Reichert
Ophthalmic Instruments

ML1

Manual Lensometer User's Guide

®

MERCOFRAMES
OPTICAL CORP

sales@mercoframes.net
www.mercoframes.com
5555 NW 74 AVE.
MIAMI. FL. 33166
P: 305-882-0120
F: 305-882-0140

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 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.

Table of Contents

Package Contents / Product Features

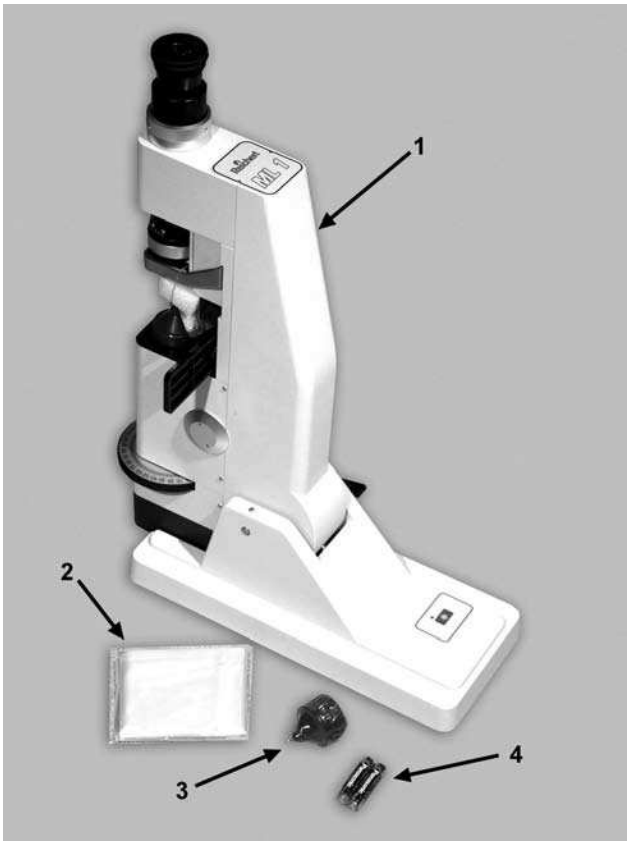

Fig. 1

1. ML1 Lensometer
2. Dust Cover
3. Contact lens holder
4. 2 “AAA” batteries

1. On-Off Switch
2. Table lift lever
3. Lens clamp handle
4. Marker lever
5. Focusable eyepiece
6. Prism compensator
7. Lens clamp
8. Lens stop
9. Power wheel
10. Axis wheel
11. Battery compartment
12. Tilt lock lever

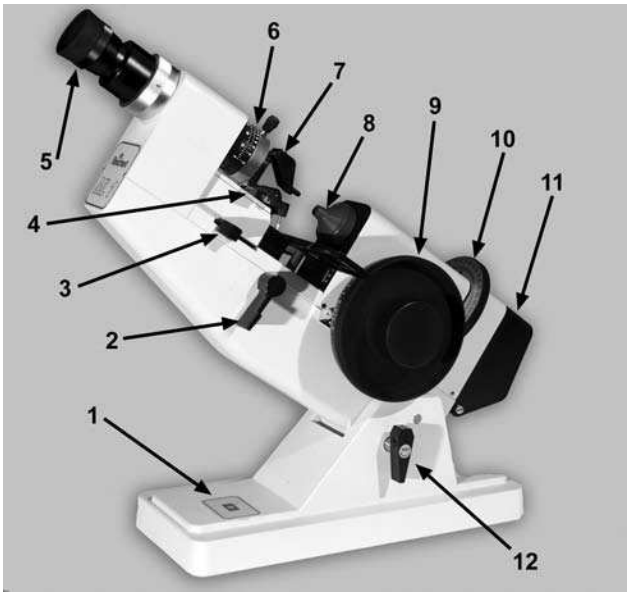

Fig. 2

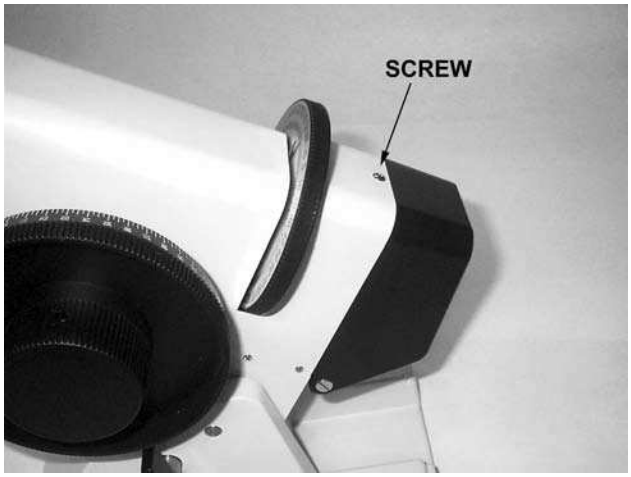

Fig. 3

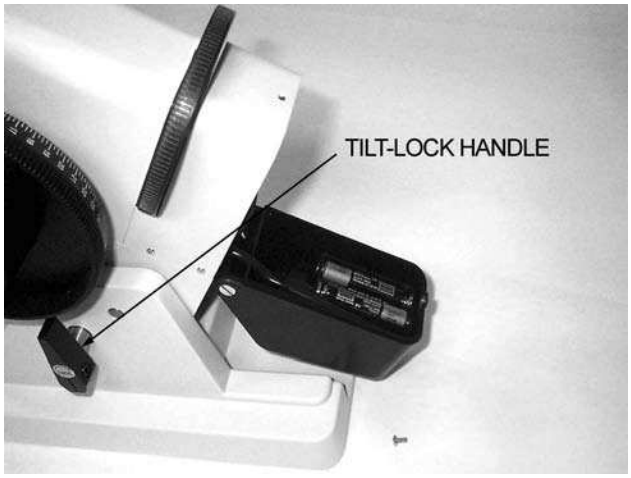

Fig. 4

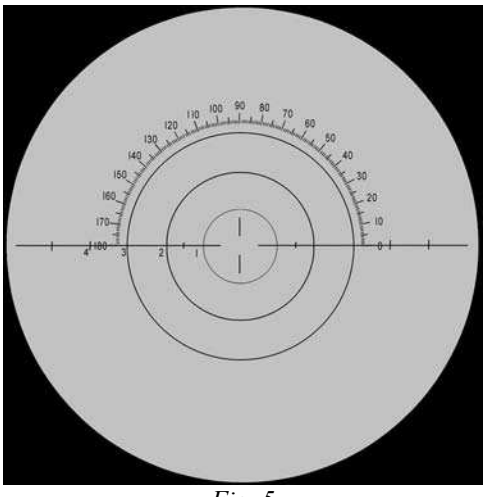

Fig. 5

Battery Installation

1. Remove the screw (Figure 3) that secures the battery compartment .
2. Open the battery compartment and install two “AAA” batteries. (Figure 4)
3. Close the battery case and secure with the screw.

Adjust the Tilt Angle

1. The angle of the main body can be adjusted for comfort or convenience.
2. Rotate the Base Tilt Lock Handle counter-clockwise to loosen the tilt mechanism. (Fig. 4)
3. Move the main body up or down to the desired position.
4. Tighten the Base Tilt Lock Handle to secure the main body in the desired position.

Focus the Eyepiece

NOTE: It is important to insure that the ML1 is focused before use. Failure to focus the ML1 could result in inaccurate measurements. Each user must focus the instrument for their individual eye.

1. Place a white sheet of paper at the position of the lens stop. 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. Slowly turn the eyepiece clockwise until the black reticle lines are in sharp focus. Do not go beyond that point. Fig. 5 shows the reticle lines in the eyepiece.
4. Remove the paper and press the ON/OFF switch. The pilot light will illuminate and the internal LED will turn on. (The ML1 will turn off automatically after approximately 5 minutes.)
5. Turn the power wheel until the illuminated cross-line target becomes clear (Fig. 6) The power scale should read “0”. If it does not, repeat the process.

NOTE: If the power scale does not read “0” without a lens in place, the instrument needs calibration.

Holding a Lens for Measurement

1. Place the concave, or back side of the lens against the lens stop.
2. If the lens is edged, or “laid out” for cutting, place the 180° line parallel to the table. Be sure the center point of the lens is in the center of the lens stop.
3. If the lens is mounted in a frame, raise the table using the lens table lever until the table supports the bottom of the frame.
4. Pull back on the lens clamp handle and slowly allow the lens clamp to move forward to contact the lens. Do not release the handle until the lens clamp makes contact with the lens.

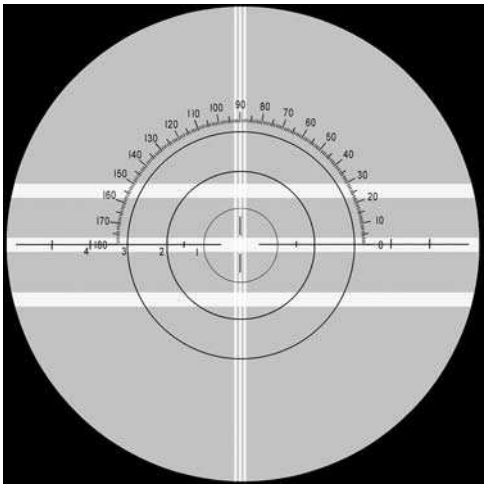

Fig. 6

Lens Analysis

1. With the lens in position, rotate both the power wheel and axis wheel to sharply focus the 3 narrow lines. 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. (Fig. 6)
3. If only the sphere lines or only the cylinder lines can be focused sharply, the lens has cylinder power (Fig. 7). By turning the power wheel, you will be able to find a position at which the sphere lines lines are in focus (Fig. 8). When the sphere lines are in focus, turning the power wheel only will bring the cylinder lines into focus (Fig. 8). The prescription of any cylinder lens can be written in two forms; one with a plus cylinder and the other with a minus cylinder.

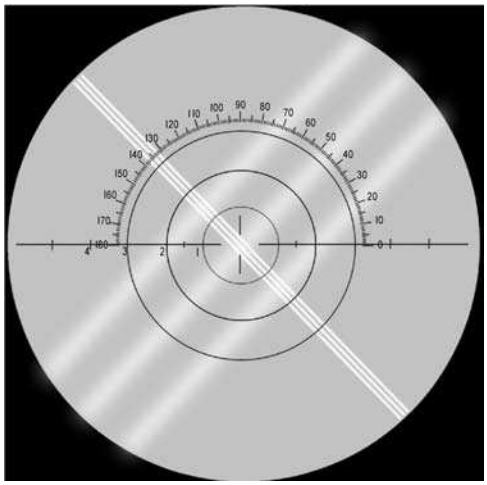

Fig.. 7

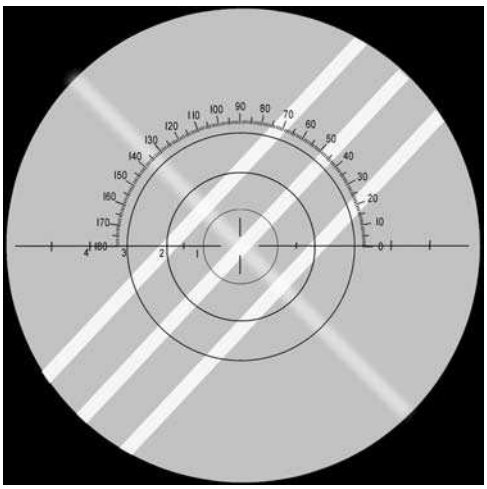

Fig. 8

Reading Plus Cylinder

1. Set the power wheel at the lower of the two focusing positions (toward the minus end of the scale) then rotate the axis wheel until the sphere lines are in focus and unbroken. Read the sphere power and axis from the power wheel and axis wheel.
2. Rotate the power wheel to focus the cylinde lines. The cylinder power is the difference between the first and second powers indicated on the power wheel.

Example of reading Plus Cylinder:
First reading: -3.00D X 110°
Second Reading: -2.50D
Direction: +
Rx: -3.00 +.5 X 110°

Example of reading in Minus Cylinder:
First reading; -2.50D X 20°
Second reading: -3.00D
Direction: -
Rx: -2.50 -0.50 X 20°

Plus / Minus examples

Reading Minus Cylinder

1. Set the power wheel to the higher of the two focusing positions (toward the plus end of the scale) and rotate the axis wheel until the sphere lines are in focus and unbroken. Read the sphere power from the power wheel and the axis from the axis wheel.
2. Rotate the power wheel until the cylinder lines are in focus. The minus cylinder power is the difference between the first and second powers indicated on the power wheel.

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 stop, slightly release the pressue of the lens clamp by pulling back somewhat on the lens clamp handle. Move the lens so that the center of the target is located at the center of the reticle (Fig 9).
2. Mark with the marking device. Press the marking lever down and forward gently and slowly to bring the pens into contact with the lens. Avoid forceful operation which can cause inaccurate marking. Three ink dots will be placed on the lens. The center dot indicates the optical center. All three dots indicate the 180° line of the lens, with the axis as indicated on the axis wheel.
3. When marking a lens for layout, turn the axis wheel to the axis specified on the prescription. Focus the sphere lines by turning the power wheel and the lens. Move the target to the center of the eyepiece scale. Mark the lens. The 3 dots will mark the optical center of the lens and indicate a line parallel to the frame.

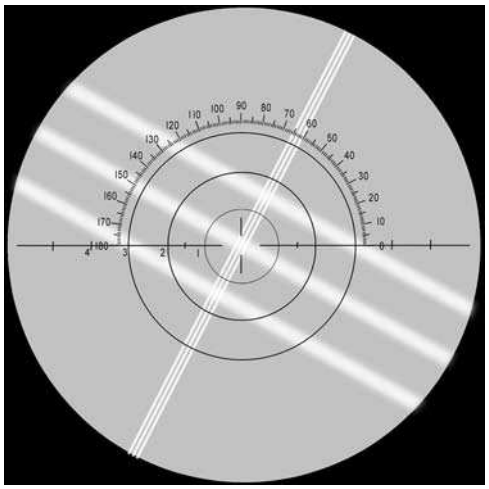

Fig. 9

Measuring Prism Power

Prism power is indicated by the position of the center of the target with respect to the eyepiece reticle. Fig. 8 shows the eyepiece reticle with the prism rings indicated by the arrows. The innermost ring is 1 prism diopter, the second ring is 2 prism diopters, The third ring is 3 prism diopters. The innermost tips of the scale lines indicates 1/2 prism diopter. (Fig. 10)

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 stop and the 180° line parallel to the lens table.
3. Bring the target into focus. 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. (Fig. 11)
5. The amount of prism power is indicated by the displacement of the taret center with refrence to the concentric circles of the reticle. 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 scale. Fig. 9 indicates a prism power of 3 diopters at an axis of 35°. 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. The prism power and axis is then read from the compensator scales.

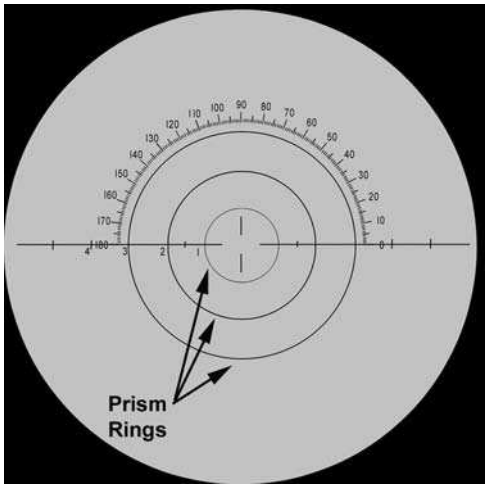

Fig. 10

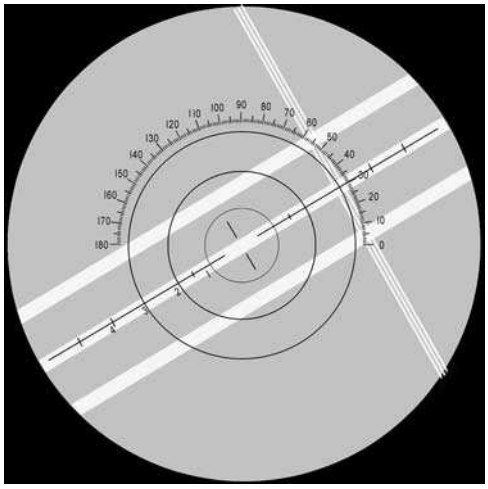
Fig. 11

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 stop. When measuring **fused** bifocal lenses, place the front or convex surface against the lens stop, measure the power through the distance portion of the lens, then measure the power through the reading portion. The add power is the difference between these two readings.

When measuring the addition of a one-piece bifocal lens, place the concave side of the lens against the lens stop, measure the power through the distance portion and through the reading portion of the lens. The add power is the difference between these two readings.

Measuring Contact Lenses

1. Remove the spectacle lens stop. Figure 12 shows the stop removed and placed on the lens table.
2. Install the contact lens stop in place of the spectacle lens stop. The contact lens stop has a smaller aperture than the spectacle lens stop. (Figure 13)
3. Loosen the tilt lock lever and tilt the instrument to the full upright position. Figure 14 shows the Lensometer in the full upright position with the contact lens stop installed. Tighten the tilt lock lever.
4. The contact lens can now be placed on the lens stop and measured as you would a spectacle lens.

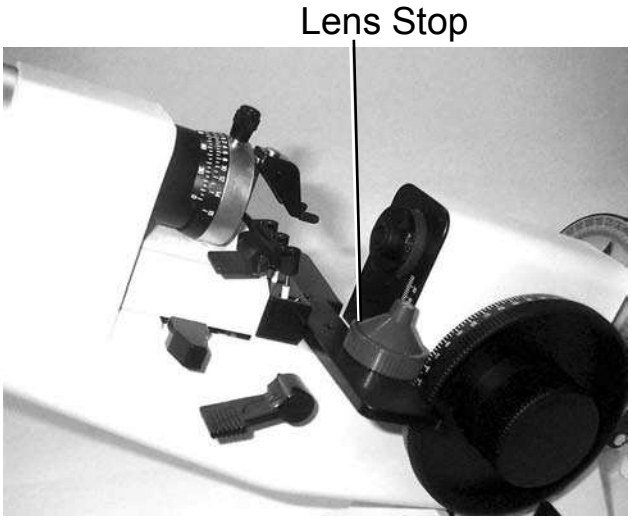

Fig. 12

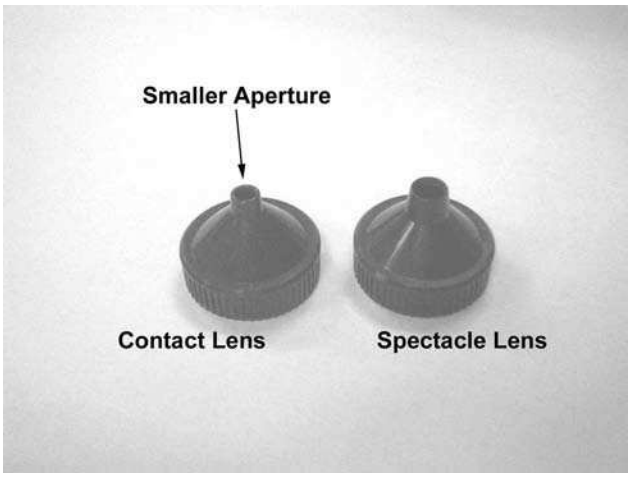

Fig. 13

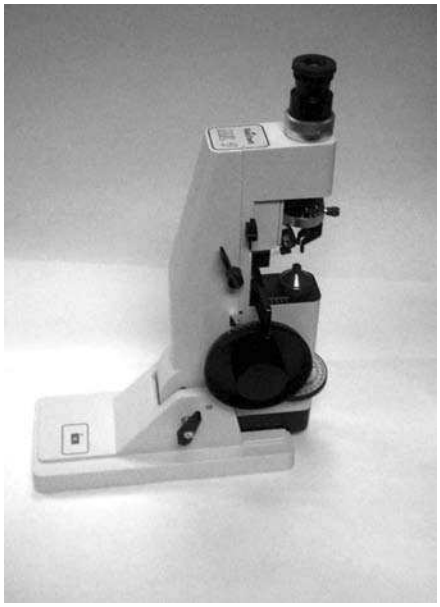

Fig. 14

Cleaning

Keep your ML1 clean. Clean the exterior surfaces with a soft cloth moistened with a mild detergent solution. Do not use strong solvents as this can damage the finish. Clean the lenses using any commercial lens cleaner. Do not remove any lenses! Clean exterior surfaces only. Use the dust cover when the instrument is not in use.

Inker Refilling

To refill the marking ink, remove the inkwell cover by pulling it up. Saturate the ink pad with ink. Replace the inkwell cover. Replace the ink pad when it becomes worn or dried out.

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.

Target Centering

It is best if the target centering is done without the prism compensator in place. To remove the prism compensator, remove the 3 screws in the prism holder and remove the compensator. (Figure 15a & 15b)

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 target centering. If the center of the target moves with respect to the eyepiece scale, the instrument should be serviced by an authorized service dealer.

1. Focus the eyepiece to obtain the clearest image of the eyepiece scale.
2. Turn the power wheel to focus the target.
3. Adjust the 3 screws (Figure 16) to bring the center of the target into the center of the eye piece scale. It is necessary to loosen a screw before tightening a screw in order to move the target image. All 3 screws should be tight when centering is complete.

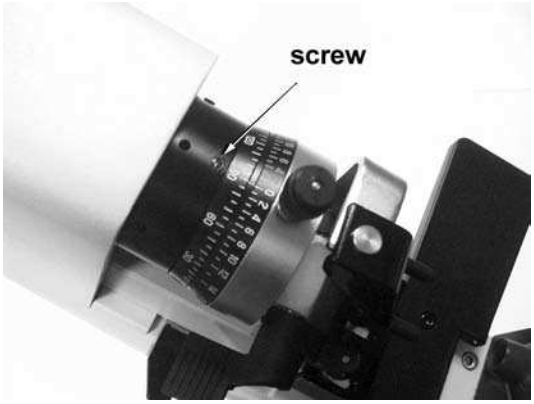

Fig. 15a

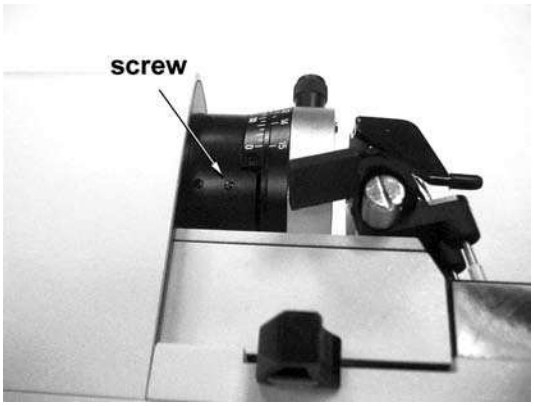

Fig. 15b

Fig. 16

Troubleshooting

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. Check for pads installed on the lense stop. - 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 target as described in Maintenance & Adjustment. 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 target as described in Maintenance & Adjustment.
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 ML1 Lensometer
Vertex Power:	
Range	-25 to +25 diopters
Steps	0.125 diopters up to +/- 3 diopters 0.25 diopters beyond +/- 3 diopters
Prismatic Power:	
Range	5 prism diopters
Step	0.5 prism diopters up to 2 diopters, 1 diopter beyond 2 diopters
Cylindrical Axis	
Range	1 to 180 degrees
Step	1 degree
Target	American Crossline
Lens Diameters	24 mm to 90 mm
Tilting Angle	30 degrees to 90 degrees
Eyepiece Focusing	+7D to -10 D
Light Source	LED (Light Emitting Diode)
Dimensions	130 mm x 475 mm x 330 mm (W x L x H)
Standard Accessories	1 Dust cover 1 Contact lens holder
Prism Compensator:	
Diopter Range	15 prism diopters
Graduations	1 prism diopter steps
Angle scale	0 degrees to 180 degrees
Graduations	5 degrees

ML1 Warranty

This product is warranted by Reichert, Inc. 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.