## OPTICAL MEASURING PROJECTORS

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OPTICAL MEASURING PROJECTORS

Starrett

400 SERIES

QUADRA-CHEK 200

CIRCLE 1

X 0.0151
Y 0.0012
D/ft 0.4556
Pts=7 F 0.0050
### The Powerful and Versatile Starrett Line of Optical Measuring Projectors

Optical measurement is a non-contact technique that graphically displays and measures parts with dimensions and shapes that would be hard to measure with regular tools. 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 12-30" (300-750mm) screen diameters, horizontal and vertical models and a wide range of special machines. We offer choices of lens magnification, manual, motor-driven and CNC workstage travel, and with mechanical or electronic readouts.

### Specification Guide

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**Key:** Standard = S; Option = O; Not Available = N/A; On Application = A. Dimensions in Inch and (mm)

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### Terminology

**Working Distance** is the distance between the objective lens and the component when the component is in focus.

**Field of View (FOV)** is the viewing area of the component. A 30mm FOV using a 10x lens would produce a screen image of 300mm.

**Half Field View** is the maximum size a component can be projected to the center of the screen before colliding with the lens.

**Full Field View** is the maximum size a component can be projected over the full screen before colliding with the lens.

**Projected Image** is how a component is projected onto the screen in relation to its placement on the workstage.

Specifications subject to change.

---

500
Horizontal Benchtop Measuring Projector

No. HE400 MkIII
16” (400mm) Screen Diameter

The Starrett HE400 MkIII provides exceptional performance, a large 16” screen, a full range of features, and Starrett quality at a competitive price.

Standard Features
◆ Sturdy, all metal construction
◆ 16” (400mm) screen with integral hood, precision cross lines and calibration markings
◆ 10 x 4” (254 x 100mm) measuring travel
◆ High precision workstage with 18.9 x 4.7” (480 x 120mm) top plate
◆ 15.4 lbs (7kg) workstage capacity with 55 lbs (25kg) max. capacity
◆ 13.8” (355mm) capacity between centers
◆ Lamphouse mounted helix adjustment for accurate threadform inspection
◆ Fine adjustment on all axes, plus zero backlash, fast traverse X-axis mechanism
◆ Fully retractable duplex fiber optic surface illumination
◆ Fan cooled halogen profile illumination with high/low intensity and yellow/green filter
◆ Heidenhain .00005” (0.001mm) resolution scales
◆ Digital protractor (1 minute res.) Q-Axis
◆ 10x, 20x, 25x, 31.25x, 50x, and 100x magnifications available
◆ Optical edge detection (optional)
◆ Available with OV², Starrett’s innovative Optical-Video Adaptor. Refer to OV² page for details

For readout choices, refer to pages at the end of this section.
Horizontal Benchtop Measuring Projector

No. HB400
16” (400mm) Screen Diameter

Superlative in design and function, the HB400 is ideal for the most demanding applications in optical measurement.

Standard Features
- Vertically correct image
- Fully useable 16” (400mm) diameter screen with crosslines and calibration marks
- Heavy-duty, metal construction
- High precision workstage
- New, larger 12” x 6” (300 x 150mm) measuring range (extended 16” X-axis measuring ranges are available)
- Staging area 21 1/4” (540mm) by 5 1/8” (130mm)
- Dual fixturing slots
- Screen-mounted overlay chart clips
- 110 lb. (50kg) weight capacity
- Dual intensity (hi/low) tungsten halogen profile illumination
- Twin-bundle, adjustable on-axis, fiber optic surface illumination
- Operator glare shields for surface illumination
- Helix angle stage adjustable ±15°
- Quick-change, bayonet style lens mount
- Q-Axis displayed in digital readout
- Heidenhain .00005” (0.001mm) resolution scales
- Centrally mounted vertical (Y-axis) scale (in-line with lens/workpiece)
- Threadless X-axis quick-release for “zero” backlash
- Protective guideway covers for both X and Y axes
- Full (and upgradable) range of readout systems/software
- Swing-away lamphouse (optional)
- Optical edge detection (optional)
- 10x, 20x, 25x, 31.25x, 50x, and 100x magnifications available
- Available as manual, motorized and CNC
- Available with OV², Starrett’s innovative Optical-Video Adaptor. Refer to OV² page for details

For readout choices, refer to pages at the end of this section.
Horizontal Benchtop Dual Lens Measuring Projector
No. HD400
16” (400mm) Screen Diameter

Based on our very popular HB400 platform, the HD features an exclusive indexing dual lens slide, a newly enlarged 16” x 6” (400 x 150mm) measuring range, and crisp, clear, tri-bundle surface illumination. Once again we have “raised the bar” in benchtop projectors.

Standard Features
◆ Exclusive indexing dual lens mount
◆ Vertically correct image
◆ Fully useable 16” (400mm) diameter screen with crosslines and calibration marks
◆ Heavy duty, metal construction
◆ 16” x 6” (400 x 150mm) measuring range
◆ Dual fixturing slots
◆ Staging area 21 1/4” (540mm) by 5 1/8” (130mm)
◆ Screen-mounted overlay chart clips
◆ 110 lb. (50kg) weight capacity
◆ Dual intensity (hi/low) tungsten halogen profile illumination
◆ Unique triple bundle, adjustable, fiber optic surface illumination
◆ Operator glare shields for surface illumination
◆ Helix angle stage adjustable ±15°
◆ Quick-change, bayonet style lens mount
◆ Q-Axis displayed in digital readout
◆ Heidenhain .00005” (0.001mm) resolution scales
◆ Centrally mounted vertical (Y-axis) scale (in-line with lens/workpiece)
◆ Threadless X-axis quick-release for “zero” backlash
◆ Protective guideway covers for both X and Y axes
◆ Full (and upgradable) range of readout systems/software
◆ Swing-away lamphouse (optional)
◆ Optical edge detection (optional)
◆ 10x, 20x, 25x, 31.25x, 50x, and 100x magnifications available
◆ Available as manual, motorized and CNC
◆ Available with OV², Starrett’s innovative Optical-Video Adaptor. Refer to OV² page for details

For readout choices, refer to pages at the end of this section.
Horizontal Floor Standing Measuring Projector

No. HF600 In Line
24” (600mm) Screen Diameter

At only 31” (725mm) across, this machine offers a compact footprint for a floor standing system. It offers a large heavy duty stage with 330 lb. (150kg) weight capacity.

Features
- Motorized X and Y axes
- Vertically correct image
- Fully useable 24” (600mm) diameter screen with crosslines and calibration marks
- Multi-position external lens turret
- Heavy-duty, metal construction
- 12” x 8” (300 x 200mm) measuring range
- Optional Heavy Duty 16” (400mm) X axis measuring range
- 3” (75mm) focal travel
- Nickel-plated steel stage with cross roller bearings
- 25” x 9” (625 x 225mm) staging area
- Dual fixturing slots
- Screen-mounted overlay chart clips
- 330 lb. (150kg) capacity
- 500 lb. (225kg) capacity with Heavy Duty option
- Dual intensity (hi/low) tungsten halogen profile illumination with yellow/green filter
- Dual-bundle, adjustable, fiber optic surface illumination standard with optional high-intensity dual lamp
- Helix angle stage adjustable ±15º
- Q-Axis displayed in digital readout
- Heidenhain .00005” (0.001mm) resolution scales
- Centrally mounted vertical (Y-axis) scale (in-line with lens/workpiece)
- Threadless X-axis quick-release for “zero” backlash
- Protective guideway covers for both X and Y axes
- Available with QC-300 or QC-200 readout, or with PC and QC-5000 Software
- Hood and curtains supplied as standard
- Optical edge detection (optional)
- 10x, 20x, 25x, 31.25x, 50x, and 100x magnifications available
- 5x lens available on special order (replaces turret)
- Optional CNC capability with QC-5000 software
- Available with OV², Starrett’s innovative Optical-Video Adaptor. Refer to OV² page for details

For readout choices, refer to pages at the end of this section.
Horizontal Floor Standing Measuring Projector

No. HF750
30’ (750mm) Screen Diameter

A proven performer, the No. HF750 combines an erect, 30’ (750mm) screen with rugged construction.

Standard Features
- Motorized X and Y axes
- Vertically correct image
- Fully useable 30’ (750mm) screen with crosslines and calibration marks
- Multi-position external lens turret
- Heavy duty, metal construction
- 12” x 8” (300 x 200mm) measuring range
- Optional Heavy Duty 16” (400mm) X axis measuring range
- 3” (75mm) focal travel
- Nickel-plated steel stage with cross roller bearings
- 25” x 9” (625 x 225mm) staging area
- Dual fixtureing slots
- Screen-mounted overlay chart clips
- 330 lb. (150kg) capacity (Heavy duty 500 lb. (225kg) capacity available)
- Dual intensity (hi/low) tungsten halogen profile illumination with yellow/green filter
- Dual-bundle, adjustable, fiber optic surface illumination with optional high-intensity dual lamp surface illumination
- Helix angle stage adjustable ±15°
- Q-Axis displayed in digital readout
- Heidenhain .00005” (0.001mm) resolution scales
- Centrally mounted vertical (Y-axis) scale (in-line with lens/workpiece)
- Threadless X-axis quick-release for “zero” backlash
- Protective guideway covers for both X and Y axes
- Available with QC-300 or QC-200 readout, or with PC and QC-5000 Software
- Hood and curtains supplied as standard
- Optical edge detection (optional)
- 10x, 20x, 25x, 31.25x, 50x, and 100x magnifications available
- 5x lens available on special order (replaces turret)
- Optional CNC capability with QC-5000 software
- Available with OV®, Starrett’s innovative Optical-Video Adaptor. Refer to OV® page for details

For readout choices, refer to pages at the end of this section.
Vertical Benchtop Measuring Projector

No. VB300
12” (300mm) Screen Diameter

Standard Features
◆ Ideal for rapid inspection of small components
◆ Workstage support has X and Y axis manual travel
◆ Manual focus 4” (100mm)
◆ Accommodates components up to 11 lbs. (5kg)
◆ Front working distances:
  10x - 3.1” (80mm),
  20x - 3” (76mm),
  25x - 2.4” (62mm),
  50x - 2” (50mm),
  100x - 1.6” (41mm)
◆ Profile illumination – High-power, fan-cooled, tungsten halogen, switchable, high/low intensity and yellow/green filter
◆ Surface illumination-on-axis adjustable
◆ Integral hood
◆ Q-Axis displayed in digital readout
◆ Workstage:
  Top plate: 10.6” x 6.9”
  (270 x 175mm) - Electronic
  Glass insert: 8” x 4.5”
  (200 x 115mm)
  Measuring travel: 6” x 2.8”
  (150 x 70mm)
◆ 0-0.00005” (0-0.001mm) scales
◆ Available with a choice of QC-300, QC-200, or QC-100 readouts
◆ Projection lens choices – 10x, 20x, 25x, 31.25x, 50x, 100x with a single lens mount

For readout choices, refer to pages at the end of this section.
Vertical Benchtop Measuring Projector

No. VB400
16” (400mm) Screen Diameter

Standard Features
◆ Ideal for high or low volume parts. Can be used in calibration labs or on the shop floor as a stand-alone unit. Also a good choice for general purpose toolroom work to measure complex shapes and hole patterns easily and quickly
◆ Accommodates components up to 22 lbs. (10kg)
◆ 360º angular movement to 1 minute of arc with electronic protractor
◆ Helix angle with universal indexing fixture
◆ Front working distances:
  10x - 3.1” (80mm),
  20x - 3.2” (82mm),
  25x - 2.8” (70mm),
  50x - 2.1” (53mm),
  100x - 1.7” (43mm)
◆ Profile illumination – Switchable high/low intensity, fan-cooled, tungsten halogen lamp with yellow/green filter
◆ Surface illumination – On-axis system
◆ Q-Axis displayed in digital readout
◆ Integral hood

Optional Features
◆ Workstage options:
1. Top plate: 16” x 9” (400 x 225mm)
   Glass insert: 9 1/4” x 5 1/2”
   Measuring travel: 8” x 4”
   (240 x 140mm)
2. Top plate: 17.7” x 11.2”
   (450 x 285mm)
   Glass insert: 11.4” x 7 1/2”
   Measuring travel: 10” x 6”
   (290 x 190mm)
◆ Workstage travel:
  1. Motorized or full CNC option
  2. Manual hand-focus travel 4” (102mm)
◆ Projection lens choices: 10x, 20x, 25x, 31.25x, 50x, 100x with a single lens or a 3-lens turret mount

For readout choices, refer to pages at the end of this section.
Vertical Floor Standing Measuring Projector

No. VF600
24" (600mm) Screen Diameter

Especially suitable for larger components found in the electronics, pressings, and extrusion industries. The VF600 is ideal for use with overlays.

Features
◆ Screen is angled 30° from horizontal for clear, easy viewing
◆ Workstage plate is 16" x 9" (400 x 225 mm)
◆ Glass insert is 9 1/4" x 5 1/2" (235 x 140mm)
◆ Workstage travel is 8" x 4" (200 x 100mm)
◆ Accommodates components up to 66 lbs. (30kg)
◆ 360° angular measurement to 1 minute of arc with electronic protractor
◆ Helix angle: ±10° lamphouse adjustment
◆ Front working distances:
  5x - 8.6" (220mm),
  10x - 5.4" (138mm),
  20x - 5" (127mm),
  25x - 4.1" (103mm),
  50x - 3.5" (88mm),
  100x - 1.7" (44mm)
◆ Profile illumination – High-power, fan-cooled, tungsten halogen 150W lamp with yellow/green filter
◆ Surface illumination – Fan-cooled 150W lamp/fiber-optic system
◆ Hood and curtains
◆ Workstage travel available as manual, motorized or CNC option
◆ Projection lens choices 10x, 20x, 25x, 31.25x, 50x, 100x or a 3-lens turret (5x fixed lens on special order)

For readout choices, refer to pages at the end of this section.
OV² Optical-Video Adaptor

The OV²™ is a special video camera that can be interchanged with the lens of Starrett Horizontal Optical Measuring Projectors to create a low cost video measuring system.

Now, the OV² utilizes the graphic capabilities of QC-300 display, eliminating the need for a separate video output monitor and crosshair generator.

The OV² adaptor is available as an option with new Starrett Horizontal Optical Measuring Projectors 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
◆ Installation is fast and simple
◆ Change over between normal optical mode and OV² is easy and fast
◆ 6.5:1 zoom lens with up to 32mm of working distance allows maximum stage travel utilization
◆ Video magnifications of 240X
◆ OV² utilizes the large internal video display and touch screen control of the new QC-300
◆ The QC-300 provides the option of entering datapoints manually through the integrated crosshair or automatically through video edge detection (VED). VED provides superior repeatability while minimizing operator input error
◆ Lens dovetails into projector body and is prealigned for linear accuracy
◆ Works with all Starrett Horizontal Optical Measuring Projectors
◆ When used with the Starrett HD400, the OV² allows immediate access to both video and optical measurement without changing the part setup
◆ Utilizes your existing investment to provide a low cost entry into video measurement technology
◆ OV² is also available with conventional flat screen monitor and crosshair generator
Quadra-Chek® 121

The QC-121 is a flexible, compact and precise digital readout that provides very high levels of precision and accuracy. Features include:

- High-visibility LCD display
- Versatile display console
- Resolution 0.00005" or 0.001mm
- Inch/metric conversion
- Incremental or absolute measurement
- Zero reset
- Linear error compensation
- Sound feedback
- RS232C serial port
- Parallel port
- Languages – English, Spanish, Italian, German, French

Quadra-Chek® 221

An advanced digital readout system for performing 2-axis measurements at very high levels of precision and accuracy. Record desired feature and construction measurements quickly, easily and accurately with the time-saving, patented Measure Magic® technology. Features easy-to-use programming and data management output.

All the features of the QC-100 plus:
- Skew function for rapid part alignment correction
- Single key calculation for angles, radius/diameter, distances, etc.
- Display in either polar or Cartesian coordinates
- 200 point feature memory (stored or displayed)
- Three built-in reports (Feature, Tolerance, .csv to Excel export)
- QC-221E includes Automatic Edge Detection. Achieve higher throughput, more accurate measurements and more consistent data with optical comparators using optical edge detection. Automatic point entry reduces operator subjectivity and fatigue

Quadra-Chek® 300

The new Quadra-Chek 300 Series Geometric Readout features an enhanced touch-screen interface and patented Measure Magic® technology. It is ideal for the measurement of 2D features. All QC-300 Series models include parallel, serial and USB ports for use with printers and in networks.

The video capabilities of the QC-300 are utilized by the Starrett OV² Optical - Video Adaptor.

- LCD 8.4" color touch screen SVGA
- Enclosure (W x H x D) 11.5" x 7.5" x 2.75"
- Base (W x H x D) 10" x 2" x 7.5"
- Inputs: Up to 4 axes, external connections including footswitch, remote keypad, RS232C serial port, parallel port and USB port
- Inch/metric conversion
- Video edge detection (VED) option
- Graphical display for tolerance, features, etc.
- Two styles of manual crosshair (used by OV²)
- Single edge video tool enables automatic entry of single points
Quadra-Chek® 5215 is a Microsoft Windows-based application available for Starrett Optical Systems running with a PC rather than a readout. It supports precise measurement and inspection of 2D parts.

**Features**

- Windows® protocols
- Graphic user interface
- Icon-based tools and toolbars
- Color-coding
- Audio feedback
- Contextual help
- Intelligent, time-saving protocols
- CAD export
- SPC export
- CNC control
- Optical Edge Detection
- Custom reporting
- Drag and Drop Report Generator
- Data Import for part programming and Export for reverse engineering
- Result Data Export to Microsoft Access, Excel, .CSV and .TXT formats for data collection and PC applications
- Full Geometrical Feature Measurement
- Full Geometrical Tolerancing
- Fully customizable screen layout
- Lockable screen layouts
- Available in multiple languages
- Intuitive yet powerful part programming with point and click editing capabilities
- Interactive 3-D Part View
- Free software updates

**CNC and Edge Sensing Capability**

Perform repetitive measurements at high speed and reduce time-consuming and subjective crosshair alignment by combining the speed of QC-CNC with the accuracy of Automatic Edge Sensing.

**Programming and Automation**

Simplified program creation – Turn on the Record function and the software “learns” the datums, measuring sequence, tolerances and reporting functions for subsequent parts.

**CAD file import** – Import pre-existing part specifications from CAD programs to jumpstart the part programming process. Imports the .DXF file from your CAD system and, simply by selecting the features you want measured, will automatically create the part program for you! With QC-CNC, the QC-5215 can also perform a path optimization, again making your inspection time faster without sacrificing accuracy.

**Guided program use** – Visual and audio cues guide operators through programmed sequences, simplifying the measurement process for entire parts or specific sequences.
## Accessories

We offer a full range of accessories and stands designed specifically for Starrett Optical Systems to ensure efficient system setup and change-over for a broad range of applications.

### Photo Key

- **A**: P-10115 Large Centers & Vees
- **B**: P-10114 2 1/32" Capacity Rotary Vise
- **C**: P-10089 HB400
- **D**: P-12014 Checking Graticle HF600, HF750
- **E**: P-12217 HF750
- **F**: P-10116 Small Centers & Vees HF600, HF750
- **G**: P-10094 Centers & Vees HF600
- **H**: P-11215 Helix Center VB300F P-11808 Support Fixture VB400, VF600
- **I**: P-11216 Centers & Vees VB400, VF600
- **J**: P-10118 Vertical Glass Plate Holder HF600, HF750
- **K**: P-10096 Vertical Glass Plate Holder HB400
- **L**: P-10091 Rotary Vise with 1 1/4" Capacity HB400 (Also larger Horizontal Projectors)
- **M**: P-11809 Rotary Workstage VB400, VF600 (200mm x 100mm Workstage)
- **N**: P-10093 Fixed Position Vise with 1 1/4" Capacity HB400 (Also larger Horizontal Projectors)
- **O**: P-10092 Universal Vee Block on Rotary Base
- **P**: P-10092 Rotary Workstage VB300 6" x 2 7/8" (150mm x 70mm) Workstage Only
- **Q**: P-10102 30" Cabinet Base HE400, HB400, HD400
- **R**: P-10102 23" Cabinet Base VB300, VB400

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J.W. Donchin Co. was established in 1924 and has been known worldwide ever since. Customer Service is our Main Focus. We offer 
**Expert Product Knowledge, Large Stocking Inventory and Competitive Pricing** to assist you in locating and selecting the correct 
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**Contact Information:**

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<td>773-261-2182</td>
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<td><a href="mailto:sales@jwdonchin.com">sales@jwdonchin.com</a></td>
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