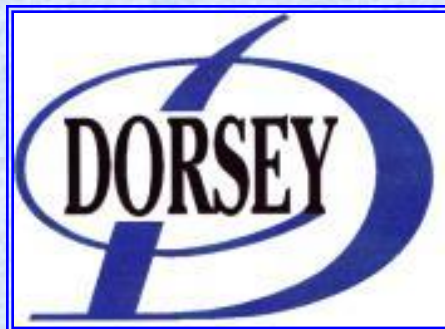




# Paragon 24P and 32P OPERATORS MANUAL

Revised: July 2002



**Dorsey Metrology International**  
**Optical Metrology Division**

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# 1.1 INTRODUCTION

The Paragon 24P & 32P series of Optical Projectors are floor standing units with a horizontal lens axis and a two-mirror optical system, giving an erect image on the screen.

These units are designed to give the maximum possible screen size and work stage capacity while retaining good operator access to the controls and screen area.

The projector in standard form includes a Vernier protractor screen with a choice of lens magnifications from 5X to 200X, and a 3-position manual turret.

Standard stage travel is dependent on model selected. All standard units are motorized in X&Y axes with a manual focus axis. The chart below specifies standard stage travel:

<u>Model</u>	<u>Travel</u>	<u>Capacity</u>
24P & 32P	24"x10"x2"	500 lbs.

Halogen surface illumination is also standard equipment.

Please see our optical comparator sales catalog for further information on options or contact your local sales representative.

# 2.1 PACKING DETAILS

The projector is normally supplied in a fully enclosed shipping container.

For deliveries overseas the projectors are sealed in plastic and vacuum packed with desiccant.

Please ensure all loose items of equipment are identified and fully unpacked before the packing material is discarded.

The projector must be lifted by the base. *Under no circumstances should the stage arm be used to lift or position the comparator. Serious damage to the X axis mechanism will result if this cover is mishandled.*

Please ensure all lifting equipment used has been certified to support a minimum of 4000 lbs. / 1400 Kg.

The work stage surface is covered with protective tape and all unprotected surfaces are coated with a silicon-based rust preventative. This protection should be removed prior to use.

The projector stands on 4 leveling bolts. Please note that these same bolts are used to retain the comparator to the packing straps. *Do not discard these bolts with the packing material.*

# 3. INSTALLATION

## □ 3.1 Operating Conditions

This precision optical instrument is designed to work in a normal workshop environment, but it is important to locate the unit as far as possible from sources of grinding grit, oil mist, and vibrations. Where possible locate the projector with the screen facing away from direct sunlight and overhead lighting.

This unit should be placed on a strong sturdy concrete platform capable of securely supporting a minimum of 3550lbs/1750Kg. with a point pressure capability minimum of 875 psi.

Canopy and curtains are not provided as standard but are available as an optional extra fitted at the factory. These items are strongly recommended when using lenses of high magnification or with surface projection of difficult components.

# 3. INSTALLATION

## 3.2 Connecting Electrical Supply

The standard Paragon series projectors (24P & 32P) are supplied to accept 110-120VAC, 50-60 Hz main power. It may also be configured to accept either 220-240VAC, 50-60Hz or 100VAC, 50-60Hz. Unless clearly labeled (next to the power input plug) this unit is configured for 110-120VAC,50-60Hz. Listed below are wire color codes

110-120 VAC system	Brown/Black	Hot
	Blue/White	Neutral
	Green	Ground
220-240 VAC system	Brown/Black	Hot 1
	Blue/White	Hot 2
	Green	Ground

***\*\*\*Note this unit must be plugged into an outlet rated at a minimum of 15A and must not be operated without an adequate ground connection.***

# 3. INSTALLATION

## 3.3 Fitting Projection Lenses

All lenses are mounted on the rotating manual 3 lens turret. Simply grasp the turret rotation ball and rotate the turret to select the proper lens

The turret will lock in place on a spring detent when the lens is aligned properly.

The proper condenser must also be selected by rotating the condenser turret located in the lamphouse. This turret is also located by spring detents and will lock in the proper position. Simply select the condenser that gives a full view on the screen.



Model 32P 3 lens turret shown with only 10x lens installed

## 3.4 Fitting Work Holding Accessories

Work holding accessories include combination centers and vees, rotary vice, various banking fixtures and a vertical glass plate work holder for the projection of small flat components.

All the accessories locate in the universal dove tail slots in the table and are angular clamped in place with clamping screws. This type of clamping accessory can be placed directly onto the table without having to thread locating nuts in from the end of the table.

Dorsey Metrology International is also able to offer advice and manufacturing facilities for special custom work-holding fixtures and or trace units. Contact us for details.

# 4. SAFETY

This equipment has been designed and manufactured so far as is reasonably practical to allow its safe operation when used in accordance with the following instructions.

The equipment must be used in position that does not constitute a hazard, where the operator and maintenance staff have free access to the control and maintenance of the equipment and are not subject to any external hazards.

Services should be conducted by an authorized person, to approved safety standards.

The electrical supply should be taken from a correctly rated source.

**WARNING** The equipment **MUST NOT** be operated without a secure earth ground terminal connection.

Before connecting to a mains supply or attempting to use the equipment all packaging must be removed including the transportation strap. Do not connect or attempt to use any equipment showing obvious signs of damage or deterioration and take extra care when switching on for the first time.

A responsible person should examine the equipment for operator safety and determine the training requirement by the operator for its safe and correct use.



# 5. OPERATING

## □ 5.1 Switching On

Ensure that the projector is connected to the mains as detailed in 3 .2.

The projector lamps are controlled by rocker switches on the lower front panel of the projector body. Separate two position switches control the profile and surface illumination lamps.

NOTE: If equipped, Please refer to the separate operating instruction manual for the various digital readout units available.

## □ 5.2 Pre-Run Checks

Ensure that the projector is secure and all 4 leveling bolts are in contact with the platform. Having selected a lens and condenser of the required magnification, locate the component to be inspected in a suitable work holding fixture which must be securely clamped to the table, the projector is now ready for use, proceed as follows:

## □ 5.3 Focusing

Focus is achieved by twisting the joystick right and left. The lens focal plane is approximately mid-way along the focus traverse, central to the dovetail slot in the table.

# 5. OPERATING

## □ 5.4 Profile Projection Intensity

There are two profile light intensity levels, high or low, selected from the rocker switch on the panel below the screen. Select the level that gives the most comfortable viewing, according to the object projected and the external lighting conditions prevailing.

Profile lighting is provided by a 24v-150 w tungsten halogen lamp.

An iris diaphragm and or green filter is available as an optional extra which may be fitted direct onto the lamp house to reduce the level of reflection from brightly polished surfaces e.g. ground threads, etc.

## □ 5.5 Surface Illumination

Illuminating surface features on solid objects is achieved using high intensity halogen or LED illuminators. These illuminators are fully articulating.

For the brightest reflected image, place the illuminators as close as possible to the face of the component to be inspected. Where components have a directional surface finish, e.g. ground faces, the surface texture should be placed at right angles to the table, this will give the brightest reflected image on the screen.

Note: See supplement A if fitted with Nikon optics package

# 5. OPERATING

## □ 5.6 Motorized Table Adjustment

Both X, Y, & Z Axes of all Paragon Series Projectors are motorized and controlled via a variable three axis Joystick. Joystick deflection in the horizontal plane moves the X-axis while Joystick deflection in the vertical plane moves the Y-axis. Twisting the joystick will move the Z-axis (focus).

The motorization speed of all paragon series projectors is also adjustable via a three-position toggle. The speed button located on top far left of the joystick can be pressed sequentially and released to toggle between high, medium, and low speeds.



# 5. OPERATING

## □ 5.7 Stage Helix Adjustment

The top plate of the stage has a helix adjustment, which allows the top plate of the stage to be rotated. To do this the **locking clamp** must first be loosened. These locking clamps can be accessed under the left and right sides of the stage. Once the locks are loosened, the stage plate can be rotated  $\pm 15$  degrees. The **helix indicator (C)** shows the amount of rotation in 5-minute increments. Once the desired helix is adjusted tighten the locking clamps to hold this position.



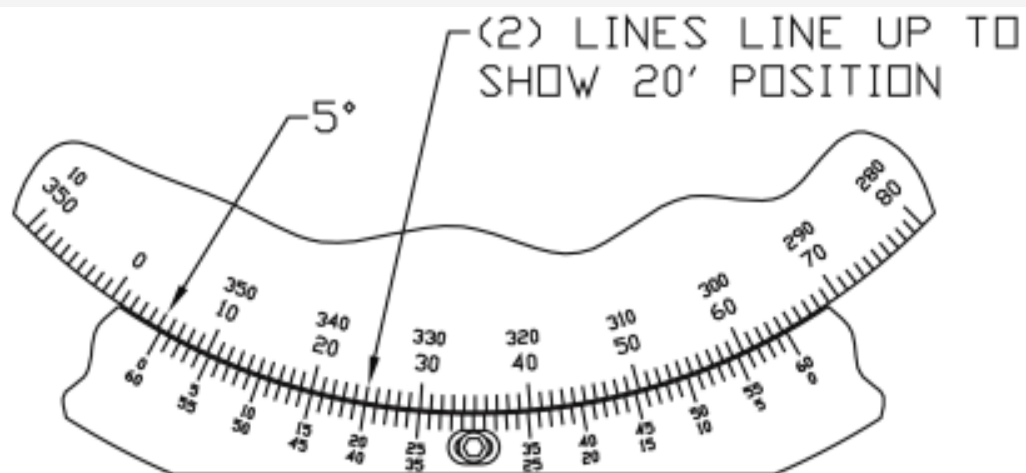
# 5. OPERATING

## 5.8 Vertical Stage Adjustment

Vertical adjustment is gained by deflection of the joystick in the vertical direction. See Section 5.6 for information on the Joystick.

## 5.9 Angular Adjustment

The Vernier protractor screen, consists of a frosted glass screen divided into four equal quadrants by precision cross lines. The screen is rotated by means of a small hand wheel on the right of the screen. The standard Vernier protractor can then be used to determine angles with 1-minute resolution.



To use the Vernier, read degrees directly at the chart ring zero line and read minutes by determining which two lines (one on screen & one on chart ring) come closest to lining up. Example shown above reads 5 degrees 20 minutes.

# 6. MAINTENANCE

## □ 6.1 Cleaning the screen lenses and mirror

### Lenses:

Any accumulated dust must be removed from the surface of the lenses with a photographic lens brush or cloth suitable for lens cleaning.

The surface of the inner lens (projection or condenser) must not be touched. The element of the projection lens facing the mirror is most critical in this respect. A single finger mark on this surface will noticeably degrade the quality of the projected image. It should be noted that the projection lens element facing the work piece is far less critical in this respect.

Any grease or finger marks may be removed with a new photographic cleaning tissue. If necessary, the tissue may be moistened with methanol or lens cleaning fluid to assist cleaning.

### Mirrors:

Access to the rear mirrors is gained by removing one or both side covers.

To remove grease or finger marks from the mirror surfaces use a surgical cotton wool swab soaked with methanol. Apply the swab very lightly to the mirror surface finally giving a light polish with another clean dry swab. **DO NOT USE FORCE.** All mirror surfaces should be cleaned as **INFREQUENTLY** as possible.

**WARNING! - Never use polishes, window cleaning aerosols or liquids when cleaning the mirrors or lenses.**

### Screens:

All screens are made from ground glass with printed crosslines. The crosslines can be removed if the screen is not cleaned properly. We recommend that the screens be cleaned only with soap (a mild non-lotion dishwashing solution) and plenty of water. Use a lint free soft cotton cloth to gently clean. Let the screen air dry. If your environment is extremely dirty, please contact us about optional encapsulated image screens which cover the markings with a protective membrane

# 6. MAINTENANCE

## 6.2 Profile Lamp Replacement and Adjustment

**WARNING!** *This must be done with the power switched off.*

To change the lamp first remove the top lamphouse cover.

To remove the bulb, grasp and pull the bulb straight up and out of its dual pin holder.

Remove the new replacement bulb from its box, plug the new bulb in place. Make every effort to not touch new bulb.



Switch main power on and set lamp intensity to low. Verify that the projected illumination is centered on the screen. To facilitate bulb alignment, remove the turret rotation ball/ pin assembly and project the filament of the bulb through the hole in the turret. Adjust the bulb holder if required. Re-seat lamp and or adjust holder if required.

If the glass lamp is accidentally marked, remove the marks immediately by swabbing with methanol.

The lamp operates at a high temperature and any finger marks will be “fired” into the surface of the quartz reducing the output and life of the lamp.

Lamps are available in packs of 5 from Dorsey Metrology International or our representatives.

# 6. MAINTENANCE

## □ 6.3 Fuse Replacement

The fuses are located on the rear chassis base and are designated as follows.

*Reading from right to left on a 120VAC system*

F1 Main 10A	120VAC System Fuse
F2 6V 15A	6 Volt System Fuse
F3 12V 15A	12 Volt System Fuse
F4 24V 15A	24 Volt System Fuse

*Reading from right to left on a 220VAC system*

F1 Main/L1 7.5A
F2 Main/L2 7.5A
F3 6V 15A
F4 12V 15A



# 6. MAINTENANCE

## □ 6.4 Replacement of Surface Illumination Lamp (NOTE: see Supplement A if fitted with Nikon lens package)

Access to surface illumination bulb/s is gained by removing side cover on right hand side of machine

Remove the thumb screws to remove the cover, then remove bulb as follows:

**WARNING: Do not pull bulb out without using ejection wire procedure below. Failure to follow proper procedure will damage the bulb socket internally.**

Remove the bulb by grasping and rotating the bulb ejection wire to eject bulb.

Remove the new replacement bulb from its box, flip the bulb ejector wire down and slide the new bulb in place.

Switch main power on and verify that the surface illumination focus pattern is centered. Re-seat lamp and or adjust holder ( by bending face ) if required.

If the glass lamp is accidentally marked, remove the marks immediately by swabbing with methanol.

The lamp operates at a high temperature and any finger marks will be “fired” into the surface of the quartz reducing the output and life of the lamp.

*Please note that the surface illumination bulb is a 250w/24v reflective bulb.*

Lamps are available in packs of 5 from Dorsey Metrology International or our representatives.

# 6. MAINTENANCE

## □ 6.5 Accuracy Checking

### Magnification Accuracy

**NOTE:** It must be stressed that the following is not part of the routine installation and servicing procedure.

This inspection instrument is designed to project an image within +/- .05% on profile and +/- .10% on surface illumination over the entire screen. Prior to shipment the unit is calibrated and certified to be well within this specification. If image accuracy of this magnitude is required daily by you, the customer, then an established calibration interval must be determined to meet your requirements.

Although the generally accepted calibration interval for this type of optical inspection equipment is 1 year; factors such as frequency of use, environment and duty may affect the ability of any instrument to remain in calibration. Calibration intervals must be adjusted up or down to compensate for these factors.

If only one lens shows a magnification or distortion error, it is possible that adjustment is required to only the lens. Simply loosen the lens retaining ring and adjust the lens as required.

If magnification is not uniform over the entire screen, then mirror adjustment will be required. Consult a qualified/certified individual or organization to perform this task. It is out of the scope of the average user to maintain the proper calibration equipment and training required to accurately calibrate an optical instrument. Dorsey Metrology International OMD provides this service and training classes on calibration.

# 6. MAINTENANCE

## □ 6.5 Accuracy Checking (continued)

### Readout Accuracy

The accuracy of your digital readout system is dependent on many items. Factors such as stage accuracy and condition, scale accuracy and condition and method of inspection will determine the outcome of any accuracy test. Although this is an operations manual and is not intended to serve as a calibration manual; we have outlined the basics of inspection and compensation below.

Inspect condition of system and repair/replace as required.

Test mechanical repeatability and geometry of stage adjust as required

Test repeatability of scale-DRO, adjust, replace or return to step 2.

Inspect accuracy of reading using a certified standard of known dimension

If reading is within specifications the procedure is complete.

If reading is not within specifications, remove all compensation and re-inspect. Compensate as required per instructions with your separate digital readout manual.

# 6. MAINTENANCE

## □ 6.6 Lubrication

All bearings in the unit are pre-lubricated and should not require additional lubricant during the life of the equipment.

A small amount of heavy lithium grease should be applied to the vertical elevating screw and to the lead screw nut assembly under the work stage at yearly intervals. This screw assembly is accessed by removing the bellows assembly.

# 7. Measuring Facilities

## □ 7.1 Linear Measuring Facilities

A wide range of digital measuring and display systems are available. See Dorsey Metrology International readout brochure for additional information. Resolution of scales provided with any system .0001mm.

- Detailed operator instructions are provided with each of the different readout/display systems, which must be carefully read and studied prior to operation.

# 8. TECHNICAL SPECIFICATIONS

**Illumination:** Built-in 24 volt/150-watt direct collimated halogen

**Screen:** 24"/600mm or 32 inch / 800 mm diameter Ground Glass with etched cross-line, 1-minute protractor and calibration reticle

**Stage motion:** X axis = 12 inches  
Y axis = 8 inches  
Focus = 3 inches  
helix rotation = +/-15°, 1° resolution

## Linear Scales

**Resolution:** .001 micron/0.00001

## Mechanical

**Accuracy:** +/- .004mm +[(L/20).001]  
L = Length of Travel

## Optical

**Accuracy:** +/- .10% Profile, +/- .15% surface

**Repeatability:** 1 Scale Count (0.002mm/0.0001 inch)

**Dimensions:** 24P 69"(L) x 28"(W) x 73"(H)  
32P 87"(L) x 38"(W) x 80"(H)

**Weight:** 24P 2450 lbs.  
32P 3150 lbs.

## Power Supply

**(required input):** AC 110 volt/60 Hz (220V 50Hz or 100V)

# 8. TECHNICAL SPECIFICATIONS

Standard accessories : Line Power Cord, choice of Lens and Condenser

Available accessories: Projection Lenses

Magnification accuracy: contour  $\pm 0.10\%$ , surface  $\pm 0.15\%$

## 24" (600mm) Lens Specifications

All dimensions in mm

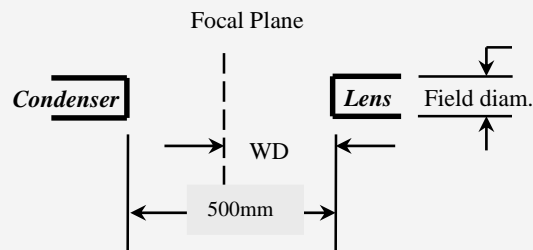
Projection Lens	Working Distance	Maximum Workpiece Diameter	Field Diameter
5x	220	400	150
10x	138	260	77
20x	138	260	60
25x	118	230	58
31.25x	N/A	N/A	N/A
50x	100	200	44
61.5	N/A	N/A	N/A
100x	48	95	38

## 32" (800mm) Lens Specifications

All dimensions in mm

Working Distance	Maximum Workpiece Diameter	Field Diameter
315	600	428
158	300	101
109	200	65
92	180	58
79	155	58
60	120	38
52	100	36
48	95	27

## Optical System Diagram



# 9.1 System Configuration Checklist

MODEL: \_\_\_\_\_ Serial No. \_\_\_\_\_ Dorsey Work Order Number: \_\_\_\_\_

When unpacking your instrument, insure all items have been included in this shipment. Back ordered items will be noted on the packing slip attached to the shipping container.

## STANDARD ACCESSORIES

- \_\_\_ Electronic Rotary Protractor : Serial # \_\_\_\_\_
- \_\_\_ Screen
- \_\_\_ Screen Chart Clips (Quantity 4)
- \_\_\_ Printed Manual
- \_\_\_ Certificates
- \_\_\_ Standard lens choice

## OPTIONAL ITEMS

- \_\_\_ Digital Readout type: \_\_\_\_\_ Serial # \_\_\_\_\_
- \_\_\_ Scale resolution \_\_\_\_\_  
Serial # X \_\_\_\_\_ Serial # Y \_\_\_\_\_
- \_\_\_ Digital Readout manual
- \_\_\_ Digital Readout plug
- \_\_\_ Digital readout arm
- \_\_\_ Digital readout tray
- \_\_\_ Edge Detector package: External \_\_\_\_\_ Internal \_\_\_\_\_
- \_\_\_ Lenses: 5x \_\_\_\_\_ 10X \_\_\_\_\_ 20X \_\_\_\_\_ 50X \_\_\_\_\_ 100X \_\_\_\_\_
- \_\_\_ Condensers: 10x 20X, 25X - 63mm
- \_\_\_ Condenser for 25, 50X, 100X - 51mm
- \_\_\_ Condenser for, 100X, 200X - 38mm
- \_\_\_ Green Filter
- \_\_\_ Iris
- \_\_\_ Surface bulb quantity
- \_\_\_ Profile bulb quantity
- \_\_\_ Cabinet stand
- \_\_\_ Tooling #1 \_\_\_\_\_
- \_\_\_ Tooling #2 \_\_\_\_\_
- \_\_\_ Tooling #3 \_\_\_\_\_
- \_\_\_ Tooling #4 \_\_\_\_\_

## Other Accessories:

- \_\_\_ Joystick (Larger models only) Serial # \_\_\_\_\_
- \_\_\_ Motor controller (Larger models only) Serial # \_\_\_\_\_
- \_\_\_ PC (QC4000 series only) Serial # \_\_\_\_\_
- \_\_\_ Monitor (QC4000 series only) Serial # \_\_\_\_\_
- \_\_\_ \_\_\_\_\_
- \_\_\_ \_\_\_\_\_
- \_\_\_ \_\_\_\_\_

Final Inspection By: \_\_\_\_\_





# UNPACKING & INSTALLATION INSTRUCTIONS

## Paragon Series Optical Comparators

Please follow the instructions listed below to properly unpack and install your optical comparator. If shipping damage becomes evident or questions arise during installation, please call **Dorsey Metrology International at 845-454-3111** for immediate assistance.

**WARNING DO NOT CONNECT POWER TO SYSTEM PRIOR TO STEP 14**

- 1) Inspect crate for evidence of shipping damage. If evidence is apparent immediately annotate damage on the receiving documentation and notify Dorsey Metrology International at the number listed above.
- 2) Remove sides and top of crate
- 3) Remove plastic moisture barrier and again inspect for shipping damage.
- 4) Inspect contents of container/s and verify contents against order.
- 5) Remove 4 lag bolts retaining instrument to crate.
- 6) Loosen rest feet and either remove or swing mounting plates under machine body.  
Note : mounting plates are retained by rest/leveling feet-do not discard leveling bolts after removing mounting plates.  
**\*\* Warning - removing the mounting plates requires the machine to be lifted or tilted back. This is a 2-person operation. Please exercise caution when performing this task.**
- 7) Place comparator on sturdy platform per specifications. Platform should be capable of securely withstanding a combined load of 2500 lbs. with 4-point pressure capability of approximately 750PSI.
- 8) Remove shipping block located under stage knee bracket. Remove pressure on block by removing bellows and rotating coupling between motor and ball screw
- 9) Install hood/visor using 3 spacers and thumbscrews supplied.
- 10) Attach DRO mounting arm and bracket to right side of comparator using 4 button head screws provided.
- 11) Attach DRO tray to DRO arm using large bolt provided.
- 12) Mount DRO on DRO tray and connect scale cables.
- 13) Remove shipping locks from X and focus axis, identified by paper tags.
- 14) Connect power to comparator and DRO.
- 15) Turn DRO on and move stage to verify scale connections on proper axis.
- 16) Turn on main comparator power and then switch profile illumination to high.
- 17) Place object on stage and verify focus while moving X axis left to right. Adjust stage mounting/helix bracket to center focal travel. Indicate to lens mount if required. Tighten stage mount after adjusting.
- 18) Verify screen magnification, adjust as required.
- 19) Verify DRO compensation, adjust as required.

# Limited Warranty Policy

Thank you for the purchase of a Dorsey Metrology International, OMD product. So that you receive a full 2-year limited warranty on your system, please read and return the Registration/RMA form immediately upon receipt. You are entitled to a full 2-year limited warranty beginning from the date of receipt of your system. If we do not receive this form within 30 days of shipment, the warranty period begins from the date of shipment from Dorsey Metrology International.

A. Dorsey Metrology International will include, with this system, a limited warranty to the end user. The limited warranty will be that the system and accessories (except those specified below) will be free from defects in material and workmanship for a period of two (2) years from the date you receive your system or as otherwise agreed in writing. Please take the time to properly fill out the warranty card and return it to Dorsey Metrology International

B. This limited warranty will cover all parts, except lamps, electrical components, readouts, scales, calibration, magnification and other consumable items. It will apply only to instruments and accessories which have been installed and operated in accordance with the instructions in Dorsey Metrology International Inc.'s reference manuals. Items which have not been tampered with or modified in any way, misused, damaged through accident, neglect or conditions beyond Dorsey Metrology International's control, and have been serviced only by authorized Dorsey Metrology International service personnel. *Please note that although readouts and electrical components are exempt from this warranty, they may be covered by a specific manufacturer 1-year limited warranty. Dorsey Metrology International will coordinate claims on behalf of the customer to resolve any problems that may occur.*

C. We will replace or repair, at our option, free of charge, any part or parts which upon examination we find defective in workmanship or material, provided that, on our request, the product or parts thereof are returned to our plant, postage prepaid, along with satisfactory documentation that the product has been installed, used, and maintained in accordance with the instructions in the product manual and has not been subject to any misuse or abuse.

D. Responsibility for loss in operating performance due to environmental conditions, such as humidity, dust, corrosive chemicals, deposition of oil or other foreign matter, spillage or other conditions beyond Dorsey Metrology International's control, will not be accepted under this warranty.

E. The Dorsey Metrology International reserves the right to modify its user limited warranty, discontinue the manufacture and sale of any Dorsey Metrology International Product, or to make any change in the design or construction of any such products without any obligation or liability whatsoever to the dealer or end user.

F. There are no other warranties, either expressed or implied, and Dorsey Metrology International shall not be liable under any circumstances for consequential damage.

# Limited Warranty Policy

## REGISTRATION / RMA FORM

To obtain service, the purchaser must first contact Dorsey Metrology International via phone or fax who will at their discretion determine which of two procedures must be followed.

### RMA Procedure

Return this Dorsey Metrology International product to the Technical Support Department of Dorsey Metrology International Inc., located at 53 Oakley Street, Poughkeepsie, NY 12601 and the following procedure must be followed:

### Procedure For Returning Merchandise

The product must be returned through an authorized Dorsey Metrology International Dealer. The customer must contact the Dorsey Metrology International Dealer who the product was purchased from to receive a Return Materials Authorization (RMA) number. The RMA number must be clearly marked on the outside of the shipping container.

The customer must provide a concise description of the problem and the circumstances under which it exists.

The customer must prepay all postage, insurance and delivery fees to Dorsey Metrology International.

Goods received without a valid RMA number will not be accepted from the carrier and will be returned freight collect to the sender. Freight for the return of all repaired goods is not under warranty and will be the responsibility of the customer.

### REGISTRATION / RMA FORM (please circle one):

***Please fill out form completely and return via mail or fax to (845) 454-3888***

Model Number: \_\_\_\_\_ Serial Number: \_\_\_\_\_

Date of shipment: \_\_\_\_\_ Date of receipt: \_\_\_\_\_

Customer Name and Address: \_\_\_\_\_ RMA#(REQUIRED): \_\_\_\_\_

Customer Telephone # (end user) :: \_\_\_\_\_

Date Installed: \_\_\_\_\_ Installed by: \_\_\_\_\_

Installer Telephone #: \_\_\_\_\_

# Certificate of Calibration



**DORSEY Metrology International**

Optical Division

53 Oakley Street, Poughkeepsie, New York 12601

TEL: 845-454-3111 FAX: 845-454-3888

Customer Name:										Date:							
Instrument Model:										Serial No:							
1.	Total magnification accuracy with Contour illuminator (units in inches)														±0.1%		
10X						20X						50X					
X scale Model # and Serial#																	
Y scale Model # and Serial#																	
2.	Digital Readout Model# and Serial#																
3.	Squareness of X axis and Y axis Spec: 100µin. / 1in.														µin.		
3.A	Squareness of Y to focus plane Spec: 200µin./1 in														µin.		
4.	X axis stage linear traveling accuracy Spec: ±( 150+L / .02 ) µin														µin.		
Displacement	0 <sub>in.</sub>	1 <sub>in.</sub>	2 <sub>in.</sub>	3 <sub>in.</sub>	4 <sub>in.</sub>	5 <sub>in.</sub>	6 <sub>in.</sub>	7 <sub>in.</sub>	8 <sub>in.</sub>	9 <sub>in.</sub>	10 <sub>in.</sub>	11 <sub>in.</sub>	12 <sub>in.</sub>	13 <sub>in.</sub>	14 <sub>in.</sub>	15 <sub>in.</sub>	
Δ Nominal																	
	µin.	µin.	µin.	µin.	µin.	µin.	µin.	µin.	µin.	µin.	µin.	µin.	µin.	µin.	µin.	µin.	
Displacement	16 <sub>in.</sub>	17 <sub>in.</sub>	18 <sub>in.</sub>	19 <sub>in.</sub>	20 <sub>in.</sub>	21 <sub>in.</sub>	22 <sub>in.</sub>	23 <sub>in.</sub>	24 <sub>in.</sub>	25 <sub>in.</sub>	26 <sub>in.</sub>	27 <sub>in.</sub>	28 <sub>in.</sub>	29 <sub>in.</sub>	30 <sub>in.</sub>	31 <sub>in.</sub>	
Δ Nominal																	
	µin.	µin.	µin.	µin.	µin.	µin.	µin.	µin.	µin.	µin.	µin.	µin.	µin.	µin.	µin.	µin.	
Remarks:																	
5.	Y Axis stage linear traveling accuracy														+/- ( 150+L / .02 ) µin		
Displacement	0 <sub>in.</sub>	1 <sub>in.</sub>	2 <sub>in.</sub>	3 <sub>in.</sub>	4 <sub>in.</sub>	5 <sub>in.</sub>	6 <sub>in.</sub>	7 <sub>in.</sub>	8 <sub>in.</sub>	9 <sub>in.</sub>	10 <sub>in.</sub>	11 <sub>in.</sub>	12 <sub>in.</sub>	13 <sub>in.</sub>	14 <sub>in.</sub>	15 <sub>in.</sub>	
Δ Nominal																	
	µin.	µin.	µin.	µin.	µin.	µin.	µin.	µin.	µin.	µin.	µin.	µin.	µin.	µin.	µin.	µin.	
Remarks:																	
6.	Electronic Rotary Protractor Model# & Serial#																
6.a.	ERP calibration counts																
6.b.	ERP Repeatability														±0.05°		

OVERALL UNCERTAINTY +/- 2 SCALE COUNTS, +/- .002MM

The referenced optical comparitor was calibrated using standards that are certified by, or traceable to, the National Institute of Standards and Technology per ANSI – Z540-1

Standard Due Date \_\_\_\_\_ Standard Serial # \_\_\_\_\_ NIST Traceability #: \_\_\_\_\_

INSPECTOR: \_\_\_\_\_ DATE: \_\_\_\_\_



# Nikon Optics Package Supplement A



The model 24P or 24LD can be fitted with a Nikon Optics package. Nikon optics offer superb on axis surface illumination as well as an extremely accurate profile image.

The Nikon lens option allows users to select between coaxial or off axis surface illumination.

### To use coaxial (thru lens) surface illumination:

- 1) Rotate the lens internal reflector lever to the far left to engage the half reflecting surface mirror.
- 2) Rotate the surface illuminator fully to the left until the light beam points directly into the side of the lens.



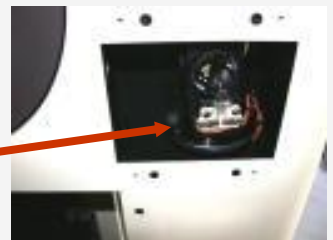
### To use off axis or profile illumination:

- 1) Rotate surface illuminator fully to the right to point the light beam directly at the part being inspected
- 2) Rotate the lens internal reflector lever to the far right to disengage the mirror.



### Maintenance:

To replace surface illumination bulb - remove four thumbscrews holding the access cover and rotate the bulb selector left to expose bulb - pull bulb directly up to remove (150W 24V).



#### 24" (600mm) Lens Specifications All dimensions in mm

Projection Lens	Working Distance	Maximum Workpiece	Field Diameter
5x	73	146	120
10x	79	158	70
20x	85	170	50
50x	50.5	101	50
100x	50.5	101	50