HUMPHREY®

LENS ANALYZER

USER'S GUIDE

QUICK START GUIDE

ICONS GLOSSARY

Measure Screen

Layout Screen

Contact Lens Screen

PAL Screen

Rounding

Spexan/Layout

Spexan Screen

Help

Cylinder Convention

Print (Restart Print)
Printer Setup

OCD Mode

PD Mode

ACCURx Plus™

System Setup

Cancel Print

Paper Advance
Replace Paper

Advance Next Screen

Return Previous Screen

Overlay

Cancel Overlay

Service Screen

Screen Setup

RS-232 Setup

ICONS GLOSSARY (Continued)

Move Right

Move Left

Enter
(on Service Screen)

Move Up

Move Down

Right/Left Indicator

Plus

Minus

MESSAGES

- **PAL?** - instrument detects rapid change in lens power. In Measure Screen, this message may indicate presence of progressive addition lens or that light beams are straddling segment. Reposition lens or switch to PAL mode (as appropriate) before remeasuring.
- **Light Path Blocked** - appears when one of the light beams is blocked. Reposition lens and/or clean lower read head and remeasure.
- **OCD Inactivated Due To Low Power** - displays when lens power is too low (< 1.00D) to calculate OCD. Change to PD mode and remeasure.
- **Cursor Inactivated Due To Plano Lens With Prism** - cursor will be stationary.
- **Aberration** - appears when lens aberration is detected or non-toric value is exceeded. Examine lens. When PAL? and Aberration conditions occur simultaneously, the "Aberration" message will override the other.
- **ACCURx Plus™** - appears above the centering display as notification that the Lens Analyzer has been programmed (through System Setup) to operate in a lens material mode other than CR-39/Spectacle Crown.

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PN 28340B1093

1 GETTING STARTED

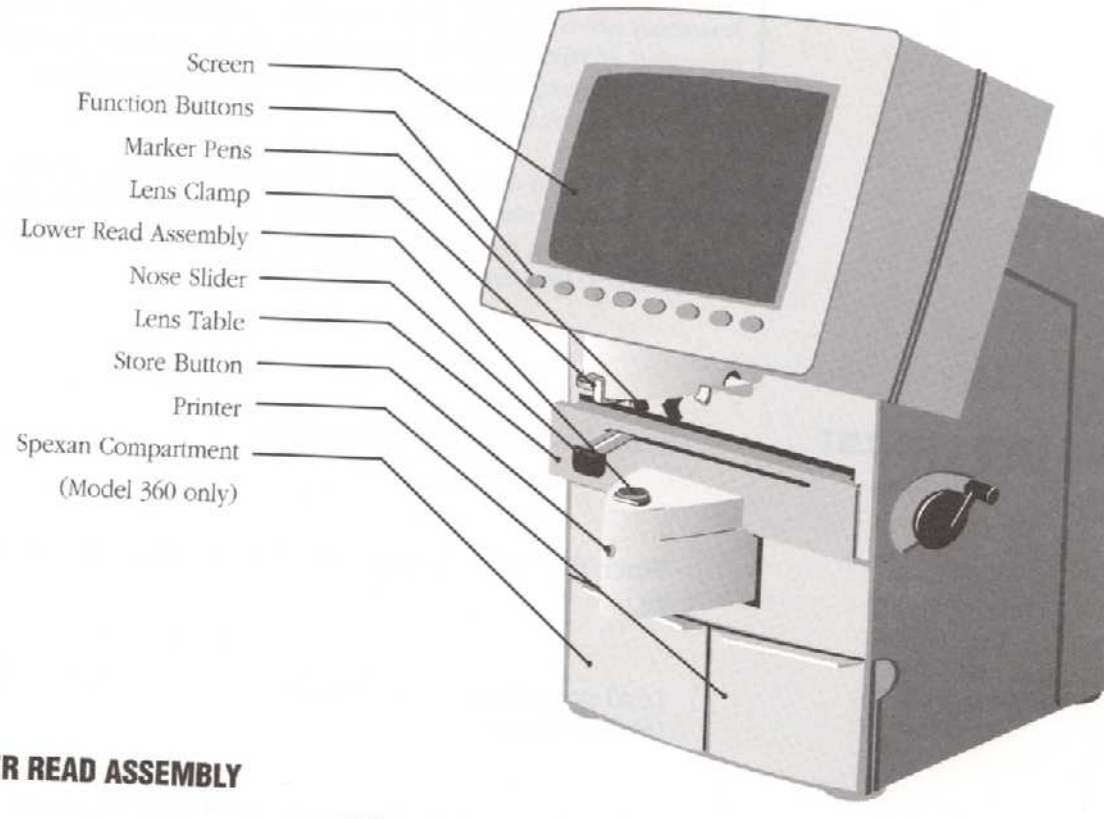
Congratulations! You have now joined thousands of fellow eyecare professionals who have chosen a Humphrey® Lens Analyzer for their lensometry needs. The Lens Analyzer is fully computerized and is designed to measure all types of spectacle lenses, lens blanks, and hard and soft contact lenses quickly and accurately. Operating a Humphrey® Lens Analyzer has never been easier.

This User's Guide is designed to serve as a training and reference aid. Whether you have vast or limited experience with automated lensmeters, we recommend that you follow the steps in the Quick Start Checklist as an introduction to the Humphrey Lens Analyzer.

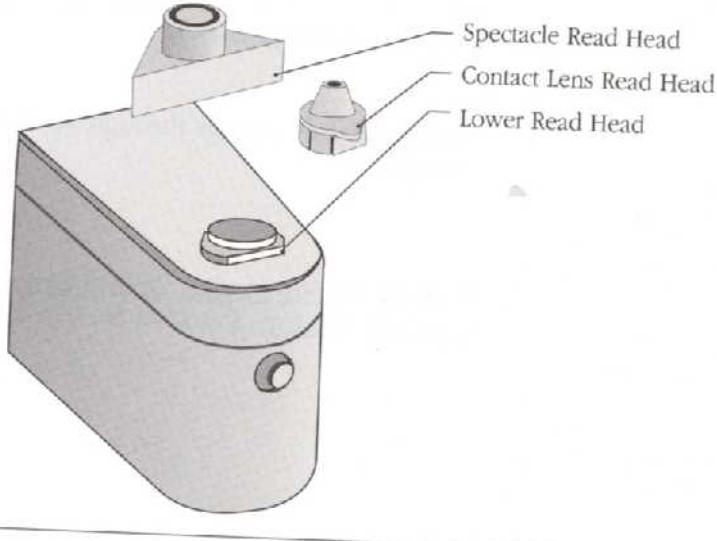
QUICK START CHECKLIST

- ☐ Read "Getting Started" (Section 1).
- ☐ Watch the Lens Analyzer video located in the accessory kit.
- ☐ Load printer paper. Follow directions in Section 10 (Maintenance).
- ☐ Follow the steps on the Quick Start Guide found in Section 1 (Getting Started).
- ☐ Change default settings through System Setup, if necessary (Section 7).
- ☐ Read Measuring Modes: Optical Center Distance and Pupillary Distance found in Section 2 (Spectacles).

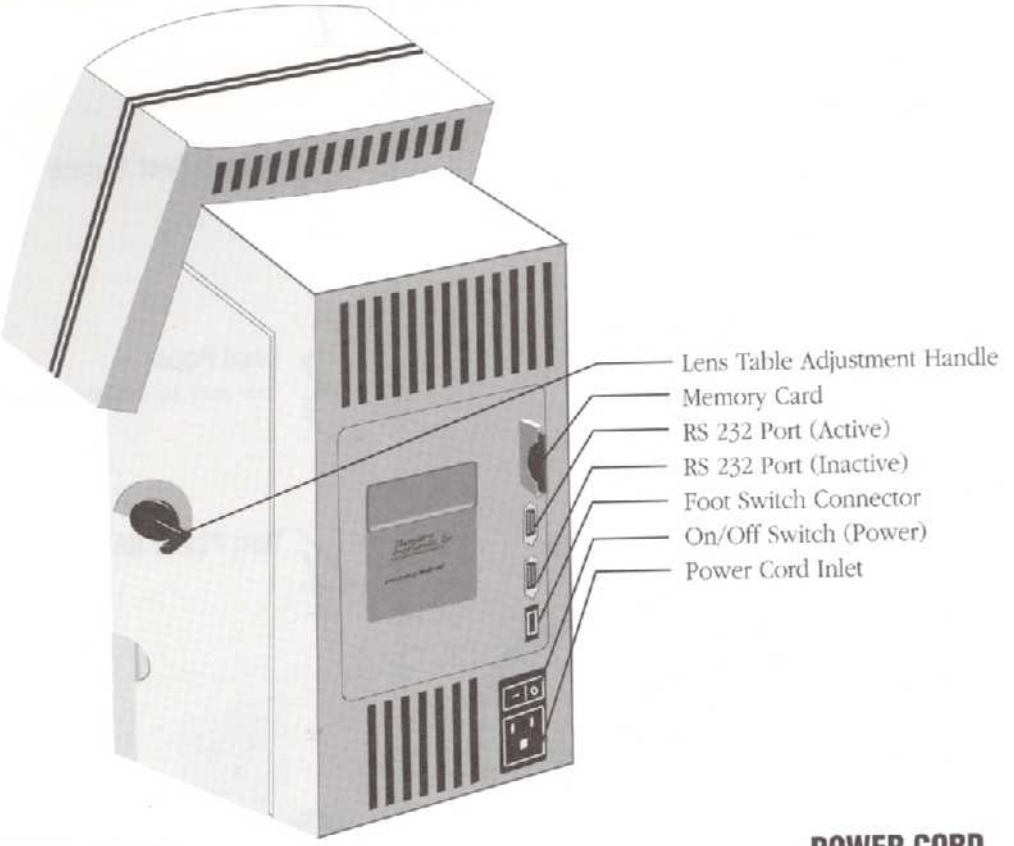
FRONT VIEW



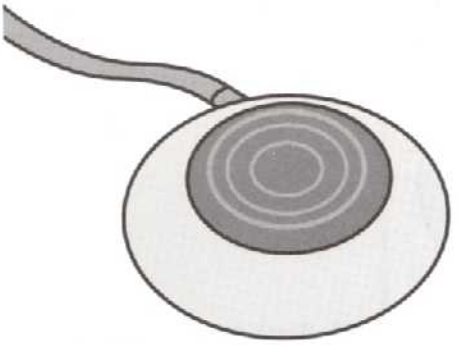
LOWER READ ASSEMBLY



REAR VIEW

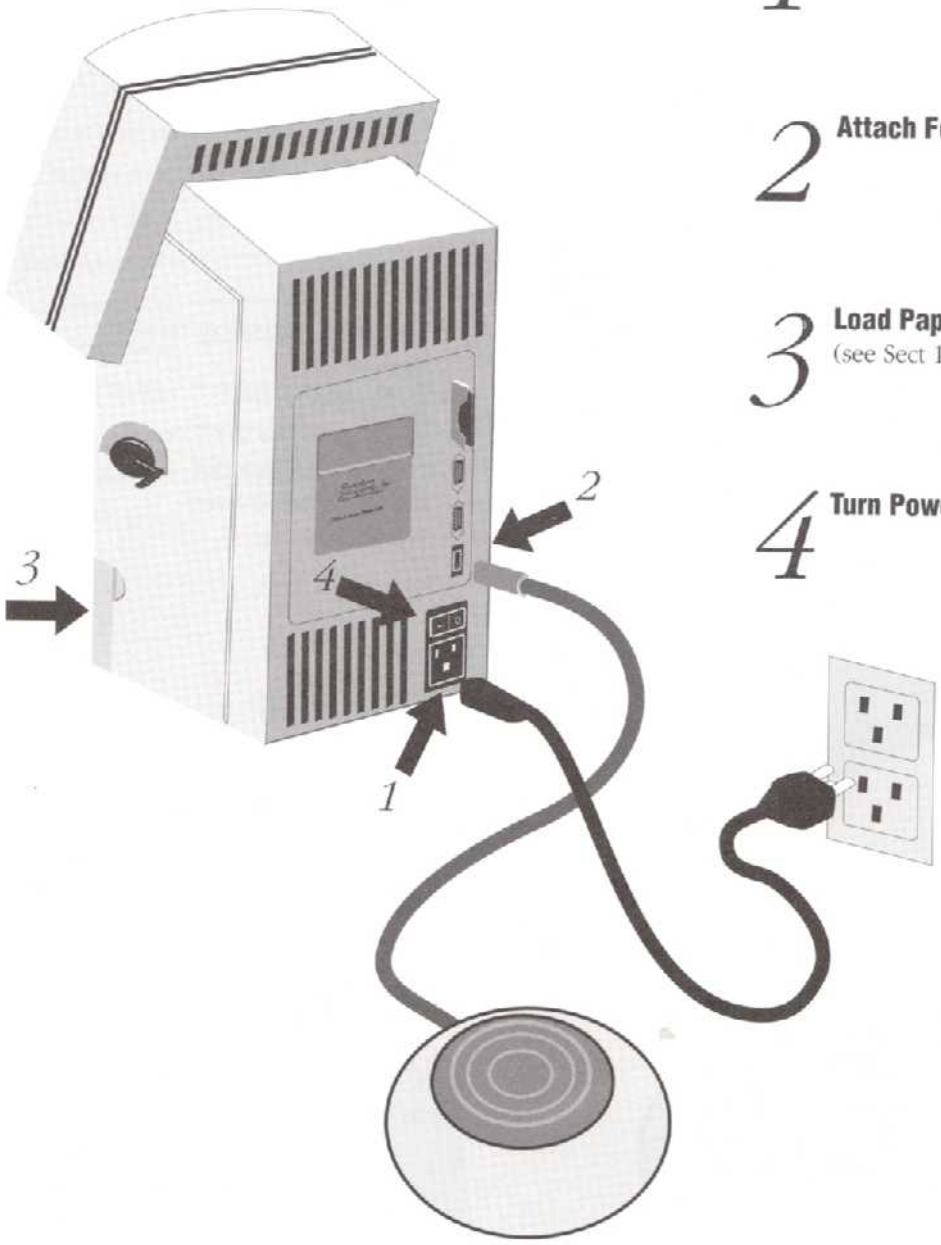


FOOT SWITCH



POWER CORD

INSTRUMENT INSTALLATION



1 **Attach Power Cord**

2 **Attach Foot Switch**

3 **Load Paper**
(see Sect 10, Maintenar

4 **Turn Power On**

■ Watch the Lens Analyzer Installation and Training Vid

SAFETY PRECAUTIONS

The Lens Analyzer should be used in a cool, dry and dust-free setting. To prevent electric shock, the instrument must be plugged into an outlet with earth ground.

The Lens Analyzer is designed to adjust automatically for line voltage from 100 to 240 V. and 50 to 60 Hz.

Although the Lens Analyzer is designed for continuous operation, it should be turned off when not used for an extended period of time.

- The Lens Analyzer is equipped with a three prong plug. The instrument should be plugged into an outlet with a ground receptacle. If the plug does not fit the outlet, contact an electrician. Do NOT disable or remove the ground pin .
- DO NOT overload your AC outlet.
- If the cord or plug is damaged, do not continue to use the instrument. Electrical shock or fire hazard may result. Call customer service for a replacement.
- The instrument has ventilation openings to allow for the release of heat generated during operation. If these openings are blocked, built-up heat can cause failures which may result in a fire hazard.
- DO NOT place the instrument on an uneven or sloped surface.
- DO NOT use accessories that are not designed for this instrument. Use only those parts recommended by Humphrey Instruments to achieve optimum performance and safety.
- DO NOT connect or disconnect cables while power is on.
- DO NOT remove or insert memory card while power is on.
- DO NOT operate the instrument in a wet environment.
- DO NOT spill liquid on instrument.

The Lens Analyzer generates radio frequency energy and may cause interference to radio, television reception and other instruments. If this equipment does cause interference to radio or television reception, the following measures may be necessary:

1. Plug the instrument into a different outlet so that the instrument and the receiving device are on different branch circuits.
2. Reorient the TV or radio antenna.
3. Reorient the instrument with respect to the TV or the radio.
4. Move the receiving device and the instrument away from each other.
5. Use only shielded communication cables.

The following symbols appear on the instrument:

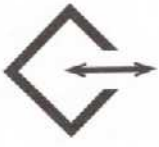
Symbol on power switch indicates Power is OFF

Symbol on power switch indicates Power is ON

Indicates that there are important operating and maintenance instructions included in the User's Guide

Indicates the presence of uninsulated high voltage inside the instrument. Risk of electric shock. Do not remove the instrument cover or parts.

Fuse rating

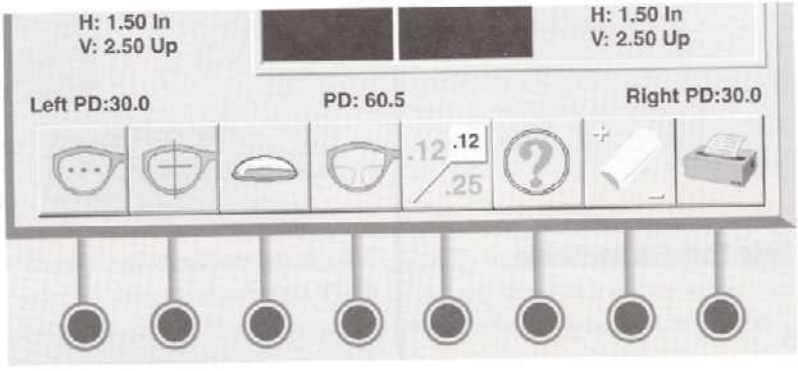


Serial RS-232 communication port

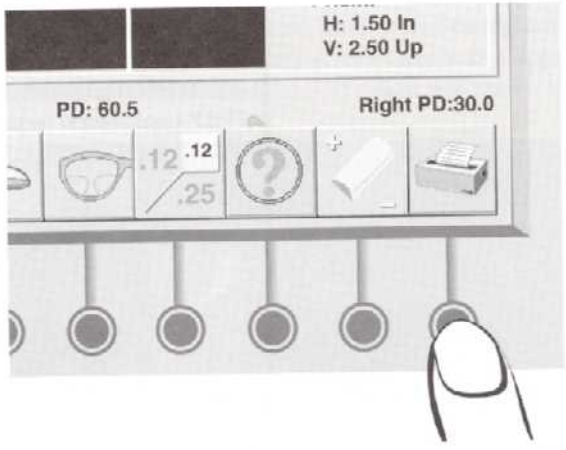
Foot switch

Friendly

Basic operation is menu-driven, which means you don't have to memorize any commands. Your options, represented by simple icons (or pictures), are clearly marked at the bottom of every screen. These pictures, along with other visual and auditory prompts, lead you through the measurement process and other functions of the Lens Analyzer. The illustration below is an example of a menu.

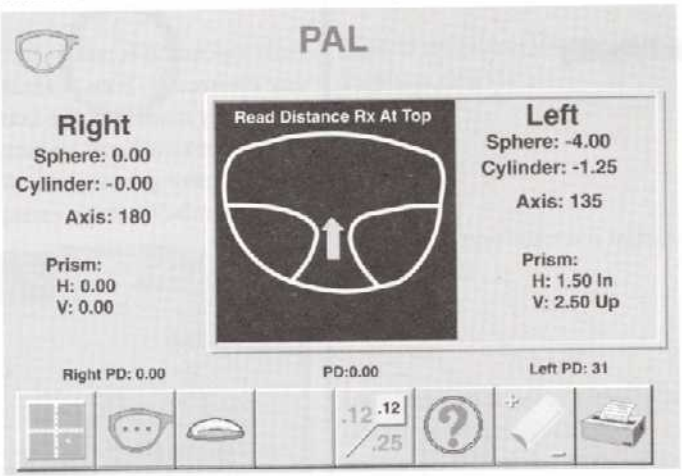


Depressing the button under the appropriate icon will take you to your menu selection or execute a command. For example, to receive a hard-copy printout of the lens measurements, press the button under the icon that represents PRINT.



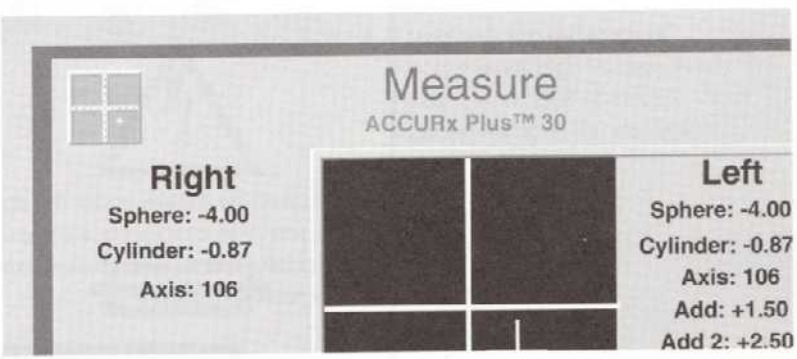
Screen Simplicity

A quick glance at the top of any screen reveals the current selection. Notice the icon representing PROGRESSIVE ADDITION LENSES in the top left corner of the screen and the screen title, PAL, in the center.

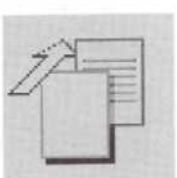


Help Screens Available

Refer to the on-line help screens for assistance with the proper operation of the Lens Analyzer.



Press the button under the HELP icon anytime it appears on the screen to access information about a specific function you are performing. When the HELP explanation requires more than one screen, use the ADVANCE NEXT SCREEN and RETURN PREVIOUS SCREEN prompts.

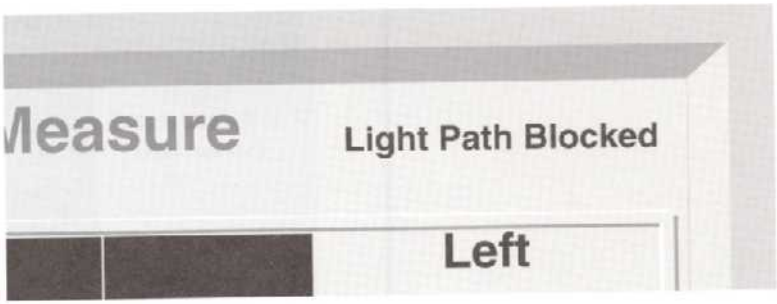


ADVANCE NEXT SCREEN

RETURN PREVIOUS SCREEN

Operator Messages

The precision-engineered Lens Analyzer is equipped with sensors to detect certain improper use. For example, the "Light Path Blocked" message appears in the upper right corner of the screen when one or more of the four measuring light beams is blocked. Typically, the edge of a spectacle frame or a speck of dirt on the lower read assembly will cause the obstruction. *Refer to Section 9 for a complete listing of Operator Messages.*



Auto Read

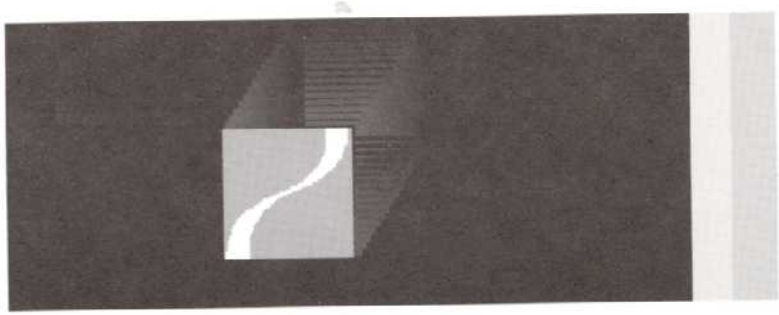
The Humphrey Lens Analyzer automatically reads and displays lens values when it detects lens power. These values are saved in memory when you press the STORE button or the foot switch. The printout reflects the last stored values.

One or both lenses of a spectacle pair may be reread *before* printing. The last stored values will appear on the printout.

When measurements from a single lens are stored, after a previous spectacle pair has been stored and printed, then only the single stored measurement will print.

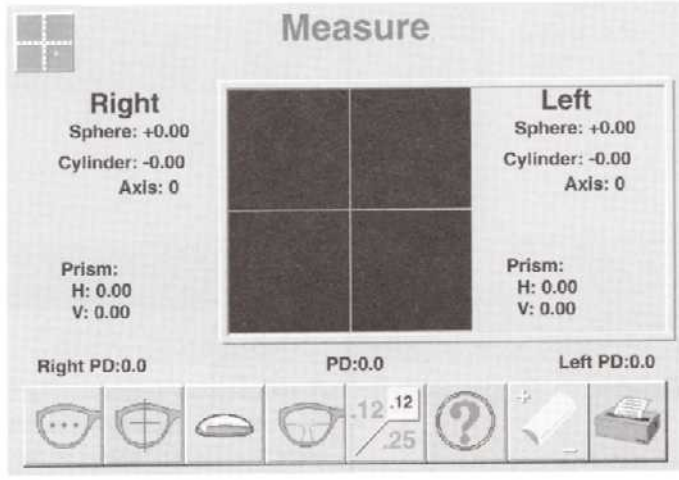
Screen Saver

A special screen will appear when the Lens Analyzer has not been used for 5 minutes. Placing a lens on the read head or depressing any button or the foot switch will bring up the current screen exactly as it appeared before screen saver mode. Previously stored values will not be lost.



Power On the Lens Analyzer

The power switch is located on the rear of the instrument. Once engaged, the Lens Analyzer begins performing a brief self-diagnostic check. In the event the computer detects a problem, a "Service" message will appear. You may begin measuring lenses as soon as the MEASURE SCREEN appears. Note the icon for measuring spectacles in the top left corner of the screen.



Choose From Two Measuring Modes

The Lens Analyzer offers two methods of measuring lenses, depending on whether or not you know the patient's inter-pupillary distance.
A discussion of Optical Center Distance (OCD) and Pupillary Distance (PD) can be found in Section 2.

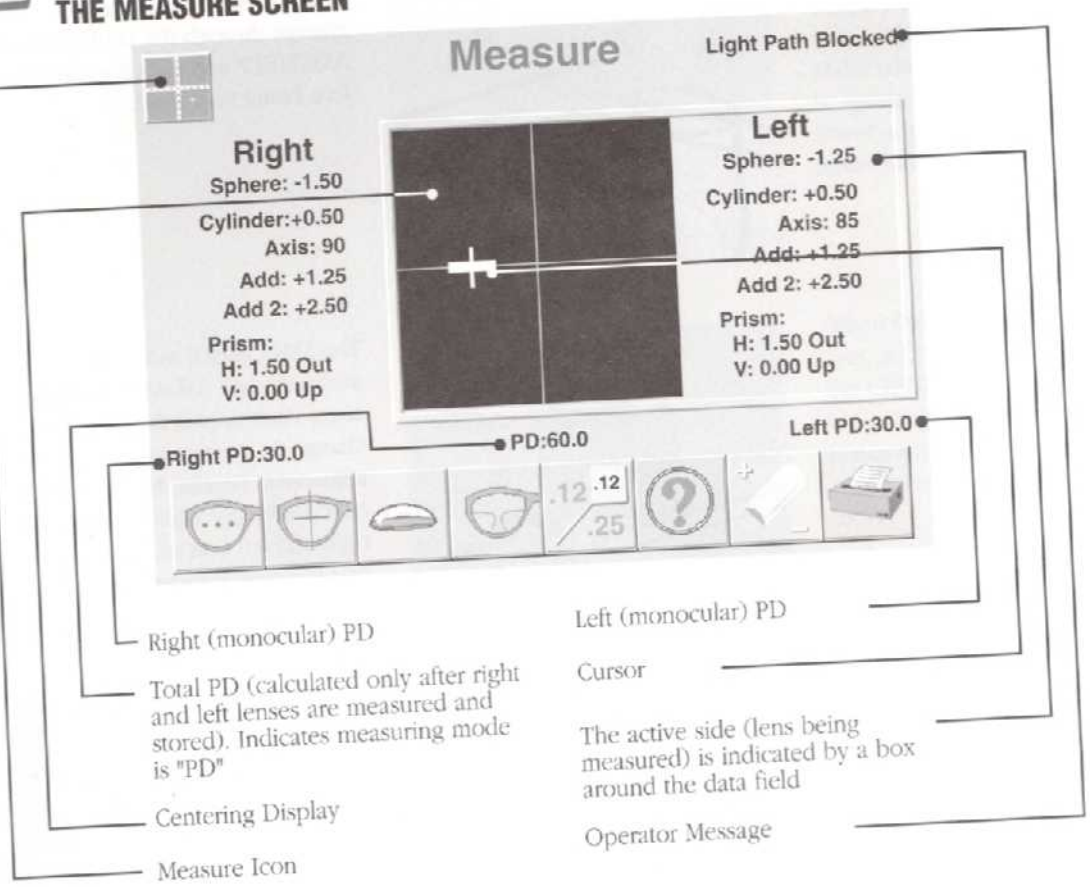
Note: Instructions for measuring lenses in this manual assume OCD mode.

Default Settings

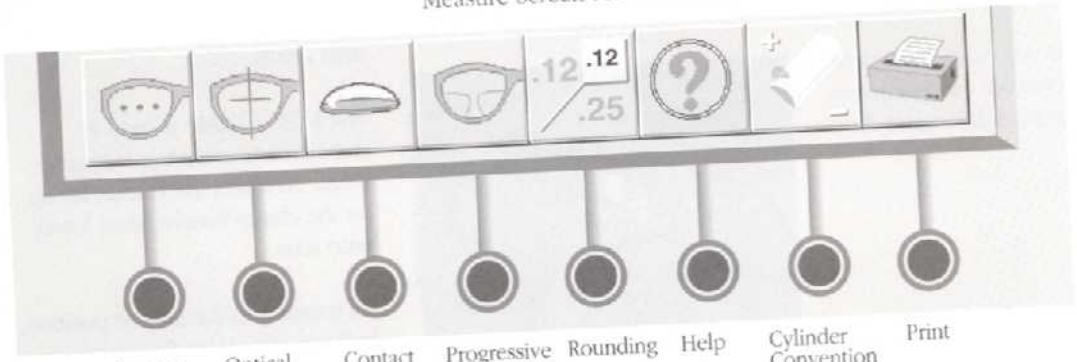
The Lens Analyzer has been shipped "ready to use." Several settings, such as cylinder convention (+ or -), were preselected before delivery. These *default* settings are operator-controlled, and may be altered in the System Setup Mode which is accessed through the HELP icon.

HELP SETUP

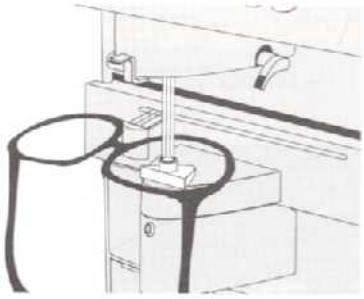
THE MEASURE SCREEN



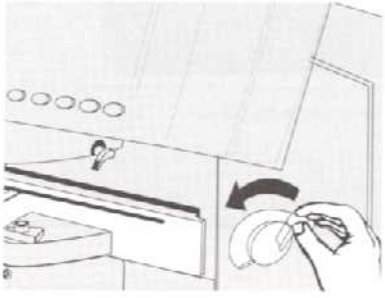
Measure Screen Menu Selections



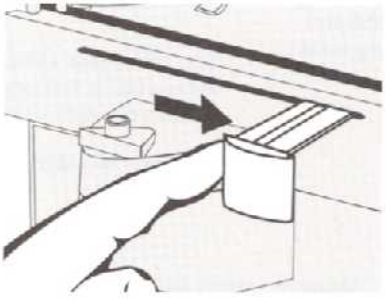
MEASURE BASICS



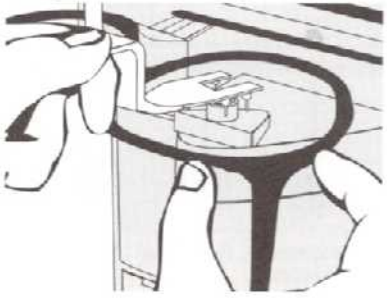
Four measuring light beams emerge through the LOWER READ ASSEMBLY and pass through the lens being measured.



The LENS TABLE moves to accommodate different spectacle sizes. Push or pull the table to change its position or turn the adjustment handle. Keep the lens table stationary while reading the right and left lens of a spectacle pair to avoid induced net vertical prism.

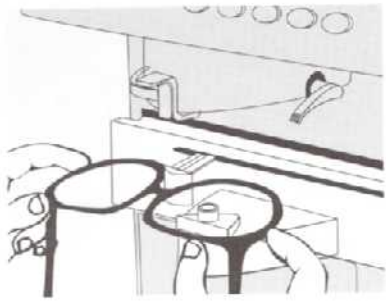


The NOSE SLIDER which moves along the lens table serves several functions. 1) It acts as an artificial nose to correctly position spectacles. 2) It signals the Lens Analyzer as to whether the left or right lens is being measured (in Measure and PAL modes only). 3) It is used to calculate pupillary distance (by its distance from the read head).

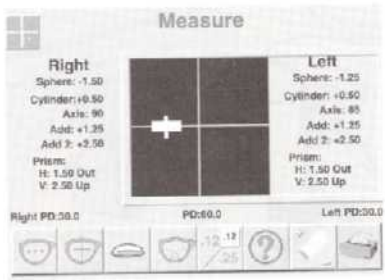


The LENS CLAMP is used to stabilize lenses during measurement. To lower the clamp, lift up on the clamp handle, then lower onto lens.

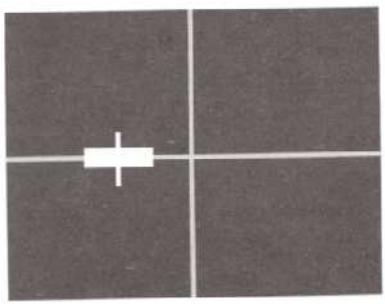
To return it to the locked position, pull straight up on the clamp handle.

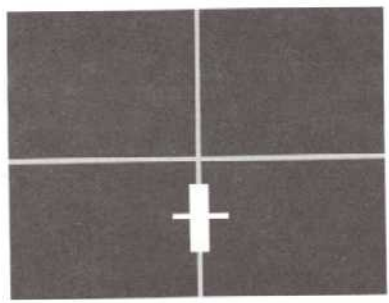


POSITION SPECTACLES with the temples down and the lens to be measured over the read head. Make sure the bridge of the glasses is against the nose slider and the lower edges of the frame (both lenses) are touching the lens table.



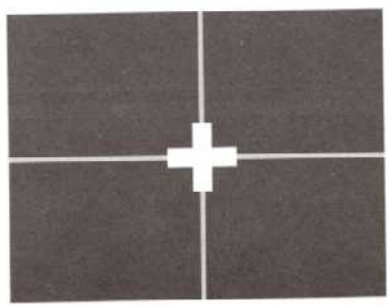
When the Lens Analyzer detects a lens, a CURSOR will illuminate in the CENTERING DISPLAY indicating how far from optical center the lens is positioned. As you move the lens the cursor will move.



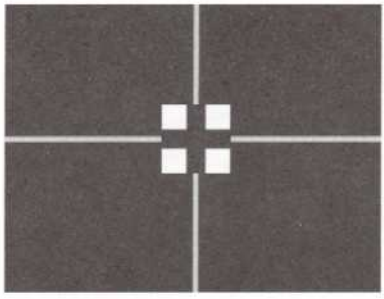


The horizontal arm of the cursor thickens when it is aligned with the horizontal arm of the centering display.

The vertical arm of the cursor thickens when it is aligned with the vertical arm of the centering display.

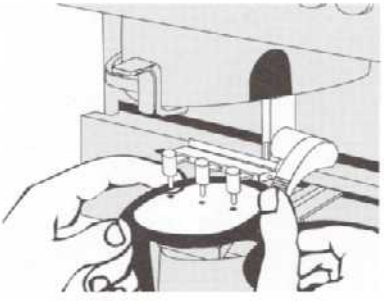


At optical center the cursor superimposes the display cross and both arms of the cursor thicken.



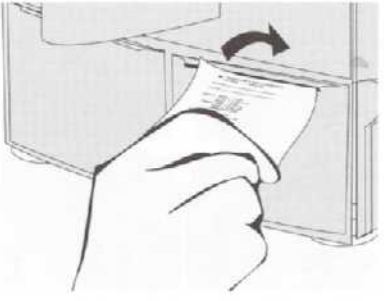
When you press STORE, the cursor and surrounding box invert color for 0.5 seconds and a tone will sound. These visual and audible cues occur irrespective of the cursor position (i.e. both on and off optical center).

TO SHIFT FROM RIGHT TO LEFT LENS (and vice versa), release lens clamp, lift the spectacles up slightly without losing contact with the nose slider and glide slider to opposite side of the read head.



The MARKER PENS "spot" lenses to show the location of optical center and axis orientation.

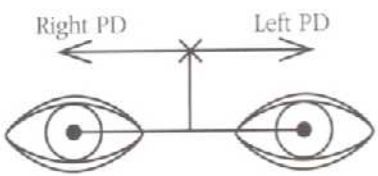
Lower the pens onto a lens by pressing down on the lever. The pens return automatically once the lever is released.



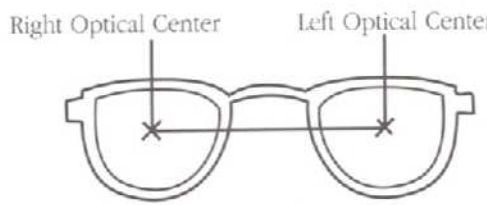
TEAR THE PRINTOUT up and to the right.

TWO MEASURING MODES: Pupillary Distance and Optical Center Distance

When neutralizing spectacles choose from two measuring modes: Pupillary Distance (PD) and Optical Center Distance (OCD). The following illustration highlights the difference between the two terms.



PD
(Inter-pupillary Distance)



OCD
(Optical Center Distance or Spectacle PD

How To Choose?

When trying to determine precisely what spectacle Rx the patient is looking through, use the PD mode and measure each lens at the patient's monocular PD. This is particularly important when there is a prism component to the Rx. Using the PD mode is the most accurate method of measuring a lens.

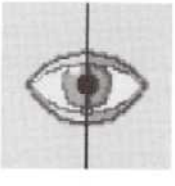
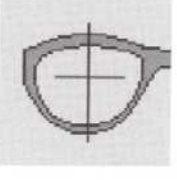
If, however, taking a quick reading is sufficient, use the OCD mode and let the Lens Analyzer automatically calculate the distance between the optical centers and the lens power at optical center. When you use OCD you are assuming that the patient's PD is close to the spectacle PD. The OCD is not a proper indicator of the PD when there is prism in the Rx.

Whenever possible, compare the recorded OCD to the patient's true PD. If the OCD is significantly different than the patient's PD, this indicates the presence of prism in the prescription. In this case, remeasure the lenses using PD mode.

Note: General instructions for measuring lenses in this manual are given using OCD mode. Instructions for using PD mode are found on page 17.

Lens power must be ≥ 1.00D to activate OCD mode.

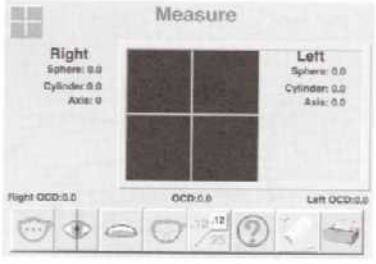
A summary of the main features are compared below.

	PD Mode	OCD Mode
Display	Measures lens power and displays the PD in millimeters (mm) based on the actual position of the lens on the read head. The Lens Analyzer displays the actual distance from the nose slider to the measured point on each lens. Net PD range is 0.0 to 90.0 mm.	Measures lens power (≥ 1.00D) and displays the OCD in millimeters (mm) at the calculated position of optical center without the lens being positioned at optical center. Net OCD range is 0.0 to 90.0 mm.
Prism	Prism measured will be that which exists at the point of measurement. When prism is detected both individual lens prism and net prism (with reference to right lens, net vertical) will appear on the printout.	Since, by definition, there is no prism at optical center, only net vertical prism for the spectacle pair is printed (weaker lens must be ≥0.25D).*
How to Position Lens?	Place the lens on the read head so that the cursor is on or close to the horizontal display line. Adjust lens table to meet the edge of the frame. Slide lens left or right until the PD reading on the display matches the patient's monocular PD.	Place the geometric center of the lens over the read head. Lower edge of frame (both lenses) must be in contact with lens table.
When to Use?	1. When you know the patient's PD. 2. When you wish to determine the lens power and prism at the point on the lens through which the patient looks (see Calculating PD, p.18). 3. When a patient complains of problems with spectacles. Measure lenses at patient's PD and compare to prescription.	1. No recorded PD and patient is not present. 2. For fast readings. 3. Patients without history of prism correction.
Icon		

* In OCD mode the net vertical prism is calculated to the level of the optical center of the stronger lens, but displayed (by convention) as the net vertical prism in the right lens.

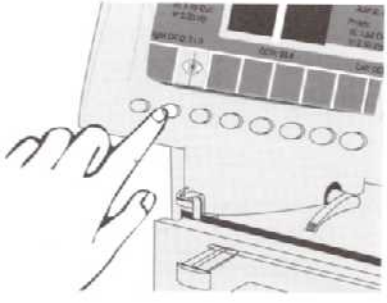
Using PD Mode

Follow these instructions to measure lenses in the PD mode.



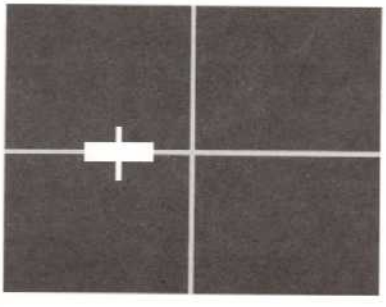
1 Start with Measure Screen.

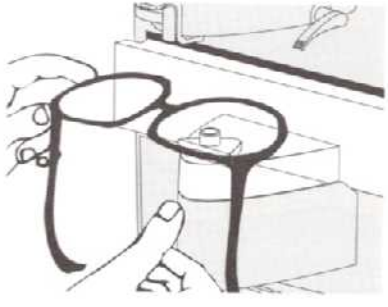
To access the Measure Screen, press the button under the measure icon. If "PD:" appears below the centering display, go to step 3. If "OCD:" appears go to step 2.



2 Select PD mode.

Press PD button on Measure Screen to change from OCD to PD mode.

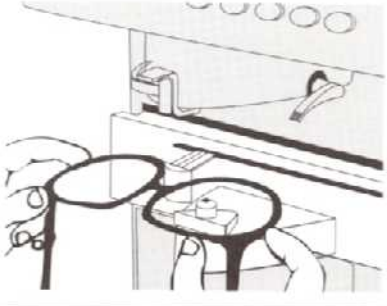




3 Position right lens.

If patient's PD is known, align cursor with horizontal line on centering display. Adjust lens table to meet the lower edge of frame. Move the spectacles and nose slider along the lens table until the patient's monocular PD appears on the display. Press STORE.

Or,



If patient's PD is not known, "dot" the lenses (see Calculating PD, p.18). Position lens so that "dot" is directly over the read head. Adjust table as above. Press STORE.

Repeat for left lens.

Calculating PD

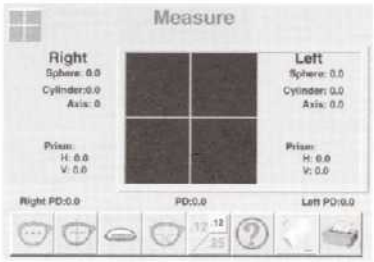
One method for determining pupillary distance is to "dot" the lenses. When you measure the lenses at these points, you get an accurate picture of the lens power the patient is looking through.

- Instruct the patient to adjust the spectacles as normally worn.
- Stand in front of the patient and say "Look right into my eye" (pointing to one of your eyes).
- Your eye will now be looking right at the patient's pupil on that side. Dot that lens with a soft tip pen where you see the pupil center.
- Instruct the patient to look at the other eye.
- Dot that lens.

Note: Unless you do this, prism measurements have little meaning. SPHERE, CYLINDER, AXIS and ADD, however, can be accurately measured without this step.

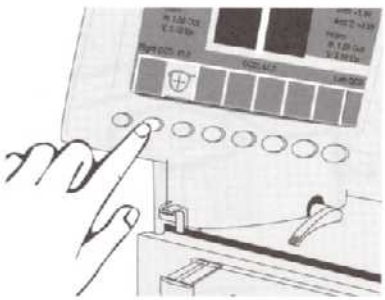
Using OCD Mode

Follow these instructions to measure lenses in the OCD mode.



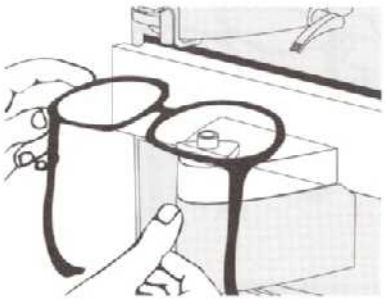
1 Start with Measure Screen.

To access the Measure Screen, press the button under the measure icon. If "OCD:" appears below the centering display, go to step 3. If "PD:" appears go to step 2.



2 Select OCD mode.

Press OCD button on Measure Screen to change from PD to OCD mode.

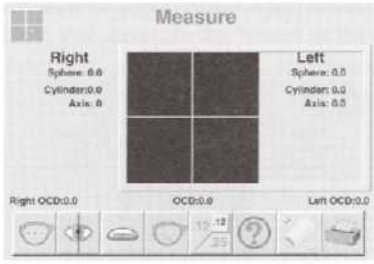


3 Position right lens.

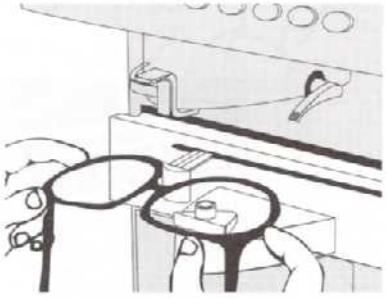
Place geometric center of lens over the read head. Adjust lens table to meet lower edge of frame (both lenses). Press STORE.

Repeat for left lens.

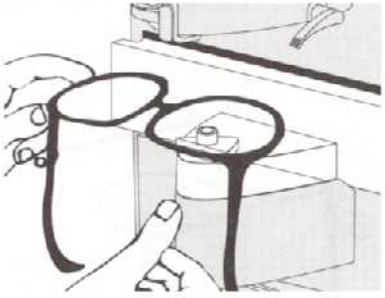
MEASURING SINGLE VISION LENSES



1 Start with Measure Screen.
To access the Measure Screen, press the button under the measure icon.

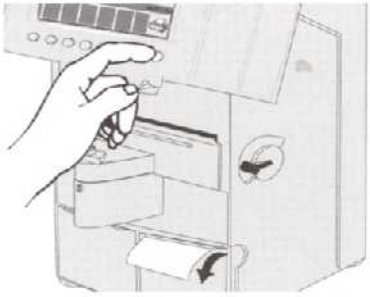


2 Position right lens.
Place center of lens over read head. Adjust lens table to meet lower edge of frame (both lenses).



3 Store results.
Press STORE. Sphere, cylinder and axis are saved in memory.

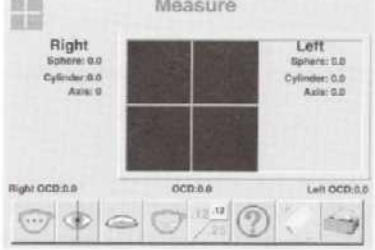
Repeat for left lens. Do *not* readjust lens table.



4 Print results.
Press the PRINT button to receive a hardcopy of the lens measurements.

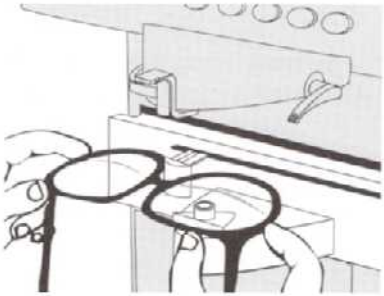
- For further information or to change System Setup values, press the HELP button.

- Use the the lens clamp to stabilize spectacles during readings.
- Keep the lens table in the same position when measuring the right and left lens of a spectacle pair to avoid induced net vertical prism.
- The foot switch may be used instead of the STORE button to facilitate the measuring process.
- The "PAL?" message may indicate the presence of a progressive addition lens. Proceed to PAL mode.
- Keep the lower edge of the frame squarely against the lens table when measuring lenses to avoid axis rotation and to assure accurate axis measurements.



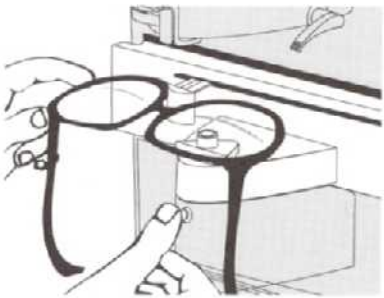
1 Start with Measure Screen.

To access the Measure Screen, press the button under the measure icon.



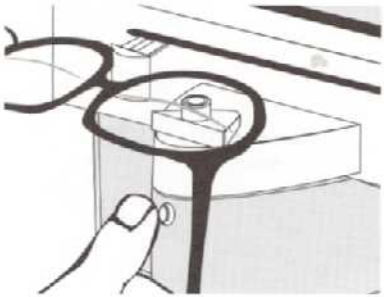
2 Position right lens for distance reading.

Position the upper portion lens (just above segment line) over read head. Adjust lens table to mee lower edge of frame.



3 Store distance Rx.

Press STORE. Sphere, cylinder and axis are saved in memory.

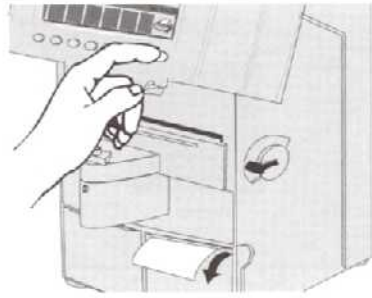


4 Read and store near ADD

Gently slide lens so that nea ADD is over read head. The display illuminates the ADD Rx. Do *not* attempt to center the cursor. Press STORE.

Repeat for left lens. Do *not* re-adjus lens table.

See next page for Step 5.



5 Print results.
Press the PRINT button to receive a hardcopy of the lens measurements.

- For further information or to change System Setup values, press the HELP button.

TIPS

- Do not attempt to center the cursor when measuring the near ADD.
- The "PAL?" message indicates a rapid change in lens surface or power. Segment line may be interfering with measurement. Reposition the lens.
- Use the lens clamp to stabilize spectacles during readings.
- Keep the lens table in the same position when measuring the right and left lens of the spectacle pair to avoid induced net vertical prism.
- Keep the lower edge of the frame squarely against the lens table when measuring lenses to avoid axis rotation and to assure accurate axis measurements.

MEASURING APHAKIC BIFOCALS

Traditionally, measuring aphakic bifocals or any fused bifocal was a challenging process. When properly executed, the operator needed to read both the front and back surfaces of a lens to determine the distance and near Rx. That process necessitated flipping the lenses and battling steep curvatures.

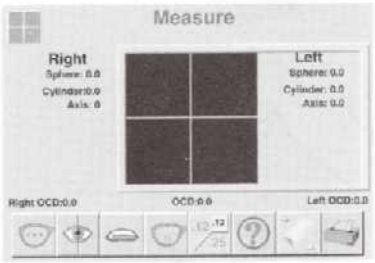
The Lens Analyzer however, incorporates sophisticated software that allows you to read any fused bifocal, including aphakic lenses, exactly as you would other bifocals. Follow directions beginning on p.22.

When measuring aphakic bifocals:

TIPS

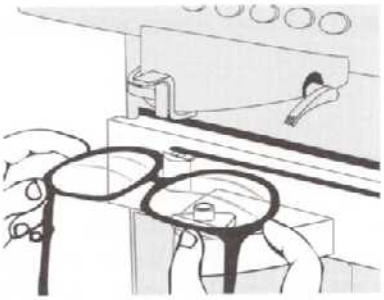
- Hold lens surface as flat as possible on the read head. When high powered lenses are tilted, aberrations affecting sphere and cylinder power are rapidly induced.
- Measure as close to the segment line as possible to minimize prismatic component. As high powered lenses are decentered, prism is rapidly induced.
- Use lens clamp only if it seats lens firmly.

MEASURING TRIFOCALS



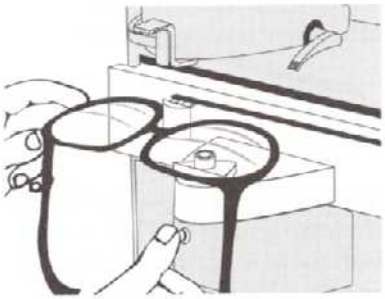
1 Start with Measure Screen.

To access the Measure Screen, press the button under the measure icon.



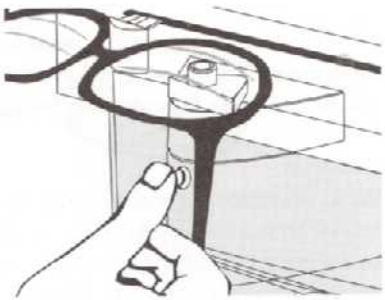
2 Position right lens for distance reading.

Position the upper portion of lens over read head. Adjust lens table to meet lower edge of frame.



3 Store distance Rx.

Press STORE. Sphere, cylinder and axis are saved in memory.



4 Read and store intermediate ADD.

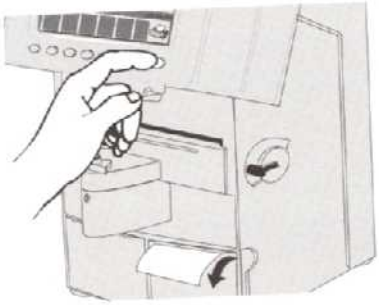
Gently slide lens so that intermediate ADD is directly over read head. The display automatically illuminates the ADD Rx. Do *not* attempt to center the cursor. Press STORE.

See next page for Steps 5-6.

5 Read and store near ADD.

Gently slide lens so that near add is directly over read head. The Lens Analyzer automatically illuminates the ADD 2 Rx. Press STORE.

Repeat for left lens. Do *not* re-adjust lens table.



6 Print results.

Press the PRINT button to receive a hardcopy of the lens measurements

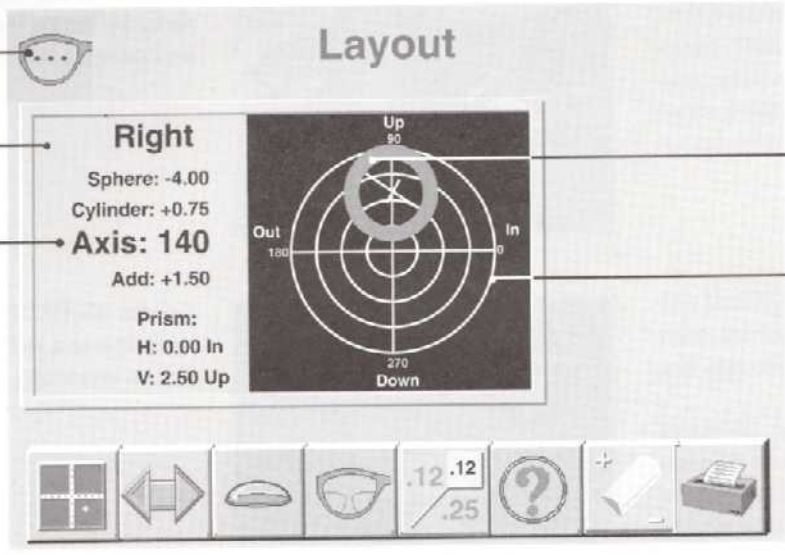
- For further information or to change System Setup values, press the HELP button.

TIPS

- Do not attempt to center the cursor when measuring the intermediate or near ADD.
- The "PAL?" message indicates a rapid change in lens surface or power. Segment line may be interfering with measurement. Reposition the lens.
- Use the lens clamp to stabilize spectacles during readings.
- Keep the lens table in the same position when measuring the right and left lens of the spectacle pair to avoid induced net vertical prism.
- Keep the lower edge of the frame squarely against the lens table when measuring lenses to avoid axis rotation and to assure accurate axis measurements.

3 LAYOUT

THE LAYOUT SCREEN



Enlarged axis display

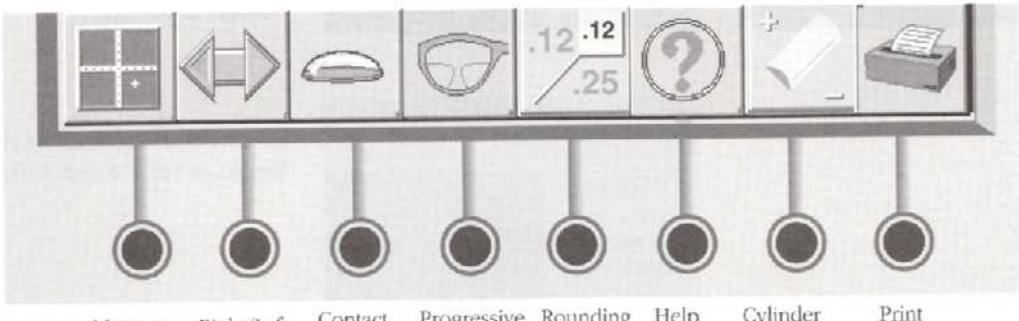
Displays Information on one lens at a time (left or right)

Layout icon

Circles on centering display are in prism diopter increments

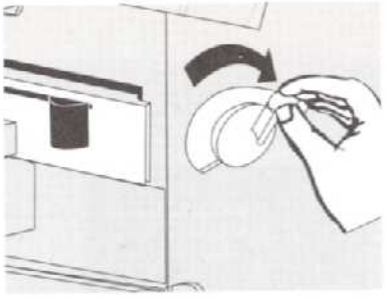
Cursor illustrates axis orientation

Layout Screen Menu Selections

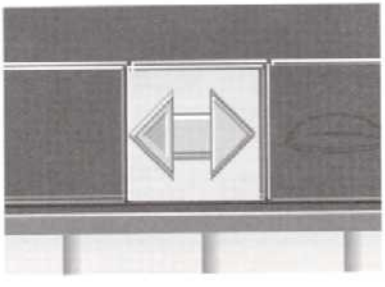


Measure | Right/Left Indicator | Contact Lens | Progressive Addition Lens | Rounding | Help | Cylinder Convention | Print

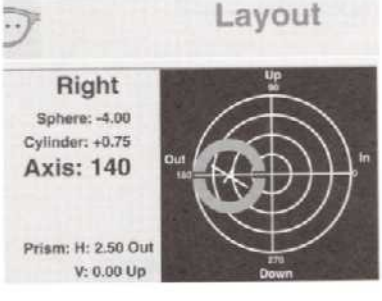
LAYOUT BASICS

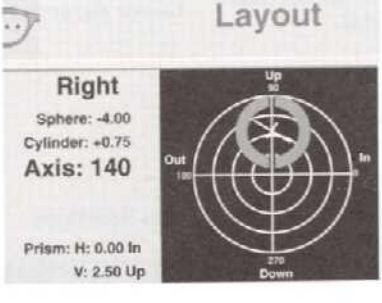


The LENS TABLE should be pushed back out of the way. Lock the nose slider by sliding it to the far right and pressing in.



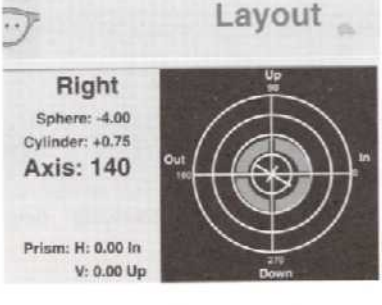
Use the RIGHT/LEFT INDICATORS to designate a right or left lens before measuring.



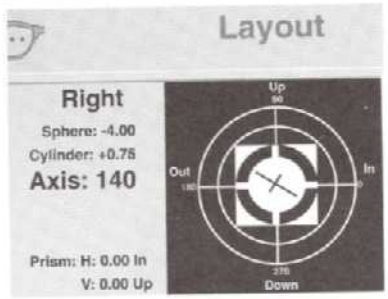


The LAYOUT CURSOR is composed of a rotating cross (shows axis orientation) within a ring (aids in vertical and horizontal alignment).

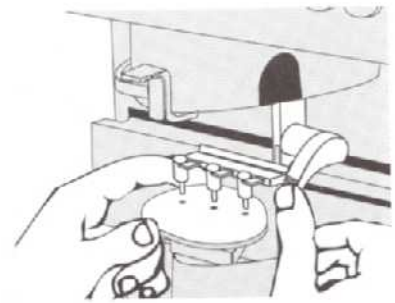
HORIZONTAL AND VERTICAL ALIGNMENT are indicated by a "break" in the ring.



At OPTICAL CENTER the ring breaks at 12, 3, 6 and 9 o'clock.



When you press STORE, the cursor and surrounding box invert color for 0.5 seconds and a tone will sound. These visual and auditory cues occur irrespective of the cursor position (i.e., on and off optical center).

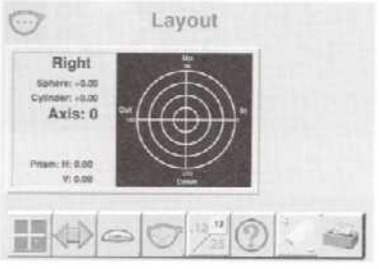


The MARKER PENS "spot" lenses to show the location of optical center and axis orientation.

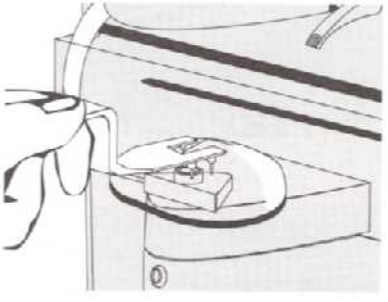
Lower the pens onto a lens by pressing down on the lever. The pens return automatically once the lever is released.

LAYING OUT A LENS BLANK

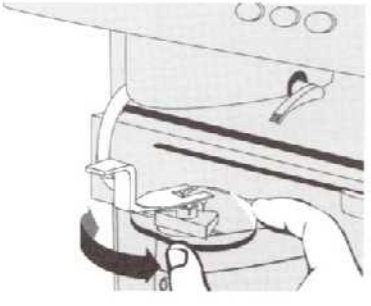
The Humphrey® Lens Analyzer demonstrates versatility in the laboratory as well as the clinical setting.



1 Start with Layout Screen. To access the Layout Screen press the button under the layout icon (accessible through Measure and PAL.

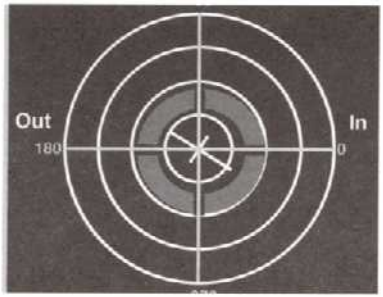


2 Position lens. Press lens indicator button to designate right or left lens (if applicable). Center lens on read head. Lower lens clamp.



3 Layout Axis. Rotate the lens until the desired axis is displayed.

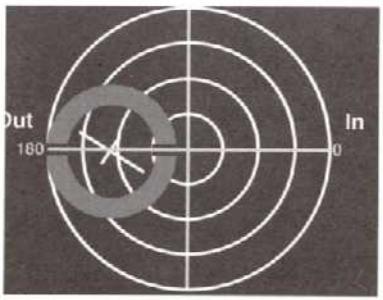
See next page for Steps 4-6.



4 Find optical center.

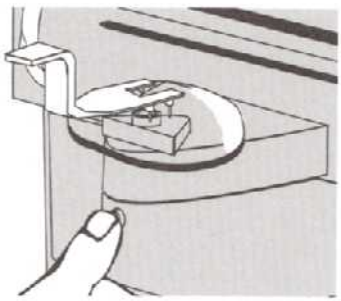
Move the lens in or out, left or right until the cursor is superimposed on the display cross. Recheck displayed axis; adjust as needed.

Or,



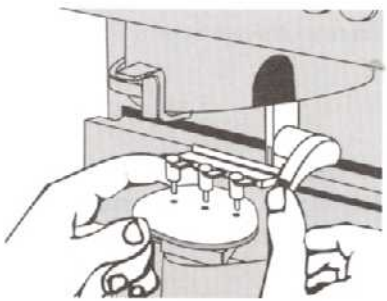
Position lens for prism.

Move the lens in or out, left or right, until the desired prism values are displayed. Recheck displayed axis; adjust as needed.



5 STORE distance Rx.

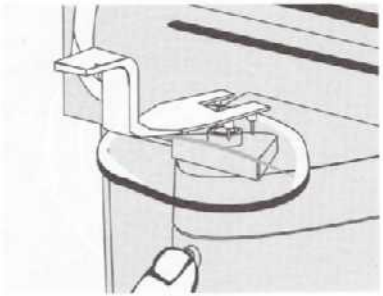
Press the STORE button. Sphere, cylinder, axis and prism are saved in memory. Check results against the original Rx.



6 Mark lens.

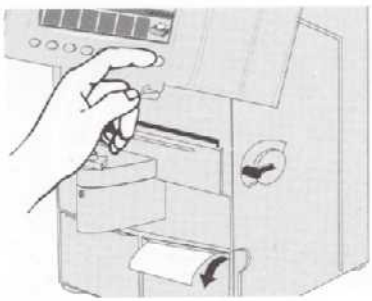
Lower marker pens until tips "spot" the lens.

See next page for Steps 7-8.



7 Read and store ADD portion of lens (if applicable).

Gently slide lens so that reading segment is over read head. The display illuminates the ADD Rx. Do *not* attempt to center the cursor. Press STORE.



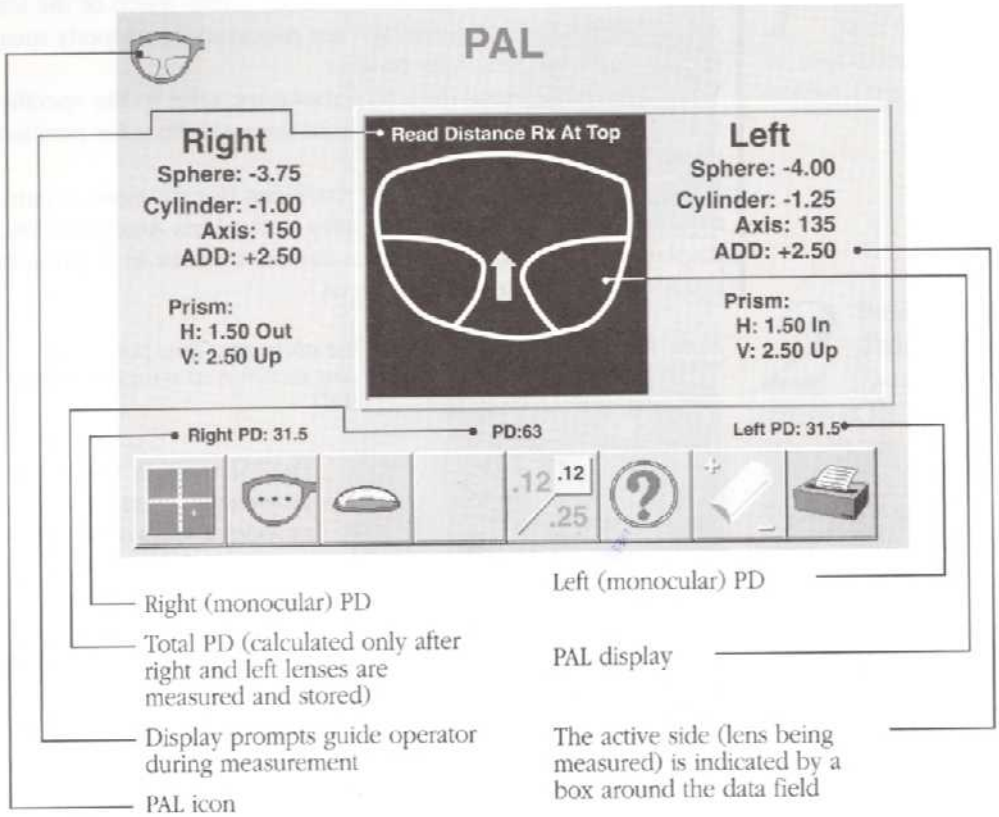
8 Print results.

Press the PRINT button to receive a hardcopy of the lens measurements.

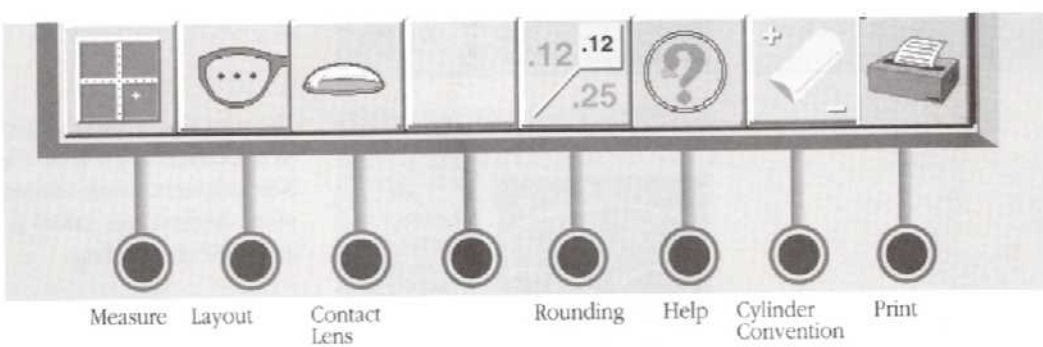
- For further information or to change System Setup values, press the HELP button.

- Have the necessary Rx information at hand before laying out lens.
- Check that Display Rounding is at desired setting. (See Section 6, Screen Setup).
- Do not attempt to center the cursor when measuring the near ADD.

THE PAL SCREEN



PAL Screen Menu Selections



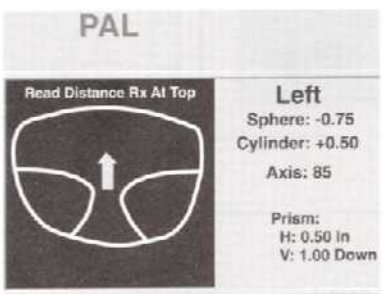
PAL BASICS

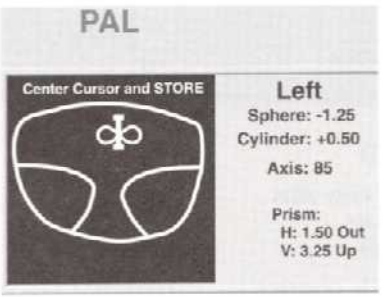
Progressive Addition Lenses are characterized by having complex optical surfaces where the power varies across much of the lens. It is for this reason that guidelines are necessary to properly measure the distance and near lens powers.

When checking a lens from the laboratory, refer to the specific manufacturer's lens markings. These are guidelines for positioning the lens before measuring.

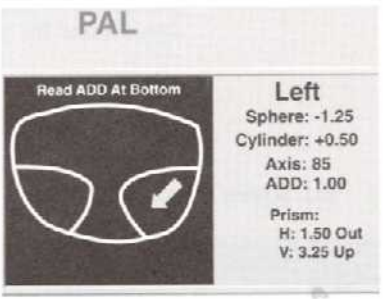
When measuring a PAL without markings (for example, a pair that a patient is currently wearing), refer to the Lens Analyzer's PAL display. Use the infinity and plus cursors to assist in locating the distance and near areas of the lens.

Note: It is important to monitor the changing lens power on the display and judge the best location at which to take a reading (that is, press STORE).

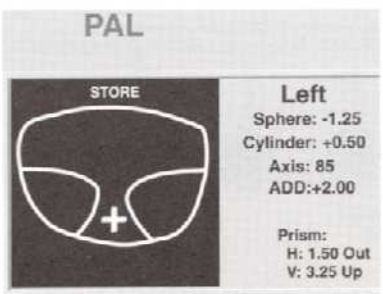




The PAL DISPLAY depicts the progressive power channel. It also provides a series of messages and prompts to help guide you through the measurement process. The cursor and infinity sign assist in locating the distance area of the lens.



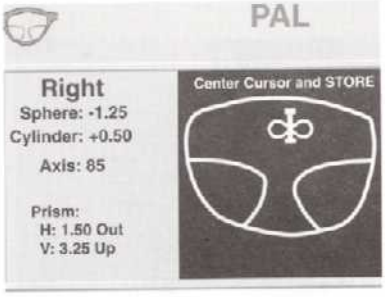
Arrows direct you through the progressive channel to the near ADD.



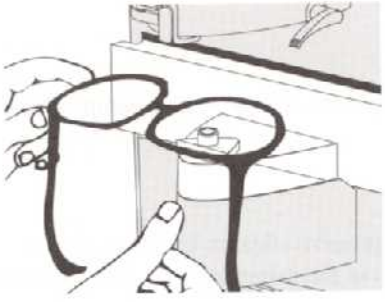
The plus sign marks the general ADD portion of the lens. Use your best judgment when selecting the point (highest lens value) at which to STORE the reading.

MEASURING PAL

1 Start with PAL Screen.
To access the PAL Screen, press the button under the PAL icon (accessible through Measure, Contact Lens and Layout).



2 Position right lens for distance reading.
Place the upper third portion of the lens over the read head. An infinity sign (∞) and cursor will appear at the top of the channel when you are in the correct position. Move the lens until the cursor superimposes the infinity sign. Adjust lens table to meet lower edge of frame.



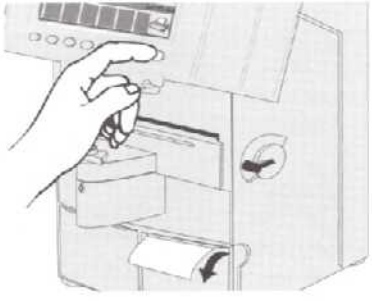
3 Store distance Rx.
Press STORE. Sphere, cylinder and axis are saved in memory.

See next page for Steps 4-5.

4 Read and store near ADD.

Slide lens towards you, watching the display panel, and let the arrows guide you through the channel. When a plus (+) appears, locate the highest ADD value and press STORE.

Repeat for left lens. Do *not* adjust lens table.



5 Print results.

Press the PRINT button to receive a hardcopy of the lens measurements

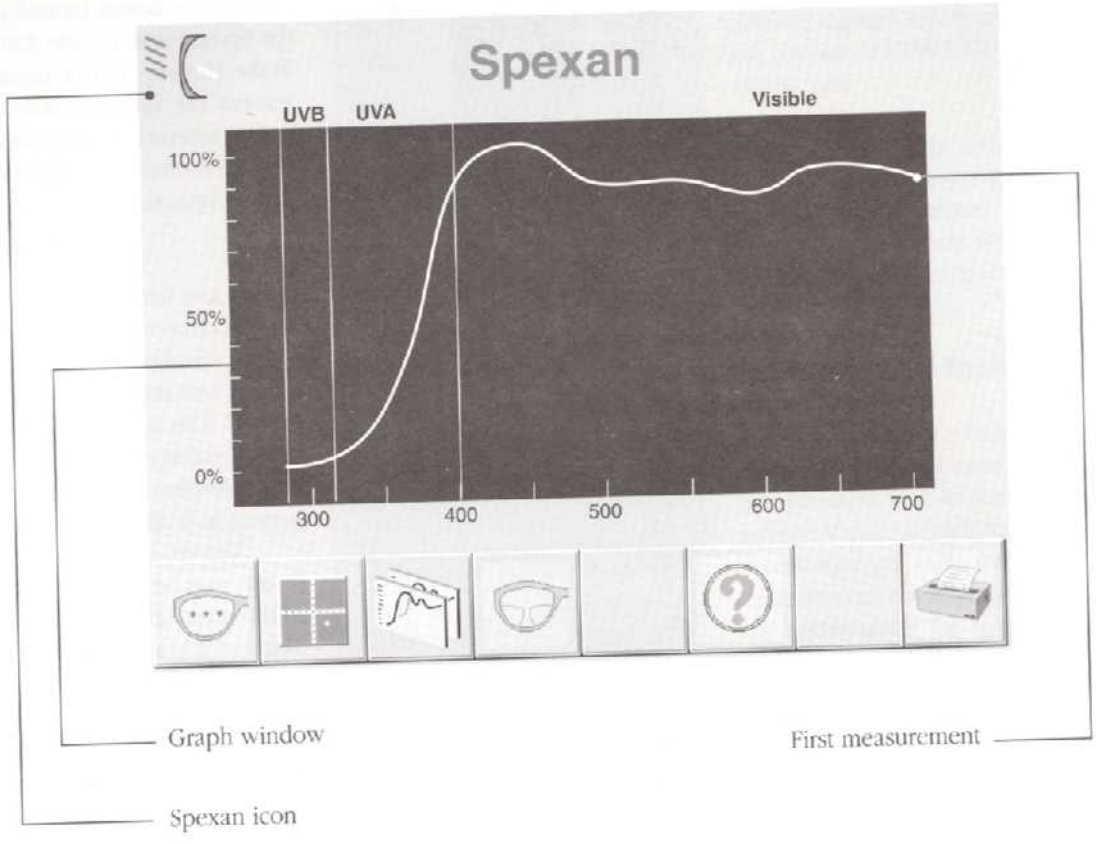
- For further information or to change System Setup values, press the HELP button.

TIPS

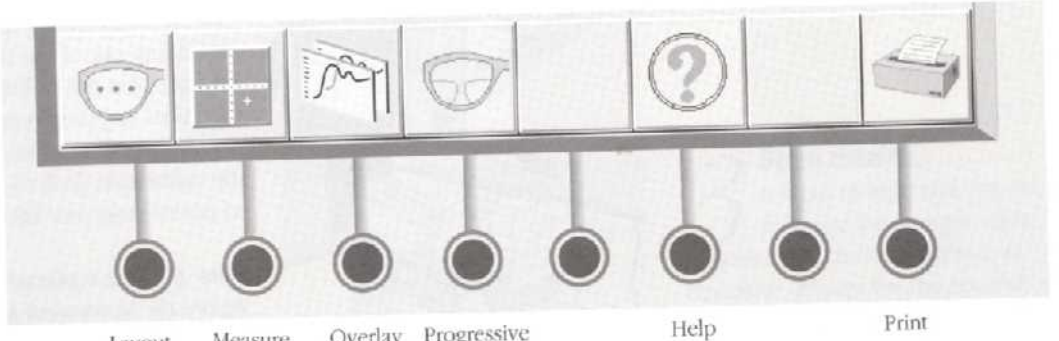
- When receiving a progressive addition lens from a laboratory, verify the distance and near powers at the location of the manufacturer's markings (irrespective of the infinity and plus signs).
- The ADD is usually located in the lower third of the lens and nasal to the distance Rx.
- Depressing STORE a second time while reading the distance Rx will replace the previous value with the current one, as long as the infinity symbol (∞) and cursor are aligned. Otherwise, it assumes ADD mode.
- Depressing STORE a second time in the add mode will replace the previous ADD value with the current one, if the lens has not been removed.

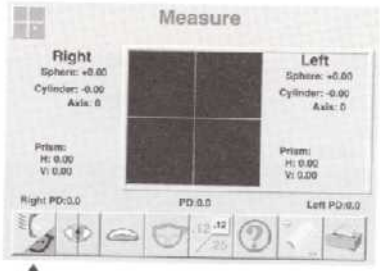
6 SPEXAN (MODEL 360 ONLY)

THE SPEXAN SCREEN

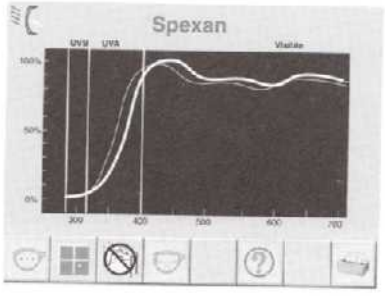


Spexan Menu Selections



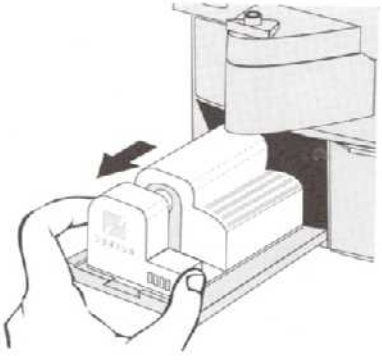


The Spexan feature is accessible through the button located unde the Spexan icon (model 360 onl in the Measure, PAL or Layout screens.The Spexan feature allow you to measure the amount of UVB, UVA and visible light whic passes through a lens.



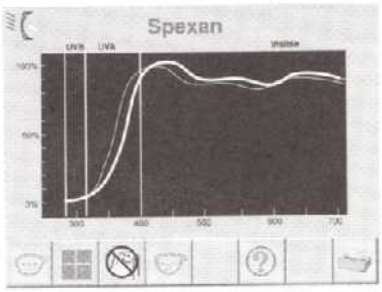
After a lens has been measured i the Spexan screen, the Overlay feature enables you to compare a second lens to the first reading if desired. This is especially helpful to assure that the same amount o tinting levels or UV protection ar present in both lenses.

Lenses may be read in any order. is important however, that the instrument has had time to calibrate itself prior to activating the Spexan measurement. To initiate Spexan, press the button under the Spexan icon, or open th compartment in which Spexan is located as shown.



Pull the unit forward until it is full protruding out of the Lens Analyzer. Do not pull the unit pas the initial stopping point where you feel resistance. Simply wait fo the calibration flash to appear prio to positioning your lens.

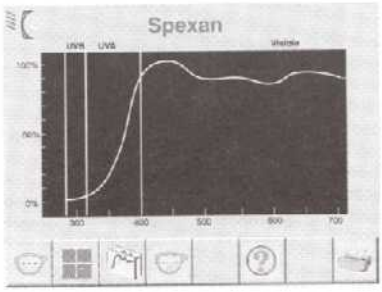
Note: If a lens is placed in Spexan before the instrument has finished calibrating itself, a user message will appear asking the operator to remove the lens (see Section 9 Troubleshooting).



Once the STORE button has been pressed, the SPEXAN SCREEN displays a graph which indicates the amount of UVB, UVA and visible light.

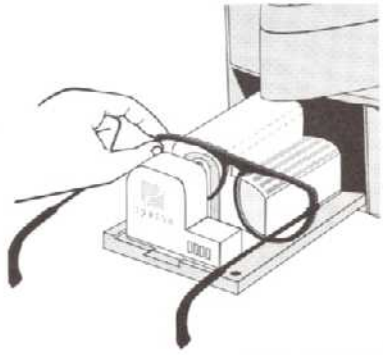
If the overlay feature is used, two lines will appear on the graph allowing for comparison. The first measurement will show in the form of a thicker line on the graph.

Measuring in Spexan



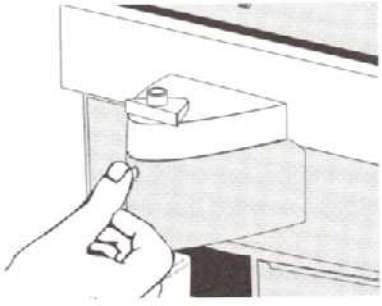
1 Start with Spexan Screen

To access the Spexan feature, open the Spexan compartment located next to the printer. If you go back to another screen function while the compartment remains open, press the button under the Spexan icon to reaccess the Spexan screen.



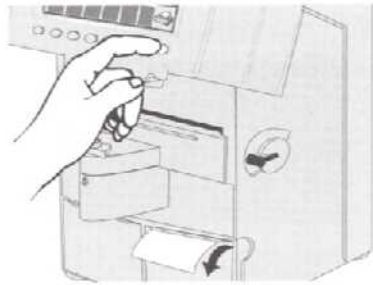
2 Wait for the calibration light flash and place the lens on the read head.

The order of the lenses (left/right) is not important.



3 Store results.

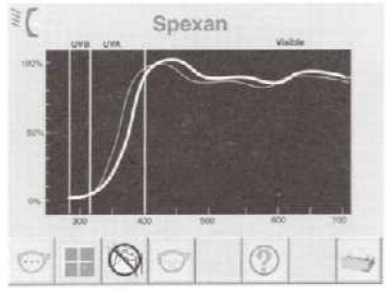
A flash of light will appear, followed by a graph. This indicates that the transmission is complete. Repeat for the second lens of a spectacle pair.



4 Print Results

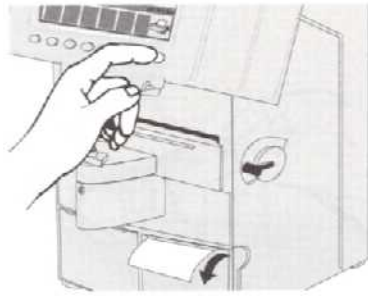
Press the PRINT button to receive a hardcopy of the lens measurements.

Overlay Function (optional)



1 Overlay.

Press the button under the Overlay icon. Read one lens as in step 2 and 3 of the previous page, then push overlay and read the second lens. The first lens read will appear as a thickened line on the graph. The second lens will appear as a thinner line. To cancel the overlay feature, press the button below the overlay cancel icon.



2 Print results.

Press the PRINT button to receive a hardcopy of the lens measurements.

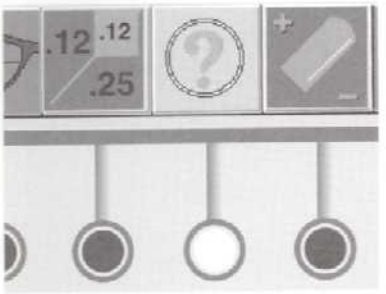
- For further information, or to change system set up values press the HELP button.

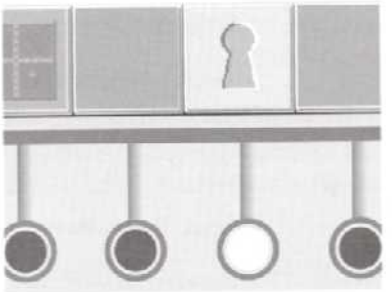
- Wait until the instrument finishes self calibration prior to measurement (see step 2).
- When Spexan Compartment is pulled out, do not pull past the stopping point where there is some resistance.
- If more than 10 flashes per minute occur, the accuracy of the instrument is compromised.

7 SYSTEM SETUP

Select and set the modes in which the instrument will default to through System Setup. Your selections should correspond with the most frequent or general use of the instrument. Though stored for your convenience, selections can be easily adjusted in the event your needs change.

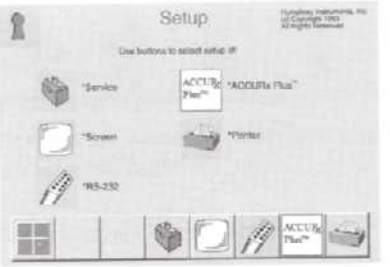
To Access System Setup:





1 Access the Main System Setup screen through the HELP button.

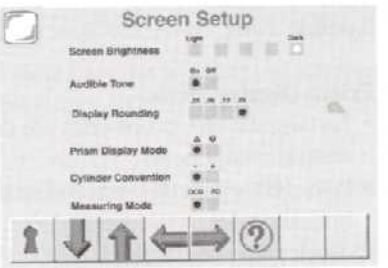
To access the individual Setup Screens, press the button under the System Setup icon.



2 Choose the desired category.

Select Screen, RS-232 Setup, ACCURx Plus™ or Printer.

To Change Settings:



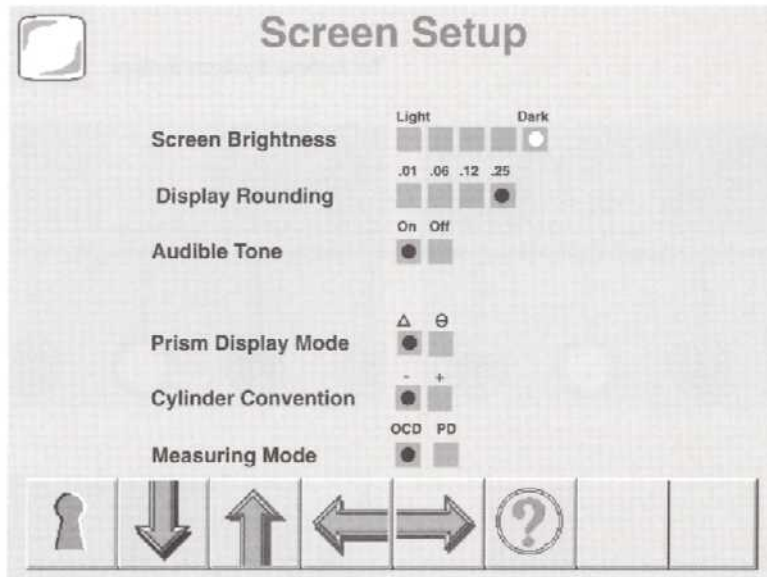
Use Left (◄) and Right (►) arrows to move within a category. Use Up (▲) and Down (▼) arrows to move from line to line.

The black dots represent the current settings. The white dot travels within a category and from line to line enabling you to change settings. The last spot the white dot occupies before exiting that category becomes the current setting and replaces the previous one.

To save new settings, exit the screen by pressing the System Setup button.

SCREEN SETUP

Screen Setup allows you to control how things are displayed on the screen. It is through this menu that you would change the cylinder convention, for example, if the factory setting was incorrect for your practice. A description of each option appears below.



Use the arrows to select the appropriate settings. Press the SYSTEM SETUP button to save the selections and exit the screen.

Screen Brightness - adjusts the intensity level from light to dark. Five levels are available.

Display Rounding - rounds values for sphere, cylinder, prism and spherical equivalent to .01, .06, .12 or .25D.

Audible Tone - turns the Store tone "ON" or "OFF".

Prism Display Mode -

- Rectangular (Δ): prism units are displayed in diopters, horizontal and vertical components.
- Polar (Θ): prism diopters and angle are displayed with reference to optical center.

Cylinder Convention -

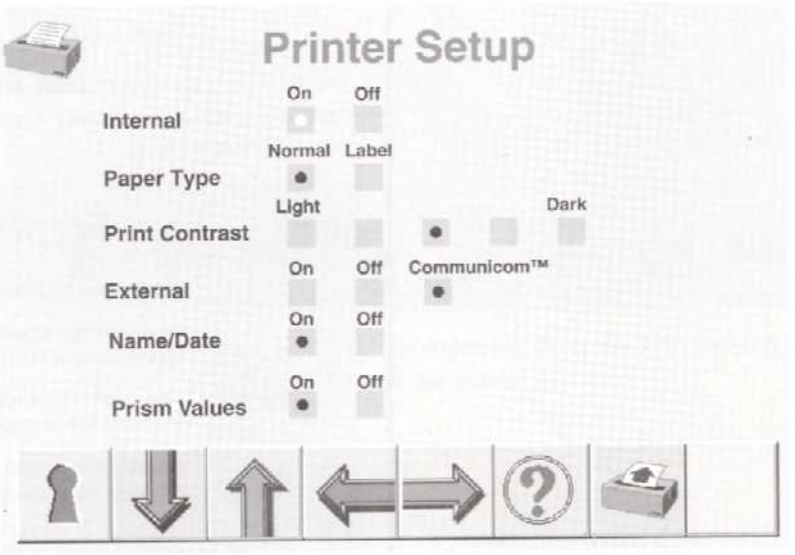
- Plus cylinder (+) : cylinder displayed in "+".
  Unit will display "+" cylinder @ 90^{O}.
- Minus cylinder (-) : cylinder displayed in "-".
  Unit will display "-" cylinder @ 180^{O}.

Measuring Mode -
- PD (pupillary distance)
- OCD (optical center distance)

Note: The Measuring Mode setting solely determines whether the instrument powers on in PD or in OCD mode (default status). Choose the one you use most often as your default. Once the instrument is powered on, use the OCD and PD function buttons to select the measuring mode appropriate for the individual circumstance.

PRINTER SETUP

The Lens Analyzer provides a hardcopy printout via its internal, thermal-type printer. You may also send the lens information to an external printer, the Humphrey® Automatic Refractor or a computer.



Use the arrows to select the appropriate settings. Press the SYSTEM SETUP button to save the selections and exit the screen.

Internal -
- "ON" turns internal printer on, allowing printout when PRINT button is depressed.
- "OFF" disables internal printer, disallowing printout when PRINT is depressed.

Paper Type -
- "NORMAL"
- "LABEL" (adhesive paper)

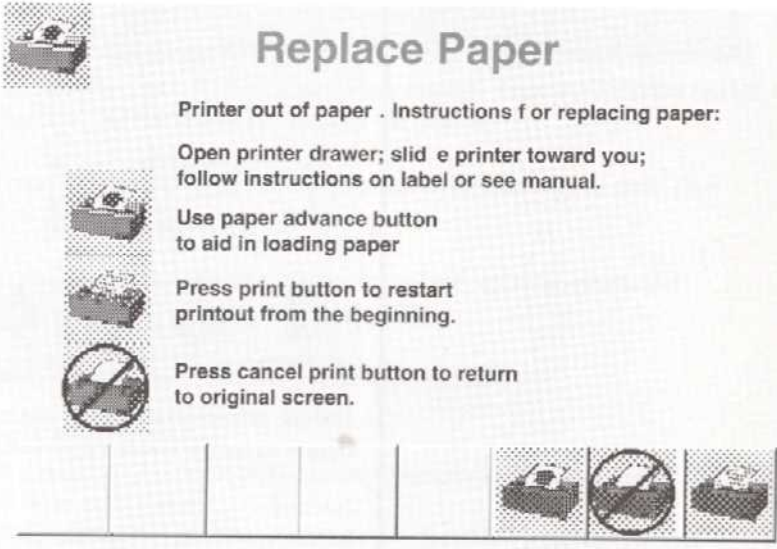
Print Contrast -
- adjusts the intensity level from light to dark. Five levels are available.

External -
- "ON" allows print to serial port.
- "OFF" disables print to serial port.
- "COMMUNICOM™" transfers lens data to the Humphrey® Automatic Refractor.

Name/Date -
- "ON" prints out Name/Date line on printout.
- "OFF" disables Name/Date line on printout.

Prism Values
- "ON" prints out Prism Values line on printout.
- "OFF" disables Prism Values line on printout.

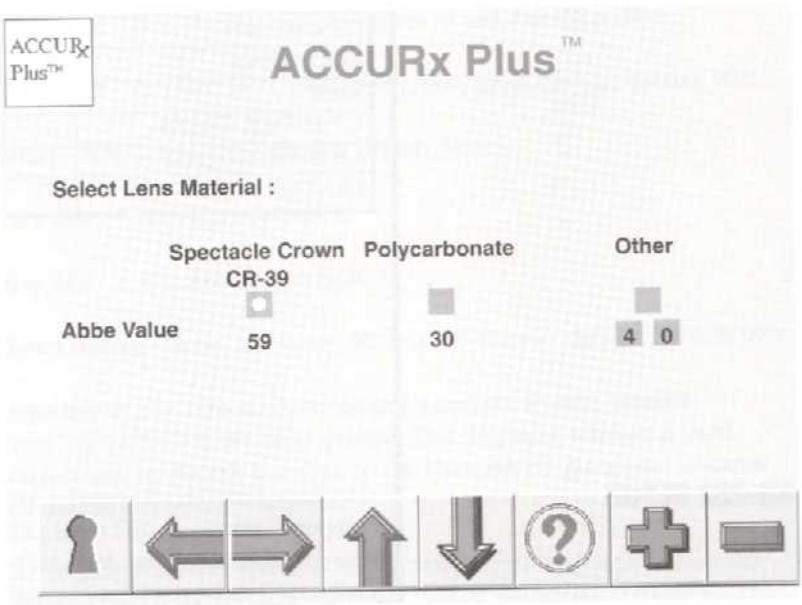
The Replace Paper Screen will automatically display when the printer senses that the paper supply is exhausted. The screen can also be accesse through Printer Setup.



Replace Paper -
- Use paper advance button to aid in loading paper (paper feeds automatically through printer).
- Restart printout. Return to original screen.
- Cancel print. Return to previous screen.

CURx Plus™ SETUP

Humphrey's ACCURx Plus™ software allows the Lens Analyzer to accurately measure lenses of varying material, including High Index lens material. Through SETUP, you designate the particular type of lens material you choose to measure.



Use the arrows to select one (1) of the following. Press the SYSTEM SETUP button to save the selections and exit the screen.

CR 39 / SPECTACLE CROWN - this selection has a preset Abbe Value of 59.

POLYCARBONATE - this selection has a preset Abbe Value of 30.

OTHER - when neutralizing a lens material with an Abbe Value other than the two preset selections, choose OTHER and enter an Abbe Value (between 30-69) that corresponds with that material (factory default, 40). Refer to the tables located on page 50 for further information.

Use the Plus (+) and Minus (-) signs to increase or decrease the Abbe Value.

Note: When Polycarbonate or Other is selected, the message "ACCURx Plus™ will appear below the screen title in Measure and Layout mode.

For Ophthalmic Glass

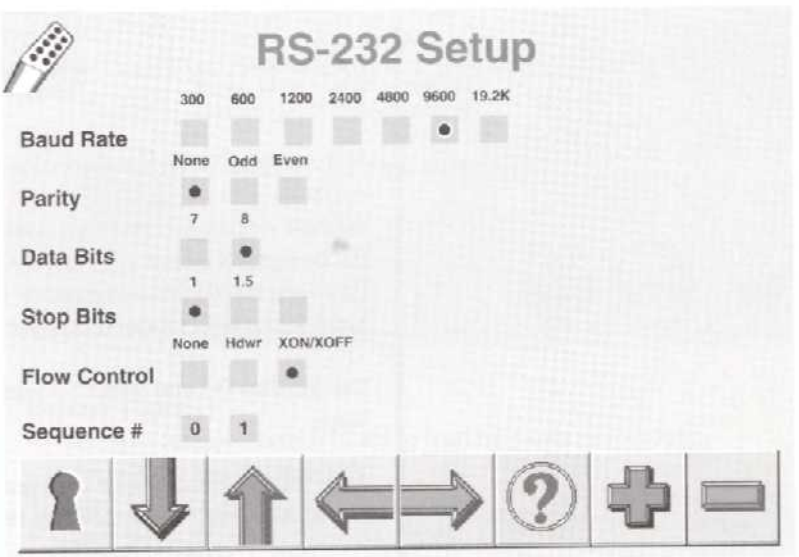
Lens	*Abbe Numbers*
SPECTACLE CROWN	58
SLIMLITE	50
TITAL	49
PUNTAL	42
M1-CROWN	42
RODALENS	39
SF64	31
1.7 INDEX GLASS	31
1.8 INDEX GLASS	25
LANTAL	35

For Ophthalmic Plastic

Lens	*Abbe Numbers*
CR-39	58
SPECTRALITE	47
POLARLITE	36 to 40
SEIKO THIN	36 to 40
HI RI	38
RLEXLITE	36
NIKON/TITMUS	35 to 37
THIN AND LITE	34 to 36
HYPERINDEX	34 to 36
LUMINOUS	32
HILORD	32
HIGH X 1.6 index plastic	36
POLYCARBONATE	30

RS-232 SETUP

The Lens Analyzer can transfer lens data to an external device (printer or computer) via the RS-232 serial port. Successful communication requires that you match the Lens Analyzer's serial parameters (Baud Rate, Parity, etc.) to those of the external device.



Use the arrows to select the appropriate parameters and settings. Press the SYSTEM SETUP button to save the selections and exit the screen.

Baud Rate - 300, 600, 1200, 2400, 4800, 9600, 19.2K (factory default, 9600)

Parity - None, Odd, Even (factory default, None)

Data Bits - 7, 8 (factory default, 8)

Stop Bits - 1, 1.5, 2 (factory default, 1)

Flow Control - None, Hardware, XON/XOFF (factory default, XON/XOFF)

Sequence # The Lens Analyzer assigns a number to each printout (from "01" to "00") in the order printed. This Sequence number is used when calling up patient lens data on the Humphrey® Automatic Refractor (via the Communicom™ System).

The Sequence number resets to "01" each time you recycle power on the Lens Analyzer, however, you can easily change the setting through RS-232 Setup. Use the plus (+) and minus (-) buttons to increase or decrease the Sequence number. These sequence numbers do not affect Spexan sequence numbers.

The Lens Analyzer must have the following parameters preset in order to use Communicom™. They may be accessed through System Setup.

1. Within RS 232 setup, make sure
   Baud Rate 9600
   Parity .....None
   Data Bits.....8
   Stop Bits.....1
   Flow Control.....XON/XOFF
2. In Printer Setup, make sure that the external printer is set to the Communicom™.

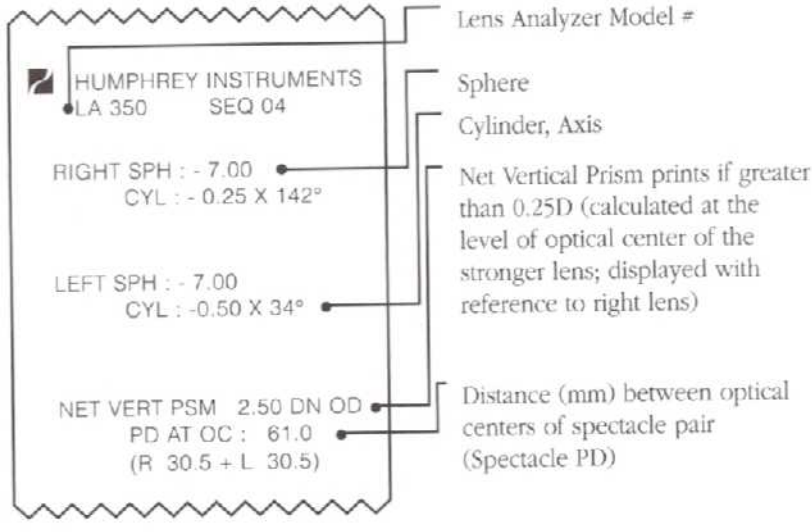
For complete instructions on how to use the Communicom™ System, refer to the Humphrey® Automatic Refractor Operator's Manual.
The Service Entry Screen should be accessed only with the advice and

8 THE PRINTOUT

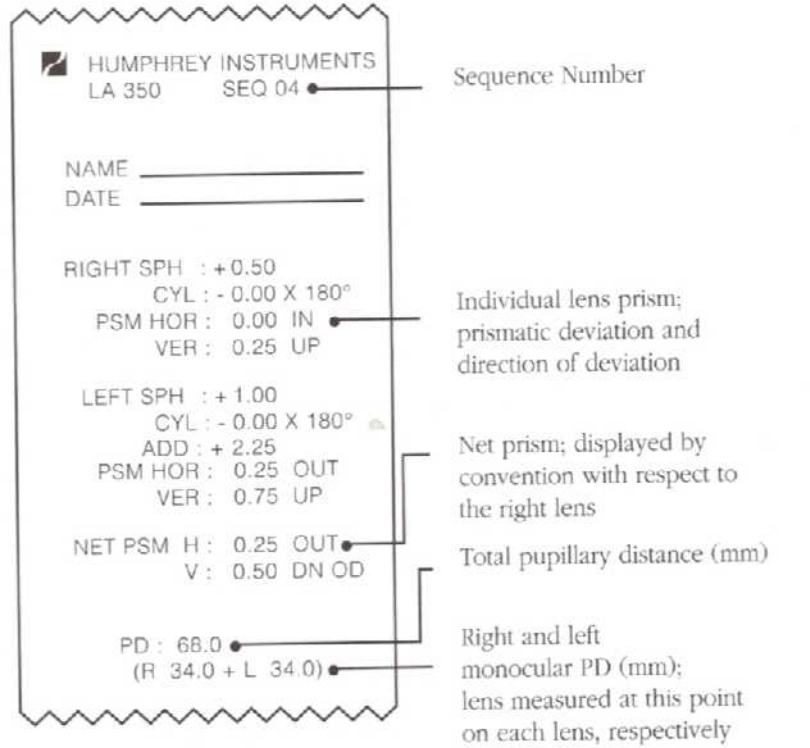
INTERPRETING RESULTS

The specific information recorded on each printout will depend on the type of lens being measured and the settings in SYSTEM SETUP.

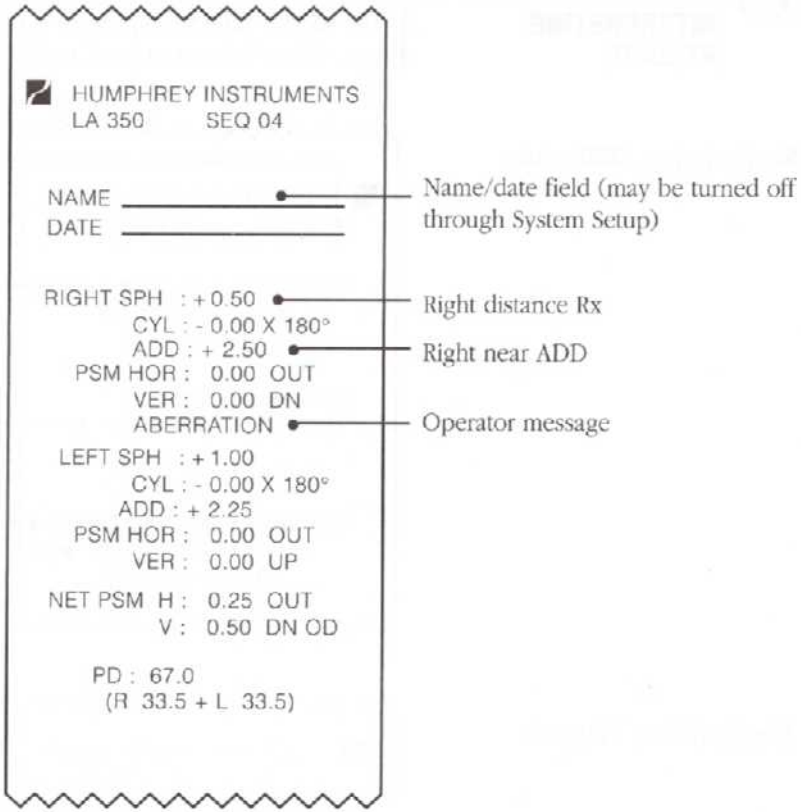
ngle vision, OCD mode



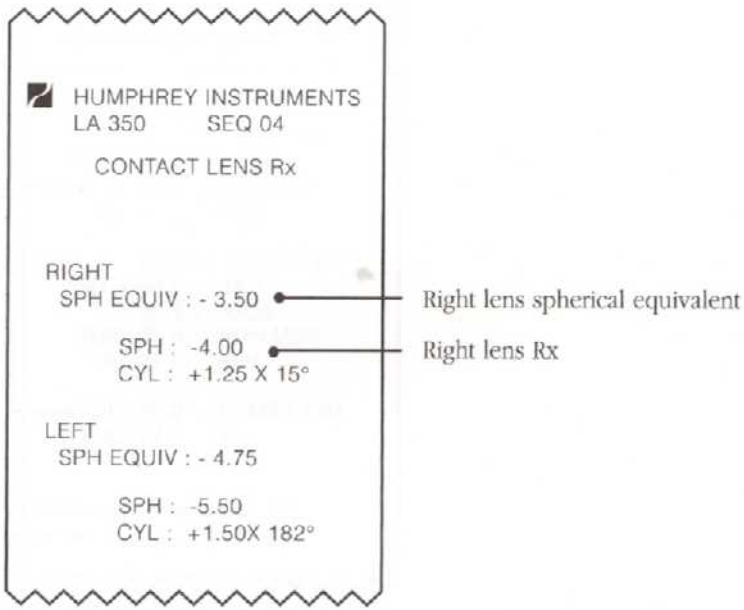
ingle vision, PD mode



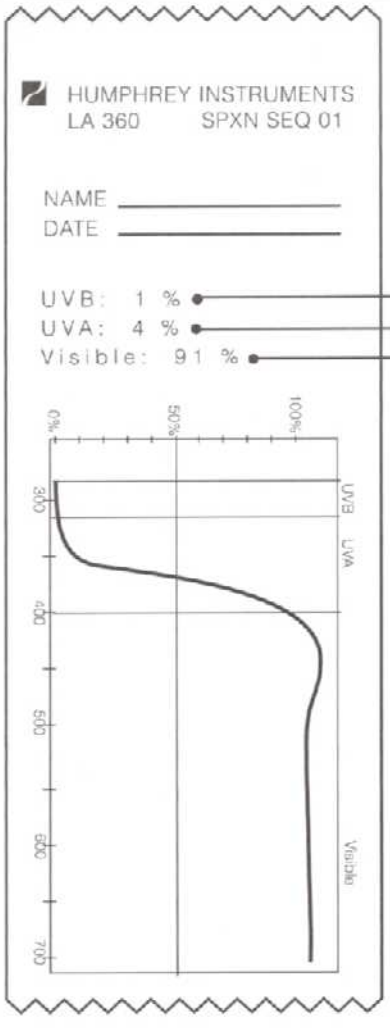
Bifocal, PD mode



Contact lens



Spexan

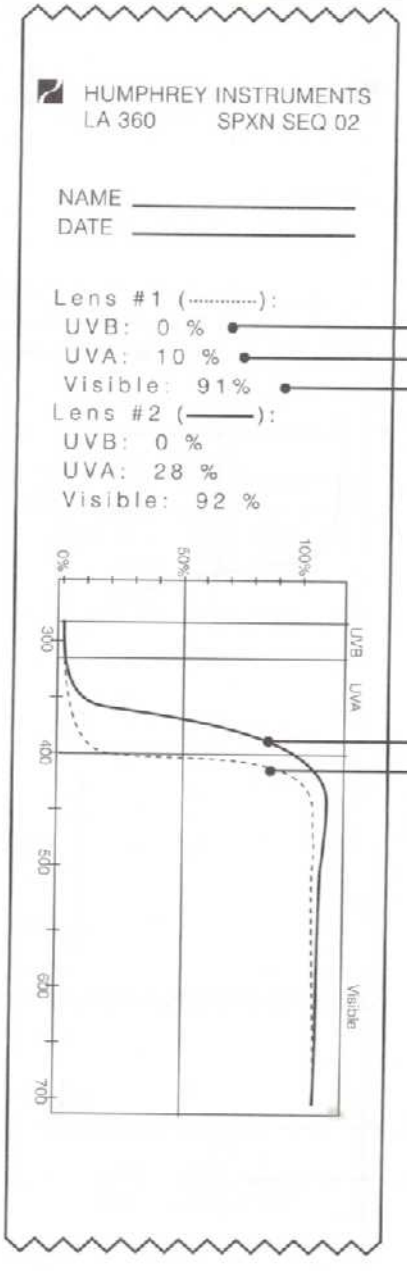


Amount of UVB light which passes through the lens.

Amount of UVA light which passes through the lens.

Amount of visible light which passes through the lens.

Spexan, overlay mode



Amount of UVB light which passes through the lens.

Amount of UVA light which passes through the lens.

Amount of visible light which passes through the lens.

Second measurement (solid line)

First measurement (dotted line)

9 TROUBLESHOOTING

	Problem	Action
General System Failure	Instrument does not power on.	Check power cord connections (instrument and wall outlet).
		Check for blown fuses (see Section 10, Maintenance).
	Measure Screen does not come on after initial warm-up.	Call Humphrey Service.
	Lens values do not save in memory when you tap foot switch.	Examine foot switch cable connection (rear of instrument).
Operational Difficulties	Random measurement errors, fluctuating axis.	Examine lower read assembly for dirt (see Section 10, Maintenance).
	Consistent measurement error, especially on high power lenses.	Check that lens is not tilted on read head. Use lens clamp, if necessary.
	Dim screen display.	Check setting in Screen Setup (see Section 7, System Setup).
	No audible tone when you depress the STORE button.	Check setting in Screen Setup (see Section 7, System Setup).
	Incorrect prism display mode.	Check setting in Screen Setup (see Section 7, System Setup).
	Incorrect display rounding of sphere, cylinder, prism and spherical equivalent.	Check setting in Screen Setup (see Section 7, System Setup).
	Incorrect cylinder notation.	Check setting in Screen Setup (see Section 7, System Setup).
	Incorrect Sequence Number (instrument was powered off).	Go to RS-232 Setup; reset number (see Section 7, System Setup).
	Cursor appears with no lens in place	Clean read head.
	Instrument will not go into Screen saver mode.	Clean read head.

	Problem	Action
	Inaccurate ADD reading in PAL mode.	Lens positioned incorrectly for ADD measurement.
		Lens was removed from read head after distance Rx stored. Do not remove lens between distance and near Rx measurements. Slide lens over read head to reading segment.
	Infinity (∞) or Plus (+) sign not activated in PAL mode.	This occurs with some PAL designs. Press STORE when you have best located the proper area of the lens for distance and near Rx.
Printout/Printing Problems	No printout when you depress the PRINT button.	Check printer for paper supply (see Section 10, Maintenance).
		Check that paper supply is installed properly and platen lever is in down (locked) position.
		Check setting in Printer Setup. INTERNAL PRINTER should be ON.
	Blank printout.	Check that paper supply is installed properly.
	Paper doesn't advance through printer properly.	Examine paper path. Eliminate any slack.
	No horizontal prism on printout when in OCD mode.	No action; this is correct. Only Net Vertical Prism is calculated in OCD mode.
	No Total OCD.	Total OCD for the spectacle pair will appear on the printout only if the weaker lens has power greater than 0.25D.
	No Net Vertical Prism on printout in OCD mode.	Only net vertical prism greater than 0.25D will print.

Problem	Action
Wrong eye prints out with lens measurements in contact lens and layout mode.	Remeasure lens using RIGHT/LEFT INDICATOR button to properly designate lens.
No Name/Date line on printout.	Check setting in Printer Setup (see Section 7, System Setup).
Printout does not reflect last lens measurements.	Only the last *stored* values will print (see Section 1, Auto Read).
Poor print contrast.	Check setting in Printer Setup (see Section 7, System Setup).
Paper jam.	See Replacing Printer Paper II p. 65.

Operator Messages

"PAL?"	Instrument detects rapid change in lens power. This may indicate that one or more of the measuring light beams are straddling the segment line; reposition lens and remeasure. In Measure Screen, this message may indicate presence of a progressive addition lens; change to PAL mode and remeasure.
"Light Path Blocked"	Appears when one of the light beams is blocked. Reposition lens and/or clean lower read assembly. Remeasure.
"OCD Inactivated due to low power"	Displays when lens power is too low (< 1.00D) to calculate OCD. Change to PD mode and remeasure.
"Cursor Inactivated due to Plano Lens with Prism"	Cursor will be stationary. No action needed.

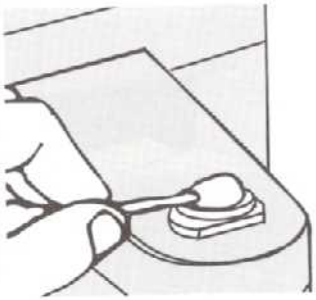
Operator Messages	Problem	Action
	"Aberration"	Appears when lens aberration is detected or non-toric value is exceeded. Examine lens. When Lens Power is Changing and Aberration conditions occur simultaneously, the "Aberration" message will override the other.
	"ACCURx Plus™"	Appears above the centering display as notification that the Lens Analyzer has been programmed (through System Setup) to operate in a lens material mode other than CR-39/Spectacle Crown.
(Spexan only)	Error: No Timers Available	Take another measurement, if error persists, contact customer service.
	Error: Interrupt Timeout	Take another measurement, if error persists, contact customer service.
	Error: Power Supply Timeout	Take another measurement, if error persists, contact customer service.
	Error: No Photo-Feedback	Take another measurement, if error persists, contact customer service.
	Error: Saturated Photo-Feedback	Take another measurement, if error persists, contact customer service.
	Error: Saturated Measurement	Take another measurement, if error persists, contact customer service.
	Warning: No Wavelength Calibration	Contact customer service.

Problem	Action
Spexan Startup Reference Flash Error	The initial attempt to set Spexan operating parameters failed, possibly because a lens was in the light path when the unit was turned on. Please remove all lenses and obstructions from the Spexan measurement unit. Press the STORE button to try again, and wait for Spexan screen to appear, or push one of the marked buttons to exit Spexan mode entirely.
Spexan Reference Flash Error	This attempt to calibrate the Spexan measurement unit has failed, possibly because a lens is in the light path. Please remove all lenses and obstructions from the Spexan measurement unit. Press the STORE button to try again, or one of the marked buttons to exit Spexan mode entirely.

10 MAINTENANCE

The Lens Analyzer is designed to meet the demands of your busy schedule. Other than cleaning the lower read assembly, no other daily maintenance is necessary. The following maintenance tips will help keep the instrument in peak working condition.

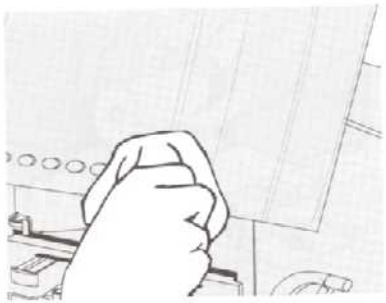
CLEANING THE LOWER READ ASSEMBLY (IMPORTANT)



Remove the spectacle read head by tilting back and lifting up.

Use a Q-tip soaked with isopropyl alcohol to clean the glass surface, taking care not to scratch it. Clean the lower assembly once per day or as often as needed to remove dirt and dust.

CLEANING THE SCREEN AND OUTER CASING



Wipe the screen with a clean cloth and any lens cleaner or isopropyl alcohol. Never spray cleaner directly onto screen.

Wipe dirt spots on outer casing with a clean cloth and mild detergent or isopropyl alcohol. Never spray detergent or alcohol directly onto casing.

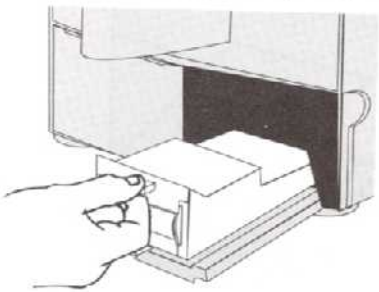
CLEANING THE FOOT SWITCH

Wipe the foot switch with a damp cloth. Do *not* immerse in water.

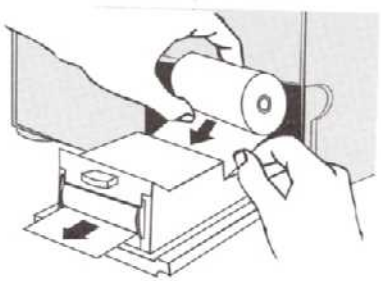
REPLACING PRINTER PAPER I

The "Replace Paper" screen automatically appears when the paper supply is completely empty. Should this occur in the midst of printing lens data, you will have an opportunity to restart the printer after a new supply of paper has been loaded. No information will be lost.

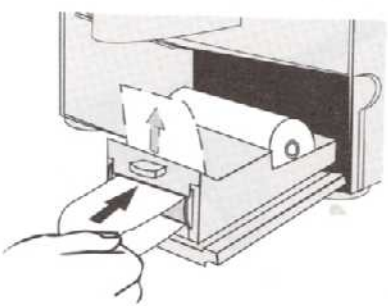
When paper supply is completely empty follow these instructions:



1 Do *not* turn off power. Open the printer door and slide out the printer. Remove old paper spool.

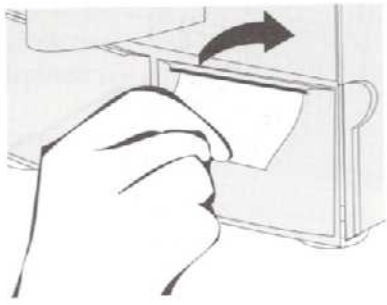


2 Drop in the new paper roll. Orient the roll so the paper feeds from the bottom and threads through the feed slot.

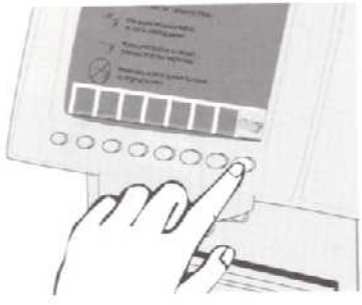


3 Reinsert paper, as shown, just enough to catch in platen. While holding the paper in place, depress the Paper Advance button until paper emerges from top (as shown with dotted lines).

See next page for Steps 4-5.



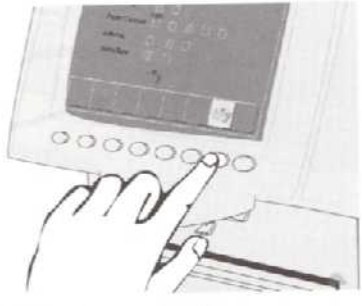
4 Slide the printer back into the housing. Close the printer door and tear off excess paper.



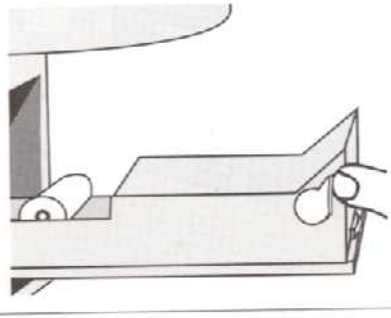
5 Restart printout.

REPLACING PRINTER PAPER II

It is possible to replenish the paper supply *before* it is completely empty or when a pink line shows along the paper edge.



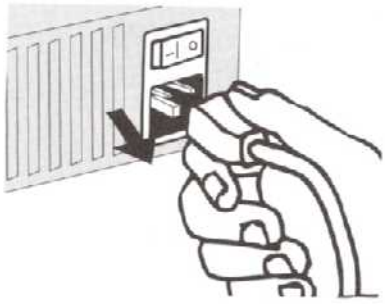
1 Access the "Replace Paper" screen through Printer Setup (see page 47). Press the REPLACE PAPER button. This takes you to the Replace Paper screen.



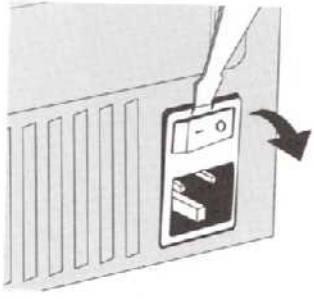
2 Lift up on platen lever to release paper. After remaining paper is removed, press down on platen lever to lock.

Follow Steps 2-4 above to complete process.

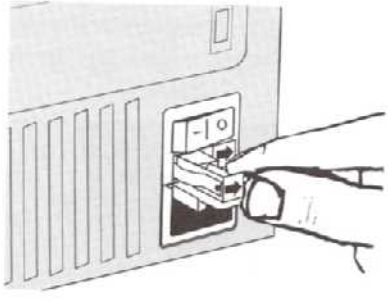
REPLACING FUSES



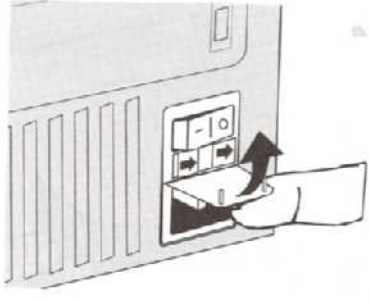
1 Two fuses are located in the rear of the unit. Turn off power. Unplug the power cord.



2 Using a small screwdriver, gently pry open the cover to expose the fuse holder.



3 Slide out each fuse holder (marked with an arrow) and check the filament for breakage. Remove defective fuse.

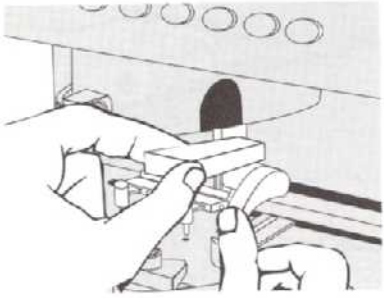


4 Insert new fuse in holder. Slide holder back into housing with arrows pointing to the right. Push the cover up and in until it snaps closed. Plug in the power cord.

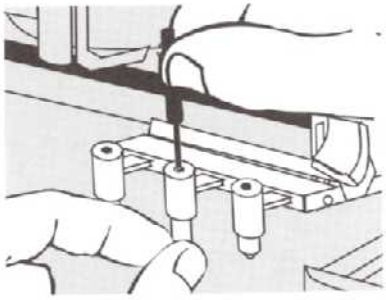
Note: Replace fuses with exact type and rating (See Instrument Specifications, page 71).

EPLACING MARKER PENS

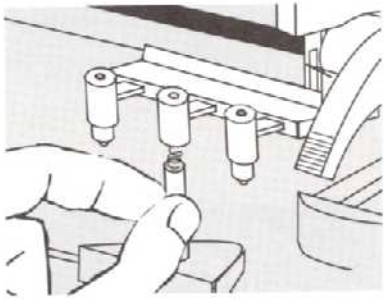
Each of the three (3) marker pens is a self-contained cartridge that houses an ink reservoir and a self-inking tip. When the ink supply becomes depleted you must replace the entire cartridge.



1 Push the lens table back and lock the nose slider. Bring the marker pens into position by placing the stop tool (found in the accessory box) as shown.



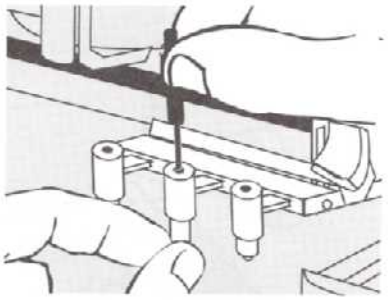
2 While holding the lower portion of the cartridge, remove the hex screw by turning it counter clockwise. The cartridge will back out of the holder.



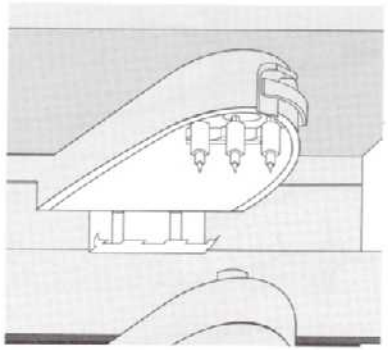
3 Slide in a new cartridge (including spring) and replace the hex screw (turn clockwise). Remove stop tool.

OPTIONAL PENS FOR LABORATORIES

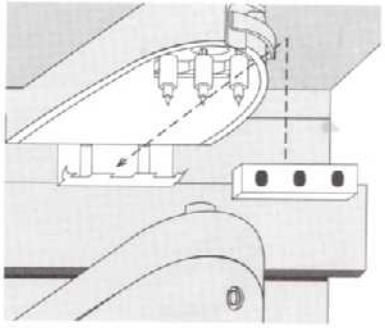
Optical laboratories will receive different pens. These pens should be replaced as follows:



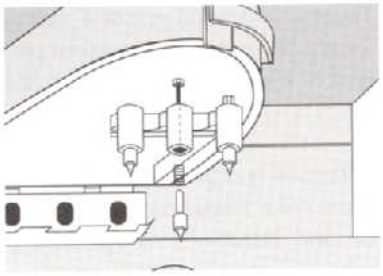
1 Remove the old marking pens. This will give you more room to complete the next few steps.



2 Attach the metal clip to the instrument front. Find the opening in the front wall directly above the lens table. Hold the clip up to the opening and orient with toothed flange toward the instrument as shown. Position the clip as far to the right as possible. Slide toothed flange over top of wall (clamp spring may have to be deflected as you push) and push down until the clip stops moving and is placed securely against the wall.



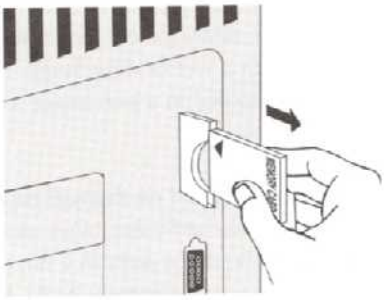
3 Install stamp into the clip.Place the stamp pad horizontally, with the 3 slots towards you on the lower shelf of the clip. Side tabs will help center the stamp pad. Push the stamp pad toward the instrument and into the clip. The upper leaves of the clip will deflect and then capture the stamp pad.



4 Install new stamp pens (including spring) and replace screws.

5 Check marking pen alignment.

INSTALLING NEW MEMORY CARD



The memory card is located in the rear of the unit. Turn off power. Remove current memory card by pulling it away from the unit.

Insert new memory card in the slot. A portion of the card will protrude from the housing.

HANDLING INSTRUCTIONS FOR THE THERMAL PRINTER PAPER

Storage Instructions

Thermal paper should be stored in the dark at an average ambient temperature of less than 25°C and a relative humidity of less than 65%. Under these conditions, the paper remains printable for at least 5 years. Also, printed paper, when stored under these conditions, will retain its printed image legibility for a minimum of 7 years.
Thermal paper begins to develop color at about 70°C; however under humid conditions it might begin to develop at an accelerated rate. If stored for 24 hours at 60°C, the paper shows some signs of development. It also shows signs of development, if stored for 24 hours at 45°C and relative humidity of 90%.. As a result of this phenomenon, ambient temperature and humidity should be monitored if paper is used continuously at a temperature above 40°C for more than 24 hours.

Exposure To Sunlight

Thermal paper will yellow if exposed to direct sunlight. Unused rolls should be kept in their original package. Printed paper should not be left next to a window, rather it should be filed as soon as possible.

Solvent-Based Adhesive

Adhesives containing alcohol or organic solvents and chemicals tend to cause color formation on thermal paper. Rubber type adhesives should no be used. Starch or PVA-type adhesives are recommended.

Plasticizers

Printed images fade and the image formation ability of unprinted paper is reduced if paper is stored for a long period in files containing PVC film. For storage, files and cases made of polyethylene, polypropylene, polyester, etc., are recommended.

Surface Handling

Frictional heat on thermal paper causes images to develop. Scratching wit any hard metal object, or even a fingernail, can damage the surface and cause image development. A printed image may fade if the image is touched with a wet or dirty finger. It is recommended that the thermal paper be handled in a non-image area.

Handling Summary

A document printed on thermal paper should be placed in a file folder an stapled (or attached using other methods mentioned elsewhere) if desired. The folder should be kept in a file cabinet or desk at office ambient temperature (approximately 72°F). Under these conditions, the image will last for a minimum of 7 years.

APPENDIX A

INSTRUMENT SPECIFICATIONS

HUMPREY LENS ANALYZER

Physical

Dimensions:	Height	Width	Depth
	459 mm	237 mm	288 mm
	18"	9.3"	11.3"

Weight: 13.2 Kg
29.0 lbs.

Operating Conditions: +10°C to +40°C
20% to 90% Relative humidity

Storage Conditions: -10°C to +60°C
20% to 90% Relative humidity
(non-condensing)

Electrical

Line voltage: 100 to 240 Volts AC
Frequency: 47 to 63 Hz Single phase
Power: 100 VA
Fuse Rating: 3A fast Blow, 250V, 5 x 20mm
Current Leakage: Less than 100uA at 120 V
Less than 500uA at 240 V

Performance

Sphere: -20D to +20D
Increments: .01D, .12D, .25D
Cylinder: -20D to +20D
Increments: .01D, .12D, .25D
Axis: 1^{O} to 180^{O}
Increments: 1^{O}
Prism: -15D to +15D
Increments: .01D, .12D, .25D
Adds: +0.25D to +10D
Increments: .01D, .12D, .25D
PD: 0 to 90mm
Increments: .5mm
Spexan (Model 360 only)
Range: 290 - 700 nm
Resolution: 5 nm
Transmission Resolution: 1%

Range of Applicability to Lens Types

Spectacles:	single, bifocal, trifocal, aphakic and progressive addition lenses
Contacts:	hard and soft (with special handling)
Tints and Coatings:	scratch resistant, UV and anti-reflective coatings and tints down to 5% luminous transmittance
Refractive materials:	all commercially available
Lens diameter:	7mm to 100mm
High Index Correction:	corrects calibration for high index materials due to dispersion difference, in response to operator input of appropriate Abbe value

Operator Interface: Output

Video Display:	9" diagonal, white phosphor CRT Resolution: 640 x 480 pixels 16 level grayscale
Paper size:	58mm thermal paper

Audible prompts and indicators

Operator Interface: Input

Function buttons
Foot Switch for STORE function
STORE button

Interfaces

RS-232 serial communication port
Selectable baud rate: 300 to 19.2K

APPENDIX B

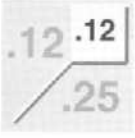
ICONS GLOSSARY

Measure Screen

Layout Screen

Contact Lens Screen

PAL Screen



Rounding

Spexan/Layout

Spexan Screen

Help

Cylinder Convention

Print (Restart Print) Printer Setup

OCD Mode

PD Mode

ACCURx Plus™

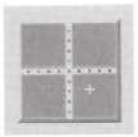
System Setup

Cancel Print

Paper Advance Replace Paper

APPENDIX B

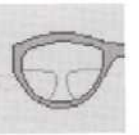
ICONS GLOSSARY



Measure Screen

Layout Screen

Contact Lens Screen



PAL Screen

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Spexan Screen

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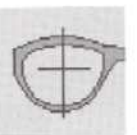
Print (Restart Print) Printer Setup



OCD Mode

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ACCURx Plus™

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Cancel Print

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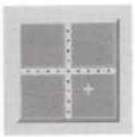
Replace Paper

APPENDIX B

ICONS GLOSSARY

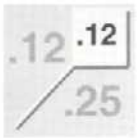


Measure Screen

Layout Screen

Contact Lens Screen

PAL Screen



Rounding

Spexan/Layout

Spexan Screen

Help

Cylinder Convention

Print (Restart Print) Printer Setup

OCD Mode

PD Mode

ACCURx Plus™

System Setup

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Replace Paper