

# 900 Series Densitometers

## OPERATION MANUAL

### INTRODUCTION.

The 900 Series Densitometers are color reflection densitometers for photographic and graphic arts applications. This manual contains information about the following 900 series instruments:

- TR-900 series: TR-927, TR-927J, and TR-924
- RD-900 series: RD-917, RD-918, RD-919, and RD-921 (*The Answer*)
- TD-900 series: TD-903, TD-904, TD-904J, TD-929, TD-931, and TD-932

### SAFETY INSTRUCTIONS



The exclamation point within an equilateral triangle is intended to alert you to the presence of important operating and maintenance (servicing) instructions in the literature that accompanies the unit.



The lightning flash with arrowhead, enclosed within an equilateral triangle, is intended to alert you to the presence of uninsulated "dangerous voltage" within the product's enclosure. This voltage may be of sufficient magnitude to constitute a risk of electrical shock.

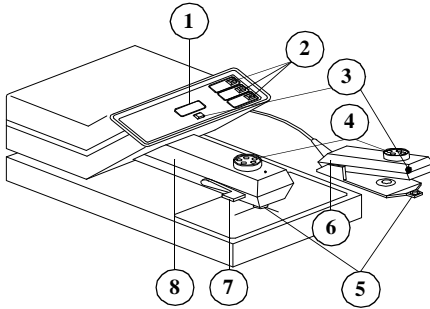
- **PLEASE READ AND FOLLOW INSTRUCTIONS**—Read and follow all safety and operating instructions before you attempt to install and operate this unit.
- **RETAIN THIS MANUAL FOR FUTURE REFERENCE**—Once you have read this manual, keep it handy for others to read or refer to when they need to operate the unit.
- **OBEY WARNINGS**—Please comply with all warnings and safeguards that we provide in this manual. They have been written to keep you and your unit safe.
- **CHOOSE PROPER POWER SOURCES**—This product should only operate with the power specified in the Electrical Requirements section of this manual.
- **DO NOT OVERLOAD CIRCUITS**—Do not overload wall outlets or use extension cords with this unit. This can result in a risk of fire or electric shock. Overloaded AC outlets and extension cords are dangerous, and can also affect performance. Periodically examine cords to make certain that they are not damaged, cracked or severely twisted during operation. Cords that show any signs of damage or wear should be replaced immediately.
- **PROTECT FROM WATER AND MOISTURE**—Maintain electrical safety when you use this unit. Do not use it in an area where there is possible hazard of electric shock from spilled water or other liquids or uncontrolled moisture.
- **CLEAN PROPERLY**—Make certain to unplug the densitometer before you attempt to clean it. Do not use liquid cleaners or aerosol cleaners on your unit. Such cleaners may not be compatible with the painted surfaces, and may actually damage the optics. Use only a slightly damp, lint-free cloth to clean the surface of the unit.

### SPECIFICATIONS

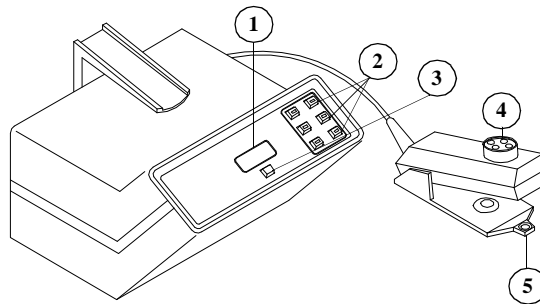
Specification	TR-900 Series	RD-900 Series	TD-900 Series
<b>Weight</b>	Approximately 37 lb (16.8 kg) maximum	Approximately 20 lb (9 kg) maximum	Approximately 33 lb (15 kg) maximum
<b>Electrical Requirements</b>	100-240VAC/ 50-60 Hz (as listed on instrument, set at factory)		
<b>Environmental Requirements</b>	50°-104° F (10° - 40° C) 10-80% Relative Humidity (Noncondensing)		

## GENERAL

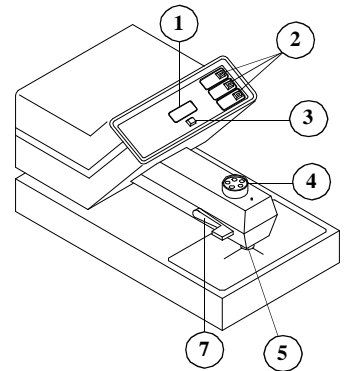
**Front of TR-900 Series**



**Front of RD-900 Series**



**Front of TD-900 Series**



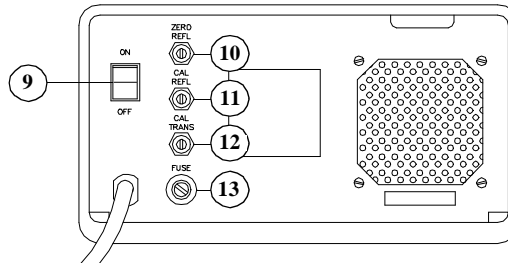
**Front of Unit Item List**

- |                     |                                  |
|---------------------|----------------------------------|
| 1- Display          | 5- Target Aperture               |
| 2- Function Buttons | 6- Reflection Measurement Head   |
| 3- Zero Buttons     | 7- Read Arm                      |
| 4- Filter Wheel     | 8- Transmission Measurement Head |

**Possible 900 Series Display Codes:**

- uuu** Filter wheel is between filter positions
- ccc** Attempt was made to take a measurement in a filter position that was not zeroed.
- 199** When % Dot measurement is attempted and the instrument has been zeroed to the paper but a value for the 100% solid has not been entered.

**Rear of 900 Series**



**Rear of 900 Series Item List**

- 9- On/Off Button
- 10- Zero Potentiometer
- 11- Reflection Calibration Potentiometer (RD & TR series)
- 12- Transmission Cal. Potentiometer (TR & TD Series)
- 13- Fuse Holder

### RS-232 Interface (for all units except TD-929)

The 900 series instruments are supplied with an RS-232 interface installed. This allows the instruments to be connected to a serial printer or the serial port of a computer. The interface protocol is as follows:

<b>Interface Type</b>	Asynchronous
<b>Baud Rate</b>	300
<b>Control Bits</b>	1 Start; 1 Stop; 10 Total
<b>Data Bits</b>	7
<b>Parity</b>	None
<b>Maximum Line Width</b>	20 characters, the last two of which are a Line Feed (LF) and a Carriage Return (CR).

**Note:** Model TR-924, TD-903, and RD-919 users must use a NULL MODEM adapter for a proper computer or printer connection. This adapter is available for a nominal cost from your local computer supply store. These interfaces are compatible with Kodak<sup>®</sup> Technet<sup>™</sup> interfaces.

## Instrument Response

Macbeth 900 Series Densitometers are color reflection and transmission instruments that conform to ISO 5/3- Spectral Conditions (all 900 Series), ISO 5/4- Geometric Conditions: Reflection (TR-900 and RD-900 Series only), and to ISO 5/2- , Geometric Conditions: Transmission (TR-900 and TD-900 Series only). Each instrument has a specific response as listed below:

Instrument	Responses	Filter Indicator				
		Red	Green	Blue	Visual/ Ortho	Ultraviolet
TR-927	Status T + Orthochromatic (ISO Type 2) + Ultraviolet (ISO Type 1)	Red	Green	Blue	White	White Circle
TR-927J	Status T + Visual + Ultraviolet (ISO Type 1)	Red	Green	Blue	Orange	White Circle
TR-924	Status A & M + Visual	Red + A or M	Green + A or M	Blue + A or M	Orange	N/A
RD-917	Status T + Orthochromatic (ISO Type 2)	Red	Green	Blue	White	N/A
RD-918	Status I + Visual	Cyan	Magenta	Yellow	Orange	N/A
RD-919	Status A + Visual	Red	Green	Blue	Orange	N/A
RD-921	Status T + Visual	Cyan	Magenta	Yellow	Orange	N/A
TD-903	Statuses A & M, + Visual	Red & A or M	Green & A or M	Blue & A or M	Orange	N/A
TD-904	Status T + Orthochromatic (ISO Type 2) + Ultraviolet (ISO Type 1)	Red	Green	Blue	White	White Circle
TD-904J	Status T + Visual + UV	Red	Green	Blue	Orange	White Circle
TD-929	Visual + Ultraviolet	N/A	N/A	N/A	Orange	White Circle
TD-931	Orthochromatic	N/A	N/A	N/A	N/A	N/A
TD-932	Visual	N/A	N/A	N/A	N/A	N/A

## CALIBRATION

**Note:** Throughout the calibration sections for the 900 Series, you will be directed to “hold the measurement head in the down position” and “hold the read arm in the down position.”

- To hold the reflection measurement head in the down position, you should press and hold the measurement head down until it touches its foot and continue to hold it in this position until directed to raise it.
- To hold the read arm in the down position, you should press the read arm all the way down and continue to hold it in this position until directed to raise it.

## Reflection Calibration Procedure

This procedure is intended for use with the following instruments:

- RD-917
- RD-918
- RD-919
- RD-921
- TR-927
- TR-927J
- TR-924

Before beginning the calibration procedure, make certain you have the instrument calibration reference. For Model TR-927 and RD-917, the calibration reference states on the reverse side that the Green filter should be used. All others state that the Visual filter should be used. Also, note the assigned values for Zero (White) and Calibration (Black).

**Note:** Steps 1 through 7 must be performed each time the instrument has power applied to it.

1. Power ON the instrument using the back panel ON/OFF button. The light in the Density button illuminates.
2. Make certain that the instrument calibration reference is clean and dust-free.
3. Place the filter wheel in the Green position (Model TR-927 and RD-917) or the Visual position (Models TR-927J and TR-924).

4. Position the reflection measurement head target aperture over the white patch on the calibration reference. Hold the measurement head in the down position.
5. Press and hold the ZERO button. A density value appears on the display. Continue to hold the measurement head in the down position.
  - *If the density value in the display is equal to the assigned value for the Zero (White) step. Go to step 7.*
  - *If the density value is not equal, continue to hold the ZERO button and the measurement head in the down position. Go to step 6.*
6. While holding in the ZERO button, adjust the ZERO potentiometer until the displayed value is equal to the value assigned to the calibration reference. After these values are equal, release the ZERO button. Continue to hold the measurement head in the down position.
7. Rotate the filter wheel to the next filter position and press the ZERO button. Continue this procedure until all filter positions have been “zeroed”.
 

**Note:** *Steps 8-10 need only be performed periodically, but it is best to perform daily calibration for accuracy.*
8. Place the filter wheel in the Green position (Model TR-927 and RD-917) or the Visual position (all other instruments).
9. Position the reflection measurement head target aperture over the black patch on the calibration reference. Hold the measurement head in the down position. **DO NOT PRESS THE ZERO BUTTON.**
10. While holding the measurement head in the down position, verify that the value shown in the display is equal to the value for the calibration reference. If it is not equal, adjust the CAL potentiometer until the values are equal. Raise the measurement head. The densitometer is now calibrated.

## Transmission Calibration Procedure

---

This procedure is intended for use with the following instruments:

- |           |           |          |
|-----------|-----------|----------|
| • TR-927  | • TD-904  | • TD-929 |
| • TR-927J | • TD-904J | • TD-932 |
| • TR-924  | • TD-903  | • TD-931 |

Before beginning the calibration procedure, make certain you have the instrument calibration reference. For Model TR-927, TD-904, and TD-931, use the Ortho filter. All should use the Visual filter.

**Note:** *Steps 1 through 7 must be performed each time the instrument has power applied to it.*

1. Power on the instrument using the ON/OFF button. The light in the button illuminates.
2. Make certain that the calibration reference is clean and dust free.
3. Place the filter wheel in the Ortho position (Model TR-927 and TD-904) or the Visual position (all other instruments). *TD-931 and TD-932 filters cannot be changed.*
4. Make certain there is no sample over the transmission measurement head target aperture.
5. Hold the read arm in the down position.
6. Press the ZERO button. “0.00” appears on the display. Continue to hold the read arm in the down position.
7. Rotate the filter wheel to the next filter position and press the ZERO button. Continue this procedure until all filter positions have been “zeroed”.

**Note:** *Steps 8- 10 need only be performed periodically, but for greatest accuracy it is best if calibration is verified at least daily.*

8. Place the filter wheel in the Ortho position (Model TR-927 and TD-904) or the Visual position (all other instruments).
9. Position the calibration reference over the target aperture. Hold the read arm in the down position. **DO NOT PRESS THE ZERO BUTTON.**
10. While holding the read arm in the down position, observe the instrument’s display and verify that the value shown is equal to the value for the calibration reference. If it is not equal, adjust the CAL potentiometer until the values are equal. Raise the instrument’s read arm. The densitometer is now calibrated.

## OPERATION

## Transmission Operation

---

*Density Mode (Transmission- all TD and TR instruments)- for transmission measurements of Absolute Density*

---

1. Press the DENSITY button. The light in the button illuminates.
2. Select the filter position.
3. Place the sample to be measured over the transmission measurement head target aperture. Lower the read arm to the down position and then raise it. The Density value appears on the display.

*Null Density Mode (Transmission- all TD and TR instruments)- for transmission measurements relative to a standard sample or density differences*

---

1. Press the NULL DENSITY button. The light in the button illuminates.
2. Select the filter position.
3. Place the sample that is to be used as the “standard” (or the area that needs to be continually subtracted out of the measured value) over the transmission measurement head target aperture. Hold the read arm in the down position.
4. Press the ZERO button. “0.00” appears on the display. Raise the read arm.
5. Place the new sample area that is to be measured over the target aperture. Lower the read arm to the down position and then raise it. The NULL DENSITY value appears on the display.
6. Continue taking measurements until a new value for the “standard” (value to be subtracted out) is needed.

*+/- % Dot Mode (Models TR-927, TR-927J, TD-904, TD-904J and TD-931 only)- for the measurement of half-tone screen tints*

---

These models can measure both Positive and Negative Dot Areas. Positive Dot area is used when creating POSITIVE images from negatives. Negative Dot Area is used when creating NEGATIVE images from Negatives (dupes). This function can only be used with the Orthochromatic filter (or Visual filter for the TR-927J and TD-904J) and UV filter.

1. Press the +/- % DOT button. The light in the button illuminates. The instrument is now in the “-% Dot” mode (100 - % dot measured) and a minus sign (“-”) appears with each measurement made.
  - If the +/- % DOT button is pressed again, the instrument switches to the “+% Dot” mode and a plus sign (“+”) appears each time a measurement is made. The values measured in the “+ % Dot” mode are also equivalent to % Transmission.
  - If you press the +/- % DOT button once more, the instrument returns to the “-% Dot” mode.
2. Place an area of clean substrate (film base) over the transmission measurement head target aperture. Lower the read arm to the down position and then raise it. For best results in dot area measurements, the instrument should be “zeroed” on a fringe or “ghost” dot (the last dot area step on the sample film that will NOT reproduce).
3. Press the ZERO button. “00” appears on the display.
4. Repeat step 3 for the UV filter by doing the following:
  - Hold the read arm in the down position.
  - Rotate to the UV filter and press the ZERO button.
  - Raise the read arm.
5. Select the filter position for the application you wish to measure (e.g., reproductions to Orthochromatic sensitive materials or reproductions to Ultraviolet sensitive materials). Place the sample over the transmission measurement target aperture. Lower the read arm to the down position and then raise it. The % Dot value is displayed.

**Note:** *When measuring transmission % Dot of films, it is not necessary to input a value for 100% as the minimum density of the solid is assumed to be above 3.00 optical density. This value is the lowest acceptable density needed when exposing contacts, dupes and plate materials. This value should be verified by measuring the 100% dot area regions on the film sample in the density mode. If the values do not meet or exceed this 3.00 density value, make adjustments in the processing conditions. Density values for the solid (100%) dot areas that fall below 2.20 optical density can impact accuracy.*

## Reflection Operation

---

*Density Mode- for the measurement of Absolute Density*

---

1. Press the DENSITY button. The light in the button illuminates.
2. Select the filter position.
3. Place the target aperture over the area that is to be measured. Lower the measurement head to the down position and then raise it.

*Expanded Density Mode (Models RD-918 and RD-921 only)- for Density measurements up to .999 only.*

---

1. Make certain the DENSITY button is illuminated.
2. Press the DENSITY button again.
3. Perform measurements as outlined above.
4. If values above 0.999 are measured, the instrument will “auto range” and displays only two decimal places (e.g. 1.24).
5. Return to the two decimal place density mode by pressing the DENSITY button again.

*Null Density Mode- for the measurement relative to a standard sample or density differences*

---

1. Press the NULL DENSITY button. The light in the button illuminates.
2. Select the filter position you wish to use.
3. Place the target aperture over the sample area that is to be used as the “standard” (or the area that needs to be continually subtracted out of the measured value).
4. Hold the measurement head in the down position and press the ZERO button. “0.00” appears on the display.
5. Place the target aperture over the new area that is to be measured. Lower the measurement head to the down position and then raise it.
6. Continue taking measurements as needed until a new value for the “standard” (value to be subtracted out) is needed.

*% Dot Area 1 Mode- (Models RD-918, and RD-921 only) for measurements using a standard N-Factor of 1.65*

---

1. Press the % DOT AREA 1 button. The light in the button illuminates.
2. Place the target aperture over an area of clean substrate (paper). Hold the measurement head in the down position.
3. Press the ZERO button. “00” appears on the display.
4. Rotate through each filter position with the measurement head in the down position. “Zero” each filter to the substrate. Raise the measurement head.
5. Select the filter position for the tint color you wish to measure.
6. Place the target aperture over an area of 100% coverage (a solid area) that is equal to the tint area color you want to measure. Hold the measurement head in the down position.
7. Press the ZERO button twice. “100” appears on the display. Repeat this procedure using the appropriate solid color patches for filter positions of each color you wish to measure (this can be done as needed).
8. Place the target aperture over the tint area you wish to measure. Lower the measurement head to the down position and then raise it. The value displayed is in Percent Dot area.

**Note:** *Re-entering the value for “zero” or the solid density for a color can be done at any time by selecting the appropriate filter and performing the procedure outlined above. Once the sequence has been performed in order once, re-entering “zero”, the solid density or measuring a tint can be performed in any order. If the ZERO button is accidentally pressed twice pressing it a third time returns the display to zero AS LONG THE MEASUREMENT HEAD IS NOT RAISED.*

*% Dot Area 2 Mode- (Models RD-918 and RD-921 only) for measurements using an adjustable N-Factor*

---

**Note:** Both % Dot Area modes use the Yule-Nielsen dot area equation which incorporate a variable N-Factor for measuring mechanical dot areas on differing substrates. It is common practice in the Graphic Arts pressroom to use the Murray-Davies dot area equation which does not use these N-Factors. These instruments can also perform the Murray-Davies dot area measurements if an N-Factor of 1.00 is set on the instrument.

This mode has an adjustable N-Factor and can be set in the range 0.00 to 9.99. A list of common N-Factors is included below. This mode can also be used to “calibrate” the instrument to a specific or known screen value. To adjust the N-Factor, proceed as follows:

1. Press and hold the % DOT AREA 2 button.
2. Adjust the % DOT AREA 2 potentiometer at the rear of the base unit labeled “Variable N” until the display shows the desired N-Factor value. Release the button.
3. You are now in the % Dot Area 2 mode and the appropriate N-Factor is set. Perform dot area measurements as outlined in “%Dot Area 1 Mode”.

To calibrate the instrument to a specific or known tint value:

1. In the % DOT AREA 2 mode, perform all steps as listed in the “% DOT AREA 1” mode first.
2. While measuring the appropriate TINT value to which the instrument should be calibrated, and with the measurement head in the down position, adjust the VARIABLE N % DOT AREA 2 potentiometer until the value displayed is equal to the value desired.
3. Raise the measurement head.
4. Press the % DOT AREA 2 button to verify the N-Factor now set.

N-Factor Reference Table					
Material/ Application	Coated paper	Uncoated Paper	Aluminum Printing Plates	Cromalin	Murray-Davies Equation
N-Factor	1.65	2.70	1.20	2.60	1.00

*% Trap Mode (RD-918 and RD-921 only)- for the measurement of overprint ink trapping*

---

1. Press the % TRAP button. The light in the button illuminates.
2. Place the target aperture over an area of clean substrate (paper). Hold the measurement head in the down position.
3. Press the ZERO button. “0.00” appears on the display.
4. Rotate through each filter position with the measurement head down and “zero” each filter to the substrate. Raise the measurement head. The instrument displays “1” indicating the top color is to be measured.
5. Select the filter position which corresponds to the top color of the two-color overprint you wish to measure. For example, for a magenta/yellow (red) overprint, yellow is the second (top) color printed and therefore the yellow filter should be used.
6. Position the target over the solid patch of the first or bottom color (e.g, magenta).
7. Perform a measurement. The density of the patch as measured is displayed. When the measurement head is raised, “2” appears on the display.
8. Position the target aperture over the solid patch of the second or top color (e.g, yellow).
9. Perform a measurement. The density of this patch as measured appears on the display. When the measurement head is raised, “3” appears on the display.
10. Measure the overprint color (e.g, red). The density of this patch as measured appears on the display. When the measurement head is raised, the Trap value appears on the display.

**Note:** If the wrong patch is accidentally measured, press the % TRAP button or change to a different filter position; “1” appears on the display. Return to step 5 to perform any additional measurements.

1. Press the HUE ERROR/GRAYNESS button. The light in the button illuminates.
2. Place the target aperture over an area of clean substrate (paper).
3. Hold the measurement head in the down position.
4. Press the ZERO button. "0.00" appears on the display.
5. Rotate through each filter position with the measurement head in the down position and "zero" each filter to the substrate.
6. Raise the measurement head. "1" appears on the display indicating the first filter measurement is to be made.
7. Position the target aperture over the area that is to be measured. Hold the measurement head in the down position.
8. Select the red, green or blue filter and perform a measurement.
9. Press the ZERO button. "2" appears on the display.
10. Keeping the measurement head in the down position, rotate the filter wheel to another filter (but not the Visual) and press the ZERO button again. "3" appears on the display.
11. Rotate the filter wheel to the final filter (but not the Visual) and press the ZERO button.
12. Raise the measurement head. The Hue Error value preceded by a "+" appears on the display.
13. To display Grayness, press the HUE ERROR/GRAYNESS button once, after the Hue Error value has appeared. The Grayness value preceded by a "-" appears on the display.

**Note:** *If the Hue Error/Grayness function is exited to use any of the other functions, the value for zero is retained in instrument memory until you turn off the instrument.*

## MAINTENANCE AND CLEANING

### CAUTION

Before performing any maintenance on the densitometer, make certain the instrument is disconnected from the main power source. Failure to disconnect the instrument from its power source could result in personal injury and damage the instrument.

### Aperture Replacement (For Transmission Only)

---

1. Using a plastic screw driver (not supplied) or your fingernail, gently pry up the existing aperture in the base portion of the instrument. Make certain to pry it evenly from four sides. You may need to pry each side a little bit at a time.
2. Once the aperture has been lifted up from the base plate, use your fingers to gently rock it out of its positioning hole.
3. Replace it with the aperture appropriate to your application. Standard apertures come in 1, 2 and 3mm sizes. A blank aperture that must be drilled by the purchaser and a 1/2mm aperture are also available as accessories. Consult your Macbeth Price List for additional information or call your nearest Macbeth Factory Service Center.



## Lamp Replacement

### CAUTION

Do not touch the glass portions of the bulb while you are cleaning or replacing it. Natural oils, creams, and other materials found on the hands can shorten the life of the lamp. Use a clean cloth or paper to hold it. If it is touched, clean it with Isopropyl alcohol and a dust free cloth.

### Reflection Probe

1. Turn the reflection probe on its side.
2. Press and hold the foot to the measurement head.
3. Through the foot of the probe, unscrew the retaining screw that secures the small access door on the measurement head. Pull the door off of the instrument.
4. Tilt down the assembly that holds the lamp so the lamp points out through the bottom. A small tab on the assembly can be used to pull the assembly down.
5. Remove the lamp by using a 5/16 inch open-end wrench or pliers to unscrew the lamp from the socket.
6. Replace the lamp. Tighten the new lamp into the socket. Press the lamp socket assembly back into the measurement head housing making certain to align the top lip with the slot at the rear of the measurement head. When the assembly is pushed back into position, it should “snap” into place. Do not overtighten.
7. When the lamp assembly is properly positioned, the bulb should be in line with the fiber optic bundle and the distance between the end of the bulb and the end of the bundle should be approximately 1/16”.
8. Replace the small access door and secure it. Do not overtighten.

### Transmission Lamp Replacement

1. Turn the instrument on its side. Remove the bottom cover by removing the screws in the unit’s rubber feet.
2. Note the position of the metal plate at the base of the lamp. This plate must be returned to this position later.
3. Loosen the screws which hold the lamp tightly in place.
4. Pull the old lamp out of its socket.
5. Replace the lamp with an identical lamp.
6. Retighten the small screw which holds the lamp tightly in place. Make certain the metal plate at the base of the lamp is in its original position.
7. Replace the bottom cover. The procedure is now complete.

## Fuse Replacement

To replace the fuse in the instrument, use a small screwdriver to remove the red portion of the fuse holder. Remove the fuse and replace it with the appropriate part as listed below:

Specification	TR-900		RD-900		TD-931, TD-932		TD-903, TD-904J, and TD-929	
Voltage/Unit	100 VAC or 117 VAC	230 VAC	100 VAC or 117 VAC	230 VAC	100 VAC or 117 VAC	220 VAC or 240 VAC	100 VAC or 117 VAC	220 VAC or 240 VAC
Necessary Fuse Value	1/2 amp #3AG Slo Blo	1/4 amp #3AG Slo Blo	1/2 amp #3AG Slo Blo	1/4 amp #3AG Slo Blo	3/4 amp #3AG Slo Blo	3/8 amp #3AG Slo Blo	1 amp #3AG Slo Blo	1/2 amp #3AG Slo Blo

## Lens Cleaning

---

The lens directly under the stage plate should periodically be cleaned using the following procedure.

1. Remove the four screws that hold the sample plane stage in place. The stage is the rectangular white plastic plate which holds the measuring aperture. The lens directly below the aperture is the one to clean.
2. Use clean (oil free) compressed air, (from a can is preferred), to blow away loose dust from the lens.
3. Use a soft brush, such as a Camel's hair brush, and gently brush away the remaining loose dust from the lens. Make certain no stray brush hairs are left on the lens.
4. Gently clean the lens using Isopropyl alcohol and lens tissue.
5. Using the compressed air again, blow off any dust from the mirror which is directly under the lens assembly. **DO NOT TOUCH THE MIRROR.** This is a front surface reflecting mirror and can be easily damaged.

**Note:** *If there is a VERY noticeable film on the mirror which is not removed by the compressed air, the mirror should be cleaned VERY GENTLY with distilled water and lens tissue ONLY. DO NOT APPLY PRESSURE when using the lens tissue. The mirror should only be cleaned if absolutely necessary.*

6. Replace the stage plate and screws in their original positions.

**Spare Parts:** Consult your Macbeth Price List for additional information or call your nearest Macbeth office.

---

1/4 Amp #3 Slo Blo Fuse	31007002	Lamp	30950000
1/2 Amp #3 Slo Blo Fuse	31005001	Aperture .5 mm	21031450
3/4 Amp #3 Slo Blo Fuse	31007002	Aperture 1 mm	21020301
3/8 Amp #3 Slo Blo Fuse	31003000	Aperture 2 mm	21020302
1 Amp #3 Slo Blo Fuse	31010001	Aperture 3 mm	21020303

TECHNICAL PUBLICATION No. CBH2-900/1.0-97-10

ISSUED: March 1997

Part No. 17800150

Changes are made periodically to the information contained in this manual. These changes will be incorporated into new editions of this publication.

Macbeth, Division of Kollmorgen Instruments Corporation, makes no warranty of any kind with regard to the material contained in this manual, including, but not limited to, implied warranties or fitness for a particular purpose. Macbeth shall not be liable for errors contained herein or for consequential damages in connection with the use of this material. This manual, as well as any revisions are the copyright of Macbeth, Division of Kollmorgen Instruments Corporation. Any reproduction of the publication in whole or in part without the express permission of Macbeth is a breach of this copyright.

Macbeth® is a registered trademark of Kollmorgen Instruments Corporation.

Kodak® is a registered trademark and Technet™ is a trademark of the Eastman Kodak Company in USA

### Macbeth®

Division of Kollmorgen Instruments Corporation

### World Wide Web Sites:

<http://www.macbethdiv.com>

<http://www.munsell.com>

### United States of America

Macbeth Division of Kollmorgen Instruments Corp.

405 Little Britain Road

New Windsor, NY 12553-6148

Tel: 800-MACBETH (USA)

800-421-COLOUR (Canada)

914-565-7660 (Outside USA and Canada)

Fax: (914) 561-0267

### Germany

Kollmorgen Instruments GmbH

Fraunhoferstrasse 14

D-8033 Martinsried, Munich

Tel: (49) 89 85707 0 Fax:(49) 89 85707 509

### Hong Kong

Macbeth Division of Kollmorgen (UK) Ltd.

12A Wardley Centre

9-11 Prat Avenue

Tsim Sha Tsui

Kowloon

Tel: (852) 2368 7738 Fax: (852) 2368 6717

### United Kingdom

Macbeth Division of Kollmorgen (UK) Ltd.

Macbeth House

Pacific Road

Altrincham

Cheshire WA14 5BJ

Tel: (44) 161 926 9822 Fax: (44) 161 926 9835

CE