

# ML1

## Manual Lensometer®

User's Guide



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# Warnings and Cautions

Reichert Technologies (Reichert) is not responsible for the safety and reliability of this instrument when:

- Assembly, disassembly, repair, or modification is made by unauthorized dealers or persons.
- Instrument is not used in accordance with this User's Guide.

## **WARNING: AN INSTRUCTION THAT DRAWS ATTENTION TO THE RISK OF INJURY OR DEATH.**



**WARNING:** UNITED STATES FEDERAL LAW AND EUROPEAN REGULATIONS REQUIRE THAT THIS DEVICE BE PURCHASED ONLY BY A PHYSICIAN OR A PERSON ACTING ON BEHALF OF A PHYSICIAN.

**WARNING:** THIS INSTRUMENT SHOULD BE USED IN STRICT ACCORDANCE WITH THE INSTRUCTIONS OUTLINED IN THIS USER'S GUIDE. THE SAFETY OF THE OPERATOR AND THE PERFORMANCE OF THE INSTRUMENT CANNOT BE GUARANTEED IF USED IN A MANNER NOT SPECIFIED BY REICHERT TECHNOLOGIES.

**WARNING:** DO NOT REPAIR OR SERVICE THIS INSTRUMENT WITHOUT AUTHORIZATION FROM THE MANUFACTURER. ANY REPAIR OR SERVICE TO THIS INSTRUMENT MUST BE PERFORMED BY EXPERIENCED PERSONNEL OR DEALERS WHO ARE TRAINED BY REICHERT SO THAT CORRECT OPERATION OF THIS INSTRUMENT IS MAINTAINED.

**WARNING:** MODIFICATIONS TO THIS INSTRUMENT IS NOT ALLOWED. ANY MODIFICATION TO THIS UNIT MUST BE AUTHORIZED BY REICHERT SO THAT CORRECT OPERATION IS MAINTAINED.

**WARNING:** IF THIS INSTRUMENT IS MODIFIED, APPROPRIATE INSPECTION AND TESTING MUST BE CONDUCTED TO ENSURE CONTINUED SAFE USE OF THIS INSTRUMENT.

**WARNING:** THE INTERNAL CIRCUITRY OF THIS INSTRUMENT CONTAINS ELECTROSTATIC DISCHARGE SENSITIVE DEVICES (ESDS) THAT MAY BE SENSITIVE TO STATIC CHARGES PRODUCED BY THE HUMAN BODY. DO NOT REMOVE THE COVERS WITHOUT TAKING PROPER PRECAUTIONS.

**WARNING:** THE EQUIPMENT OR SYSTEM SHOULD NOT BE USED ADJACENT TO OR STACKED WITH OTHER EQUIPMENT AND THAT IF ADJACENT OR STACKED USE IS NECESSARY, THE EQUIPMENT OR SYSTEM SHOULD BE OBSERVED TO VERIFY NORMAL OPERATION IN THE CONFIGURATION IN WHICH IT WILL BE USED.

**WARNING:** THIS INSTRUMENT IS NOT SUITABLE FOR USE IN THE PRESENCE OF FLAMMABLE ANESTHETIC MIXTURES, SUCH AS OXYGEN OR NITROUS OXIDE.

**WARNING:** THE BATTERY SHOULD ONLY BE REPLACED WITH THE BATTERY SPECIFIED IN THIS MANUAL. USE OF ANOTHER BATTERY MAY CAUSE FIRE OR AN EXPLOSION.

**WARNING:** DO NOT PLACE A SHORTING DEVICE BETWEEN THE BATTERY TERMINALS, OR ALLOW THE BATTERY TO BECOME WET. MISUSE OR IMPROPER DISPOSAL OF THIS BATTERY MAY CAUSE IT TO BECOME VERY HOT, IGNITE OR EXPLODE. DAMAGE TO THIS UNIT AND/OR SERIOUS PERSONAL INJURY MAY RESULT.

**WARNING:** DO NOT RECHARGE THE BATTERIES. THE BATTERY IS NOT DESIGNED TO BE CHARGED BY ANY ELECTRICAL SOURCE. CHARGING COULD GENERATE GAS AND INTERNAL SHORT-CIRCUITING, LEADING TO DISTORTION, LEAKAGE, OVERHEATING, EXPLOSION OR FIRE.

**WARNING:** DO NOT EXPOSE THE BATTERIES TO TEMPERATURES ABOVE 140°F, DISASSEMBLE THE BATTERIES, OR DAMAGE TO THIS UNIT AND/OR SERIOUS PERSONAL INJURY MAY RESULT.

**WARNING:** NEVER ALLOW LIQUID LEAKING FROM THE BATTERY TO GET IN YOUR EYES OR MOUTH AS THIS LIQUID COULD CAUSE SERIOUS PERSONAL INJURY. IF IT COMES IN CONTACT WITH YOUR EYES OR MOUTH, FLUSH THEM IMMEDIATELY WITH PLENTY OF WATER AND CONSULT A PHYSICIAN.

## Warnings and Cautions (continued)

**WARNING:** ALWAYS KEEP BATTERIES OUT OF THE REACH OF INFANTS AND YOUNG CHILDREN TO PREVENT THEM FROM BEING SWALLOWED. IF SWALLOWED, CONSULT A PHYSICIAN IMMEDIATELY.

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**CAUTION: AN INSTRUCTION THAT DRAWS ATTENTION TO THE RISK OF DAMAGE TO THE PRODUCT.**



**CAUTION:** THE INTERNAL CIRCUITRY OF THE INSTRUMENT CONTAINS ELECTROSTATIC DISCHARGE SENSITIVE DEVICES (ESDS) THAT MAY BE SENSITIVE TO STATIC CHARGES PRODUCED BY THE HUMAN BODY. DO NOT REMOVE THE COVERS WITHOUT TAKING PROPER ESDS PRECAUTIONS.

**CAUTION:** DO NOT USE SOLVENTS OR STRONG CLEANING SOLUTIONS ON ANY PART OF THIS INSTRUMENT AS DAMAGE TO THE UNIT MAY OCCUR. SEE MAINTENANCE SECTION FOR DETAILED CLEANING INSTRUCTION.

**CAUTION:** MEDICAL ELECTRONIC EQUIPMENT NEEDS SPECIAL PRECAUTIONS REGARDING EMC AND NEEDS TO BE INSTALLED AND PUT INTO SERVICE ACCORDING TO THE EMC INFORMATION PROVIDED IN THE ACCOMPANYING DOCUMENTS.

**CAUTION:** PORTABLE AND MOBILE RF COMMUNICATIONS EQUIPMENT CAN AFFECT MEDICAL ELECTRICAL EQUIPMENT.

**CAUTION:** THIS INSTRUMENT IS NOT TO BE USED NEAR HIGH-FREQUENCY EMITTING SURGICAL EQUIPMENT.

# Symbol Information

The following symbols appear on the instrument.



Consult Instructions for Use symbol indicating important operating and maintenance instructions that are included in this User's Guide



Caution Symbol indicating important information and maintenance instructions that are included in the User's Guide



Type B Product Classification  
Class I Equipment, Continuous Operation



Protective Earth



ON / OFF



DC Volts



Date of Manufacture

**REF**

Catalog Number

**SN**

Serial Number



Waste of Electrical and Electronic Equipment



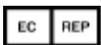
Compliance to Medical Device Directive 93/42/EEC



Fragile Contents in Shipping Container - handle with care



Keep Dry - Package shall be kept away from rain



Authorized Representative in European Community



This Way Up - Indicates the correct upright position of package

# Introduction

Congratulations on the purchase of your new ML1 Manual Lensometer®.

The ML1 will provide you with fast, accurate and reliable measurements of eyeglass lenses and contact lenses for many years. The instrument utilizes an innovative battery-powered, LED illumination system to enable clear and precise measurements of single, multifocal, and progressive lenses.

This User's Guide is designed as a training and reference manual for operation, maintenance and troubleshooting. We recommend that you read it carefully prior to use and follow the instructions in the guide to ensure optimum performance of your new instrument.

Please retain this manual for future reference and to share with other users. Additional copies can be obtained from your authorized Reichert dealer or from the Reichert Customer Service department. Contact information is provided at the end of this guide.

## **Indications for Use**

The ML1 is a battery powered lensmeter that is intended for measuring spectacle lenses as well as contact lenses.

## **Contraindications**

None.

## Instrument Setup (continued)

### Unpacking

1. Open the top of the shipping box and remove the User's Guide from the top. Refer to Figure SU-01.
2. Remove the Styrofoam Box and set on a flat surface. Refer to Figure SU-02.
3. Cut or remove the Tape that is at the seam of the Styrofoam Box. Refer to Figure SU-02.

**CAUTION:** THERE IS ONLY A THIN AMOUNT OF STYROFOAM BETWEEN THE INSTRUMENT AND THE BOX. BE CAREFUL NOT TO CUT INTO THE TAPE AND STYROFOAM TOO DEEP IF USING A KNIFE OR SCISSORS, OR THE ML1 MAY BECOME SCRATCHED OR DAMAGED.

4. Lift off the top part of the Styrofoam Box. Refer to Figure SU-03.
5. Remove the ML1 Lensometer and stand it upright on a flat surface.
6. Remove the accessories. Refer to Figure SU-03.

#### Accessories Included:

- 2 AAA Batteries (P/N 13950000-902)
- Dust Cover (P/N 15110-016)
- Contact Lens Holder (P/N 15110-017)
- User's Guide (P/N 15110-101)  
(Removed in step 1)

7. Carefully remove the plastic bag that was protecting the ML1 during shipping. Refer to Figure SU-03.
8. Remove the Rubber Band, Styrofoam Block, and package of Desiccant that was holding the Marking Pens upright during transport. Refer to Figure SU-04.
9. Keep the packaging in case transportation of the ML1 is required in the future.

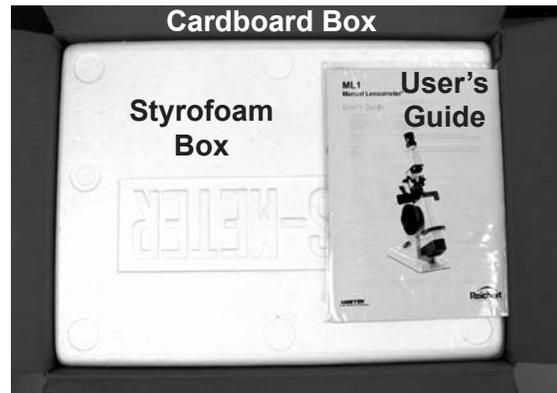


Figure SU-01 User's Guide

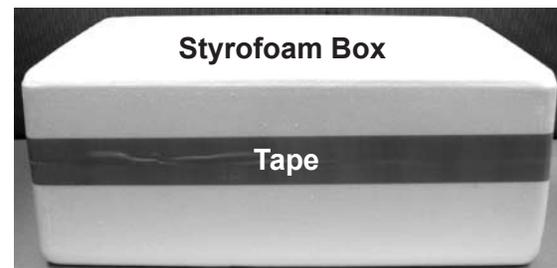


Figure SU-02 Styrofoam Box

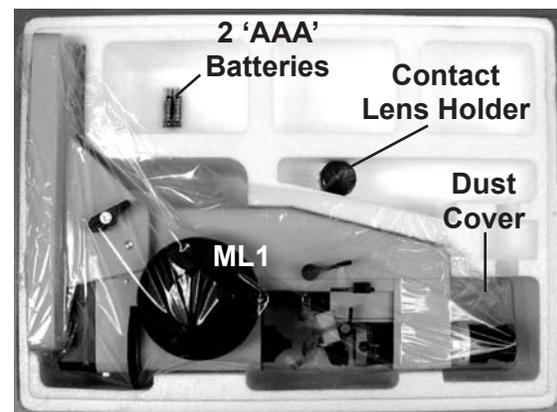


Figure SU-03 ML1 and Accessories

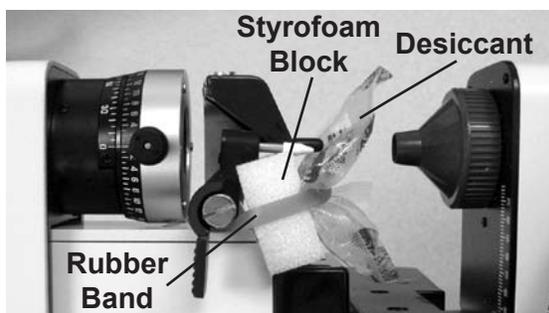


Figure SU-04 Rubber Band & Styrofoam

## Instrument Setup (continued)

### Parts Diagram

#### ML1 Parts

1. On-Off Switch
2. Table Lift Lever
3. Lens Clamp Handle
4. Marking Lever
5. Focusable Eyepiece
6. Prism Compensator
7. Lens Clamp
8. Lens Holder
9. Power Wheel
10. Axis Wheel
11. Battery Compartment
12. Tilt Lock Lever
13. Lens Table

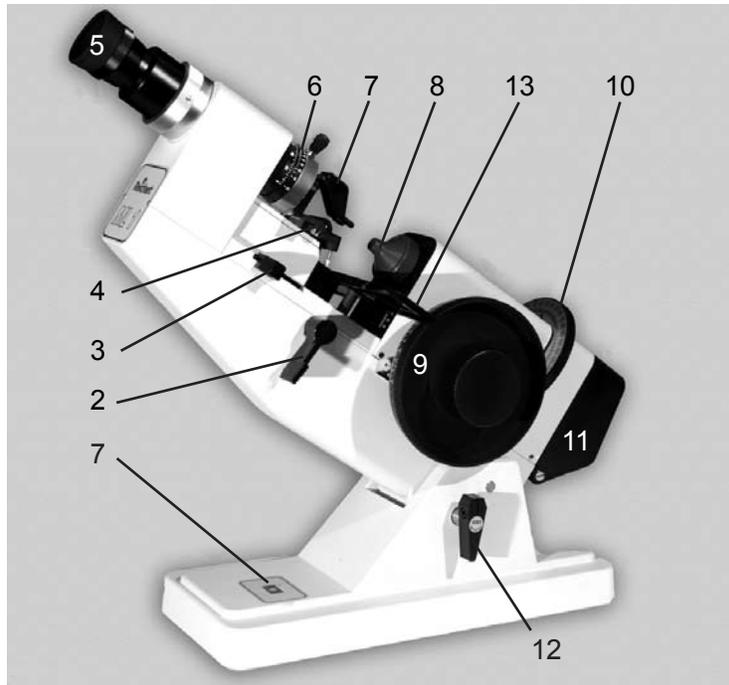


Figure SU-05 ML1 Parts Diagram

#### Accessories

1. Dust Cover (P/N 15110-016)
2. Contact Lens Holder (P/N 15110-017)
3. 2 "AAA" Batteries (P/N 13950000-902)

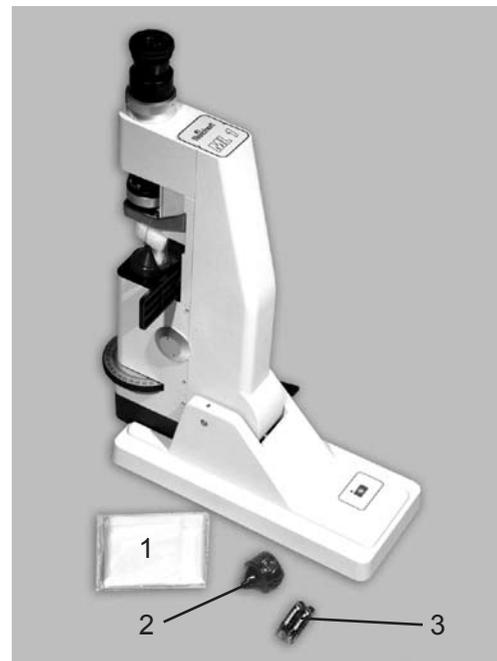


Figure SU-06 MML1 & Accessories

## Instrument Setup (continued)

### Battery Installation

1. Using a flathead screwdriver, remove the Screw that secures the Battery Compartment to the ML1. Refer to Figure SU-07.
2. Open the Battery Compartment and install the two “AAA” Batteries. Refer to Figure SU-08.
3. Close the Battery Compartment and secure it with the screw. Refer to Figure SU-07.

### Tilt Angle

The angle of the main body can be adjusted for comfort or convenience.

**Note:** When measuring contact lenses, the ML1 needs to be fully upright.

1. Rotate the Tilt Lock Lever counter-clockwise to loosen the tilt mechanism. Refer to Figure SU-08.
2. Move the main body up or down to the desired position.
3. Tighten the Tilt Lock Lever to secure the main body in the desired position. Refer to Figure SU-08.

### Turning the ML1 On and Off

To turn on the instrument, press the On-Off Switch. Refer to Figure SU-09. A green LED light will illuminate, indicating the unit is on.

**Note:** The ML1 will enter ‘sleep mode’ and turn off automatically after approximately 5 minutes.

To turn the power off, press the On-Off Switch again. Refer to Figure SU-09. The green LED light will turn off, indicating that the power is off.

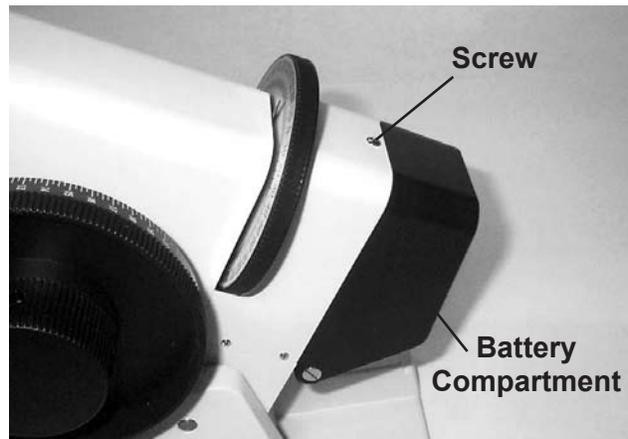


Figure SU-07 Battery Screw

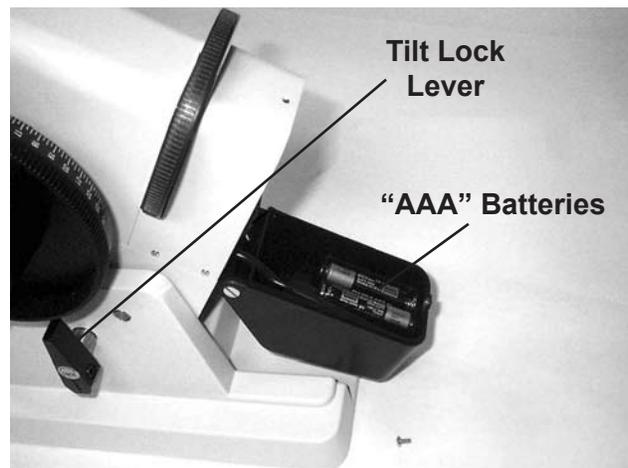


Figure SU-08 Install Batteries



Figure SU-09 On-Off Switch

## Instrument Setup (continued)

### Focus the Eyepiece

It is important to insure that the ML1 is focused before use. Each user must focus the instrument for their individual eye.

**Note:** Failure to focus the ML1 could result in inaccurate measurements.

1. Place a white sheet of paper at the position of the Lens Holder. This will provide enough light to illuminate the reticle in the Eyepiece.
2. Turn the Eyepiece counterclockwise to the stop.
3. With both eyes open, look through the Eyepiece with your dominant eye.
4. Slowly turn the Eyepiece clockwise until the black reticle lines are in sharp focus. Refer to Figure SU10.

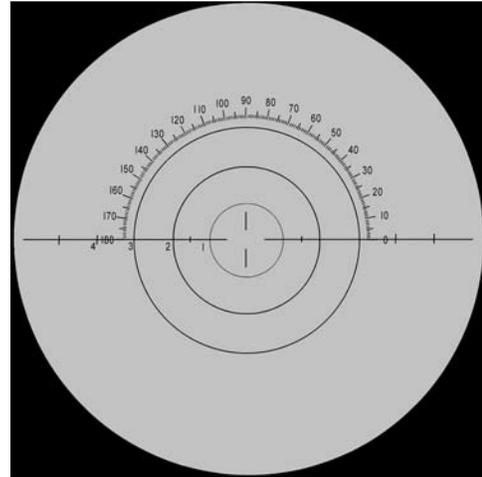
**Note:** Do not go beyond that point.

5. Remove the paper.
6. Press the ON-OFF Switch. The green LED light will illuminate and the internal LED will turn on.

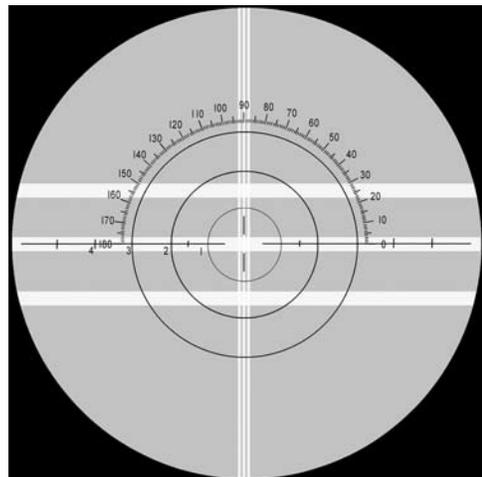
**Note:** The ML1 will enter 'sleep mode' and turn off automatically after approximately 5 minutes.

7. Turn the Power Wheel until the illuminated cross-line target becomes clear.
8. The power scale should read "0". Refer to Figure SU-11.
9. If it does not, repeat from step 1.

**Note:** If the power scale does not read "0" without a lens in place, the instrument needs calibration.



**Figure SU-10 Reticle Lines**



**Figure SU-11 Zero Power**

# Instructions For Use

## Holding a Lens for Measurement

1. Place the concave, or back side of the lens against the Lens Holder.

**Note:** If the lens is edged, or “laid out” for cutting, place the 180° line parallel to the Lens Table.

**Note:** Be sure the center point of the lens is in the center of the Lens Holder.

2. If the lens is mounted in a frame, raise the Lens Table using the Lens Table Lever until the Lens Table supports the bottom of the frame.
3. Pull back on the Lens Clamp Handle and slowly allow the Lens Clamp to move forward to contact the lens.

**Note:** Do not release the Handle until the Lens Clamp makes contact with the lens.

## Lens Analysis

1. With the lens in position, rotate both the Power Wheel and Axis Wheel to sharply focus the 3 narrow lines.

**Note:** Make certain that the last focusing movement of the Power Wheel is topside toward you.

2. If both the Sphere Lines (3 narrow lines) and Cylinder Lines (3 wide lines) come into focus at the same time, the lens has sphere power only and the sphere power can be read on the Power Wheel. Refer to Figure IU-01.
3. If only the Sphere Lines or only the Cylinder Lines can be focused sharply, the lens has cylinder power. Refer to Figures IU-02 and IU-03.
4. By turning the Power Wheel, you will be able to find a position at which the Sphere Lines are in focus. Refer to Figure IU-02.
5. When the Sphere Lines are in focus, turning the Power Wheel only will bring the Cylinder Lines into focus. Refer to Figure IU-03.

**Note:** The prescription of any cylinder lens can be written in two forms; one with a plus cylinder and the other with a minus cylinder.

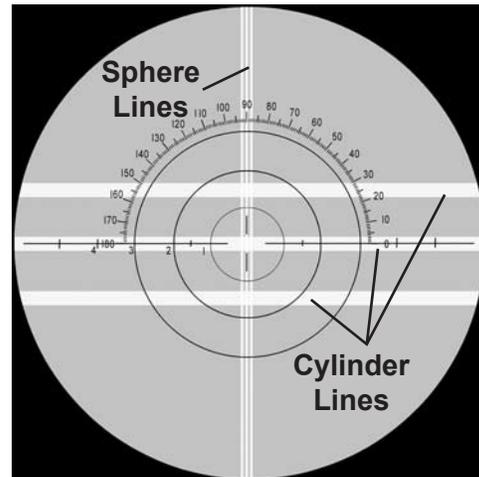


Figure IU-01 Sphere Power Only

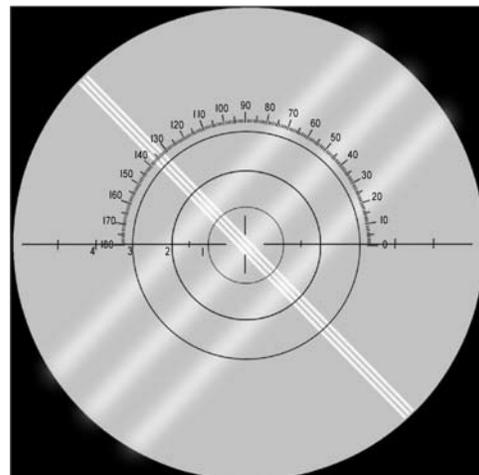


Figure IU-02 Sphere Power Focused

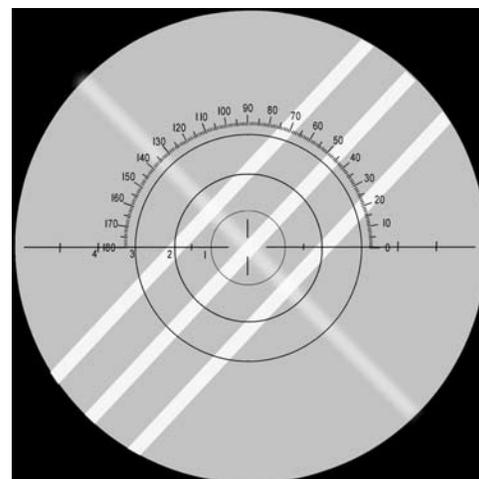


Figure IU-03 Cylinder Power Focused

# Instructions For Use (continued)

## Lens Analysis (continued)

### Reading Plus Cylinder

1. Set the Power Wheel at the lower of the two focusing positions (toward the minus end of the scale).
2. Rotate the Axis Wheel until the Sphere Lines are in focus and unbroken. Refer to Figure IU-02.
3. Read the sphere power and axis from the Power Wheel and Axis Wheel.
4. Rotate the Power Wheel until the Cylinder Lines are in focus. Refer to Figure IU-03.
5. The cylinder power is the difference between the first and second powers indicated on the Power Wheel.
6. Refer to Figure IU-04 for a sample reading of plus cylinder lenses.

### Reading Minus Cylinder

1. Set the Power Wheel to the higher of the two focusing positions (toward the plus end of the scale).
2. Rotate the Axis Wheel until the sphere lines are in focus and unbroken. Refer to Figure IU-02.
3. Read the sphere power from the Power Wheel and the axis from the Axis Wheel.
4. Rotate the Power Wheel until the Cylinder Lines are in focus. Refer to Figure IU-03.
5. The minus cylinder power is the difference between the first and second powers indicated on the Power Wheel.
6. Refer to Figure IU-04 for a sample reading of minus cylinder lenses.

#### Example of reading Plus Cylinder:

First reading:  $-3.00D \times 110^\circ$

Second Reading:  $-2.50D$

Direction: +

Rx:  $-3.00 +.5 \times 110^\circ$

#### Example of reading in Minus Cylinder:

First reading;  $-2.50D \times 20^\circ$

Second reading:  $-3.00D$

Direction: -

Rx:  $-2.50 -0.50 \times 20^\circ$

Figure IU-04 Sample Readings

## Lens Centering and Marking

The optical center of a lens can be located and marked in the following manner.

1. With the lens clamped in position against the Lens Holder, slightly release the pressure of the Lens Clamp by pulling back somewhat on the Lens Clamp Handle.
2. Move the lens so that the center of the target is located at the center of the reticle. Refer to Figure IU-05.
3. Mark the lens by pressing the Marking Lever forward, gently and slowly, until the Marking Pens come in contact with the lens.

**Note:** Avoid forceful operation which can cause inaccurate marking.

4. Three ink dots will be placed on the lens.

**Note:** The center dot indicates the optical center.

**Note:** All three dots indicate the  $180^\circ$  line of the lens. The axis is indicated on the Axis Wheel.

5. When marking a lens for layout, turn the Axis Wheel to the axis specified on the prescription.
6. Focus the Sphere Lines by turning the Power Wheel and the lens.
7. Move the target to the center of the Eyepiece. Refer to Figure IU-05.
8. Mark the lens. The 3 dots will mark the optical center of the lens and indicate a line parallel to the frame.

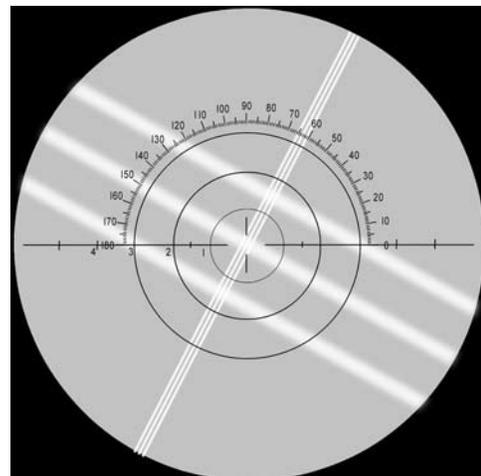


Figure IU-05 Target Centered

## Instructions For Use (continued)

### Measuring Prism Power

Prism power is indicated by the position of the center of the target with respect to the Eyepiece reticle. The innermost Prism Ring is 1 prism diopter, the second Prism Ring is 2 prism diopters, and the third Prism Ring is 3 prism diopters. Refer to Figure IU-06.

**Note:** The innermost tips of the scale lines indicates 1/2 prism diopter.

1. Place a dot on the lens at the “optical center” position (the point at which the prismatic power is to be measured).
2. Place the lens in the instrument with the dot in the center of the Lens Holder and the 180° line parallel to the Lens Table.
3. Bring the target into focus.

**Note:** The target will not be centered on the reticle if there is prism power. The target will always be decentered in the direction of the base of the prism. For example, if the center of the target is above the center of the reticle, base up prism is indicated.

4. Rotate the Prism Scale until the line of the scale passes through the center of the target. Refer to Figure IU-07.

**Note:** The amount of prism power is indicated by the displacement of the target center with reference to the concentric circles of the reticle.

**Note:** Powers of 1.00 to 4.00 prism diopters are clearly indicated with numerical designations. Small cross-lines on the Prism Scale indicate 1.5 prism diopters and 5 prism diopters at the extreme ends of the Prism Scale.

**Note:** Figure IU-07 indicates a prism power of 3 diopters at an axis of 35°.

5. If the center of the target is below the center of the Eyepiece scale, add 180° to the axis scale reading.
6. When measuring prism powers above 5.0 diopters, the Prism Compensator is used to bring the center of the target into the center of the Eyepiece scale.
7. The prism power and axis is then read from the Compensator Scales.

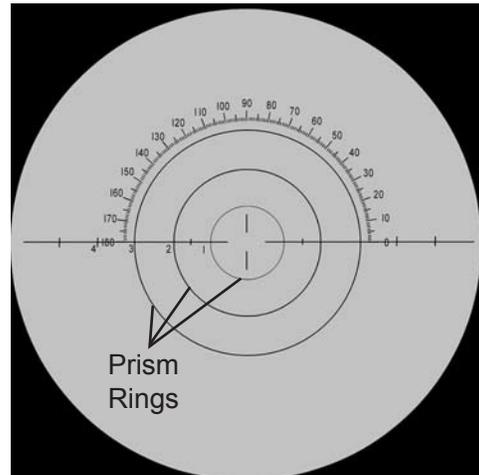


Figure IU-06 Prism Rings

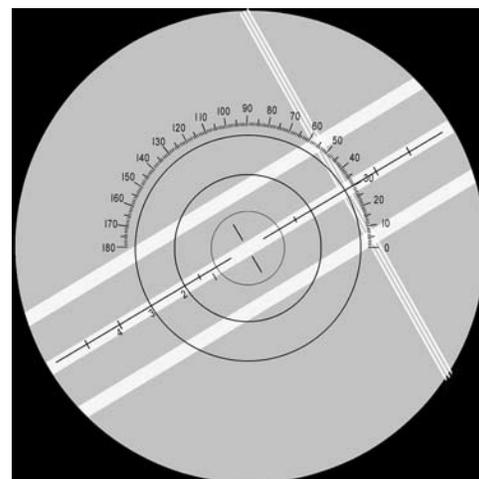


Figure IU-07 3 Diopters of Prism

## Instructions For Use (continued)

### Measuring Bifocal Additions

The bifocal addition equals the difference between the powers measured through the distance and reading portion of a bifocal lens with the segment surface against the Lens Holder.

#### Fused Bifocal Lens

1. Place the front or convex surface of the lens against the Lens Holder.
2. Measure the power through the distance portion of the lens.
3. Measure the power through the reading portion.

**Note:** The add power is the difference between these two readings.

#### One-Piece Bifocal Lens

1. Place the concave side of the lens against the Lens Holder.
2. Measure the power through the distance portion of the lens.
3. Measure the power through the reading portion.

**Note:** The add power is the difference between these two readings.

### Measuring Contact Lenses

1. Remove the spectacle Lens Holder. Refer to Figure IU-08.
2. Install the Contact Lens Holder in place of the Spectacle Lens Holder.

**Note:** The Contact Lens Holder has a smaller aperture than the Spectacle Lens Holder. Refer to Figure IU-09.

3. Loosen the Tilt Lock Lever and tilt the instrument to the full upright position. Refer to Figure IU-10.
4. Tighten the Tilt Lock Lever to secure the ML1 in the upright position.
5. Place the contact lens on the Contact Lens Holder.
6. Measure the contact lens as you would a spectacle lens.

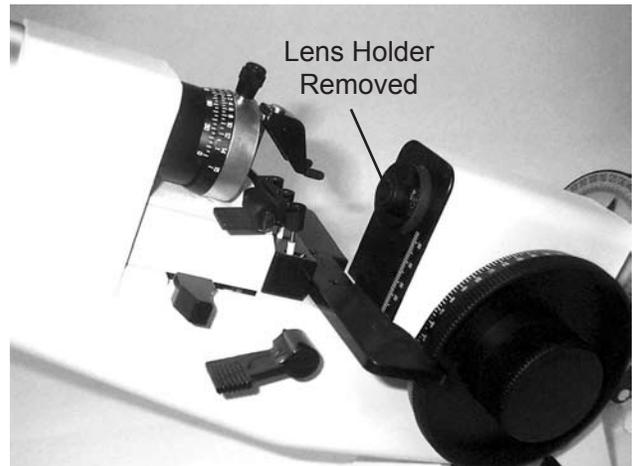


Figure IU-08 Spectacle Lens Holder Removed

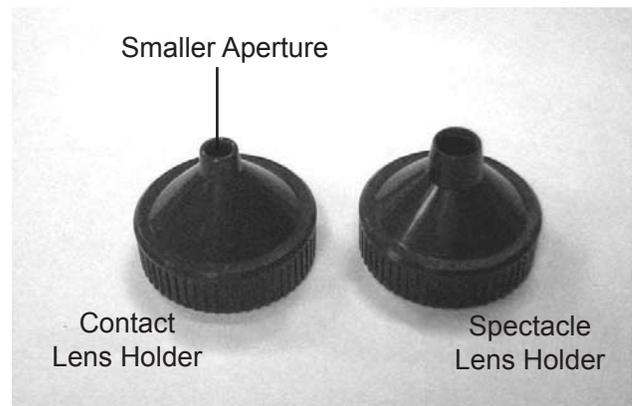


Figure IU-09 Lens Holders



Figure IU-10 Fully Upright

# Cleaning & Maintenance

## Cleaning

### Exterior Cleaning

**CAUTION:** DO NOT USE SOLVENTS OR STRONG CLEANING SOLUTIONS ON ANY PART OF THIS INSTRUMENT AS DAMAGE TO THE UNIT MAY OCCUR.

Clean the exterior surfaces with a soft cloth moistened with a mild soap solution (1 cc of liquid dish soap to one liter of clean, filtered water (filtered below 5 microns)).

**Note:** Keep your ML1 clean. Use the Dust Cover when the instrument is not in use.

### Lens Cleaning

Clean the lenses using any commercial lens cleaner.

Using a lint-free cotton swab lightly moistened with a commercial lens cleaner, clean the lens surfaces.

**Note:** Clean exterior surfaces only.

**Note:** Do not remove any lenses.

### Ink Pad Refilling

**CAUTION:** DO NOT OVERFILL THE INKWELL. IT IS ONLY NECESSARY FOR THE PAD TO BE SATURATED WITH INK. EXCESSIVE INK CAN CAUSE DAMAGE TO THE INSTRUMENT.

1. Rotate the Marking Pens up so that the Inkwell Cover is accessible. Refer to Figure MM-01.
2. Remove the Inkwell Cover by pulling it straight up. Refer to Figure MM-02.
3. Saturate the Inkpad with ink.
4. Install the Inkwell Cover.

**Note:** Replace the Inkpad when it becomes worn or dried out.

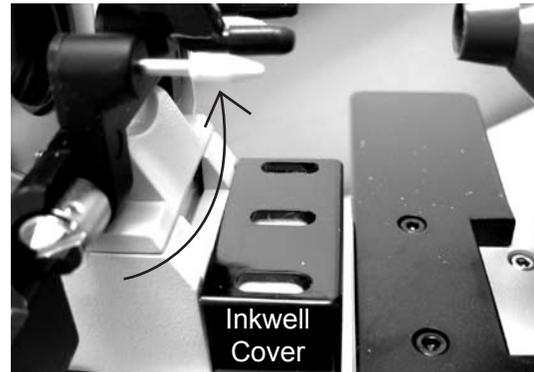


Figure MM-01 Rotate Marking Pens Up

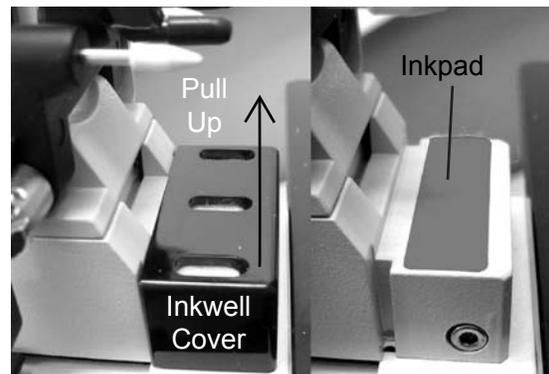


Figure MM-02 Remove and Refill Inkwell

## Cleaning & Maintenance (continued)

### Target Centering

#### Removing Prism Compensator

It is best if the target centering is done without the Prism Compensator in place.

1. Using a flathead screwdriver, remove the 3 Screws in the Prism Compensator. Refer to Figures MM-03 and MM-04.

**Note:** There is a Screw on the top of the Prism Compensator, and one on each side. Only two Screws are visible in Figures MM-03 and MM-04.

2. Remove the Prism Compensator and set aside.

#### Target Centering Procedure

The target must be centered on the Eyepiece scale when the Power Wheel is set to "0" and there is no lens in place for measurement.

If the target is not centered, rotate the Axis Wheel while observing the target. If the center of the target remains stationary, proceed with the target centering procedure.

**Note:** If the center of the target moves with respect to the Eyepiece scale, the instrument should be serviced.

1. Focus the Eyepiece to obtain the clearest image of the Eyepiece scale.
2. Turn the Power Wheel to focus the target.
3. Using a flathead screwdriver, adjust the 3 Screws to bring the center of the target into the center of the eye piece scale. Refer to Figure MM-05.

**Note:** It is necessary to loosen one Screw before tightening another Screw in order to move the target image.

**Note:** All 3 Screws should be tight when centering is complete.

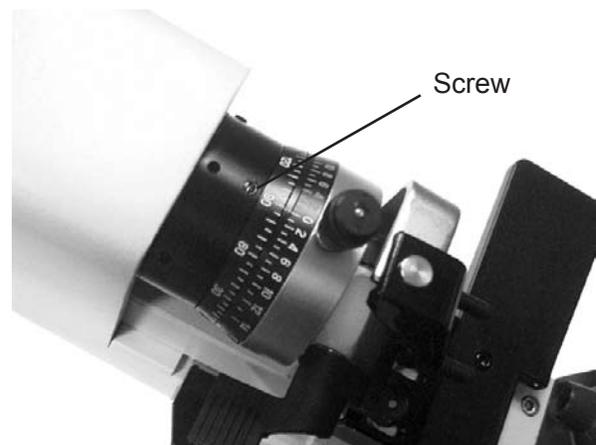


Figure MM-03 Prism Compensator Screws

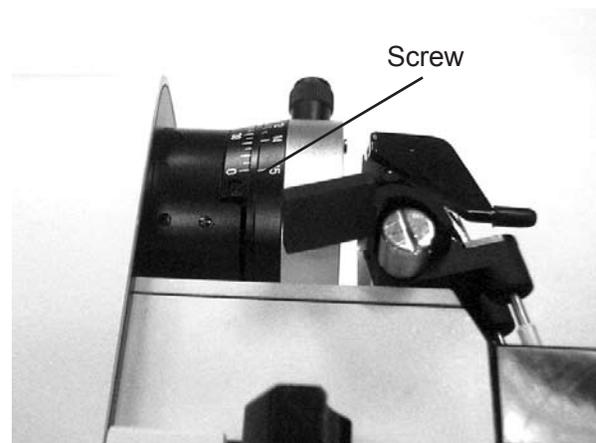


Figure MM-04 Side Screws

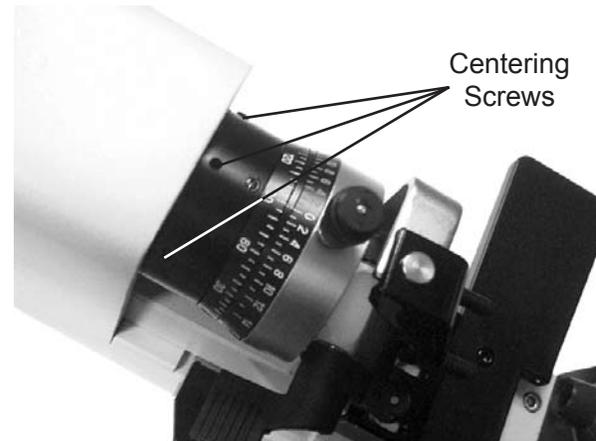


Figure MM-05 Centering Screws

# Troubleshooting

## Chart of Common Errors

Problem	Cause	Solution
Does not read "0" without a lens in place	Eyepiece not focused for user.	Focus Eyepiece.
	Needs calibration.	Have instrument serviced.
High powers off same amount in the same direction, i.e. +12.00 reads +12.25, -12.00 reads -11.75.	Vertex distance setting incorrect. Pads may be installed on the Lens Holder.	Remove any pads.
	Needs calibration.	Have instrument serviced.
High powers off in different directions or different amounts, i.e. +12.00 reads +12.50, -12.00 reads -12.25.	Needs calibration.	Have instrument serviced.
Not marking center of lens.	Prism Compensator not at "0".	Set Prism Compensator to "0".
	Target not centered.	Center the target.
	Marker out of alignment.	Have instrument serviced.
Target not centered with no lens in place, target center remains in place when Axis Wheel is rotated.	Prism compensator not set to "0".	Set the prism compensator to "0".
	Target not centered.	Center the target.
Target not centered, target center moves when the Axis Wheel is rotated.	Target not mechanically centered.	Have instrument serviced.
Axis reading incorrect	Target, Axis Wheel or table not aligned.	Have instrument serviced.
No Power	Instrument in "sleep" mode.	Press On-Off Switch.
	Dead batteries.	Replace batteries.
	Batteries installed incorrectly.	Install Batteries with negative side toward the spring.
	Electronic problem.	Have instrument serviced.

# Specifications

**Catalog Number** 15110

<b>Physical Dimensions</b>	
Size:	Weight, unpacked: 11 lbs. ( 4.9 Kg)
Height: 18.7 in. (47.5 cm)	
Width: 5.1 in. (12.9 cm)	
Depth: 12.9 in. (32.8 cm)	
<b>Electrical</b>	
Voltage: 3 VDC (2 AAA batteries at 1.5 VDC each)	
<b>Vertex Power</b>	<b>Prismatic Power</b>
Range -25 to +25 diopters	Range 5 prism diopters
Steps 0.125 diopters up to +/- 3 diopters 0.25 diopters beyond +/- 3 diopters	Step 0.5 prism diopters up to 2 diopters, 1 diopter beyond 2 diopters
<b>Cylindrical Axis</b>	<b>Prism Compensator</b>
Range 1 to 180 degrees	Diopter Range 15 prism diopters
Step 1 degree	Graduations 1 prism diopter steps
	Angle scale 0 degrees to 180 degrees
	Graduations 5 degrees
<b>Tilting Angle</b> 30 degrees to 90 degrees	<b>Target</b> American Crossline
<b>Light Source</b> LED (Light Emitting Diode)	<b>Lens Diameters</b> 24 mm to 90 mm
<b>Eyepiece Focusing</b> +7D to -10 D	

## Disposal

This product does not generate any environmentally hazardous residues. At the end of its product service life, follow your local laws and ordinances regarding the proper disposal of this equipment.

# Reichert Warranty

This product is warranted by Reichert Technologies against defective material and workmanship under normal use for a period of one year from the date of invoice to the original purchaser. (An authorized dealer shall not be considered an original purchaser.) Under this warranty, Reichert's sole obligation is to repair or replace the defective part or product at Reichert's discretion.

This warranty applies to new products and does not apply to a product that has been tampered with, altered in any way, misused, damaged by accident or negligence, or which has had the serial number removed, altered or effaced. Nor shall this warranty be extended to a product installed or operated in a manner not in accordance with the applicable Reichert instruction manual, nor to a product which has been sold, serviced, installed or repaired other than by a Reichert factory, Technical Service Center, or authorized Reichert Dealer.

Lamps, bulbs, charts, cards and other expendable items are not covered by this warranty.

All claims under this warranty must be in writing and directed to the Reichert factory, Technical Service Center, or authorized instrument dealer making the original sale and must be accompanied by a copy of the purchaser's invoice.

This warranty is in lieu of all other warranties implied or expressed. All implied warranties of merchantability or fitness for a particular use are hereby disclaimed. No representative or other person is authorized to make any other obligations for Reichert. Reichert shall not be liable for any special, incidental, or consequent damages for any negligence, breach of warranty, strict liability or any other damages resulting from or relating to design, manufacture, sale, use or handling of the product.

## PATENT WARRANTY

If notified promptly in writing of any action brought against the purchaser based on a claim that the instrument infringes a U.S. Patent, Reichert will defend such action at its expense and will pay costs and damages awarded in any such action, provided that Reichert shall have sole control of the defense of any such action with information and assistance (at Reichert's expense) for such defense, and of all negotiation for the settlement and compromise thereof.

## PRODUCT CHANGES

Reichert reserves the right to make changes in design or to make additions to or improvements in its products without obligation to add such to products previously manufactured.

## CLAIMS FOR SHORTAGES

We use extreme care in selection, checking, rechecking and packing to eliminate the possibility of error. If any shipping errors are discovered:

1. Carefully go through the packing materials to be sure nothing was inadvertently overlooked when the unit was unpacked.
2. Call the dealer you purchased the product from and report the shortage. The materials are packed at the factory and none should be missing if the box has never been opened.
3. Claims must be filed within 30 days of purchase.

## CLAIMS FOR DAMAGES IN TRANSIT

Our shipping responsibility ceases with the safe delivery in good condition to the transportation company. Claims for loss or damage in transit should be made promptly and directly to the transportation company.

If, upon delivery, the outside of the packing case shows evidence of rough handling or damage, the transportation company's agent should be requested to make a "Received in Bad Order" notation on the delivery receipt. If within 48 hours of delivery, concealed damage is noted upon unpacking the shipment and no exterior evidence of rough handling is apparent, the transportation company should be requested to make out a "Bad Order" report. This procedure is necessary in order for the dealer to maintain the right of recovery from the carrier.

# Notes

Notes (continued)

Notes (continued)



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