AL200

Automatic Lensometer®

User's Guide



AMETEK®
ULTRA PRECISION TECHNOLOGIES

Reichert®
TECHNOLOGIES

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Caution: Federal law restricts this device to sale by or on the order of a licensed physician. Rx only.

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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 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 OR SERIOUS INJURY TO THE OPERATOR OR PATIENT MAY OCCUR.

WARNING: MODIFICATIONS TO THIS INSTRUMENT ARE NOT ALLOWED. ANY MODIFICATION TO THIS UNIT MUST BE AUTHORIZED BY REICHERT SO THAT CORRECT OPERATION IS MAINTAINED OR SERIOUS INJURY TO THE OPERATOR OR PATIENT MAY OCCUR.

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

WARNING: TO AVOID RISK OF ELECTRIC SHOCK, THIS EQUIPMENT MUST ONLY BE CONNECTED TO A SUPPLY MAINS WITH PROTECTIVE EARTH OR DAMAGE TO THIS INSTRUMENT AND/OR INJURY TO THE OPERATOR OR PATIENT MAY OCCUR.

WARNING: ENSURE THAT THE VOLTAGE APPLIED TO THE UNIT IS THE SAME AS THE VOLTAGE THAT IS INDICATED ON THE DATA PLATE OR DAMAGE TO THE INSTRUMENT AND/OR INJURY TO THE OPERATOR OR PATIENT MAY OCCUR.

WARNING: THIS INSTRUMENT MUST BE PLUGGED INTO AN OUTLET WITH AN EARTH GROUND. DO NOT REMOVE OR DEFEAT THE EARTH GROUND CONNECTION ON POWER INPUT CONNECTOR OR THE UNIT'S POWER CORD OF THIS INSTRUMENT OR DAMAGE TO IT AND/OR INJURY TO THE OPERATOR OR PATIENT MAY OCCUR.

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 USE OF ACCESSORIES OR CABLES OTHER THAN THOSE SPECIFIED, WITH THE EXCEPTION OF THOSE SOLD BY THE MANUFACTURER AS REPLACEMENT PARTS FOR INTERNAL COMPONENTS, MAY RESULT IN INCREASED EMISSIONS OR DECREASED IMMUNITY OF THE EQUIPMENT OR SYSTEM.

WARNING: THE POWER CORD THAT IS INCLUDED WITH THIS UNIT HAS A FERRITE FILTER TO PROTECT AGAINST ELECTROMAGNETIC AND RADIO FREQUENCY INTERFERENCE.

Warnings and Cautions (continued)

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: THIS INSTRUMENT IS NOT INTENDED TO BE CONNECTED TO EQUIPMENT OUTSIDE THE CONTROL OF REICHERT TECHNOLOGIES OR MUST BE TESTED TO AN APPLICABLE IEC OR ISO STANDARDS.

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: USE OF AMMONIA BASED CLEANERS ON THE LIQUID CRYSTAL DISPLAY (LCD) MAY CAUSE DAMAGE TO THE DISPLAY. SEE MAINTENANCE SECTION FOR DETAILED CLEANING INSTRUCTION.

CAUTION: DO NOT AUTOCLAVE OR DISINFECT USING HIGH TEMPERATURES EXCEEDING THE RECOMMENDED TEMPERATURES INDICATED IN THE SPECIFICATIONS SECTION OF THIS MANUAL OR DAMAGE TO THE UNIT MAY OCCUR.

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.

CAUTION: DO NOT INSTALL ANY ADDITIONAL SOFTWARE OTHER THAN WHAT WAS SUPPLIED WITH THIS INSTRUMENT. INSTALLATION OF ADDITIONAL SOFTWARE MAY CAUSE UNEXPECTED OPERATION RESULTING IN MALFUNCTION OF THIS INSTRUMENT.

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



Protective Earth



Alternating current power



ON / OFF



Date of Manufacture

REF Catalog Number

SN Serial Number



Waste of Electrical and Electronic Equipment



Compliance to Medical Device Directive 93/42/EEC



Authorized to mark given by Intertek ETL Semko for conformance with electrical standards



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 AL200 Auto Lensometer®.

The AL200 will provide you with fast, accurate and reliable measurements of eyeglass lenses for many years. The instrument has an innovative microprocessor controlled lens measurement system that reduces operator error and provides precise, repetitive measurements for single, multifocal, and progressive lenses.

This User's Guide is designed as a training and reference manual for operation, maintenance, and trouble-shooting. 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. Properly trained eyecare professionals such as ophthal-mologists, optometrists, opticians and eye care technicians should operate this instrument. All parts of this ME system are suitable for use within the patient environment.

Please retain this guide for future reference and to share with other users. Additional copies can be obtained from your authorized Reichert Technologies dealer or contact our Customer Service department directly at:

Tel:716-686-4500
Fax:716-686-4555
www.reichert.com

Indications for Use

A lensometer is indicated for measuring prescription lenses.

Contraindications

None.



Installation Features and Functions

Contents

The items listed below should be included in the AL200 packaging container. If any of these items are missing, please contact Reichert Customer Service.

- AL200 Auto Lensometer (P/N 13600)

Accessories

- Dust Cover (P/N 12621-044)
- Spare Nosepiece Cover (P/N 12621-047-001
- Flat, open-ended wrench (for nosepiece tip removal) (P/N 13600-050)
- Power Cord
  (P/N WCBL10018 (110 VAC) or WCBL10027 (230 VAC) with Ferrite Filter (P/N RFIL20028) attached
- Users Guide (P/N 13600-101)
- Quick Reference Guide (P/N 13600-104)

Setup

Place the AL200 on a table in an environment that is clean, dry, temperature controlled, and away from direct sunlight and sources of bright light. Refer to the Specifications section of this manual for operating conditions.

If applicable, connect the printer interface cable from the printer to the RS-232C connector on the rear connection panel of the AL200. Tighten the screws, finger tight, on the RS-232C cable.

Insert the female end of the power cord into the power input receptacle on the rear of the AL200. Attach the other end of the power cord to a power source of the correct voltage as indicated on the data plate.



AL200 Rear Panel

Installation Features and Functions (continued)

Application of Input Power

WARNING: CARE MUST BE TAKEN TO ARRANGE THE CABLES FOR THE ACCESSORIES SUCH THAT THEY DO NOT PRESENT A TRIPPING HAZARD TO THE EXAMINER OR A DANGER TO THE PATIENT.

WARNING: POSITION THIS INSTRUMENT SO THAT IT IS NOT DIFFICULT TO OPERATE THE DISCONNECTION DEVICE (PLUG).

WARNING: DO NOT REMOVE THE OUTSIDE COVERS OF THE UNIT OR ATTEMPT TO REPAIR ANY INTERNAL PARTS. REPAIR AND SERVICE OF THE UNIT MUST BE PERFORMED BY EXPERIENCED PERSONNEL OR DEALERS THAT ARE TRAINED BY REICHERT.

WARNING: THE POWER CORD THAT IS INCLUDED WITH THIS UNIT HAS A FERRITE FILTER TO PROTECT AGAINST ELECTROMAGNETIC AND RADIO FREQUENCY INTERFERENCE.

CAUTION: ENSURE THAT THE VOLTAGE APPLIED TO THE UNIT IS THE SAME AS THE VOLTAGE THAT IS INDICATED ON THE DATA PLATE NEXT TO THE INPUT CORD RECEPTACLE OR DAMAGE TO THE UNIT MAY OCCUR.

CAUTION: FOR CONTINUED PROTECTION AGAINST THE RISK OF FIRE, ANY REPLACEMENT OF DAMAGED FUSES MUST BE IN ACCORDANCE WITH THE RATING AS INDICATED IN THE SPECIFICATIONS SECTION OF THIS MANUAL.

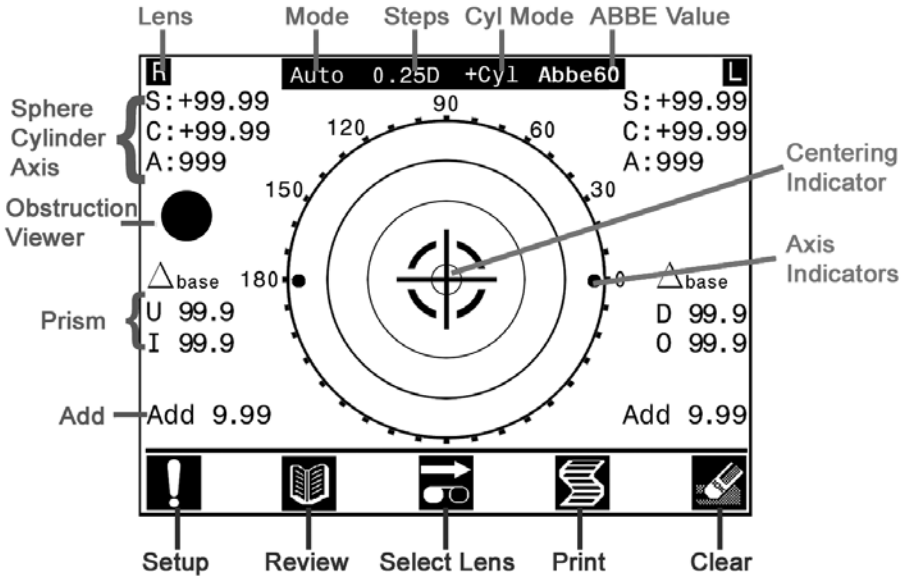
1. After the unit is in its secure location, apply the correct input voltage to the instrument using the Power Cord supplied with the unit.
2. Press down on the “I” located on the ON/OFF Switch. The power inlet is located on the back of the unit.
3. If necessary, adjust the screen contrast by turning the knob located on the rear of the AL200.
4. Read the User’s Guide and the Quick Reference Card before operating this instrument.

Disconnection of Input Power

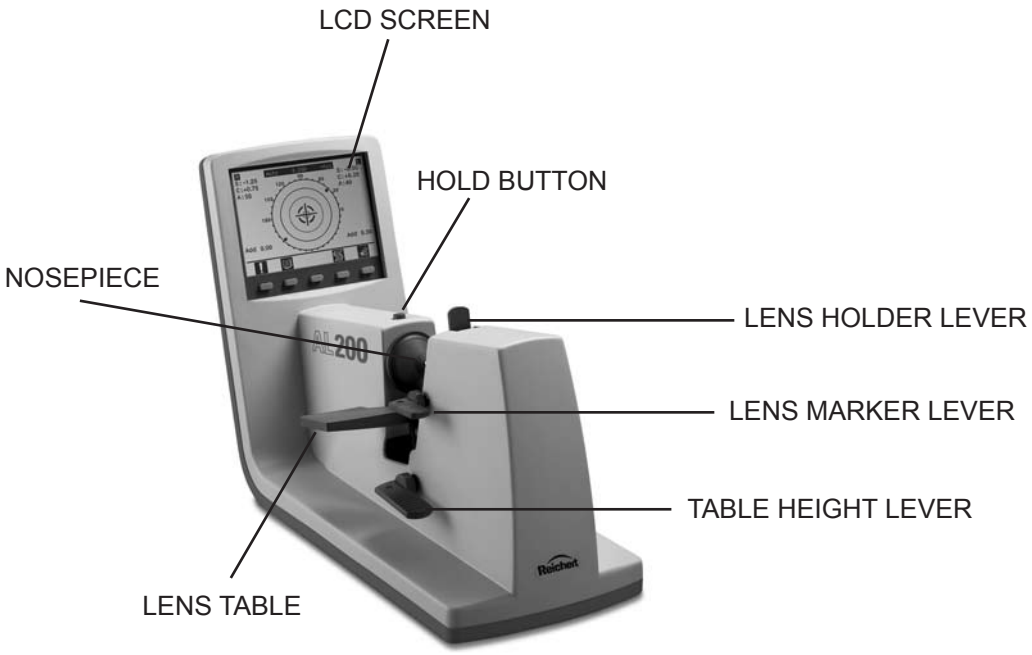
1. At any time, the power switch can be set to OFF. The unit does not have a power down sequence. To terminate operation of this instrument, press the ON / OFF switch to the OFF position (O).
2. If this instrument is intended to be OFF for an extended period of time, it can be disconnected from power by detaching the power cord from its receptacle.

Installation Features and Functions (continued)

Parts Identification



LCD Screen (most common screen features shown)



AL200 Features

Installation Features and Functions (continued)

Icon Guide

The AL200 utilizes an Icon-based operating system. Icons located along the bottom of the screen represent the functions that the buttons beneath them perform. Some buttons perform different functions, depending on which mode the instrument is in. Users should become familiar with the AL200 icons in order to understand the functions of each mode. Icons utilized on the AL200 are shown and described below.

Operation Icons


Setup - Press to enter the Setup mode


Review - Press to enter the Review mode - used for viewing measurement data


Right / Left - Press to switch from the right lens to the left lens


Left / Right - Press to switch from the left lens to the right lens


Print - Press to print measurement results


Clear - Press to clear any data on the screen



Auto / Manual - Press to toggle between automatic and manual modes


Progressive - Press to change to progressive lens measurement mode


Single Vision - Press to change to single vision lens measurement mode


Bifocal - Press to change to bifocal measurement mode

Setup Menu Icons


Up - Press to move up through menu choices


Down - Press to move down through menu choices


Left - Press to move left through menu choices


Right - Press to move right through menu choices

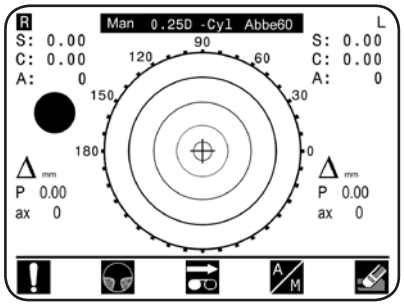

Enter - Press to confirm menu choices and exit setup mode


Clear - Press to clear any data on the screen

Setup Mode

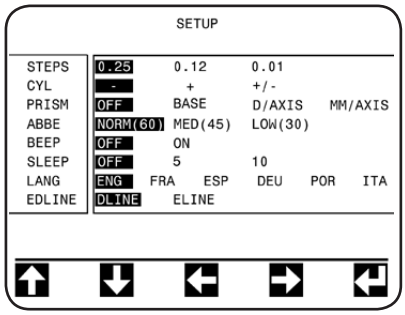
The AL200 comes configured with the most commonly used instrument settings. Default settings can be changed in the setup mode. Once changes are made, all settings are stored until further changes are made.

Entering SETUP Mode



Upon initialization the AL200 will display the Reichert logo and then proceed to the default measurement screen (single vision, auto mode). To enter the SETUP mode from any measurement screen, simply press the button under the setup icon button on the lower left side of the screen.

SETUP Screen



Once in SETUP mode, operators can navigate and activate menu options using the buttons under the arrow icons. Current instrument settings appear highlighted. To change any setting, simply use the up and down arrow buttons to select the desired menu, then use the left and right arrow buttons to move between the choices. Once the desired settings have been highlighted, press the enter button to confirm the settings and exit setup mode.

SETUP Options

SETUP options are as follows:

STEPS Operators can select from 0.25, 0.12, and 0.01 diopter increments.

CYL Operators can select from minus, plus, or mixed cylinder mode.

PRISM Operators can choose to display no prism (off), or prism in Base (U, D, I, O), or Axis (diopters or millimeters).

ABBE The Abbe setting should be selected based on the type of optical material to be measured. Choose from Normal (60), Medium (45) or Low (30).

TONE Operators can choose to turn the AL200 tone on or off.

SLEEP Operators can select from 5 minutes, 10 minutes, or no sleep mode.

LANG Operators can select from the following display languages: Eng (English), Fra (French), Esp (Spanish), Deu (German), Por (Portuguese), and Ita (Italian).

EDLINE Operators can choose from D Line or E Line measurement scales.

Operation

Auto Measurement Mode

Single Vision

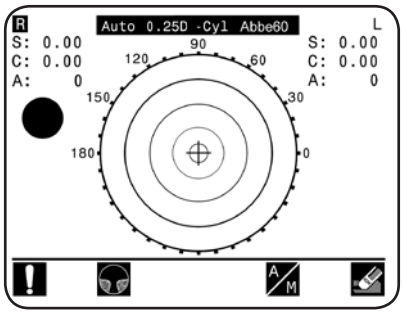
Start Screen



Upon initialization the AL200 will display the Reichert logo screen and perform a brief calibration check. After the calibration is complete, press any button to enter Single Vision Auto Measurement mode.

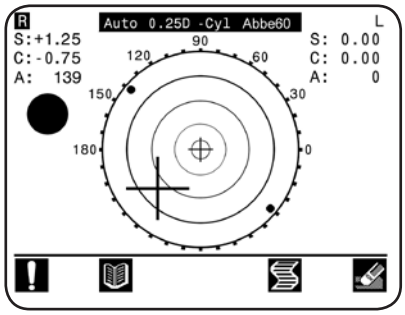
Note: Do not place any lenses or obstructions in front of the aperture during calibration.

Default Measurement Screen Single Vision Auto Mode



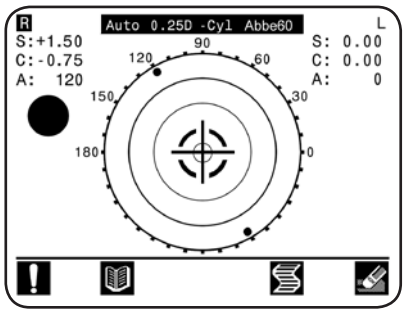
The AL200's default measurement mode is Single Vision, Automatic. This mode is used for fast, easy measurement of a pair of single vision spectacle lenses. The instrument is now ready to measure the right lens, indicated by the highlighted R on the upper left side of the screen.

Centering the Lens



Place the spectacles on the lens table and secure the right lens with the lens holder. Using the table base levers and your hand, move the lens until the large cross is positioned directly over the small cross in the middle of the centering target. If the operator inserts a progressive lens in single vision mode, the progressive icon may flash to indicate that the mode should be changed.

Optical Center



When optical center has been located, the AL200 tone will sound and the measurements will be locked on the screen. Upon removal of the lens the AL200 will automatically switch to the left lens, indicated by the highlighted L on the upper right side of the screen. Repeat the measurement process for the left lens. All measurements will remain on the screen until the operator chooses to print or clear the data.

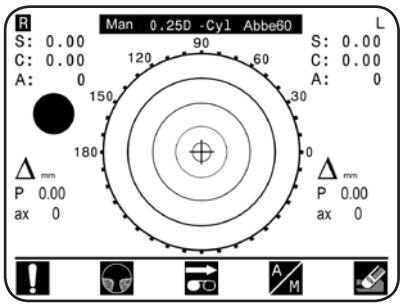
Operation (continued)

Auto Measurement Mode (continued)

Progressive

Default Measurement Screen Single Vision Auto Mode



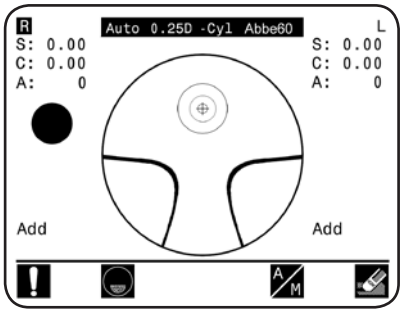


Upon initialization the AL200 will display the Reichert logo screen and perform a brief calibration check. After the calibration is complete, press any button to continue.

Note: Do not place any lenses or obstructions in front of the aperture during calibration.

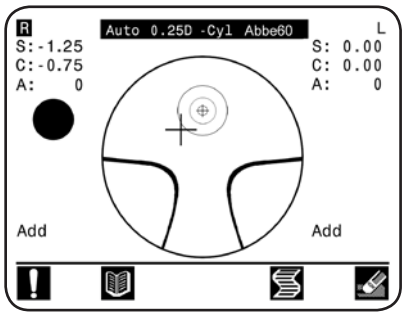
To switch to Auto Progressive mode, simply press the lens type button once.

Auto Progressive Mode



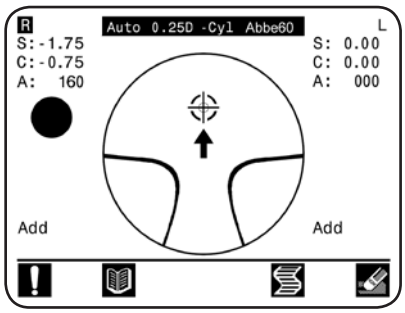
Once in Auto Progressive mode the AL200 is ready to measure the right lens of a pair of progressive spectacles, indicated by the highlighted R in the upper left corner of the screen.

Centering the Lens



To measure the distance segment of the lens, place the spectacles on the lens table and secure the right lens with the lens holder. Using the table base levers and your hand, move the lens until the large cross is positioned directly over the small cross in the middle of the centering target.

Distance Measurement



When the lens has been properly positioned, the AL200 tone will sound and the distance measurement will be locked on the screen. An arrow will appear on the screen instructing the operator to move the lens upward to begin measuring the progressive zone (add).

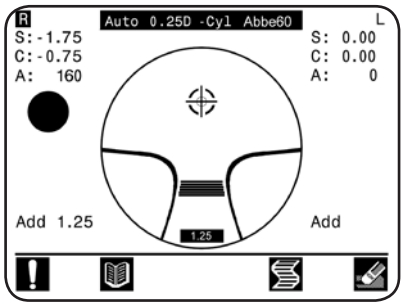
Note: The design of certain progressive lenses may prohibit auto distance measurement. In these cases operators must press the hold button to lock the distance value on the screen.

Operation (continued)

Auto Measurement Mode (continued)

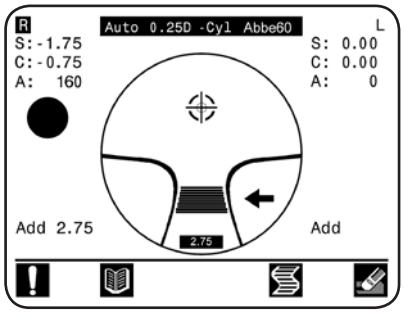
Progressive (continued)

Measuring Add Power



As the lens is moved through the add zone, black lines will fill the progressive area on the screen indicating the amount of add being detected. In addition, the add power (in diopters) is displayed at the bottom corner of the screen.

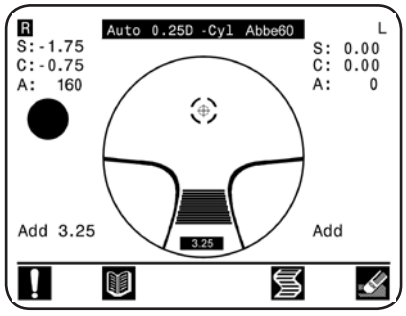
Arrows Indicate Path to Maximum Add Value



Arrows to the right and left of the add zone will indicate if the operator is moving outside the progressive zone. Continue following the direction of the arrows until the maximum add power is reached.

Note: The black lines may not completely fill the progressive area.

Maximum Add Measured



To lock the add power on the screen the operator simply presses the hold button on the top of the AL200. The tone will sound and all right lens measurement values will be locked on the screen. Upon removal of the lens the AL200 will automatically switch to the left lens, indicated by the highlighted L on the upper right side of the screen. Repeat the measurement process for the left lens. All measurements will remain on the screen until the operator chooses to print or clear the data.



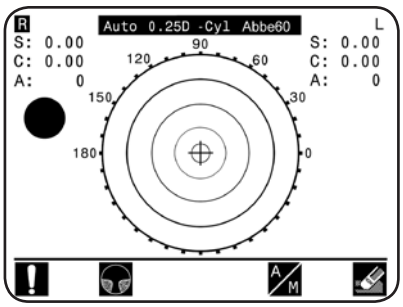
Operation (continued)

Auto Measurement Mode (continued)

Bifocal

Default Measurement Screen Single Vision Auto Mode



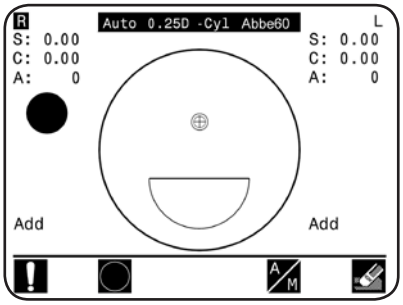


Upon initialization the AL200 will display the Reichert logo screen and perform a brief calibration check. After the calibration is complete, press any button to continue.

Note: Do not place any lenses or obstructions in front of the aperture during calibration.

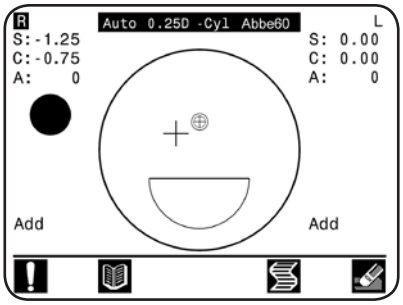
To switch to Auto Bifocal mode, simply press the lens type button twice.

Auto Bifocal Mode



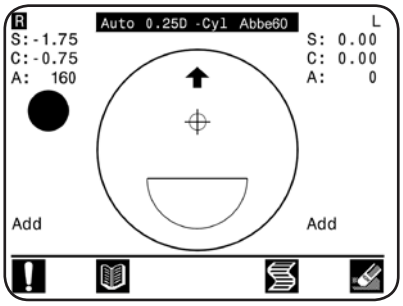
Once in Auto Bifocal mode the AL200 is ready to measure the right lens of a pair of bifocal spectacles, indicated by the highlighted R in the upper left corner of the screen.

Centering the Lens



To measure the distance segment of the lens, place the spectacles on the lens table and secure the right lens with the lens holder. Using the table base levers and your hand, move the lens until the large cross is positioned directly over the small cross in the middle of the centering target.

Distance Measurement



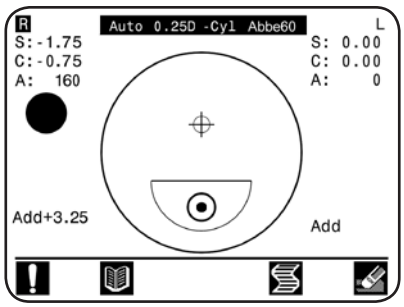
When the lens is properly positioned, the AL200 tone will sound and the distance measurements will be locked on the screen. An arrow will appear on the screen instructing the operator to move the lens to measure the add power.

Operation (continued)

Auto Measurement Mode (continued)

Bifocal (continued)

Measuring Add Power



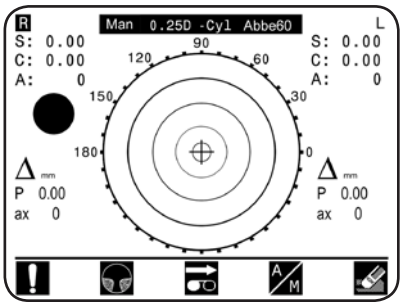
Move the lens to position the add power segment over the aperture. The AL200 will automatically detect the add power and lock the value on the screen. Upon removal of the lens the AL200 will automatically switch to the left lens, indicated by the highlighted L on the upper right side of the screen. Repeat the measurement process for the left lens. All measurements will remain on the screen until the operator chooses to print or clear the data.

Operation (continued)

Manual Measurement Mode

Single Vision

Default Measurement Screen Single Vision Auto Mode

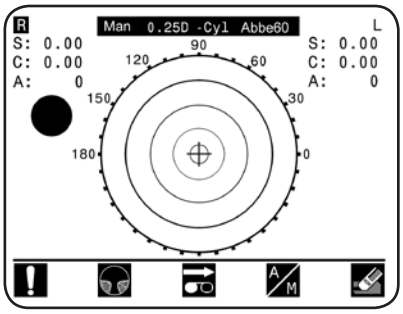


Upon initialization the AL200 will display the Reichert logo screen and perform a brief calibration check. After the calibration is complete, press any button to continue.

Note: Do not place any lenses or obstructions in front of the aperture during calibration.

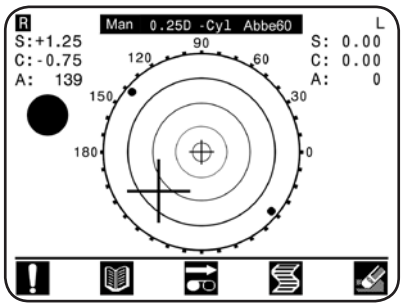
To switch to Single Vision Manual mode, simply press the Auto / Manual button.

Single Vision Manual Mode



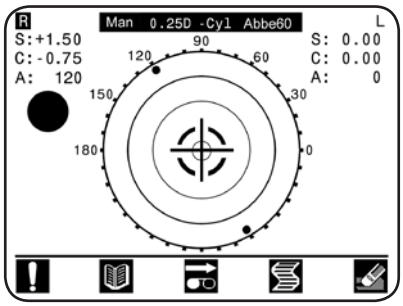
Once in Single Vision Manual mode the AL200 is ready to measure the right lens of a pair of single vision spectacles, indicated by the highlighted R in the upper left corner of the screen. If preferred, the left lens can be measured first by pressing the Right / Left lens button.

Centering the Lens



Place the spectacles on the lens table and secure the right lens with the lens holder. Using the table base levers and your hand, move the lens until the large cross is positioned directly over the small cross in the middle of the centering target. If the operator inserts a progressive lens in single vision mode, the progressive icon may flash to indicate that the mode should be changed.

Optical Center



Press the hold button when the desired positioning has been reached. The AL200 tone will sound and measurements will be locked on the screen. Remove the lens and press the Right / Left lens button to measure the next lens. Repeat the measurement process for the left lens. All measurements will remain on the screen until the operator chooses to print or clear the data.

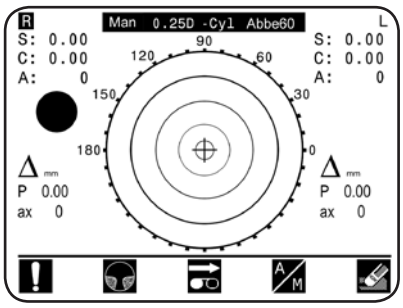
Operation (continued)

Manual Measurement Mode (continued)

Progressive

Default Measurement Screen Single Vision Auto Mode



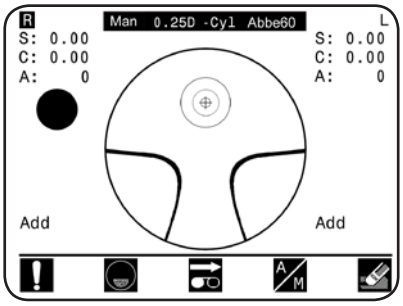


Upon initialization the AL200 will display the Reichert logo screen and perform a brief calibration check. After the calibration is complete, press any button to continue.

Note: Do not place any lenses or obstructions in front of the aperture during calibration.

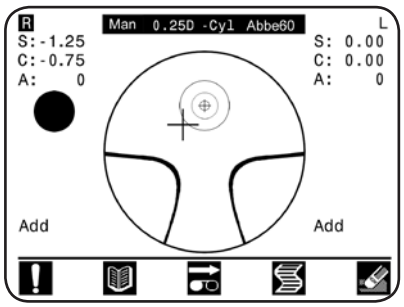
To switch to Progressive mode, simply press the lens type button once, then press the A/M button to enter manual mode.

Manual Progressive Mode



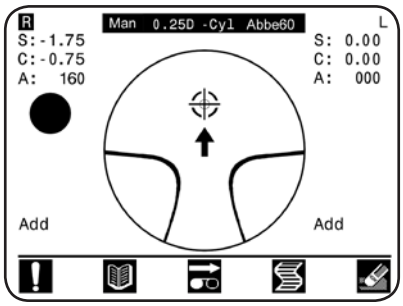
Once in Progressive Manual mode the AL200 is ready to measure the right lens of a pair of progressive spectacles, indicated by the highlighted R on the upper left side of the screen. If preferred, the left lens can be measured first by pressing the right / left lens button.

Centering the Lens



To measure the distance segment of the lens, place the spectacles on the lens table and secure the right lens with the lens holder. Using the table base levers and your hand, move the lens until the large cross is positioned over the small cross in the middle of the centering target.

Distance Measurement



Press the hold button when the desired positioning has been reached. The AL200 tone will sound and measurements will be locked on the screen. An arrow will appear on the screen instructing the operator to move the lens upward to begin measuring the progressive zone (add).

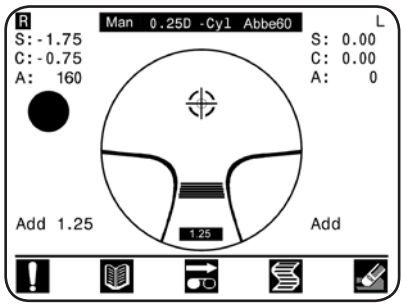
-continued-

Operation (continued)

Manual Measurement Mode (continued)

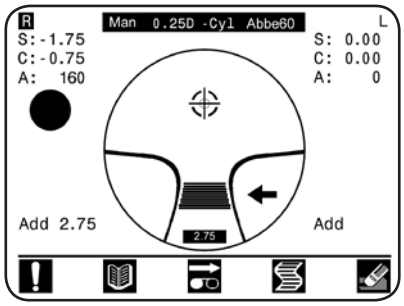
Progressive (continued)

Measuring Add Power



As the lens is moved through the add zone, black lines will fill the progressive area on the screen indicating the amount of add being detected. In addition, the add power (in diopters) is displayed at the bottom corner of the screen.

Arrows Indicate Path to Maximum Add Value

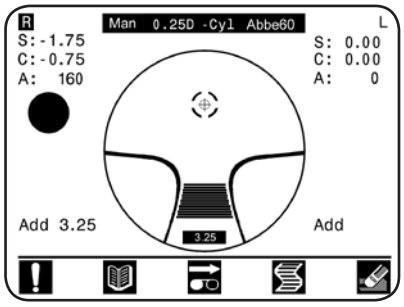


Arrows to the right and left of the add zone will indicate if the operator is moving outside the progressive zone. Continue following the direction of the arrows until the maximum add power is reached.

Note: The black lines may not completely fill the progressive area.

Maximum Add Measured





Press the hold button when the desired add value has been reached. The AL200 tone will sound and all right lens measurement values will be locked on the screen. Remove the lens and press the Right / Left lens button to measure the next lens. Repeat the measurement process for the left lens. All measurements will remain on the screen until the operator chooses to print or clear the data.

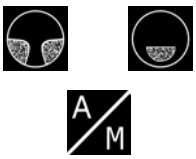


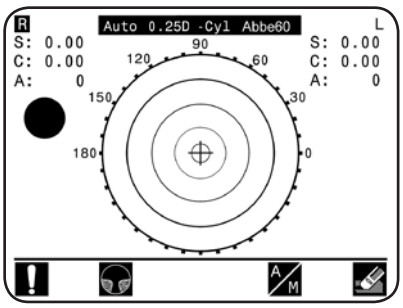
Operation (continued)

Manual Measurement Mode (continued)

Bifocal

Default Measurement Screen Single Vision Auto Mode



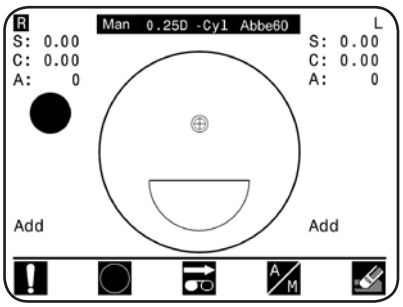


Upon initialization the AL200 will display the Reichert logo screen and perform a brief calibration check. After the calibration is complete, press any button to continue.

Note: Do not place any lenses or obstructions in front of the aperture during calibration.

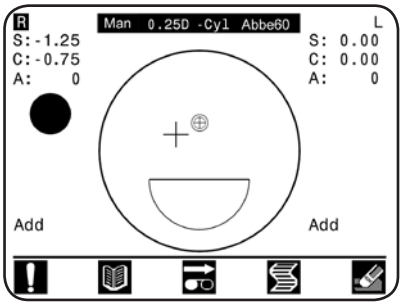
To switch to Bifocal mode, simply press the lens type button twice, then press the A/M button to enter manual mode.

Manual Bifocal Mode



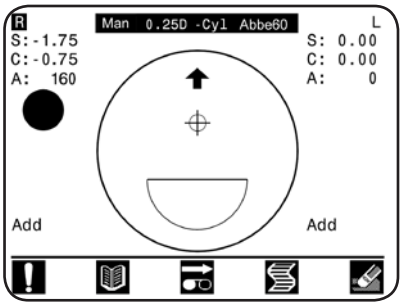
Once in Manual Bifocal mode the AL200 is ready to measure the right lens of a pair of bifocal spectacles, indicated by the highlighted R in the upper left corner of the screen. If preferred, the left lens can be measured first by pressing the right / left lens button.

Centering the Lens



To measure the distance segment of the lens, place the spectacles on the lens table and secure the right lens with the lens holder. Using the table base levers and your hand, move the lens until the large cross is positioned directly over the small cross in the middle of the centering target.

Distance Measurement



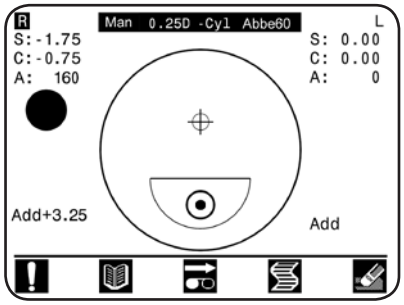
Press the hold button when the desired positioning has been reached. The AL200 tone will sound and measurements will be locked on the screen. An arrow will appear on the screen instructing the operator to move the lens to measure the add power.

Operation (continued)

Manual Measurement Mode (continued)

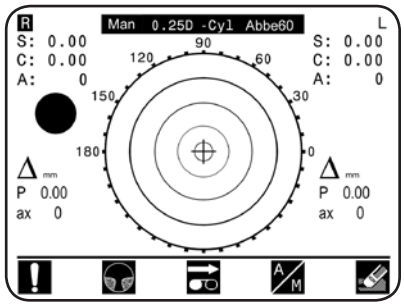
Bifocal (continued)

Measuring Add Power



Move the lens to position the add power segment over the aperture. Press the hold button when the add value has been measured. The AL200 tone will sound and all right lens measurement values will be locked on the screen. Remove the lens and press the Right / Left lens button to measure the next lens. Repeat the measurement process for the left lens. All measurements will remain on the screen until the operator chooses to print or clear the data.

Prism Measurement



Marked Lens

Prism measurements for a marked lens are obtained by measuring at the indicated measurement point on the lens.

Unmarked Lens

Prism measurements in an unmarked lens are obtained by:

- First applying a non-permanent ink dot on the lens where the patient's distance vision is focused (aligned with the center of the pupil). If an add segment is present, a second dot may be applied to facilitate the add reading
- Prism (and Sphere, Cylinder, and Axis) measurements are obtained by measuring at the ink dot on the lens.

Note: Measurements for prism are displayed in either the x-y (x, y displacement in mm), or P-b (prism in diopters) as indicated in the SETUP mode (Prism option).

Note: If a lens is not marked with the optical center, an inaccurate prism measurement may be displayed.

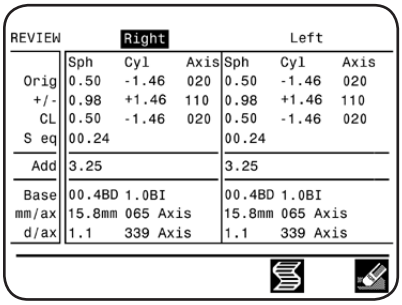
Operation (continued)

Review Mode

Review Mode



The Review mode is used to view the current lens measurement data in all available formats (+/- Cylinder, Spherical Equivalent, Contact Lens conversion, Prism in Diopters, Prism in Millimeters, Prism in Base/Axis). Complete information for both lenses is displayed. Measurement formats displayed are described below:



Orig	Shows the lens data in the measured format
+/-	Converts the original data to plus or minus cylinder
CL	Converts the original measurement data to contact lens data
S eq	Shows the spherical equivalent of the original measurement data

Base	Shows prism value in Base format
mm/ax	Shows prism value in Millimeters / Axis
d/ax	Shows prism value in Diopters / Axis

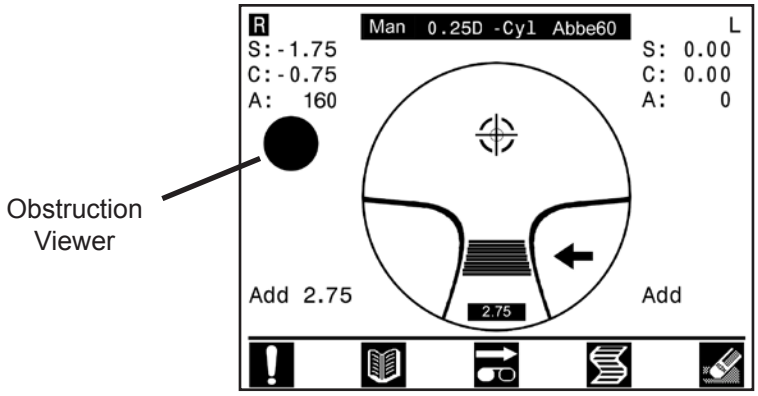
Obstruction Viewer

The AL200's obstruction viewer is a real-time view of the camera image inside the instrument. See picture below.

The obstruction viewer is particularly helpful in identifying obstructions that could affect the measurements of a lens, such as excessive dirt or markings on the lens.

The obstruction viewer also assists with viewing the rim of a lens while measuring progressive lenses, as well as viewing the line on a bifocal lens.

The obstruction viewer is always on the screen and there is no need to adjust any settings.



Troubleshooting

Chart of Common Errors

Power		
Issue	**Possible Problem**	**Possible Solution**
Screen blank.	Instrument may be in sleep mode.	Push any button.
	LCD contrast may be set incorrectly.	Adjust knob on the back of the AL200.
Instrument will not turn on.	Power cord may not be installed correctly.	Ensure power cord is properly seated in the power input receptacle on the back of the AL200.
	Power cord may not be plugged into a live or properly volted outlet.	Ensure that the instrument is plugged into a wall outlet of the correct voltage.
	Fuses may be blown.	Check the fuses located in the fuse holder on the back of the AL200. Replace fuses if required. Fuse specifications are shown in the specification table.
Measurement		
Data on screen with no lens in place.	There may be dirt inside the aperture.	Refer to the Cleaning & Maintenance section for cleaning instructions.
Unstable / erroneous readings	Instrument may have been turned on with a lens in place, causing improper calibration.	Remove all lenses from AL200 and reboot the instrument.
	There may be dirt inside the aperture.	Refer to the Cleaning & Maintenance section for cleaning instructions.
Obstruction detected message	There may be something blocking the aperture.	Ensure that there are no physical obstructions in front of the aperture. **Note:** If the marking pens are not fully returned to their resting position they may obstruct the aperture.
	There may be dirt inside the aperture.	Refer to the Cleaning & Maintenance section for cleaning instructions.
Lens positioning is abnormally slow	Dark lenses are more difficult to read and may cause positioning to be slower than normal.	No action required.
	There may be dirt inside the aperture.	Refer to the Cleaning & Maintenance section for cleaning instructions.
	The lens being measured is dirty or scratched.	Cleaning the lens may help.

For all other problems or questions please contact Reichert Technical Support.
Contact information is provided on the back page of this manual.

Cleaning & Maintenance

Cleaning

Perform the following procedures as necessary to maintain proper operation of the AL200.

WARNING: ALWAYS WEAR EYE PROTECTION WHEN PERFORMING CLEANING AND MAINTENANCE.

CAUTION: DO NOT USE STRONG CLEANING SOLUTIONS OR SOLVENTS ON ANY PART OF THE AL200 OR DAMAGE TO THE INSTRUMENT MAY OCCUR.

LCD Screen Cleaning

Gently clean any dirt or contaminants off of the LCD screen using a lint-free cotton cloth lightly dampened with a mild cleaning solution that is safe for plastic. Be sure to wipe off any residual solution using a lint-free cotton cloth.

Housing Cleaning

Gently clean any dirt or contaminants off the housing and the LCD screen using a lint-free cotton cloth lightly dampened with a mild cleaning solution that is safe for plastic. Be sure to wipe off any residual solution using a lint-free cotton cloth moistened with clean water.

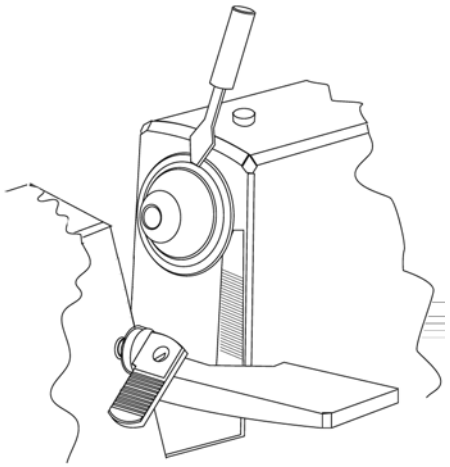
Pen Cleaning

The AL200 utilizes pre-filled, self contained, felt tip marking pens. Under normal circumstances these pens will require no maintenance except periodic replacement as required. However, if excess ink gathers on the tip of the pens, it may be wiped off with a lint-free cotton cloth moistened with clean water.

Nosepiece Cover Cleaning / Removal and Installation

WARNING: ALCOHOL IS FLAMMABLE. KEEP AWAY FROM HEAT AND FLAMES.

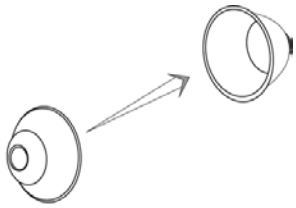
Clean the outside of the Nosepiece Cover with a lint-free cotton cloth moistened with alcohol. If the inside surface of the Nosepiece Cover is contaminated, remove the Nosepiece Cover and clean the inside with a lint-free cotton swab moistened with alcohol. If the Nosepiece Cover is damaged or torn, replace it. Refer to the following diagrams for nosepiece removal and installation instructions.



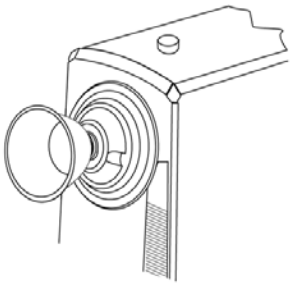
Using a small, flat screwdriver, push the blade under the outer edge of the rubber nosepiece cover. Grasp the edge with your fingers and pull the nosepiece cover out of the groove and off of the metal nosepiece. Clean or replace the nosepiece as required.

Cleaning & Maintenance (continued)

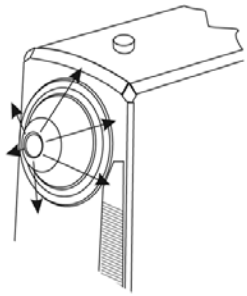
Nosepiece Cover Cleaning / Removal and Installation (continued)



After the nosepiece is cleaned or a new nosepiece cover is obtained, invert (flip inside out) the nosepiece cover for installation onto the AL200 nosepiece.



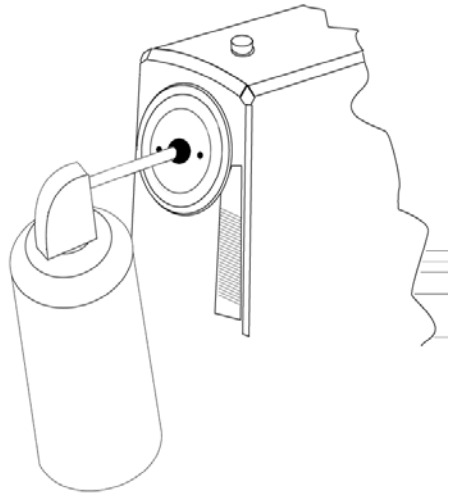
Position the cleaned or new nosepiece cover over the front of the metal nosepiece on the AL200.



Push the outer edges of the nosepiece cover over the metal nosepiece. Use your fingers to seat the rubber nosepiece cover securely into the groove in the metal nosepiece.

Nosepiece Lens Cleaning

CAUTION: DEBRIS AND CONTAMINATION INSIDE THE NOSEPIECE MAY CAUSE MEASUREMENT ERRORS. USE ONLY CLEAN, DRY, OIL-FREE COMPRESSED AIR TO CLEAN INSIDE THE NOSEPIECE.



1. Fully retract the lensholder and remove the nosepiece cover as described in Nosepiece Cover Cleaning/Removal and Installation.
2. Using the provided wrench, remove the metal tip of the nosepiece assembly.
3. Using canned air spray a few short bursts of air into the opening.
4. Reinstall the metal nosepiece tip and tighten using the provided wrench. Insure that the tip is tightened so that it can not be loosened by hand. Install the nosepiece cover when complete.
5. Remove all lenses and obstructions from the AL200. Turn the instrument off, and then back on to initiate the calibration cycle. Insure that all sphere, cylinder, and axis data on the screen reads zero.

** Suggested source of canned air:*
EnviroTech Duster 1671 Tech Spray.

Cleaning & Maintenance (continued)

Fuse Replacement

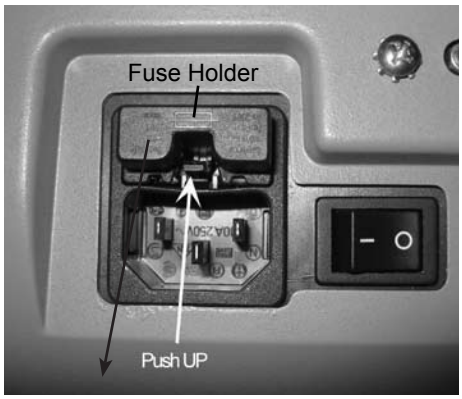
Fuses are located next to the power inlet. Replace fuses with only a rating as indicated in the General Specifications section of this manual.

WARNING: DISCONNECT POWER BEFORE ATTEMPTING TO REMOVE THE FUSES OR SERIOUS INJURY OR DEATH MAY OCCUR.

Replace the fuses in the Power Input Module with the fuses indicated in the Specifications section of this manual.

1. Turn the power to the AL200 off.
2. Remove the Power Cord from the Power Input Module.
3. Push up on the tab in the middle of the Power Input Module to release the Fuse holder.
4. Pull the fuse holder out of the input module.
5. Install new fuses that are indicated in the Specification section of this manual into the Fuse holder.
6. Push the Fuse holder into the Power Input Module until it snaps into place.
7. Install the Power Cord into the Power Input Module.

Note: Replacement of this fuse must be performed by qualified service personnel only.





Specifications

Physical Dimensions

Size
Weight, unpacked: 23.0 lbs. (10.4 Kg)
Height: 19.8 in. (50.2 cm), Width: 10.5 in. (26.7 cm), Depth: 14.0 in. (35.6 cm)

Electrical
Voltage: 100-240 VAC, 50/60 Hz
Power: 50 VA, Fuses: Time-Lag (6.30 mA, 250V) 5x20mm, RoHS

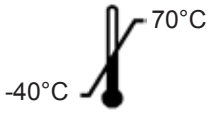
Measurement Range
Types of Lenses Measured:
Single Vision, Bifocal/Trifocal, and Progressive Addition

Performance:
Spherical Power ..... -25D to + 25D
Increments ..... 0.01D, 0.12D or 0.25D
Cylindrical Power ..... -10D to + 10D
Increments ..... 0.01D, 0.12D or 0.25D
Axis: ..... 0° to 179°
Increments ..... 1°
Add: ..... 0D to + 10D
Increments ..... 0.01D, 0.12D or 0.25D
Prism: ..... 0 D to 10 D
Increments ..... 0.01D, 0.12D or 0.25D

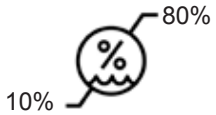
Lens Diameters Accommodated:
Lens Blanks .....28 to 100 mm

Operational Conditions

Environmental:
The environmental conditions are as follows:



Operating:
Temperature 10° C (50° F) to 35° C (95° F)
Relative Humidity: 30% to 75%
Atmospheric Pressure: 80 (23.6 in. Hg) to 106 kPa (31.3 in. Hg)



Transportation & Storage:
Temperature -40° C (-40° F) to +70° C (158° F).
Relative Humidity: 10% to 80% (non-condensing)
Atmospheric Pressure: 50 (14.8 in. Hg) to 106 kPa (31.3 in. Hg)



Exposure to extreme temperature conditions indicated above must not exceed 15 weeks.

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.

Software Revision

The software revision can be obtained by contacting Reichert Technologies. The serial number identifies the manufacture date and will provide access to the software version.

Guidance Tables

Table 201 – Guidance and Manufacturer's Declaration

Electromagnetic Emissions

All Equipment and Systems

Guidance and Manufacturer's Declaration – Electromagnetic Emissions

The AL200 Lensometer is intended for use in the electromagnetic environment specified below. The customer or user of the AL200 Lensometer should ensure that it is used in such an environment.

Emissions Test	Compliance	Electromagnetic Environment - Guidance -
RF Emissions CISPR 11	Group 1 Class A	The AL200 Lensometer uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
Harmonics IEC 61000-3-2	Class A	The AL200 Lensometer is suitable for use in all establishments, other than domestic, and those connected directly to the public low-voltage power network that supplies buildings used for domestic purposes.
Flicker IEC 61000-3-3	Complies	

Guidance Tables (continued)

Table 202 – Guidance and Manufacturer's Declaration

Electromagnetic Immunity

All Equipment and Systems

Guidance and Manufacturer's Declaration – Electromagnetic Immunity

The AL200 Lensometer is suitable for use in the electromagnetic environment specified below. The customer or user of the AL200 Lensometer should ensure that it is used in such an environment.

Immunity Test	IEC 60601 Test Level	Compliance Level	Electromagnetic Environment - Guidance
ESD IEC 61000-4-2	±4kV Contact ±8kV Air	±2kV Contact ±8kV Air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the R/H should be at least 30%. **Note:** Instrument does not meet compliance level for ESD contact. At ±4kV contact discharge to data port, device may need to be reset by cycling of power.
EFT IEC 61000-4-4	±1kV Mains ±0.5kV I/Os	±1kV Mains ±0.5kV I/Os	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	±1kV Differential ±2kV Common	±1kV Differential ±2kV Common	Mains power quality should be that of a typical commercial or hospital environment.
Voltage Dips/Dropout IEC 61000-4-11	100% Dip for 0.5 Cycle 100% Dip for 1 Cycle 30% Dip for 25 Cycles 100% Dip for 250 Cycles	100% Dip for 0.5 Cycle 100% Dip for 1 Cycle 30% Dip for 25 Cycles 100% Dip for 250 Cycles	Mains power quality should be that of a typical commercial or hospital environment. If the user of the AL200 Lensometer requires continued operation during power mains interruptions, it is recommended that the AL200 Lensometer be powered from an uninterruptible power supply or battery.
Power Frequency 50/60Hz Magnetic Field IEC 61000-4-8	3A/m	3A/m	Power frequency magnetic fields should be that of a typical commercial or hospital environment.

Guidance Tables (continued)

Table 204 – Guidance and Manufacturer's Declaration

Electromagnetic Immunity

All Equipment and Systems

Guidance and Manufacturer's Declaration – Electromagnetic Immunity

The AL200 Lensometer is intended for use in the electromagnetic environment specified below. The customer or user of the AL200 Lensometer should ensure that it is used in such an environment.

Immunity Test	IEC 60601 Test Level	Compliance Level	Electromagnetic Environment - Guidance
Conducted RF IEC 61000-4-6	3 Vrms 150 kHz to 80 MHz	(3) Vrms	Portable and mobile RF communications equipment should be no closer to any part of the AL200 Lensometer including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. Recommended Separation Distance: d=(3.5/V1)(Sqrt P) d=(3.5/V1)(Sqrt P) 80 to 800 MHz d=(7/E1)(Sqrt P) 800 MHz to 2.7 GHz Where P is the max output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in meters (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey, should be less than the compliance level in each frequency range. Interference may occur in the vicinity of equipment marked with the following symbol. 
Radiated RF IEC 61000-4-3	3 V/m 80 MHz to 3.0 GHz	(3) V/ms	

Note 1: At 80 MHz and 800 MHz, the higher frequency range applies.

Note 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

* Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the ME Equipment or ME System should be observed to verify normal operation. If abnormal performance is observed, additional measures many be necessary, such as re-orienting or relocating the ME Equipment or ME System.

* Over the frequency range 150 kHz to 80 MHz, field strengths should be less then [V1] V/m.

Guidance Tables (continued)

Table 206 – Recommended Separation Distances between Portable and Mobile RF Communications Equipment and the AL200 Lensometer

Recommended Separation Distance between

Portable and Mobile RF Communications Equipment and the AL200 Lensometer

The AL200 Lensometer is intended for use in the electromagnetic environment in which radiated RF disturbances are controlled. The customer or user of the AL200 Lensometer can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF Communications Equipment (transmitters) and the AL200 Lensometer as recommended below, according to the maximum output power of the communications equipment.

Rated Max Output Power of Transmitter (W)	Separation (m) 150kHz to 80 MHz d=(3.5/V1)(Sqrt P)	Separation (m) 80 to 800 MHz d=(3.5/E1)(Sqrt P)	Separation (m) 800MHz to 2.5GHz d=(7/E1)(Sqrt P)
0.01	0.1166	0.1166	0.2333
0.1	0.3689	0.3689	0.7378
1	1.1666	1.1666	2.3333
10	3.6893	3.6893	7.3786
100	11.6666	11.6666	23.3333

For transmitters rated at a maximum output power not listed above, the recommended separation distance (d) in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (w) according to the transmitter manufacturer.

Note 1: At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.

Note 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects, and people.

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

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