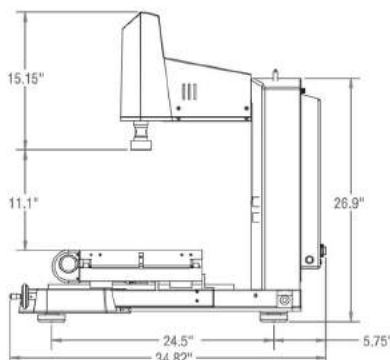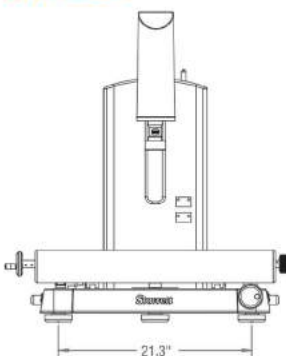
FEATURES

- X-Y travel for MVR200: 8" x 4" (200 x 100 mm)
- X-Y travel for MVR300: 12" x 8" (300 x 200 mm)
- Z travel: 8" (200 mm) with 2.0x auxiliary lens
- Manual X-Y positioning via hand wheels
- Motorized Z-axis positioning with variable speed control
- Windows® 7 Professional operating system for network connectivity
- MetLogix M3 metrology software with DXF/FOV option pack
- Video edge detection (VED)
- Field-of-view (FOV) measurements integrated with stage motion
- Renishaw scales for .00002" (0.5 µm) of X and Y resolution
- Accuracy: 2.5µm + 5L/1000 for X and Y, 2.5µm + 5L/1000 for Z
- Color digital video camera
- Collimated LED sub-stage illumination
- Ring light LED surface illumination
- Granite base

OPTIONS

- Dedicated 6.5:1 zoom optics
- Quick-change bayonet lens mount
- Quadrant LED Ring Light
- Bayonet-mountable 6.5:1 zoom optics
- Bayonet mountable 0.30x, 0.50x, 0.80x, 1.0x, 2.0x, and 4.0x telecentric optics
- 0.5x, 1.5x, and 2.0x auxiliary lenses for zoom optics
- Calibration standards
- Coaxial LED surface illumination for zoom optics
- DXF/FOV option pack for automatic comparison to CAD designs
- Modular system workstation

MVR200

MVR300

WEIGHT AND DIMENSIONS

	MVR200	MVR300
Net Weight	200lbs	250lbs
	90kg	113kg
Shipping Weight	250lbs	300lbs
	115kg	135kg

For more information please see the Options and Specifications table at the end of this section.

MVR200
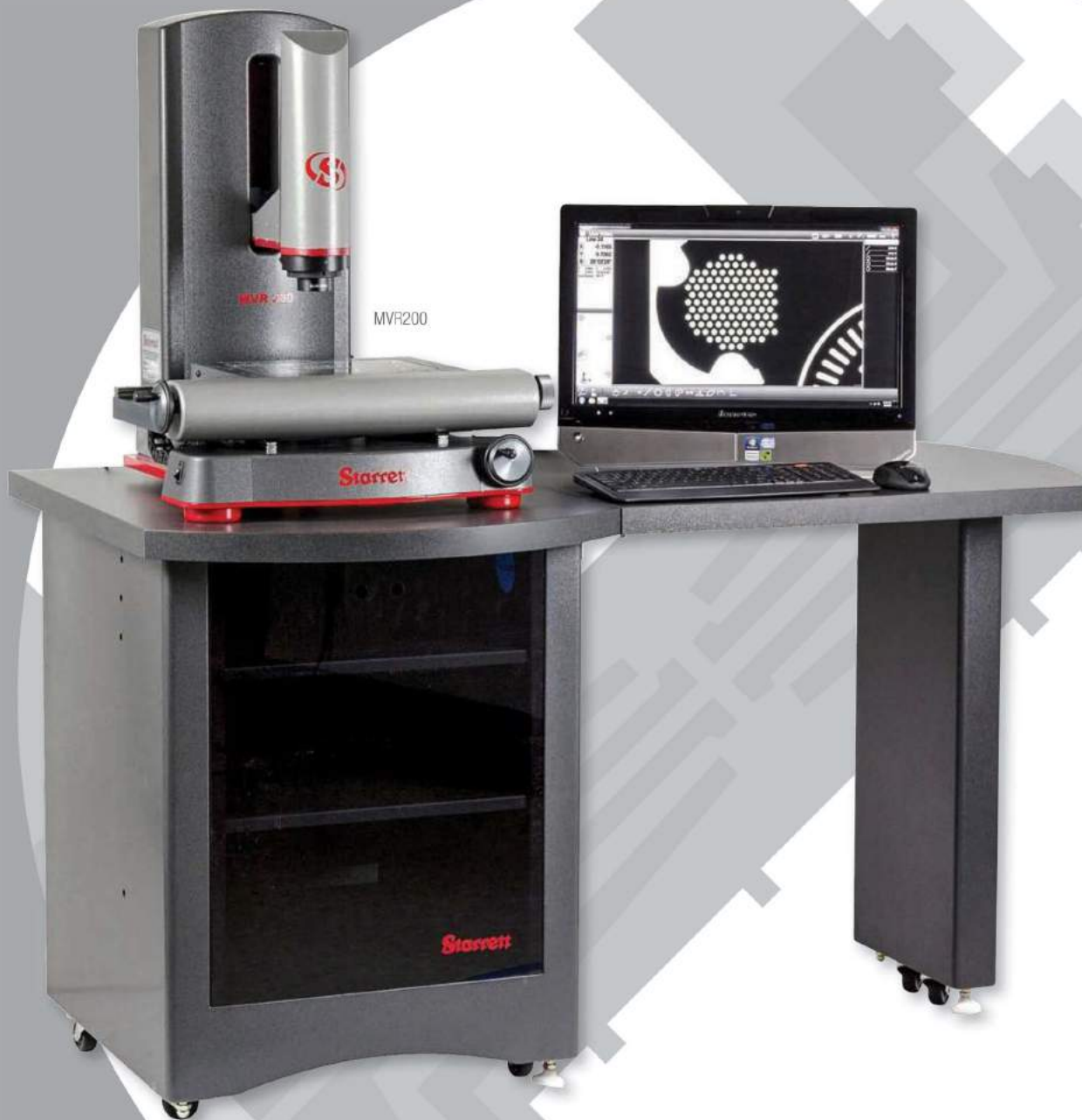
MVR MANUAL VISION SYSTEM

Automatic Vision Metrology Systems

AV
AV300 AND AV350

The AV automatic vision (or video-based) metrology systems provide accurate 3-axis measurement capability (X-Y-Z) with hi-resolution video zoom optics. The systems can be pre-programmed (CNC) for repetitive part inspection, or driven manually via a joystick and trackball for individual measurements. Superb performance is achieved by a highly stable mechanical design, with precision linear bearings. Throughput is maximized with either QC5000 or Metlogix M3 software controlling all aspects of Video Edge Detection (VED) and multiple channel Fiber Optic or LED illumination.

These automatic vision systems are ideal for quality assurance, inspection, and production runs. Flexible and powerful, the AV series allows users to cost effectively achieve maximum throughput of their inspection process. Measured data is effectively archived or networked to other devices.

Also see our AV+ multi-sensor metrology systems, which can provide vision metrology operation with travel up to 50" x 36" x 8" (1270 x 915 x 200mm).
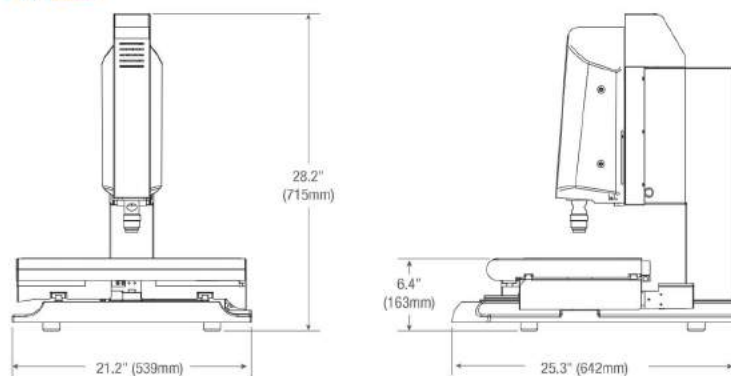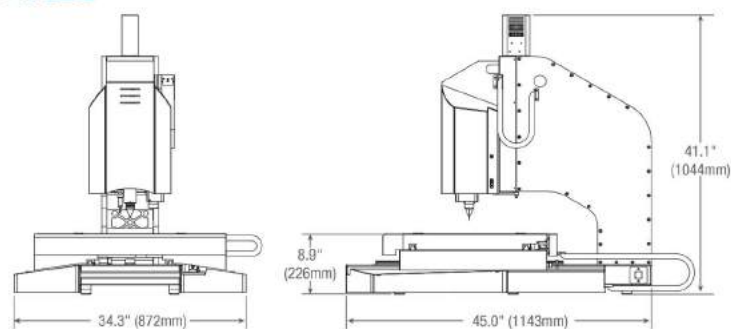
FEATURES

- CNC operation or manual operation via joystick and trackball
- AV300 12" x 6" x 5.5" (300mm x 150mm x 140mm)
- AV350 14" x 14" x 8" (350mm x 350mm x 200mm)
- AV300, E2 = 1.9 µm + 5L/1000 accuracy for X and Y, E1 = 2.5 µm + 5L/1000 for Z
- AV350, E2 = 2.5 µm + 5L/1000 accuracy for X and Y, E1 = 2.5 µm + 5L/1000 for Z
- Reading resolution 4µin (0.1µm)
- Magnification on 24" monitor, 1:1 pixel setting: 37x to 240x with 6.5:1 zoom, 25x to 240x with 12:1 zoom
- Multiple channel Fiber Optic or LED Illumination
- Cast aluminum base for AV300. Granite base on AV350
- 1.3 megapixel color camera

LENS OPTIONS

- 6.5:1 or 12:1 zoom optics
- Optional 0.5x, 1.5x and 2.0x auxiliary lenses

OPTIONS

- Ergonomic workstation (standard with AV350)
- Calibration standards
- 0.5x, 1.5x and 2.0x auxiliary lenses for zoom optics
- LED darkfield quadrant illuminator

AV300

28.2" (715mm)
6.4" (163mm)
21.2" (539mm)
25.3" (642mm)

AV350

41.1" (1044mm)
8.9" (226mm)
34.3" (872mm)
45.0" (1143mm)

WEIGHT AND DIMENSIONS

	AV300	AV350
Net Weight	115lbs	900lbs
	53kg	409kg
Shipping Weight	345lbs	1,275lbs
	157kg	579kg

AV350

AV300

AV AUTOMATIC VISION SYSTEM

AUTOMATIC VISION METROLOGY SYSTEMS

AVR

AVR200 AND AVR300

The AVR CNC automatic vision metrology systems are ideal for repetitive measurements and automatic comparison to CAD files. They are available with dedicated zoom optics or a quick-change bayonet lens mount which accepts a choice of telecentric lenses for micron-level resolution and optical distortion down to 0.001% for accurate field-of-view (FOV) measurements. These can encompass an entire small part up to 2.00" x 1.50" or a feature of a larger part and be seamlessly integrated with stage motion to measure parts with a length up to 8" (AVR200) or 12" (AVR300).

AVR hardware features a granite base for maximum stability, recirculating ball linear guides for smooth and precise stage motion, and full CNC control for high throughput. The AVR line is built around a 21" all-in-one touch screen PC which runs MetLogix M3-CNC software under Windows® 7. M3 software capabilities include 3-axis measurements and 2D geometrical constructs (points, lines, angles, rectangles).

AVR200
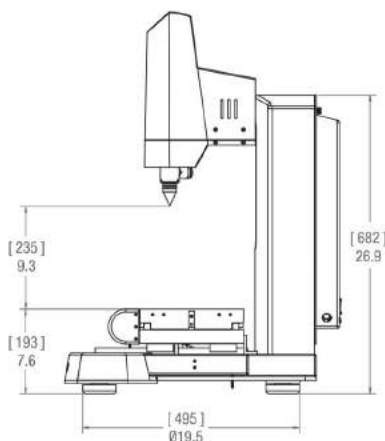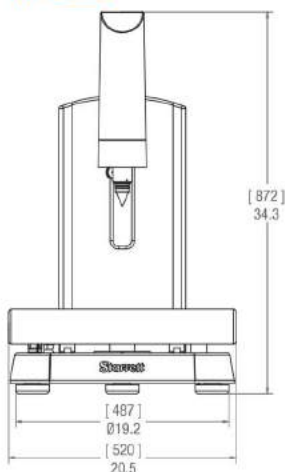
AV300
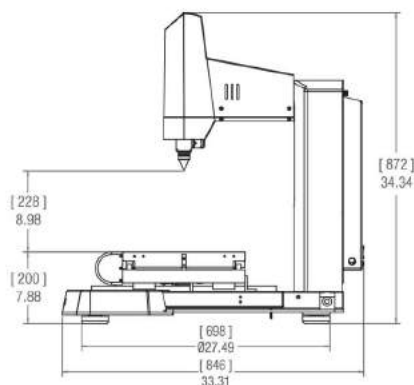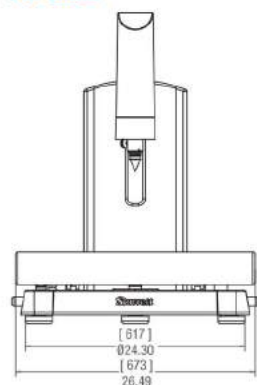
FEATURES

- X-Y travel for AVR200: 8" x 4" (200 x 100 mm)
- X-Y travel for AVR300: 12" x 8" (300 x 200 mm)
- Z travel: 8" (200 mm) with 2.0x auxiliary lens
- Full CNC X-Y-Z positioning or motorized manual positioning using a pendant with joystick and trackball
- Windows® 7 Professional operating system for network connectivity
- MetLogix M3 CNC metrology software
- Video edge detection (VED)
- Field-of-view (FOV) measurements integrated with stage motion
- Renishaw scales for .00002" (0.1µm) of X,Y and Z axis
- Accuracy: 2.5µm + 5L/1000 for X and Y, 3.5µm + 5L/1000 for Z
- Color digital video camera
- Collimated LED sub-stage illumination
- Ring Light LED surface illumination
- Granite base
- AVR200 H x W x D: 34" x 20.5" x 27" (863 x 520 x 685mm)
- AVR300 H x W x D: 34" x 29.2"x 35" (865 x 740 x 890mm)

OPTIONS

- Dedicated 6.5:1 or 12:1 CNC zoom optics
- Quick-change bayonet lens mount for telecentric optics
- Bayonet mountable 0.30x, 0.50x, 0.80x, 1.0x, 2.0x, 4.0x telecentric optics
- 0.5x, 1.5x and 2.0x auxiliary lenses for zoom optics
- Quadrant LED surface illumination for zoom optics
- DXF/FOV option pack for automatic comparison to CAD designs
- Modular system workstation
- Calibration standards

WEIGHT AND DIMENSIONS

	AVR200	AVR300
Net Weight	200lbs	250lbs
	90kg	113kg
Shipping Weight	250lbs	300lbs
	115kg	135kg

AVR300

AVR200

AVR 200

Starrett

AVR AUTOMATIC VISION SYSTEM

AUTOMATIC VISION METROLOGY SYSTEMS

AV+
MULTI-SENSOR

AV300+

An enhanced version of the popular AV300 CNC video-based measurement system. The AV300+ system improves measuring performance by utilizing a precision granite base along with an extended travel Z column, delivering 12" x 6" x 8" (300 x 150 x 200mm) X-Y-Z measuring range. The system is a servo driven motion platform for enhanced performance and includes a 12:1 zoom lens, hi-resolution digital color camera and your choice of fiber optic or LED Illumination. Complete with vibration isolation and integrated machine stand, the AV300+ delivers more capability for multi-sensor requirements. The AV300+ is powered by QC5300 software to handle a variety of measuring applications.

AV350+

Offering similar attributes and performance to the AV300+ with an expanded measurement envelope of 14" x 14" x 8" (350 x 350 x 200mm) X-Y-Z measuring range for those larger part and payload measurement requirements.

FEATURES

- 12:1 Zoom Optics with co-axial illumination
- Precision Granite base construction
- System stand and control cart standard
- Windows® 7 Professional operating system for network connectivity
- Touch probe and laser compatible
- Touch probe change rack compatible
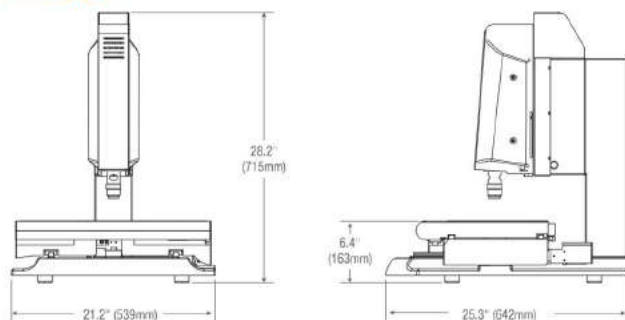
AV300+ MICRO
MICROSCOPE-BASED OPTICS

The AV300+ Micro is a CNC system that offers a granite base and column, 12" x 6" x 4" (300 x 150 x 100mm) travel, microscope optics, a lens turret which accepts up to Five Olympus M plan objectives, a choice of powerful QC5300 or PAXIT software control systems, video edge detection (VED), LED or fiber optic illumination options, standard machine pedestal and computer cart. With PAX-it imaging software, an operator can measure, image analysis software is available to detect objects by shape, size, color and other criteria. PAX-it can measure, annotate, and analyze the images, and then create a written report that includes the images. Processing options include image stitching, fusion, blending, and background subtraction. These systems are ideal for automated measurements of microscopic features, such as semiconductors, microelectronic and biomedical components.

FEATURES

- QC5000 or PAXIT software
- X travel of 12" (300mm), Y 6" (150mm), Z 4" (100mm)
- Turrett holds up to 5 Olympus lenses
- Scale resolution up to 5nm
- Adaptable to your applications

AV300+

28.2" (715mm)

6.4" (163mm)

21.2" (539mm)

25.3" (642mm)

AV350+

41.1" (1044mm)

8.9" (226mm)

34.3" (872mm)

45.0" (1143mm)
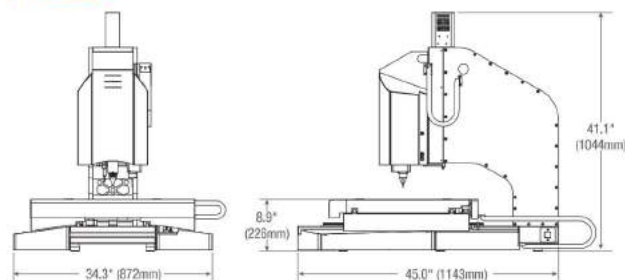
WEIGHT AND DIMENSIONS

	AV300+	AV350+	AV300+ MICRO
Net Weight	115lbs	900lbs	115lbs
	53kg	409kg	53kg
Shipping Weight	345lbs	1,275lbs	345lbs
	157kg	579kg	157kg

AV350+

AV300+ MICRO

MICRO

Starrett

AV300+

AV+ VISION SYSTEMS

LARGE FORMAT PREMIER

LF

Our LF Premier machines offer X-Y travel from 12" (305mm) to a generous 50" (1273mm). Z travel is 8" (200mm). Increased accuracy helps you verify critical dimensions. Ideal for use in QC labs, research, engineering, or manufacturing environments.

FEATURES

- Transports are driven by hi-speed (up to 30" per second), zero maintenance, balanced linear motors which are close-looped to precision hi-resolution scales in all three axes
- Adjustable ergonomic workstation including a compact control panel and standard keyboard maximizes operator performance
- Massive granite base, bridge and air-bearing ways for superior machine stability and precision
- QC5300 or MetLogix M3 Software
- 21.5" touchscreen with M3 software
- 24" monitor with QC5300

OPTIONS

- Optional Renishaw contact probe and laser scanner allows these systems to be configured to meet a variety of measurement needs (with QC5300)
- Optional touch probe spotter camera for viewing critical placement of touch probe points as well as a touch probe changing rack
- LED Surface Ring Illumination
- LED Transmitted Illumination
- LED Coaxial Illumination
- Digital Video Color Camera: 1.2 MP, 1/3" SXVGA sensor

1. **User Programmability**. Over-movement, focus, magnification, lighting, data acquisition tools, and reporting. Automating these tasks eliminates operator error and speeds throughput.

2. **Accurate Positioning** of samples obtained from high acceleration, linear motors, and high accuracy scales to determine position. Path optimization may improve throughput.

3. **Non-Linear Error Correction (NLEC)** software feature allows any errors detected in the measurement system to be corrected automatically. The entire measurement area is mapped and compensated for inherent mechanical errors.

4. **Video Edge Detection (VED)** is user programmable feature, which allows the choice of how the software sees a feature. Setting the threshold strength and the VED method provides great flexibility in the types of features that can be measured.

5. **Powerful software choices**. QC5300 provides a flexible solution that allows a user to run up to 3 sensors on the system; video, touch probe and laser. MetLogix M3 software offers powerful simplicity with a touchscreen operator interface and a wide range of software measuring functionality.

These five concepts, combined with other principles, make the LF Vision Line a teachable, automatic, and accurate measuring device.

WEIGHT AND DIMENSIONS

Model		LF313	LF463	LF713	LF963	LF1273
Dimensions (W x D x H)		34" x 40" x 68" (87 x 102 x 173cm)	40" x 40" x 68" (102 x 102 x 173cm)	50" x 64" x 68" (127 x 163 x 173cm)	69" x 80" x 71" (176 x 204 x 180cm)	85" x 93" x 71" (217 x 235 x 180cm)
Weight	gross	1950lb (885kg)	2300lb (1043kg)	3600lb (1630kg)	4600lb (2087kg)	6600lb (2994kg)
	net	1300lb (590kg)	1500lb (726kg)	2700lb (1225kg)	3500lb (1588kg)	5400lb (2450kg)

For more information please see the Options and Specifications table at the end of this section.

M3 Software display

QC5000 display

LARGE FORMAT PREMIER

HORIZONTAL DIGITAL VIDEO PROJECTOR

HDV

HDV300 AND HDV400

HDV300 CNC AND HDV400 CNC

The HDV horizontal digital video comparators combine the best features of a horizontal optical comparator and a vision metrology system. With a rigid steel design, they are configured like a traditional horizontal comparator. The workstage is the same as the Starrett field-proven HB400 and HD400 comparators, with a 110lb (50kg) load capacity. The heart of the system centers on a uniquely designed interchangeable lens mounting system coupled to a hi-resolution color digital video camera (patent pending). The system is available with a choice of seven telecentric lenses for micron-level resolution and optical distortion as low as 0.001% for accurate field-of-view (FOV) measurements. Lenses provide a maximun FOV of up to 2.44" x 1.85" (62mm x 47mm). Stage movement can be related to the imported file allowing part comparison up to 16" (400mm) long.

The HDV systems house a powerful 64-bit PC, which runs MetLogix M3 Metrology software. With this software, DXF CAD files can be imported and 2D Go/No-Go gages can be developed directly from the CAD files. Video edge detection (VED), allows real-time interaction of the imported file with the video image of the part being inspected. Productivity, speed and accuracy are all enhanced. Systems are available in manual or CNC control.
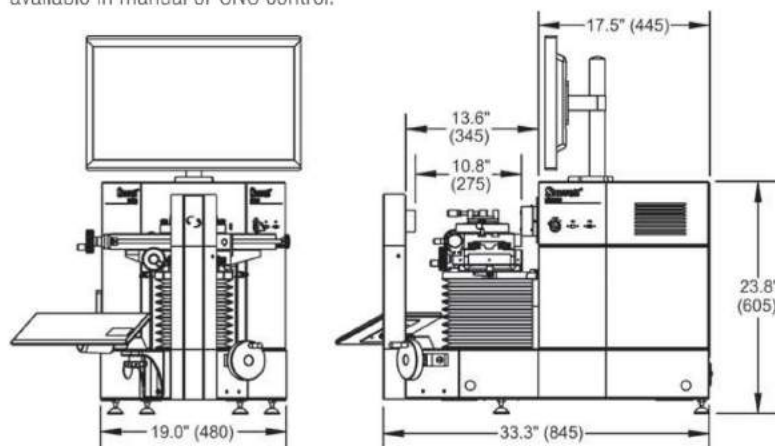
FEATURES

- Steel construction with hard anodized X Y stage
- 12" x 6" (300mm x 150mm) of stage travel for HDV300
- 16" x 6" (400mm x 150mm) of stage travel for HDV400
- 21.3" x 5.1" (540mm x 130mm) workstage
- 110lb (50kg) maximum load capacity
- 2" (51mm) of focus travel
- Helix angle adjustment with ±15° Vernier scale
- Manual X-Y and focus positioning via hand wheels or CNC with joystick and trackball positioning
- Heidenhain glass scales for 0.5µm (.00002") X and Y resolution
- LED illumination for surface and profile lighting
- 5 megapixel color camera (2448 x 2058 pixels)
- Ultra-low distortion to 0.001% for telecentric FOV measurements
- 64-bit Intel® Processor
- Windows® 7 Professional operating system
- MetLogix M3 software with DXF/FOV option pack
- Parts displayed on 24" (60cm) touch-screen color monitor (1920 x 1080 pixels)

OPTIONS

- 7 interchangeable telecentric lenses for fields of view from 2.36" x 1.77" to 0.09" x 0.07" (patent pending)
- 6.5:1 zoom optics
- 23" or 32" high cabinet stands
- Calibration standards

For more information please see the Options and Specifications table at the end of this section.

WEIGHT AND DIMENSIONS

	HDV300	HDV400
Net Weight	220lbs	230lbs
	100kg	105kg
Shipping Weight	300lbs	440lbs
	100kg	200kg

Starrett

HDV300

HORIZONTAL DIGITAL VIDEO PROJECTOR
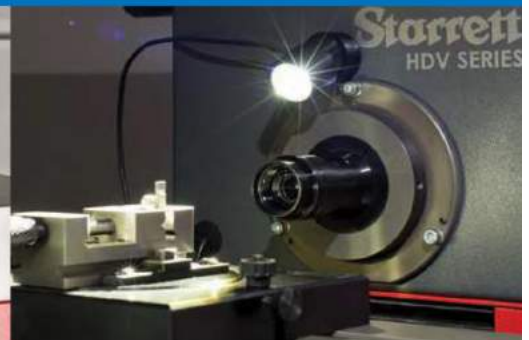
VIDEO INSPECTION SYSTEMS

KINEMIC™

KMR

KineMic video microscopes are a family of seven versatile and affordable inspection and vision metrology systems. They are ideal for receiving inspection, quality assurance, training, manufacturing assembly, research, and documentation – wherever easy setup and a range of magnifications are required. Depending on the size of the parts to be measured, measurements can be all electronic within the field of view, or be integrated with stage motion for parts up to 8" (200mm).

FEATURES

- XGA models set the standard for quick setup and ease of use by not requiring a computer

- D1 and M3 models offer the power of a 21.5" color touch-screen PC with MetLogix D1 or M3 inspection and metrology software

- LED surface and transmitted illumination

- Small footprint takes up minimal space

KMR-200 with M3

Our KMR systems line provide high performance for low cost. These machines are simple to operate without compromising performance.

Lighting options, either manually or through the software, target less eye strain and neck fatigue for the operator. With seven models to choose from, we can customize to your specific needs.

Call for an exact quote.

	KineMic XGA Zoom, Basic	KineMic XGA Zoom, 2 x 2 Stage	KineMic D1 Zoom	KineMic D1 Zoom, 2 x 2 Stage	KineMic M3 Zoom, 4 x 8 Stage	KineMic M3 Zoom, FOV	KineMic M3 Telecentric, FOV
Part Number	KMR-XGA	KMR-50-XGA	KMR-D1	KMR-50-D1	KMR-200-M3	KMR-M3	KMR-TFOV-M3
Optics	6.5:1 zoom	6.5:1 zoom	6.5:1 zoom	6.5:1 zoom	6.5:1 zoom	6.5:1 zoom	6 telecentric lenses
CCD Sensor	0.83 MPixel	0.83 MPixel	1.33 MPixel	1.33 MPixel	1.33 MPixel	1.33 MPixel	2.02 MPixel
Camera Interface	VGA cable	VGA cable	USB cable	USB cable	USB cable	USB cable	USB cable
Computer	N/A	N/A	All-in-one PC	All-in-one PC	All-in-one PC	All-in-one PC	All-in-one PC
Software	N/A	N/A	MetLogix D1	MetLogix D1	MetLogix M3	MetLogix M3	MetLogix M3
Video Screen	19" XGA monitor	19" XGA monitor	21.5" all-in-one PC	21.5" all-in-one PC	21.5" all-in-one PC	21.5" all-in-one PC	21.5" all-in-one PC
Screen Resolution	1024 x 768	1024 x 768	1920 x 1080	1920 x 1080	1920 x 1080	1920 x 1080	1920 x 1080
Lens Magnification	0.7x to 4.5x	0.7x to 4.5x	0.7x to 4.5x	0.7x to 4.5x	0.7x to 4.5x	0.7x to 4.5x	0.30x, 0.50x, 0.80x, 1.0x, 2.0x, 4.0x
Screen Magnification	31x to 200x	31x to 200x	31x to 200x	31x to 200x	31x to 200x	31x to 200x	13x to 178x
Auxiliary lenses	0.5x, 0.75x, 1.5x, 2x	0.5x, 0.75x, 1.5x, 2x	0.5x, 0.75x, 1.5x, 2x	0.5x, 0.75x, 1.5x, 2x	0.5x, 0.75x, 1.5x, 2x	0.5x, 0.75x, 1.5x, 2x	N/A
Field of view (X-axis)	1.4 to 9.0mm	1.4 to 9.0mm	1.4 to 9.0mm	1.4 to 9.0mm	1.4 to 9.0mm	1.4 to 9.0mm	1.8 to 24mm
X-Y Stage Motion	None	50 x 50 mm	None	50 x 50 mm	200 x 100 mm	None	None
Metrology Means	None	Micrometers	D1 software**	D1 software**	X and Y encoders	M3 FOV software	M3 FOV software
Measurement Resolution	N/A	1µm (.00005")	Up to 2µm*	1µm (.00005")	0.5µm (0.00002")	Up to 2µm*	Up to 2µm*
Meas. Accuracy	N/A	3µm per 25mm	Up to ±2.5µm*	3µm per 25mm	2.5µm + 5L/1000	Up to ±2.5µm*	Up to ±2.5µm*
Basic Stand	Standard	Standard	Standard	Standard	Standard	Standard	Standard
Boom Stand	Optional	N/A	Optional	N/A	N/A	Optional	N/A
LED Back Light	Standard	Standard	Standard	Standard	Standard	Standard	Standard
LED Ring Light	Standard	Standard	Standard	Standard	Standard	Standard	Standard
Lighting Control	Adjustment knobs	Adjustment knobs	Adjustment knobs	Adjustment knobs	Via M3 software	Via M3 software	Via M3 software

* These are best values. Actual values will depend on the zoom lens setting or selected telecentric lens.

**D1 software basic measurements are taken by manually positioning a crosshair on the screen.

Disclaimer: Due to continual product improvements, specifications may change without notice.

Starrett®

KMR 50-D1

KMR-XGA

KMR-D1

KMR-FOV wtih M3

	KineMic XGA Zoom, Basic	KineMic XGA Zoom, 2 x 2 Stage	KineMic D1 Zoom	KineMic D1 Zoom, 2 x 2 Stage	KineMic M3 Zoom, 4 x 8 Stage	KineMic M3 Zoom, FOV	KineMic M3 Telecentric, FOV
Model Number	KMR-XGA	KMR-50-XGA	KMR-D1	KMR-50-D1	KMR-200-M3	KMR-M3	KMR-TFOV-M3
Video Inspection	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Basic Dimensions	No	Manual LCD Micrometer	Yes - Manual	Manual LCD Micrometer	Yes	VED	VED
Geometric Constructs	No	No	No	No	Yes	Yes	Yes
Image Annotation	No	No	Yes	Yes	Yes	Yes	Yes
Image Archiving	No	No	Yes	Yes	Yes	Yes	Yes
Video Edge Detection	No	No	No	No	Yes	Yes	Yes

Check out our website for interactive features at starrett.com

441

VIDEO INSPECTION SYSTEMS

KINESCOPE

A digital video camera with precision optics and LED lighting, in a microscope that fits in the palm of your hand. The KineScope has 40-140x magnification, which lets you zoom in on the fine details of electronics, product parts, or anything else too small to see.

Place the KineScope over the object and view the image on your computer screen instead of looking into a small eyepiece. Capture images or video and easily add labels, make measurements, and draw on the live image. The KineScope connects to your computer's USB port and includes VLink imaging software.

FEATURES

- View live and captured images on a computer screen (or use a computer projector for large groups)
- 40-140x magnification
- Completely portable with your laptop computer
- Save still images, movies and time lapse
- Apply labels, markers, time stamps and measurement
- Draw directly on the live image
- Includes VLink imaging software

SPECIFICATIONS

- Image Sensor: 1/4" CMOS
- Pixel Resolution: 640 x 480
- Power Req. USB Port, 2.0 or greater
- Minimum Operating System Requirements: Windows® 2000, XP or Vista with DirectX 8.1 and Pentium III 500MHz (also compatible with Windows® 7 and 8 in either 32 or 64 bit. MAC versions are also available)
- Illumination: Super-Bright LED

System Type	Hand Held
Illumination - Standard	LED and IR
Magnification Range	40x and 140x
Field of View at Low Magnification	7.5mm x 10mm
Field of View at High Magnification	1.8mm x 2.5mm
Video Camera	2 MP Digital
Control System/Software	VLink
Display PC and Monitor	Required (not included)
Image Capture	Standard
Resolution	4 microns (at High Magnification)
Base Stand	Optional
Boom Stand	Optional
Power Requirement	USB
Calibration Standards	Optional

442 | **Starrett®**

ACCESSORIES

Starrett offers a wide variety of accessories to customize our products for your applications. Contact us for details.

FIBER OPTIC LIGHTING

ROTARY HEAD WITH CHOICE OF COLLET KIT
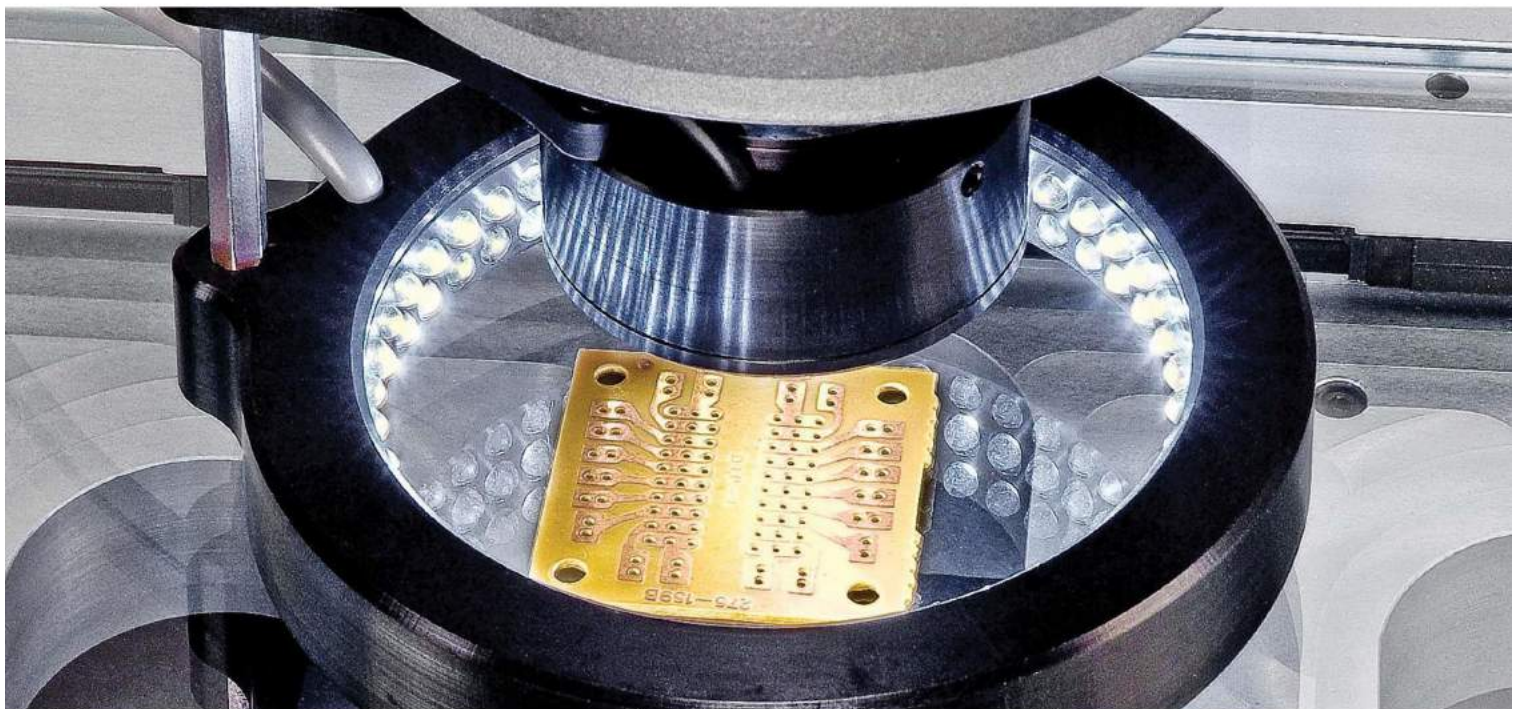

CALIBRATION STANDARDS

RENISHAW TOUCH PROBE KIT

WORKSTATION PEDESTAL - EXTENSION CAN BE MOUNTED LEFT OR RIGHT

WORKSTATION MONITOR MOUNT AND KEYBOARD SWING ARM

Check out our website for interactive features at starrett.com

443

MOTION STAGES

TM X-Y STAGES

TM X-Y stages are designed for use in a variety of applications such as measurement, microscopy, inspection, and automation. TM stages adapt to existing microscopes from Nikon and Mitutoyo and are available in manual and motorized configurations. Custom sizes and configurations are also available.

SPECIFICATIONS

- Measurement Area (X-Y):
  TM200: 4" x 8" (200mm x 100mm)
  TM50: 2" x 2" (50mm x 50mm)

- Accuracy: E1=3.5+5L/1000
  (with computer enhancement)

- Resolution:
  TM200: 20µin (0.5µm)
  TM50: 100µin

- X-Y Squareness: Within 100µin/1"
  (2.5µm/25mm)

- Top Tooling Plate Overall Size:
  TM200: 14" x 8" (350mm x 200mm)
  TM50: 6" x 6" (150mm x 150mm)

- Repeatability: within 2.5mm

FEATURES

- Manual Drives are hand wheels with leadscrews on the TM200 or 2" (50mm) micrometer heads on the TM50

- Precision machined from heat treated, billet aluminum, with dark gray anodized finish

- Open frame (with removable stage glass) standard

- Precision cross-roller bearings

- Top plate has 4mm threaded holes for custom tooling

TM200 4" x 8" stage

TM50 2" x 2" stage with digital micrometers

TM50 2" x 2" stage
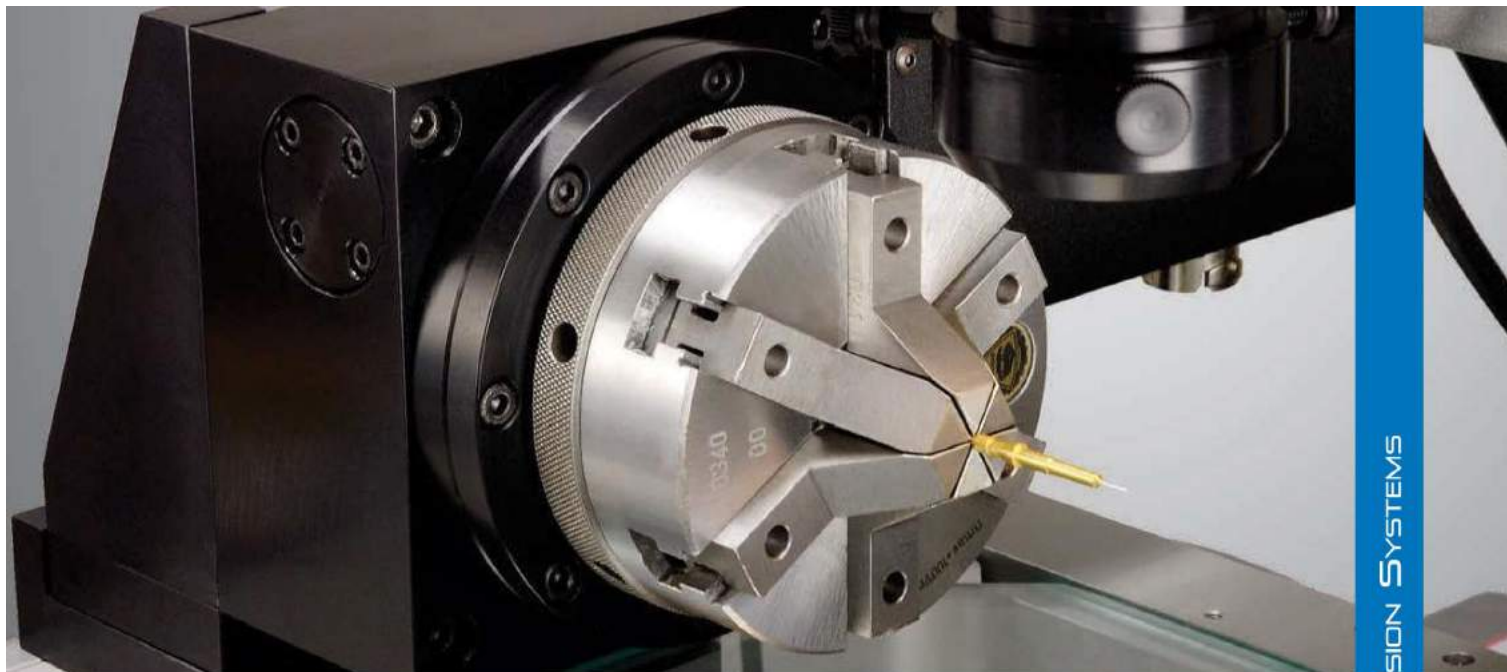
Starrett®

ROTARY STAGES

The 100mm and 150mm Rotary Stages from Starrett come complete with stepper motor, bidirectional limits, tooling plate, enclosure and connectors. Each stage is certified to meet or exceed application standards.

FEATURES

- Weight: 100mm, 4lbs; 150mm, 13.5lbs

- Pre-loaded Worm and Gear Assembly

- Maximum Output Speed: 30 rpm

- Main Spindle Run-out, TIR: .0002"

- Tooling Plate Run-out, (flatness) TIR: .0004"

- Positioning Accuracy: 0.09° peak to peak, 0.05° goal

- Limit Switches: 2 normally closed switches provide ±160° of rotation (170° of rotation on 150mm Rotary Stage)

- Motion control: Compatible with common controllers

METROLOGY FRAMES AND COMPONENTS

Looking for a custom solution? Starrett offers a selection of standard and custom solutions from Z-axis columns and granite bases that work in conjunction with our TM stages as well as complete X-Y-Z metrology and precision positioning platforms. Please consult us for more information.

CP7K custom solution with X-Y-Z platform

Check out our website for interactive features at starrett.com

445

Specifications and Options

Model	MV300	MV350	MVR200	MVR300	AV300	AV350	AVR200
Bench-Top System	X	X	X	X	X	–	X
Floor-Standing System	–	–	–	–	–	X	–
Part View Orientation	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical
X-Y-Z Travel (in)	12" x 6" x 5.5"	14" x 14" x 8"	8" x 4" x 8"	12" x 8" x 8"	12" x 6" x 5.5"	14" x 14" x 8"	8" x 4" x 8"
X-Y-Z Travel (mm)	300 x 150 x 135mm	350 x 350 x 200mm	200 x 100 x 200mm	300 x 200 x 200mm	300 x 150 x 135mm	350 x 350 x 200mm	200 x 100 x 200mm
Z Axis Measuring	Optional	Optional	Optional	Optional	Standard	Standard	Standard
CNC	–	–	–	–	Standard	Standard	Standard
X-Y Accuracy (µm)	E2 = 2.5µm + 5L/1000	E2 = 2.5µm + 5L/1000	E2 = 2.5µm + 5L/1000	E2 = 2.5µm + 5L/1000	E2 = 1.9µm + 5L/1000	E2 = 2.5µm + 5L/1000	E2 = 1.9µm + 5L/1000
Z Accuracy (µm)	E1 = 2.5µm + 5L/1000	E1 = 2.5µm + 5L/1000	E1 = 2.5µm + 5L/1000	E1 = 2.5µm + 5L/1000	E1 = 2.5µm + 5L/1000	E1 = 2.5µm + 5L/1000	E1 = 2.5µm + 5L/1000
Scale Resolution	0.5µm	0.5µm	0.5µm	0.5µm	0.1µm	0.1µm	0.1µm
Multi-Sensor Compatible	–	–	–	–	–	–	–
Base	Cast Aluminum	Granite	Granite	Granite	Cast Aluminum	Granite	Granite
Control System/Software	M3	M3	M3	M3	M3 or QC5300	M3	M3
Display	21" Touchscreen PC	21" Touchscreen PC	21" Touchscreen PC	21" Touchscreen PC	21" Touchscreen PC or 24"Monitor	21" Touchscreen PC	21" Touchscreen PC
Zoom Optics - Standard	6.5:1	6.5:1	6.5:1	6.5:1	6.5:1	12:1	6.5:1 – 2 LED 12:1 – 3 LED
Zoom Optics - Optional	–	–	–	–	–	–	–
Optics	–	–	–	–	–	–	–
Microscope Optics	–	–	–	–	–	–	–
Digital Video Camera	1.3 MP Color	1.3 MP Color	1.3 or 2.0 MP Color with Telecentric	1.3 or 2.0 MP Color with Telecentric	1.3 MP Color	1.3 MP Color	1.3 MP Color Standard; 2 MP wtih Telecentric
Surface Ring Illumination	LED or FO	LED or FO	LED	LED	LED or FO	LED or FO	LED
Transmitted Illumination	LED or FO	LED or FO	LED	LED	LED or FO	LED or FO	LED
Coaxial Illumination - Optional	LED or FO	LED or FO	LED	LED	LED or FO	LED or FO	LED

Starrett

AVR300	AV300+	AV350+	AV300+ MICRO	LF Premier	HDV300	HDV400
X	–	–	–	–	X	X
–	X	X	X	–	–	–
Vertical	Vertical	Vertical	Vertical	–	Horizontal	Horizontal
12" x 8" x 8"	12" x 6" x 8"	14" x 14" x 8"	12" x 6" x 4"	12" x 12" x 8" 18" x 12" x 8" 28" x 24" x 8" 38" x 30" x 8" 50" x 36" x 8"	12" x 6"	16" x 6"
300 x 200 x 200mm	300 x 150 x 200mm	350 x 350 x 200mm	300 x 150 x 100mm	305 x 305 x 200mm 460 x 305 x 200mm 711 x 610 x 200mm 965 x 760 x 200mm 1270 x 915 x 200mm	300 x 150mm	400 x 150mm
Standard	Standard	Standard	Standard	–	–	–
Standard	Standard	Standard	Standard	–	–	–
E2 = 1.9µm + 5L/1000	E2 = 1.9µm + 5L/1000	E2 = 2.5µm + 5L/1000	E2 = 1.5µm + 5L/1000	E2 = 1.5 + 5L/1000	E1 = 3.0µm + L33	E1 = 3.0µm + L/33
E1 = 2.5µm + 5L/1000	E1 = 2.5µm + 5L/1000	E1 = 2.5µm + 5L/1000	E1 = 2.0µm + 5L/1000	E1 = 1.9 + 5L/1000 (Z)	–	–
0.1µm	0.1µm	0.1µm	5nm	0.1µm	0.5µm	0.5µm
–	Yes	Yes	–	–	–	–
Granite	Granite	Granite	Granite	–	Steel	Steel
M3	QC5300	QC5300	QC5300 or PAX–it	QC5300 or M3	M3	M3
21" Touchscreen PC	24" Monitor	24" Monitor	24" Monitor	24" Monitor or 21.5" Touchscreen	24" Touchscreen Monitor	24" Touchscreen Monitor
6.5:1 – 2 LED 12:1 – 3 LED	12:1	12:1	–	12:1	–	–
–	–	–	–	–	6.5:1	6.5:1
–	–	–	–	–	Choice of 4.0x, 2.0x, 1.0x, 0.80x, 0.50x and 0.30x interchangeable Telecentric Lenses Optional- 0.14X fixed	Choice of 4.0x, 2.0x, 1.0x, 0.80x, 0.50x and 0.30x interchangeable Telecentric Lenses Optional- 0.14X Fixed
–	–	–	Standard	Optional	–	–
1.3 MP Color Standard; 2 MP with Telecentric	1.3 MP Color	1.3 MP Color	1.3 MP Color	1.3 MP Color	5 MP Color	5 MP Color
LED or FO	LED or FO	LED or FO	–	–	LED	LED
LED or FO	LED or FO	LED or FO	LED or FO	–	LED	LED
LED or FO	LED or FO	LED or FO	LED or FO	–	–	–

Specifications and Options

(CONTINUED)

Model	MV300	MV350	MVR200	MVR300	AV300	AV350	AVR200
Microscope Objectives (required on MICRO)	–	–	–	–	–	–	–
Auxiliary Lenses - Optional	0.5x, 1.5x, 2.0x	0.5x, 1.5x, 2.0x	0.5x, 1.5x, 2.0x	0.5x, 1.5x, 2.0x	0.5x, 1.5x, 2.0x	0.5x, 1.5x, 2.0x	0.5x, 1.5x, 2.0x
Rotary Fixture	–	–	–	–	Optional	Optional	Optional
Renishaw Touch Probe	–	–	–	–	–	–	–
Renishaw Touch Probe Change Rack	–	–	–	–	–	–	–
Multi-Part Touch Probe Change Rack	–	–	–	–	–	–	---
Touch Probe Spotter Camera	–	–	–	–	–	–	–
Optimet Laser	–	–	–	–	–	–	–
Machine Pedestal and Point of Control Cart/Arm	–	Standard	–	–	–	Standard	–
Cabinet Stand	–	–	–	–	–	–	–
Workstation Base, Extension and Swing Arm	Optional	–	Optional	Optional	Optional	–	Optional
Part Fixturing	Optional	Optional	Optional	Optional	Optional	Optional	Optional
Dark Field Quadrant Illumination (LED only)	–	–	–	–	Optional	Optional	Optional
Video Pixel Calibration Standard	Optional	Optional	Optional	Optional	Optional	Optional	Optional
Calibration Standards	Optional	Optional	Optional	Optional	Optional	Optional	Optional
FOV, Linear and 2D Calibration Standards	Optional	Optional	Optional	Optional	Optional	Optional	Optional

AVR300	AV300+	AV350+	AV300+ MICRO	LF Premier	HDV300	HDV400
–	–	–	5x, 10x, 20x, 50x, 100x	–	–	–
0.5x, 1.5x, 2.0x	0.5x, 1.5x, 2.0x	0.5x, 1.5x, 2.0x	–	0.5x, 1.5X, 2.0x	–	–
Optional	Optional	Optional	Optional	Optional	–	–
–	Optional	Optional	–	Optional	–	–
–	Optional	Optional	–	–	–	–
–	–	–	–	Optional	–	–
–	–	–	–	Optional	–	–
–	Optional	Optional	–	Optional	–	–
–	Standard	Standard	Standard	–	–	–
–	–	–	–	–	Optional	Optional
Optional	–	–	–	–	–	–
Optional	Optional	Optional	Optional	Optional	Optinoal	Optional
Optional	Optional	Optional	Optional	Optional	–	–
Optional	Standard	Standard	Standard	Standard	Optional	Optional
Optional	Optional	Optional	Optional	Optional	Optional	Optional
Optional	Optional	Optional	Optional	Optional	Optional	Optional

VISION SYSTEMS

QUADRA-CHEK® SOFTWARE

Modern metrology is a complex sequence of measuring, recording, analyzing and reporting dimensional data. The conceptual model underlying the Quadra-Chek digital readout design organizes the workflow to support operators at every stage of the measurement process

QC100

- Perform 2 and 3 axis measurements at very high levels of precision and accuracy
- Measurements viewed on the front panel LCD can be transmitted to a PC over a standard serial port connection, or to a printer over a parallel or serial port

QC200

Metrology DRO requires a video monitor display and crosshair generator in vision configuration. QC200 is a time-saving measurement tool with patented Measure Magic® technology. Ideal for measuring 2D features on Optical Comparators and Manual Vision Machines.

- Inch/metric conversion, toggle between incremental/ absolute and simple zero reset
- Skew function for ease of part alignment
- Integrated geometric tolerancing allowing for pass/ fail measurements
- Simple part programming with measure guide
- USB and RS232 Interface
- Linear and segmented linear error correction
- Intuitive displays
- Crisp, clear, bright black and white LCD display
- Optional optical edge for comparators

QC100

450

Starrett®

QC5200

Metrology software is a Windows® 7 Professional 32-bit based PC inspection system for video measuring machines.

The QC5200 supports a wide range of industries that require precise measurement and inspection of 2D parts using a single sensor. This product features an intuitive user interface and simple, meaningful visual displays. The design reflects a deep understanding of the user's needs along with a process model that supports the operator at every stage in the measurement process.

- Powerful yet intuitive video edge detection tools
- Auto-Focus
- "XY" 2D measurements with optional "Z" axis for height measurements
- Image capture with drag and drop data reporting
- Image processing tools
- Continuous edge mode
- Patented Measure Magic
- Alternative algorithms
- Auto program from CAD files
- Pattern recognition
- Integrated runs database
- Geometric tolerancing
- Advanced calculation
- Data cloud analysis
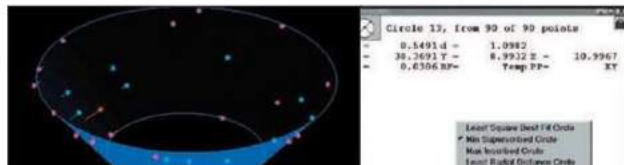
Data Cloud Alternate fits

QC5300

Metrology software picks up where the QC5200 leaves off. This product offers multi-axis dimensional measurement of 2D and 3D parts. The QC5300 integrates an innovative user interface, state of the art ergonomics, powerful data import, export and data analysis tools.
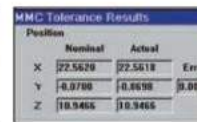
- 3D measurement set
- 3D offset alignments
- Customizable screen layouts
- Multiple reference frames
- 3D part view
- Renishaw touch probe interface
- Optional laser sensor
- Vector probing
- Multiple language support
- 3D Measure Magic
- Advanced calculations
- 3D data clouds
- Alternate algorithms
- Drag and drop report generator
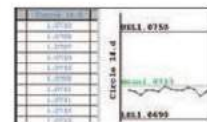- Data export to a wide variety of applications

Measure Magic

Image View

Tolerance

Integrated Database

Color Key	QC-5200								QC-5300	
Configurations	5200	5205	5210	5215	5230	5235	5240	5245	5300	5310
2D Measurement										
3D Measurement										
X-axis										
Y-axis										
Z-axis										
Q-axis (Electronic Protractor)										
Optical edge detection (optional)										
Options										
Motion control system										
Video edge detection (color or b/w)										
Programmable light control										
Auto-focus (Z-axis only)										
Programmable zoom										
Non-linear error correction										

2D Measurement
3D Measurement

Check out our website for interactive features at starrett.com

MetLogix™ Software

M1 and M2

FOR OPTICAL COMPARATORS

Graphics rich display, large icon buttons, and intuitive operation. Coordinate display for X and Y linear axes and Q radius values for screen rotation. Easy part alignment and datum function.

FEATURES

- Clean and simple touchscreen interface with large icon buttons and intuitive operation

- Graphics-rich display providing instant information on feature form, tolerances, and measurement data

- Coordinate display for X and Y linear axes and Q radius values for screen rotation

- Easy part alignment and datum functions

- Measure and tolerance these geometric features: point, line, angle, distance, radius, diameter

- As you measure, a part view is created in the feature view. Constructions between features such as distances and bolt hole pattern can been done by simple selections from the part view.

- For repetitive part measurement, create a part program that will visually guide operators through part measurement

- Available optical edge detection provides better throughput and removes operator subjectivity

- Four different report forms can be printed or exported to Microsoft Excel, text files, or to an SPC program

- Mounts and displays in either vertical or horizontal postition

- M2 utilizes a Windows® 7 Professional-based operating system enables flexible data export and interface capability with Windows

- Fast, easy connection to printers and networks

- M1 utilizes an Android operating system and a Bluetooth connection to the host Optical Comparator

M3

FOR VISION SYSTEMS

Multi-touch software control that can pan and zoom with pinch, swipe, or touch. Works with active part views and live video feeds (or use the conventional mouse interface). Custom "Eye Measure" probe captures complex edges generated by a finger path drawn on the touch screen. Measure Logic probe intelligence provides instant feature determination and measurement with a single touch.

FEATURES

- DXF CAD file import for comparing parts being inspected to the actual design file; no need for cumbersome Mylar overlays

- "Vtouch" Probe has video touch probe functionality – just click for simple acquisition of points on a feature's edge

- Part View can generate distance and tangent lines from within the graphical part view. The "Gesture Menu" can be used for feature creation and manipulation tools.

- "Quick Annotate" allows data on several features to be displayed simultaneously with smart marquee feature selection

- Application of universal tolerance value entry according to feature resolution groupings

- Feature Detail Graphics: Individual feature views display point cloud distributions, nominal deviations, and tolerance results. Scroll through Actual, Nominal, Tolerance, Deviation and Data Fit Type information.

- Simple machine/camera calibration with popular machine and video correction methods

- Windows® 7 Professional-based, globally recognized OS for flexible data exporting and interface with Windows applications

M1, M2 and M3

MetLogix control software provides a broad range of powerful, user-friendly functions on a compact, icon-based touchscreen interface in place of the traditional control.

M1 shown on HE400

	MetLogix M1	MetLogix M2	MetLogix M3
Mounted to comparator arm	x	x	
Color graphics	x	x	x
Touch-screen operation	x	x	x
MS Windows® operating system		x	x
X-Y-Q (angle) measurements	x	x	x
2D geometry software with skew	x	x	x
Optical edge detection option	x	x	x
Video edge detection option			x
CAD file import and export option		x	x
CNC drive option		x	x

Starrett®

M3

M1, M2 AND M3 SOFTWARE

D1 DIMENSIONING SOFTWARE

FEATURES

- View and manipulate live and static images from a variety of inspection devices on any Windows® 7 or Windows® 8 PC. Mouse/Keyboard and touchscreen systems are supported.

- A simplified operating interface requires only a few quick clicks to capture, mark up, export, print and email images directly from your inspection equipment

- Zoom and Pan the camera feed until the desired image is displayed. Add custom text, and graphic elements to generate detailed image capture for defect reporting and to improve overall visual communication of parts and component characteristics.

- Perform basic calculations of feature size, position, and orientation using a simple crosshair tool. Translate or rotate the crosshair tool within the image window to probe circle, line, point, and angle features within the field of view.

- Add feature annotation directly to selected features to display size, position and orientation results on either the video frame or within a blank part view space

- Access previously stored images easily in the thumbnail image list. Convenient date and time stamps are added to help sort and review collections of images.
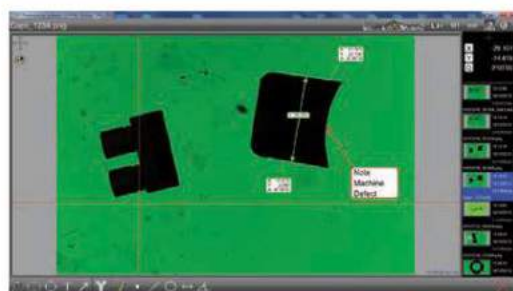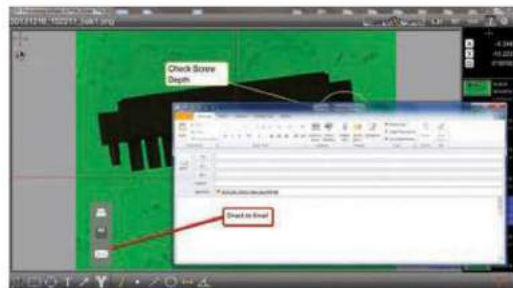
D1 Software display

KineMic - KMR with D1 software

454 **Starrett®**

HE400

HB400, HD400

VB400, VF600

HF600, HF750

HS600, HS750

OPTIONS AND ACCESSORIES

OPTICAL COMPARATORS

Optical comparators provide a time tested cost effective, solution for non-contact measurement. They are found in lab and shop environments, often near product manufacturing activity. Optical comparators are used for an exceptionally wide range of dimensional inspection applications. In recent years, Starrett's enhanced mechanical designs have combined with an advancement in microprocessor capability to make our current products even more accurate, repeatable, efficient and easy to use.

At the heart of these systems are precision optics, superb lighting and a highly accurate workstage. They combine to ensure bright, sharp images and exceptional accuracy.

Generally, horizontal models work well with parts that need to be fixtured, held in a vise, or on centers. Vertical models provide comparable accuracy and are ideal for parts that are placed on the glass insert of the workstage.

Vertical systems work well when the parts to be measured are flexible or soft (i.e., plastic, thin stampings or electrical components).

The versatile Starrett line includes optical systems from 16", 30" (400-750mm) screen diameters, horizontal and vertical models and a wide range of special machines.

We offer many choices of optical magnification, manual, motor-driven or CNC workstage travel, with PC or LCD metrology readouts.

OPTICAL COMPARATORS

HE400

The most economical of our benchtop horizontal comparators, this machine offers a 16" (400mm) screen, 10 x 4" (250 x 100mm), bayonet fitting lenses and Q-axis angular readout; all to improve capacity and performance. These latest horizontal projectors are fitted with either Quadra-Chek® digital readout systems or MetLogix™ M1 or M2 software as standard, making them simple to use, but having the power to satisfy the most complex measuring requirements.

The HE400 comes with a bayonet socket that can accommodate six interchangeable projection lenses to convert system operation from profile projector to video metrology system.
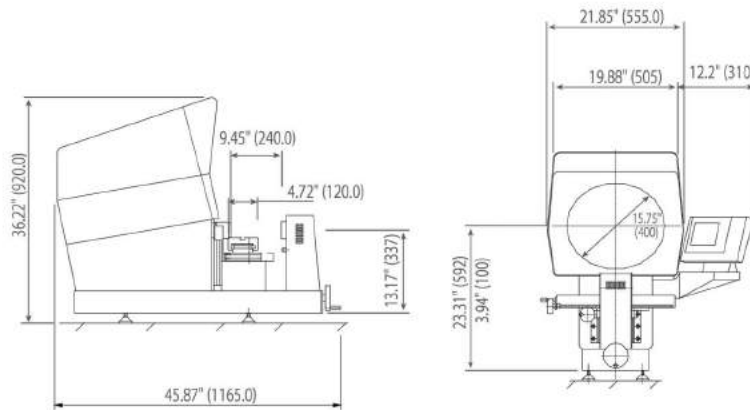
FEATURES AND SPECIFICATIONS

- All metal construction
- Digital protractor for accurate angle measurements: 1' resolution
- Lamphouse-mounted helix adjustment for accurate thread form inspection
- Available with MetLogix M1 tablet, M2 PC-based touch screen software or Quadra-Chek readout system
- 10" (250mm) horizontal travel
- 4" (100mm) vertical travel
- Fine adjustment on all axes, plus zero backlash, fast traverse mechanism on the X-axis
- Measurement by means of a linear encoder (glass scale) on both X and Y axes
- Fully retractable duplex fiber optic surface illumination
- Optional automatic edge detection

WEIGHT AND DIMENSIONS

	HE400
Net Weight	230lbs
	105kg
Gross Weight	300lbs
	135kg

HE400

HE HORIZONTAL BENCHTOP

Check out our website for interactive features at **starrett**.com

457

HB400

The HB400 horizontal optical comparator provides exceptional performance with a fully-usable 16" (400mm) diameter viewing screen, a 21" x 5" (530 x 125mm) workstage, 12" x 6" (300 x 150mm) of stage travel, and high 110lb workload capacity. Linear glass scales provide .00002" (0.5μm) of resolution. A bayonet lens socket accepts a choice of seven lenses or an OV2 Video Adapter for video edge detection (VED). Optional optical edge detection removes operator subjectivity in locating edges.
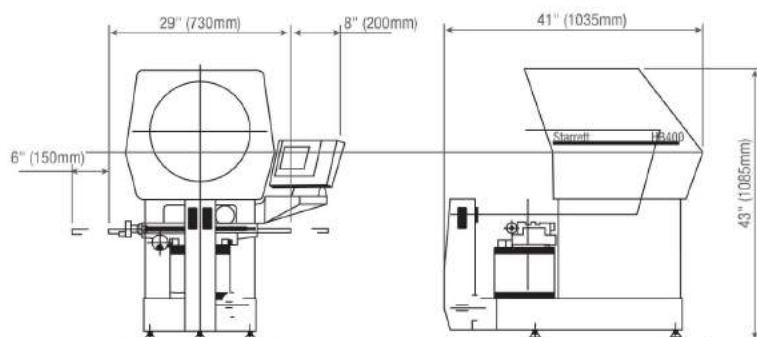
FEATURES AND SPECIFICATIONS

- Digital protractor for accurate angular measurements (1' resolution) via Q-axis on readout

- Hard anodized aluminum top plate with cast iron intermediate and base plates

- 12" (300mm) horizontal travel by manual fine adjustment with quick release mechanism and 15° workstage helix adjustment

- 6" (150mm) vertical travel

- 24V, 150W profile illumination

- 24V, 250W fiber optic surface illumination

- Single lens mount with quick action lens change (lens not included); interchangeable and fixed 5x versions are available, call for quote

- Collimating condenser with yellow/green filter and provision to mount further accessories

- Measurement by means of a linear encoder (glass scale) on both X and Y axes

- Available with MetLogix™ M1 tablet, M2 PC-based touch screen software or Quadra-Chek® readout system

- Fixed retractable fiber optic surface illumination

- Extended workstage option

Dimensions: 29" (730mm) · 8" (200mm) · 41" (1035mm) · 6" (150mm) · 43" (1085mm)

WEIGHT AND DIMENSIONS

	HB400
Net Weight	320lbs
	145kg
Gross Weight	385lbs
	175kg

For more information please see the **Options and Specifications** table at the end of this section.
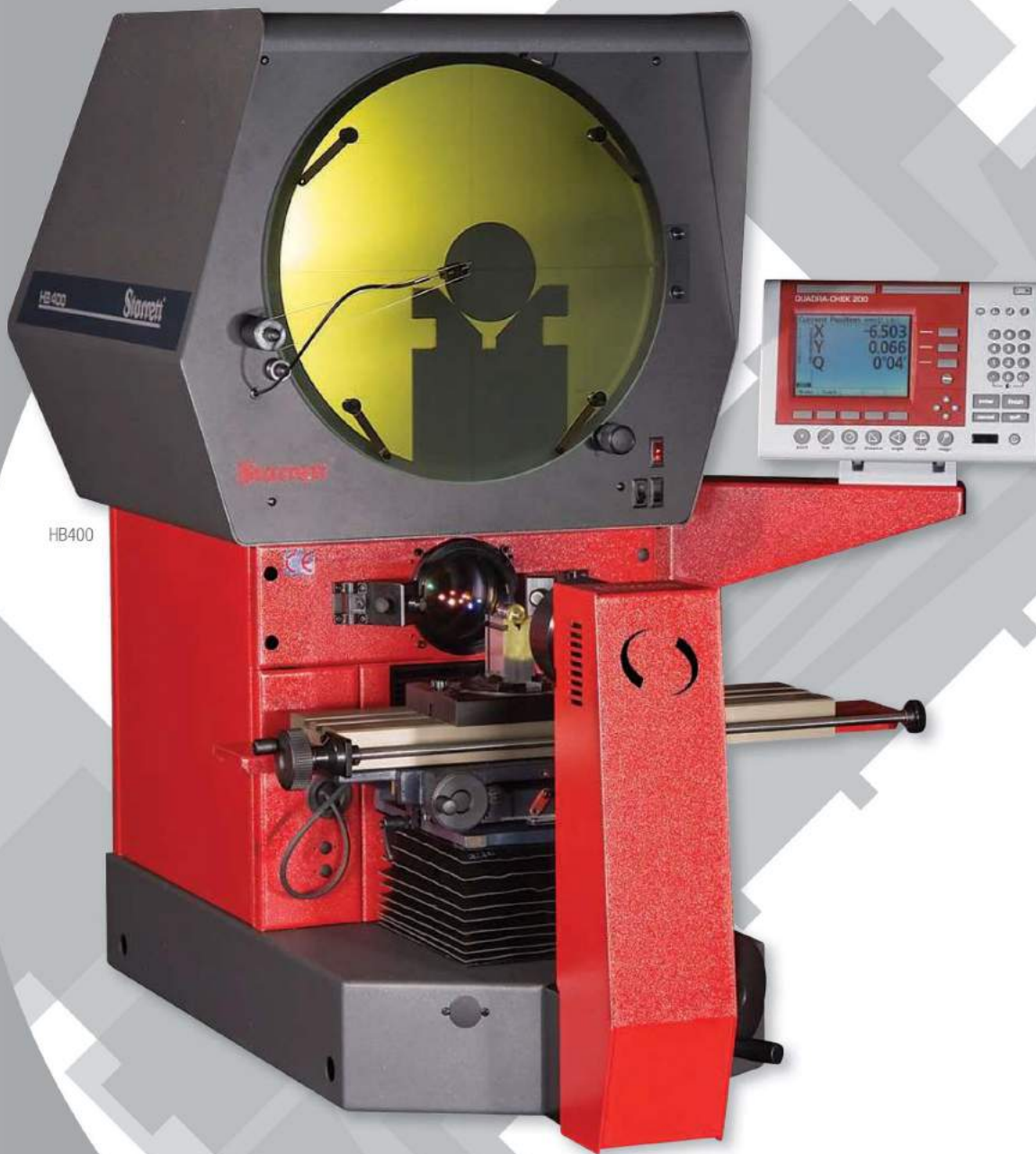
HB400

HB400

HB HORIZONTAL BENCHTOP
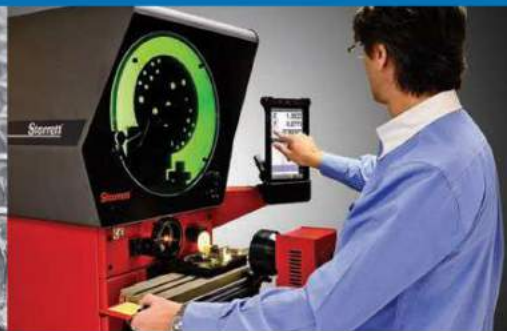
OPTICAL COMPARATORS

HD400

DUAL LENS

The HD400 is a dual lens benchtop horizontal projection comparator, with a 16" (400mm) diameter screen, a vertically correct image, 16" x 6" (400 x 150mm) of stage travel, a high 110lb workload capacity, and ultra-bright lighting. A two-lens slide allows instant switching between two magnifications. Available with fiber-optic or video edge detection, this comparator provides performance previously only available with floor-standing models.
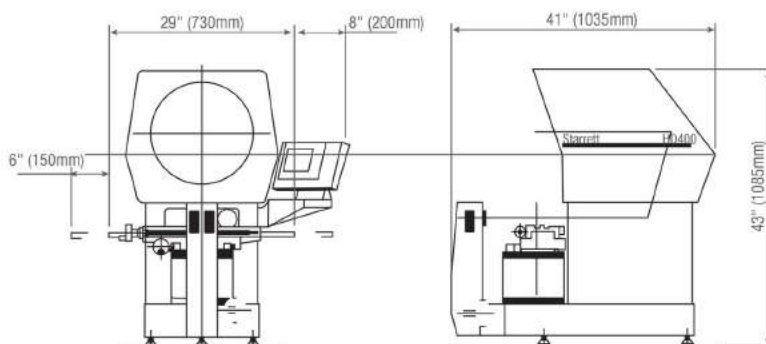
FEATURES AND SPECIFICATIONS

- Dual lens system
- Digital protractor for accurate angular measurements (1' resolution) via Q-axis on readout
- Hard anodized aluminum top plate with cast iron intermediate and base plates
- 16" (400mm) horizontal travel by manual fine adjustment with quick release mechanism and 15° workstage helix adjustment
- 6" (150mm) vertical travel
- 24V, 150W profile illumination
- 24V, 250W fiber optic surface illumination
- Single lens mount with quick action lens change (lens not included); interchangeable and fixed 5x versions are available, call for quote
- Collimating condenser with yellow/green filter and provision to mount further accessories
- Measurement by means of a linear encoder (glass scale) on both X and Y axes
- Available with MetLogix™ M1 tablet, M2 PC-based touch screen software or Quadra-Chek® readout system
- Fixed retractable fiber optic surface illumination
- Extended workstage option

WEIGHT AND DIMENSIONS

	HD400
Net Weight	320lbs
	145kg
Gross Weight	375lbs
	170kg

For more information please see the Options and Specifications table at the end of this section.

460 | **Starrett**®

Starrett
PRECISION OPTICAL HD400

400 SERIES

Stage Position
X   -0.5558
Y   -0.1847
Q   0°00'00

HD400

## HD HORIZONTAL BENCHTOP

461

OPTICAL COMPARATORS

VB400

VERTICAL BENCHTOP

The VB400 vertical projection comparator allows flat parts to be simply laid on a glass insert in the workstage. Features include a 16" diameter vertical screen, ultra-bright LEDs for long-life illumination, linear encoder scales for .00002" (0.5μm) resolution, and angular readout to better than 1' resolution. Available with stages with 8" x 4" (200 x 100mm) of XY travel. Options include six projection lenses from 10x to 100x and a choice of digital interfaces.

FEATURES AND SPECIFICATIONS

- Exceptionally stable, all metal, design and construction for optimum performance and accuracy
- High precision workstage with 16" x 9" top plate, with machine slot for easy fixturing
- Available systems with of Quadra-Chek® readout, MetLogix™ M1 tablet or M2 software with touchscreen PC
- Digital protractor for accurate angle measurements, 1' resolution
- Fine adjustment on all axes, plus zero backlash, fast traverse mechanism on the X and Y axis
- Automatic edge detection option
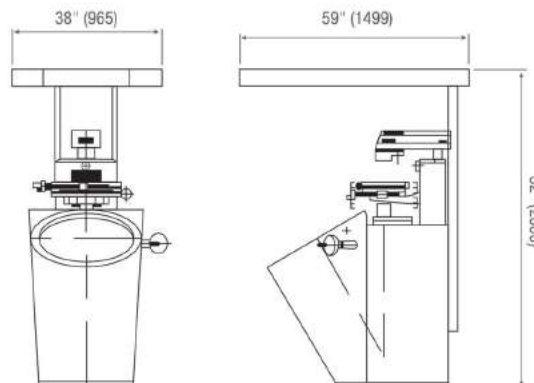- Variable LED surface illumination
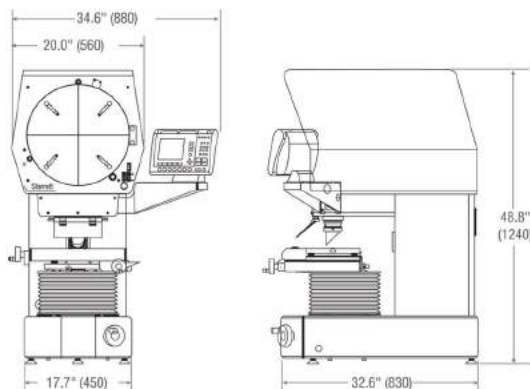
VF600

VERTICAL FLOOR STANDING

If your measuring requirements demand the use of a large screen vertical axis projector, then look no further than the Starrett VF600. A design based on 35 years of knowledge in the manufacture of high performing optical projectors, the VF600 is ideal for the larger components found in the electronics, pressings and extrusion industries.

With its helix facility, single or multiple lens turret, choice of workstages and large range of digital readout options, the VF600 is the ultimate in vertical axis profile projectors.

FEATURES AND SPECIFICATIONS

- Available systems with of Quadra-Chek® readout, MetLogix™ M1 tablet or M2 software with touchscreen PC
- Screen is angled 30° from horizontal for clear, easy viewing
- Glass insert is 9-1/4" x 5-1/2"
- 8" horizontal travel
- 4" vertical travel
- Projection lens turret with three lens capacity (lenses not included)
- Turret mounted condenser system complete with two lenses and yellow/green filter with provision to mount further accessories
- Erect image
- Full canopy and curtains
- Measurement by means of a linear encoder (glass scale) on both X and Y axes
- Optional two-axis motorized drive via joystick and variable speed controls for fine adjustment
- Optional fully automatic CNC control available
- Interchangeable and fixed 5x versions available

For more information please see the Options and Specifications table at the end of this section.

WEIGHT AND DIMENSIONS

	VB400
Net Weight	423lbs
	192kg
Shipping Weight	443lbs
	201kg

VB400

VF600

VERTICAL COMPARATOR SYSTEMS
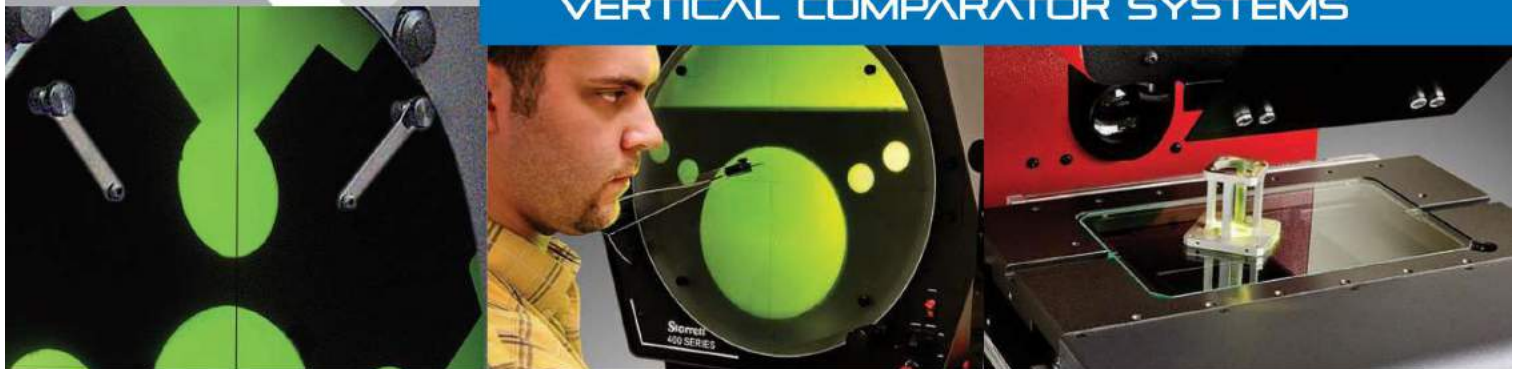
HF600

Well known throughout the world for superior value and exceptional measuring performance across the full measuring range and at all magnifications. The HF600 sets the standard in all applications from the QC lab to the production floor, the HF600 floor-standing horizontal projection comparator features a fully usable 24" (600mm) screen and a heavy-duty workstage with 330 lb (150 kg) load capacity. It comes with a four-position lens turret for instant selection of magnification. Inserting the optional "OV2.doc" OV2 Video Adapter in place of a projection lens converts the comparator and using a readout device with video edge detection (VED) capability converts the comparator into a video metrology system.

Ideal for use over a broad spectrum of industries and applications, the HF600 and HF750 projectors are designed and built to satisfy the requirements of measuring small to large workpieces with total precision, ruggedness, and efficiency.

The HF600 runs 2D software for geometries like diameters, radius, angles, lines and points, and for skew correction. It also provides many advanced software tools such as CAD file import, CAD data export for reverse engineering, standard and custom reports, and Ethernet networking.

FEATURES AND SPECIFICATIONS

- Available with MetLogix™ M1 tablet, M2 PC-based touch screen software or Quadra-Chek® readout systems
- Heavy-duty corrosion and scratch-proof nickel plated precision work stage with 25" x 9" (625 x 225mm) top plate
- Two-axis power drive via joystick and variable speed control for fine adjust
- 12" (300mm) horizontal travel
- 8" (200mm) vertical travel
- 3" (75mm) focus travel
- 12V, 100W surface illumination
- 24V, 150W profile illumination
- Projection lens turret with four lens capacity (lenses not included)
- Turrett mounted condenser system complete with two lenses and yellow/green filter with provision to mount further accessories
- Erect image
- Full canopy and curtains
- Measurement by means of a linear encoder (glass scale) on both X and Y axes
- Optional fully automatic CNC control
- Extended workstage available

HF750

The same exemplary build standards as the HF600, the HF750 super capacity optical comparator delivers benefits from an even larger 30" (762mm) screen. This large, fully usable screen sets a new standard for clarity and brightness.

Ideal for use over a broad spectrum of industries and applications, the HF750 projector is designed and built to satisfy the requirements of measuring small to large workpieces with total precision, ruggedness, and efficiency.

The geometric software handles diameter, radius, angle, line and point features, plus parts skewing for faster setup. The HF750 includes optical edge (E) detection and video edge detection.

Side bed models, HS600 and HS750 are also available.

FEATURES AND SPECIFICATIONS

- Available with MetLogix™ M1 tablet, M2 PC-based touch screen software or Quadra-Chek® readout systems
- Heavy-duty corrosion and scratch proof nickel plated precision work stage with 25" x 9" (625 x 225mm) top plate
- Two-axis power drive via joystick and variable speed controls for fine adjust
- 12" (300mm) horizontal travel
- 8" (200mm) vertical travel
- 3" (75mm) focus travel
- 12V, 100W surface illumination
- 24V, 150W profile illumination
- Projection lens turrett with three lens capacity (lenses not included)
- Turret mounted condenser system complete with two lenses and yellow/green filter with provision to mount further accessories.
- Erect image
- Full canopy and curtains
- Measurement by means of a linear encoder (glass scale) on both X and Y axes
- Optional fully automatic CNC control
- Extended workstage available.

464 | **Starrett®**

HF600

HF750

HORIZONTAL FLOOR STANDING SYSTEMS

SIDE BED OPTICAL COMPARATORS

HS600

The HS600 floor-standing horizontal optical comparator has all the same features as the HF600, except it has the screen position set to the side of the workstage area allowing close, comfortable and unrestricted access to the viewing and control area. It has a 12" (300mm) X-axis (16" [400mm] optional) and 8" (200mm) Y-Axis motorized travel (CNC control optional), Q-axis digital protractor with angular measurements to 1' resolution, and your choice of powerful Quadra-Chek® or MetLogix™ software control systems. A time tested, cost-effective solution for non-contact measurement. They are simple to use, yet have excellent capacity and performance to satisfy an exceptionally wide range of dimensional inspection applications and complex measuring requirements. At the heart of these systems are precision optics, superb lighting, and a highly accurate workstage that combine to ensure bright, sharp images and exceptional accuracy.

FEATURES AND SPECIFICATIONS

- Accommodates components up to 330lbs (150kg)
- 24" (600mm) diameter screen
- 4 lens capacity
- Canopy and curtains standard
- Automatic edge detection option
- 20" (500mm) extended workstage available

HS750

The HS750 floor-standing horizontal optical comparator has all the same features as the HF750, except it has the screen position set to the side of the workstage area allowing close, comfortable and unrestricted access to the viewing and control area. It has an extra large 30" (762mm) screen, 12" (300mm) X-axis (16" [400mm] optional) and 8" (200mm) Y-Axis motorized travel (CNC control optional), lens turret with 3 lens capacity, Q-axis digital protractor with angular measurements to 1' resolution, powerful Quadra-Chek® or MetLogix™ software control systems, canopy and curtains. A time tested, cost-effective solution for non-contact measurement. They are simple to use, yet have excellent capacity and performance to satisfy an exceptionally wide range of dimensional inspection applications and complex measuring requirements. At the heart of these systems are precision optics, superb lighting and a highly accurate workstage that combine to ensure bright, sharp images and exceptional accuracy.

FEATURES AND SPECIFICATIONS

- Very rigid and inherently stable metal construction ensures optimum performance and accuracy
- Large diameter screens provide extensive field of view giving the user more component detail on the screen
- Side screen design gives the operator uninterrupted access to the screen and working area
- Large workstage, power driven on both axes, with high load capacity
- CNC workstage option
- 20" (500mm) extended travel workstage available
- Available with the full range of Quadra-Chek® or MetLogix™ readout systems
- Canopy and curtains standard
- Wide range of ancilliaries and options allows specification tailoring and easy upgrading
- Accessories include alternative workstage, precision centers, vees, vices etc.

466 | **Starrett**

HS600

HS750

SIDE BED COMPARATOR SYSTEMS

Check out our website for interactive features at starrett.com

467

OV2™ Optical Comparator Video Adaptor

The OV2 is a special zoom lens and video camera that can be interchanged with the lens on Starrett Optical comparators. Combined with M3 software and touchscreen PC, the result is a low cost video measuring system, expanding the versatility of your Optical Comparator!

The OV2 is available as an option with new Starrett comparators and as an easy-to-install field retrofit.

When used with the dual lens Starrett HD400, the OV2 allows immediate access to both Video and Optical measurement without changing the part setup.

Features

- Replaces bayonet mount comparator lens with video camera to create a video measuring system

- Changeover between normal optical mode and OV2 is easy and fast

- Lens locks into projector body and is prealigned for linear accuracy

- 6.5:1 zoom lens with up to 1.25" (32mm) of working distance allows maximum stage travel utilization

- Video magnifications up to 240x

- Utilizes M3 software and a PC for video display and touch screen control

- Maximizes existing investment to provide a low cost entry into video measurement technology

- Also available for other makes of optical comparators, please call for availability

Easily interchangable between normal optical mode and OV2 video

Starrett
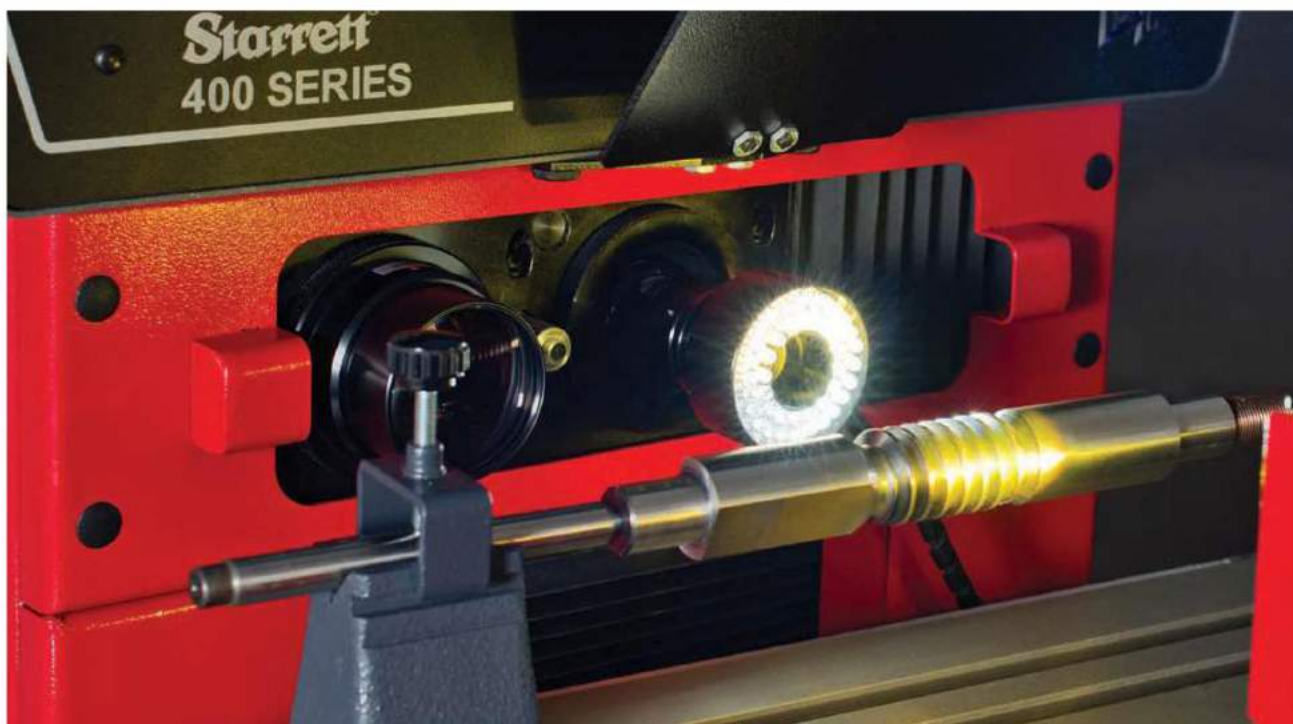
ACCESSORIES

Starrett offers a full range of accessories and stands designed for our Optical Systems to ensure efficient system setup and changeover for a broad range of applications.

Photo Key	Part No.	Description	For Models
A	OCN8	Large and Centers Vees	HF600, HF750
B	ORV2	2-1/32" Capacity Rotary Vise	
C	4U000 OGH1 OGH2	Magnification Checking Graticule	HE/HB/HD400 and VB400 HF600 HF750
D	OCN7	Small Centers and Vees	HF600, HF750
E	4G000 7P000	Centers and Vees	HB350 HE/HB/HD400
F	9W000 3V000	Helix Center Support Fixture	VB300
G	6H000	Centers and Vees	VB400, VF600
H	OVH1	Vertical Glass Plate Holder	HF600, HF750
J	7U000	Vertical Glass Plate Holder	HE/HB/HD400
K	4H003	Rotary Vise with 1-1/4" Capacity	HE/HB/HD400 (also larger horizontal projectors)
M	6U003	Rotary Workstage	VB400, VF600 for use on 200mm x 100mm workstage
N	4H002	Fixed Position Vise with 1-1/4" Capacity	HE/HB/HD400 (also larger horizontal projectors)
P	4H004	Universal Vee Block on Rotary Base	
S	P-10095 P-10102	32" Cabinet Base 23" Cabinet Base	HE400, HB400, HD400, VB400

SPECIFICATIONS AND OPTIONS

Model	HE400	HB400	HD400	VB400
Bench Top System	X	X	X	X
Floor-Standing System	-	-	-	-
Part View Orientation	Horizontal	Horizontal	Horizontal	Vertical
Side Bed Version	-	-	-	-
Screen Diameter (in)	16"	16"	16"	16"
Screen Diameter (mm)	400mm	400mm	400mm	400mm
X-Y Measuring Range (in)	10" x 4"	12" (16" optional) x 6"	16" x 6"	8" x 4"
X-Y Measuring Range (mm)	250 x 100mm	300 (400mm optional) x 150mm	400 x 150mm	200 x 100mm
Linear Glass Scale Encoder on X and Y Axis	Standard	Standard	Standard	Standard
Motorized X-Y Axis	-	Optional	Optional	-
CNC Control	-	Optional	Optional	-
Focus Range (in)	1.125"	2"	2"	4"
Focus Range (mm)	30mm	50mm	50mm	100mm
Work Stage (in)	18.75" x 4.75"	21.25" x 5"	21.25" x 5"	16" x 19"
Work Stage (mm)	475 x 120mm	540 x 130mm	540 x 130mm	400 x 225mm
Load Capacity with Negligible Deflection (lbs)	15lbs	22lbs	22lbs	22lbs
Load Capacity Maximum (lbs)	55lbs	110lbs	110lbs	50lbs
Angular Measurement Resolution	1'	1'	1'	1'
Profile Illumination	Standard	Standard	Standard	Standard
Surface Illumination	Standard	Standard	Standard	Standard
Quick Change Lens Mount (lenses not included)	Single	Single	Single	Single
Collimating Condenser with Yellow/Green Filter	Standard	Standard	Standard	Standard
Control System Software	QC100, QC200, M1, M2	QC100/QC200, QC5200, M1, M2, M3	QC200, QC5200, M1, M2, M3	QC100, QC200, M1, M2

Starrett

VF600	HF600	HF750	HS600	HS750
-	-	-	-	-
X	X	X	X	X
Vertical	Horizontal	Horizontal	Horizontal	Horizontal
-	-	-	Standard	Standard
24"	24"	30"	24"	30"
600mm	600mm	750mm	600mm	750mm
8" x 4"	12" (16" optional) x 8"	12" (16" optional) x 8"	12" (16" optional) x 8"	12" (16" optional) x 8"
200 x 100mm	300 (400mm optional) x 200mm	300 (400mm) x 200mm	300 (400mm) x 200mm	300 (400mm optional) x 200mm
Standard	Standard	Standard	Standard	Standard
-	Standard	Standard	Standard	Standard
-	Optional	Optional	Optional	Standard
4"	3"	3"	3"	3"
100mm	75mm	75mm	75"	75mm
16" x 9"	25" x 9"	25" x 9"	25" x 9"	25" x 9"
400 x 225mm	630 x 230mm	630 x 230mm	630 x 230mm	630 x 230mm
22lbs	110lbs	110lbs	110lbs	110lbs
66lbs	330lbs	330lbs	330lbs	330lbs
1'	1'	1'	1'	1'
Standard	Standard	Standard	Standard	Standard
Standard	Standard	Standard	Standard	Standard
3 Lens Turret	4 Lens Turret	3 Lens Turret	4 Lens Turret	3 Lens Turret
Standard	Standard	Standard	Standard	Standard
QC200, QC5200, M1, M2, M3	QC200, QC5200, M1, M2, M3	QC200, QC5200, M1, M2, M3	QC200, QC5200, M1, M2, M3	ND1120/5200, M1, M2, M3

OPTICAL COMPARATORS

Model	HE400	HB400	HD400	VB400
Display (control system dependent)	QC DRO or 15.6" Touchscreen PC, M1 with 7" tablet	QC DRO, 15.6" or 21" Touchscreen PC or 24" Monitor, M1 with 7" tablet	QC DRO, 15.6" or 21" Touchscreen PC or 24" Monitor, M1 with 7" tablet	QC DRO or 15.6" Touchscreen PC, M1 with 7" tablet
Optical Edge Detection	Optional	Optional	Optional	Optional
Digital Video Camera System	-	Optional	Optional	-
Lenses - Screen Magnification (one required, not included)	10x, 20x, 25x, 31.25x, 50x, 100x	10x, 20x, 25x, 31.25x, 50x, 100x	10x, 20x, 25x, 31.25x, 50x, 100x	10x , 20x, 25x, 50x
Iris Diaphragm	Optional	Optional	Optional	-
Precision Rotary Vise	Optional	Optional	Optional	-
Vee Block on Rotary Base	Optional	Optional	Optional	-
Precision Fixed Vise	Optional	Optional	Optional	-
Precision Centers and Vees	Optional	Optional	Optional	Optional
Helix Center Support System	-	-	-	Optional
Precision Rotary Work Stage	-	-	-	Optional
Glass Plate Work Holder	Optional	Optional	Optional	-
Field of View Diameter (in)	1.57", 0.79", 0.63", 0.50", 0.31", 0.16"	-	-	-
Field of View Diameter (mm)	40mm, 20mm, 16mm, 13mm, 8mm, 4mm	-	-	-
Working Distance (in)	.15", 2.60", 2.44", 2.28", 1.97", 1.61"	-	-	-
Working Distance (mm)	0mm, 66mm, 62mm, 58mm, 50mm, 41mm	-	-	-
Cabinet Stand 32"	Optional	Optional	Optional	-
Cabinet Stand 23"	Optional	Optional	Optional	Optional
Canopy and Curtains	Optional	Optional	Optional	Optional

VF600	HF600	HF750	HS600	HS750
QC DRO, 15.6" or 21" Touchscreen PC or 24"Monitor, M1 with 7" tablet	QC DRO, 15.6" or 21" Touchscreen PC or 24" Monitor, M1 with 7" tablet	QC DRO, 15.6" or 21" PC Touchscreen or 24" Monitor, M1 with 7" tablet	QC DRO, 15.6" or 21" Touchscreen PC or 24" Monitor, M1 with 7" tablet	QC DRO, 15.6" or 21" Touchscreen PC or 24" Monitor, M1 with 7" tablet
Optional	Optional	Optional	Optional	Optional
-	Optional	Optional	Optional	Optional
10x, 20x, 25x, 50x, 100x	10x, 20x, 25x, 31.25x, 50x, 100x	10x, 20x, 25x, 31.25x, 50x, 100x	10x, 20x, 25x, 31.25x, 50x, 100x	10x, 20x, 25x, 31.25x, 50x, 100x
-	Optional	Optional	Optional	Optional
-	Optional	Optional	Optional	Optional
-	Optional	Optional	Optional	Optional
-	Optional	Optional	Optional	Optional
Optional	Optional	Optional	Optional	Optional
Optional	-	-	-	-
Optional	-	-	-	-
-	Optional	Optional	Optional	Optional
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-
Optional	Standard	Standard	Standard	Standard

METROLOGY SERVICES

TOTAL SOLUTION PROVIDER

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

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

Our factory trained experts are available to perform calibration, preventive maintenance, repairs, upgrades and system retrofits. We offer in-house training, custom programming and measurement process development. Our field technicians are trained on both Optical Comparator and Vision Systems to assure that the same calibration and validation methods utilized in the factory are used in the field.

474 **Starrett**

CUSTOM SOLUTIONS

Starrett stands out from other precision tool providers through our willingness to work directly with customers to design and manufacture custom tools for applications where standard products cannot perform.

For metrology products, system specification many times involves customization. We approach each application with a wide range of excellent products, accessories and expertise. If necessary, we will take the additional step to developing original, customized solutions. Whatever it takes, we will work with you to configure a system that is just right for your requirements.

As a company, Starrett has provided solutions to industries including energy, aerospace, automotive, food packaging, high-technology, plastics, medical components, and to NASA and other government agencies.

Through design, testing, product specification and system development, we will find a solution to meet your requirements to your full satisfaction.

- From Problem
- To Innovation
- To Solution

At the conclusion of the process, a difficult problem is transformed into an innovative, often elegant solution.
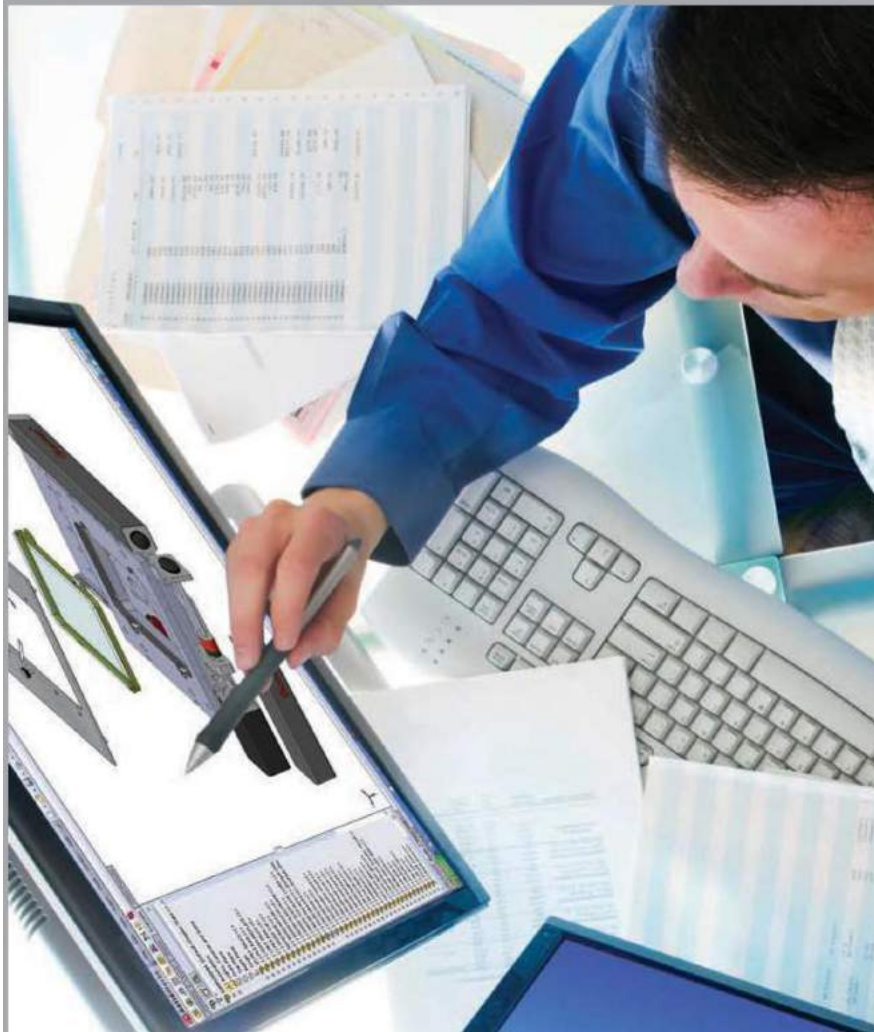
Check out our website for interactive features at **starrett**.com

475

TRAINING SERVICES

Expert knowledge of software and metrology readout systems is essential to get the most from your measurement and inspection system. We offer training on our industry-standard leading MetLogix and Quadra-Chek® software and metrology readouts. Classes can be held at your facility, in our training room or online. Our expert instructors have extensive experience with these products as well as in the measurement sciences. They will show you how to get the best return on your investment.

We also offer custom training. Let us work with your engineering/metrology personnel to meet your specific needs and establish solutions for your challenging measurement applications. Starrett Metrology wants to become your one stop metrology headquarters, both for new machine sales and to support your current metrology equipment.

Give us a call to see what we can accomplish together! 1-949-348-1213 or training@starrettkinemetric.com

476 | **Starrett**®