Table of Contents

AT LEAST READ THIS!!!

EIGHT COMMANDMENTS FOR PROPER USE OF THE SPECTRUM

1. **Make sure your lens and all optical elements are clean and free from dust.**

2. **Proper Positioning of Spectacles is imperative for best results in Spectacles Mode**

3. **Single Vision and Progressive Spectacles should be measured at a table setting of 40mm. Bifocals should be measured at 45 mm.**

4. **When transferring a machine to from a cold to a warm temperature, condensation may occur on exposed glass elements, obstructing the light path. A simple tissue wipe will clean the elements.**

5. **Keep the SPECTRUM away from direct sunlight or strong incandescent light.**

6. **Being familiar with the machine's specifications will lead to satisfaction.**

7. **When in doubt about the veracity of any measurement, press Reset for that function.**

8. **Be sure to clear the screen between frame measurements.**

Chapter 1 Introduction

Congratulations! You have just acquired the SPECTRUM .

Before using your SPECTRUM, we strongly recommend reading the entire user's guide.

IMPORTANT: This document contains non-contractual information intended for direct equipment use. That information is subject to change without prior notice. Every effort has been made to avoid error and/or omission, although some may remain. The manufacturer can in no way be held responsible for operational shortcomings or data loss resulting from these errors or omissions.

Chapter 2 Getting Started

Unpacking

The Manufacturer has done the utmost to insure that your **SPECTRUM** unit has been shipped to you intact and in perfect working condition. However, if for some reason you detect damage or malfunction of any part of the unit, do not hesitate to contact us by telephone or e-mail and we will be glad to assist you.

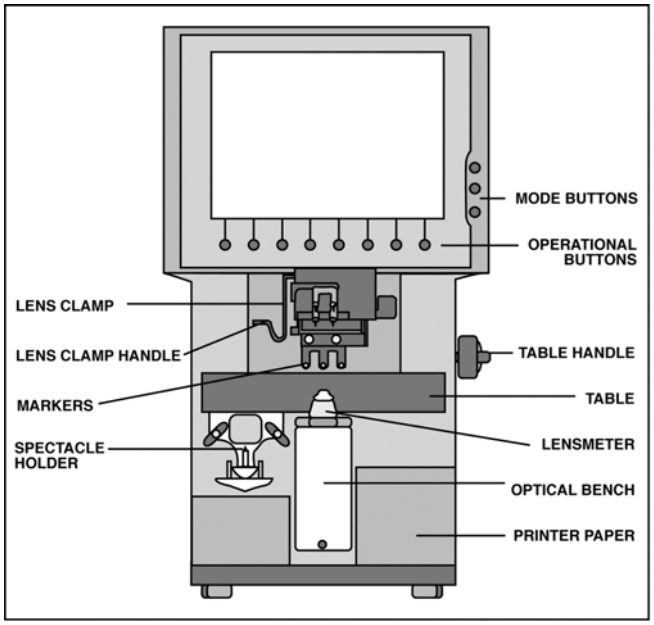
To unpack:

1. Open the box at the top.
2. Use the straps to pull out the machine.
3. Carefully remove the system and place on the table.
4. Unwrap the parts.

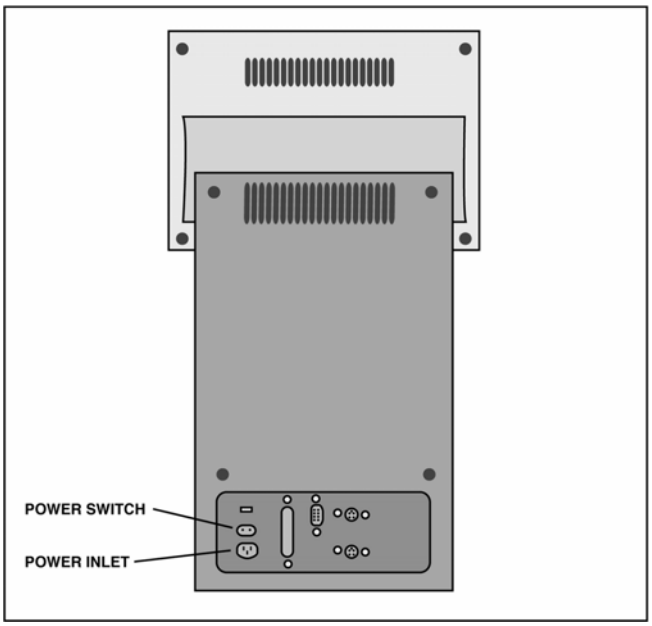
Verify that all the parts of the unit are included and intact (see Accessory List
5.)

FRONT VIEW OF SPECTRUM

Figure 1



REAR VIEW OF SPECTRUM



Accessory List

The following is a list of accessories included with the **SPECTRUM** unit. The **starred** items are stored in the small drawer (lower left side).

Lensmeter tray ∗

Lens Detection tray ∗

Contact lens head ∗

Refractive index (silicon) adapter ∗

2 Spare Fuses

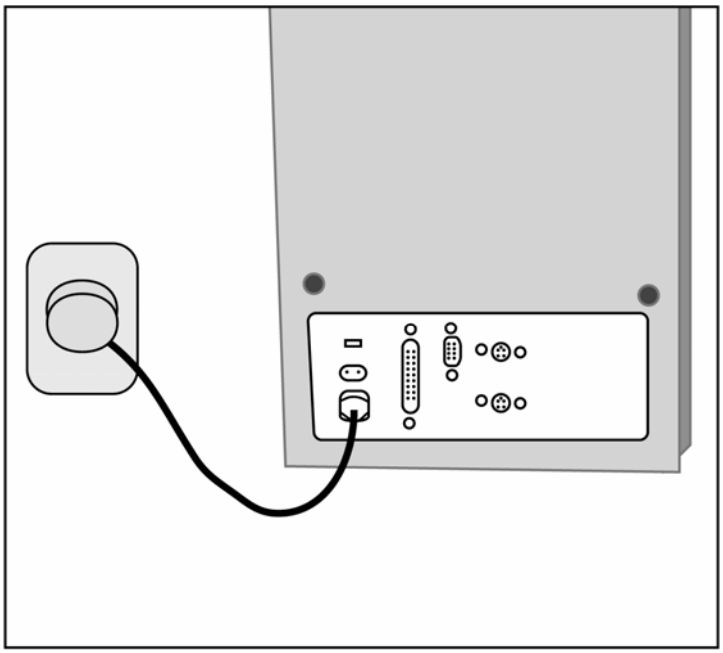
Spare printing paper roll

Installation

1. Connect *the **power cable** to the **power inlet** on the **SPECTRUM.***
2. *Connect the **power cable** to the **power source**.*

You have the option of using an external printer.

*Connect the **printer cable (4**) to the **parallel port** (LPT 1**) (5).***



Safety Precautions

The following safety precautions are designated to obtain maximum performance and safety of your ***SPECTRUM***.

The ***SPECTRUM*** unit should be used in a cool, dry and dust-free setting.

To prevent electric shock, plug the unit into an outlet with earth ground.

Turn off the unit when it is not used for an extended period of time.

The unit is equipped with a 3-prong plug. Plug it into an outlet with a ground receptacle. If the plug does not fit the outlet, contact an electrician. **DO NOT** remove or disable the ground pin.

DO NOT overload your AC outlet.

Note the following fuse ratings:

Mains Fuse **2X 2A slow blow 250VA**

Internal DC fuses

5V: 8A 250VA

-12V: 3A 250VA

+12V: 3A 250VA

If the cord or plug is damaged, **DO NOT** continue to use the instrument. Electrical shock or fire hazard may result. Call Distributor for a replacement.

DO NOT place the unit on an uneven, sloped or vibrating surface.

DO NOT use accessories that are not designed for the ***SPECTRUM*** unit or recommended by the distributor.

DO NOT connect or disconnect cables while the power is on.

DO NOT spill liquid on the unit.

DO NOT open the back casing.

Call technical support for any installation or replacement of external parts.

Operating the SPECTRUM

Introduction

The **power switch** is located in the rear of the unit. When the power is turned on, after a warm up period of about 60 seconds, the unit automatically resets and is ready for measurement.

The **SPECTRUM** offers three modes for measuring lenses:

Lensmeter Mode

Lens and Frame Detection Mode

Materials Property Mode

As a *lensmeter*, the **SPECTRUM** locates and measures the *optical center* or *specific points* on the lens surface. As a *lensographer*, the **SPECTRUM** provides a detailed color *map* of the complete lens surface. As a *material measuring device,* the **SPECTRUM** measures different lens materials (the refractive index).

Choosing the Measurement Mode

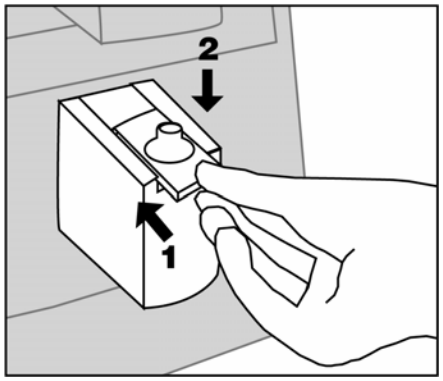
Each measurement mode has its own measurement accessory. Inserting the accessory automatically resets the unit and displays the desired measurement screen.

To choose the Lensmeter mode:

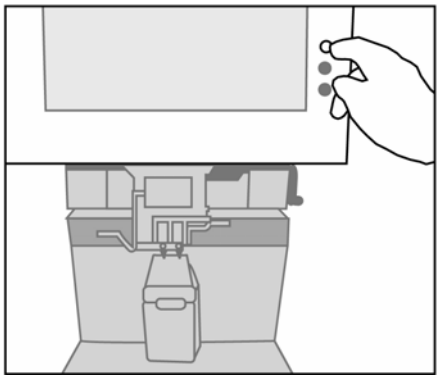
1. Slide the lensmeter plate onto the

Lens bench.

2. Snap the plate into place by pressing down.



3. Press the Lensmeter Mode button (first vertical button);
4. The Main Screen for the lensmeter mode is displayed see Figure 2).



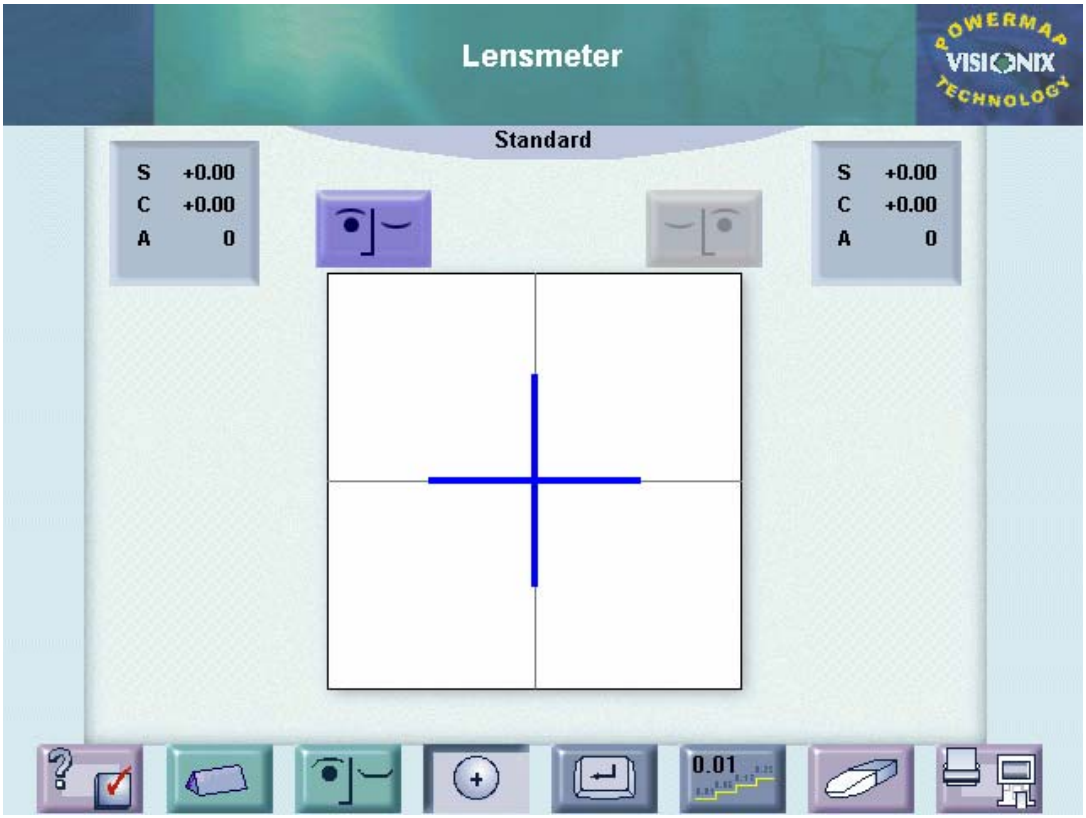
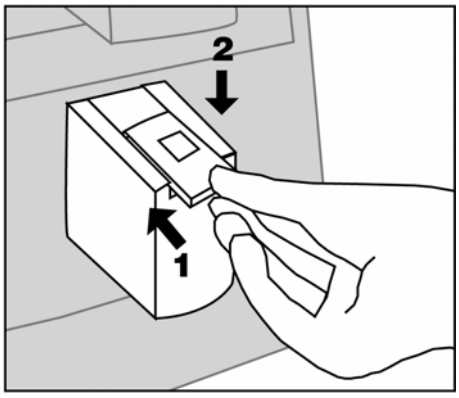

Lensmeter
POWERMAP
VISIONIX
TECHNOLOGY
Standard
S +0.00
C +0.00
A 0
S +0.00
C +0.00
A 0
0.01

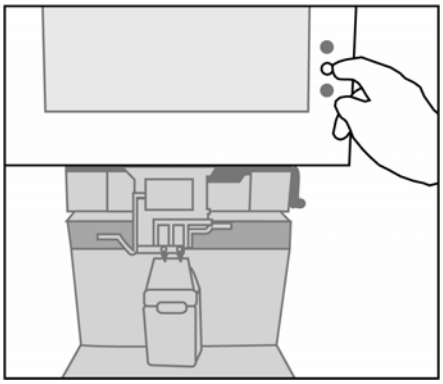
Figure 2

Choosing the Lens and Frame Detection mode:

1. Slide the lens detection tray onto the Lens bench.
2. Snap the plate into place by pressing down.



3. Press the Lens and Frame Detection Mode button (second vertical button); the Main Screen for the Lens detection mode is displayed (see **Figure 3**).



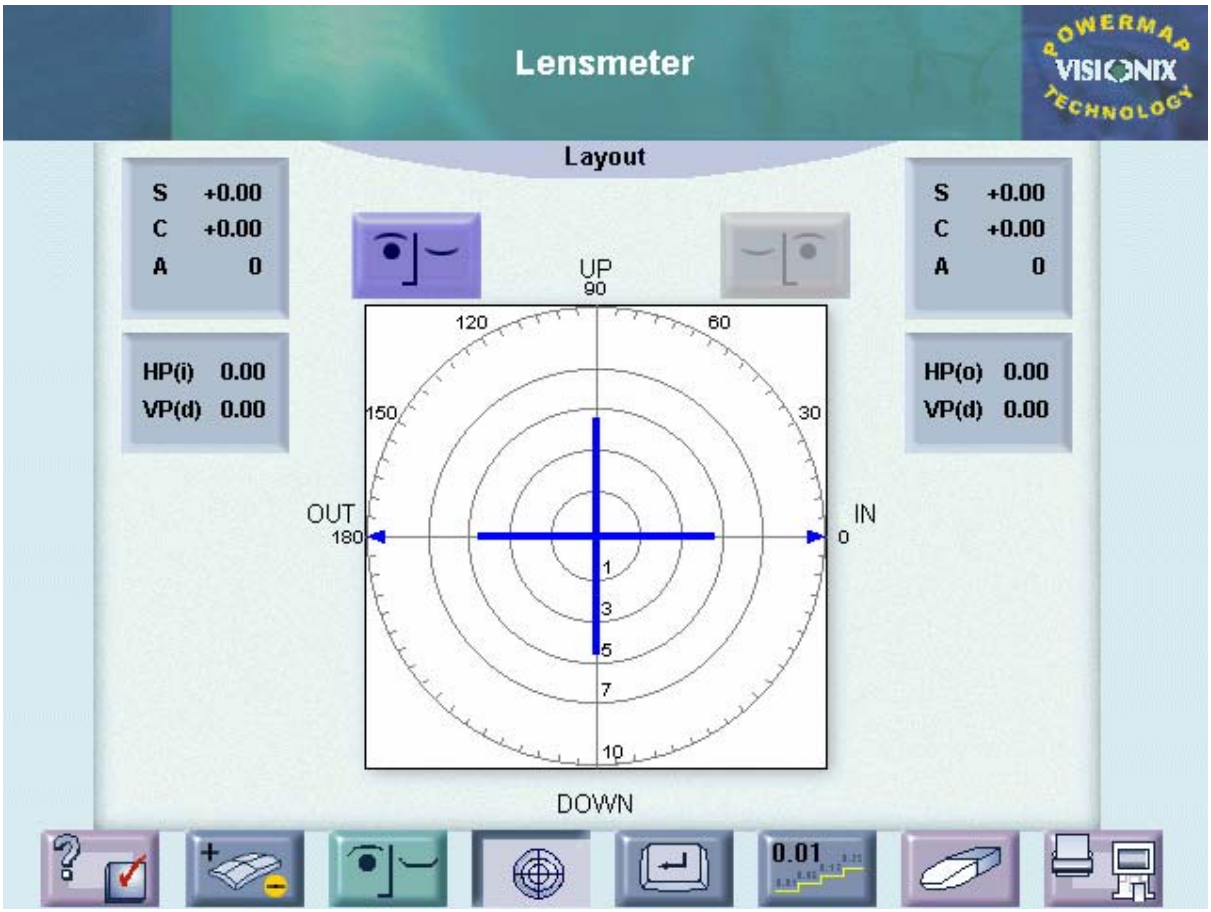

Lensmeter
POWERMAP
VISIONIX
TECHNOLOGY
Layout
S +0.00
C +0.00
A 0
HP(i) 0.00
VP(d) 0.00
S +0.00
C +0.00
A 0
HP(o) 0.00
VP(d) 0.00
UP
90
120
60
150
30
OUT
180
IN
0
1
3
5
7
10
DOWN
0.01

Figure 3

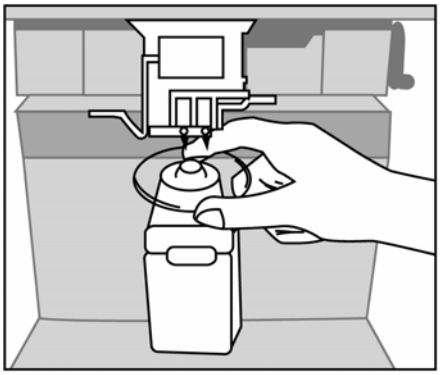
Chapter 3 Lensmeter Mode

Introduction

As a lensmeter, the **SPECTRUM** locates and measures the *optical center* of the lens. However, you can measure if desired any other *specific point* on the lens. The measuring process is simple and straightforward and can be done in a few easy steps. The results are displayed in both graphic and numerical form and can be printed out for your convenience. You can also accurately measure lenses for marking the *optical center*. Single-vision, bifocal, trifocal and progressive lenses can be measured for single lenses, spectacles or contact lenses.

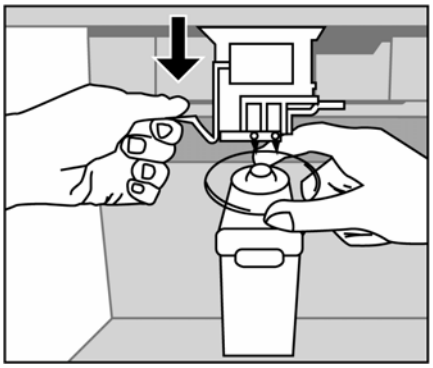
Measuring Basics

Positioning the Lens



Place the lens face up on the lens head.

Lowering the Lens Clamp:

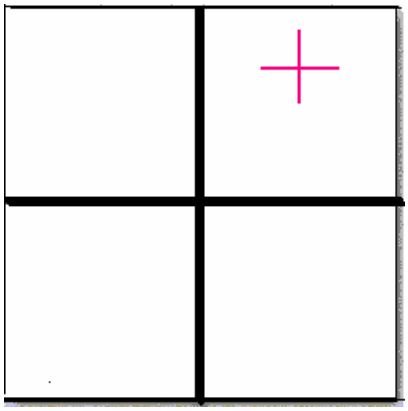


The **lens clamp** is used to prevent the lens from moving during measurement.

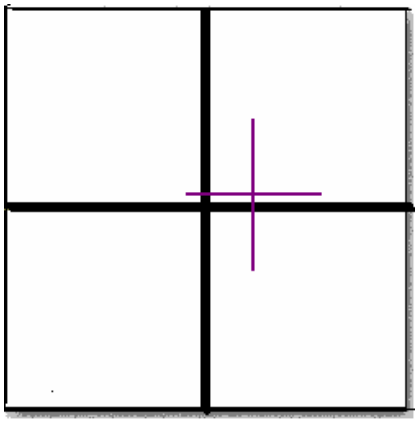
To lower clamp, lift up the clamp handle slightly and gently lower it over the lens.

Centering the Lens

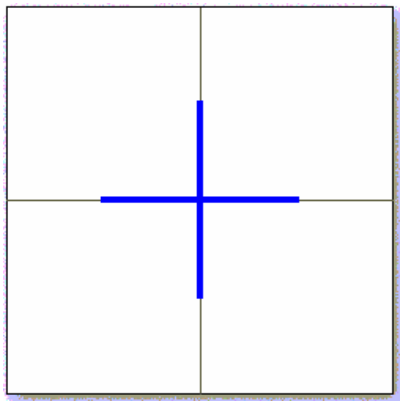
When the **SPECTRUM** detects a lens, the RED CROSS cursor indicates how far from the optical center the lens is positioned. As you move the lens, the RED CROSS cursor moves.



Move the lens so that the RED CROSS cursor is **exactly** in the center. As the CROSS cursor approaches the center, it is enlarged and changes in color to blue.



When it is **exactly** centered, a beep is sounded.

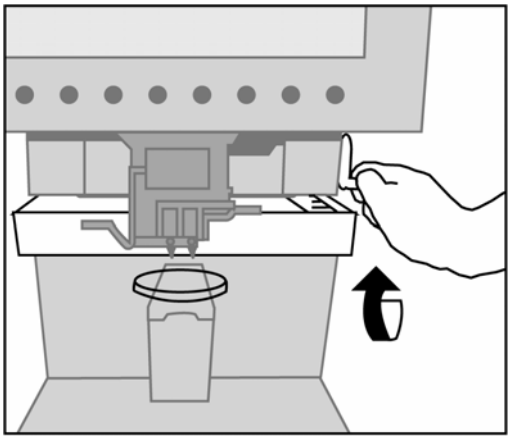


NOTE: As you move the lens over the lens head, the measurement results change according to the cursor position on the lens.

Marking the lens

You can mark the *optical center* and the *axis orientation* on the lens. You should be in the **Layout Mode** to accurately mark the lens.

To lower the markers, lift up slightly and gently lower the markers over the lens.

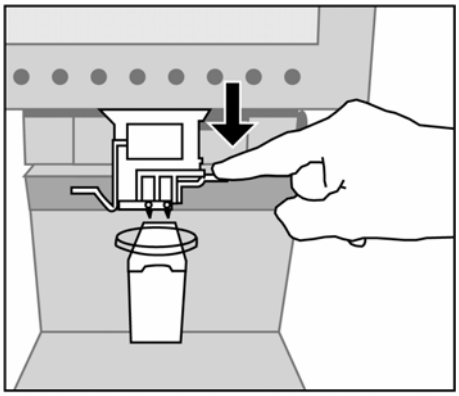


Using the Lens table

The **Lens table** moves to adapt to *different sizes* of spectacles or lenses. The **ruler** on the lens table can be used to measure the *distance* between the *table's edge* and the marked *optical center* of marked *edge* of the lens. This is especially useful when measuring the same prescription on different size lenses or measuring lenses after they have been cut or sized.

Turn the table handle towards you to lengthen the table.

Turn the handle away from you to shorten the table.



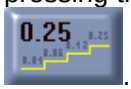
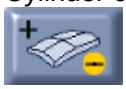
Layout Measurement and Marking of Single Vision Lenses

Marking the *optical center* requires a precise and accurate measurement

To accurately measure and mark the optical cente*r*:

1. Press the **Mode** button (4th button from left) until the **Layout Mode** screen is displayed.  .
2. Place the lens over the lens head.
3. Lower the lens clamp.
4. Center the lens over the lens head so that the BLUE CROSS is on the optical center and a beep is sounded.
5. Lower the markers over the lens.

NOTES:

- You can obtain a measurement value for a specific point on the lens surface. As you move the lens over the lens head, the values change for each specific point.
- You can change the measurement step by pressing the step button  . Each successive pressing will toggle the step through the options: 0.01D, 0.06D, 0.12D, 0.25D.
- In layout mode, the cross movement responds to a detected change in the prism.
- You can change the cylinder convention by pressing the Cylinder convention button 

Measurement Results

The measurement results are displayed in both graphic and numerical form on the screen

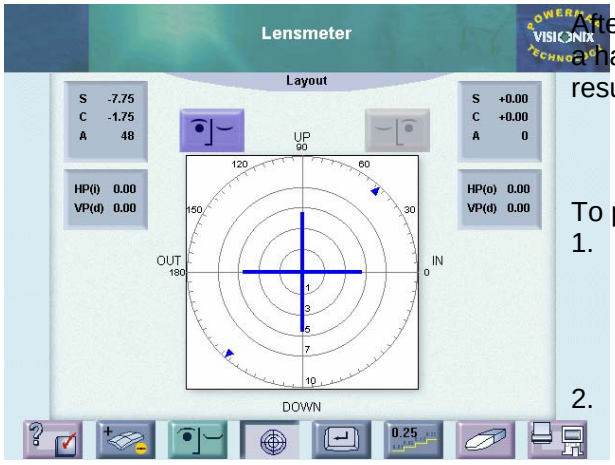


Figure 4

Graphic Display

The RED CROSS cursor designates a *prism point* on the lens.

The BLUE CROSS cursor designates the *optical center* of the lens.

The BLACK CONCENTRIC CIRCLES designate the *prismatic diopter* scale.

The BLUE arrows around the circles designate the *orientation of the cylinder axis*.

Numerical Display

The *sphere* (**S**), *cylinder* (**C**), and *axis* (**A**) numerical values are displayed for both the right and left lenses.

The *prism* (**P**) and *prismatic angle* (**B**) values are also displayed if you have selected the **Polar Prism Convention** in the **Setup** menu.

If you want to display the **HP Out** and **HP In** values, select **Cartesian Prism Convention** in the **Setup** menu (see Chapter 6).

Printing

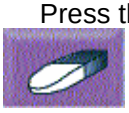
After each measurement, you can print a hard copy of the measurement results.

To print:

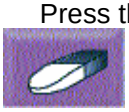
1. Press the **Print** button  ; a hardcopy of the lens measurement is printed.
2. Tear the print out up and to the right.

Clearing the Screen

To clear the measurement results from **one** side of the screen:

Press the **Clear** button  .

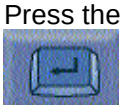
To clear the measurement results from **both** sides of the screen:

Press the **Clear** button  **twice**.

Measuring Bifocal or Trifocal Lenses

When measuring bifocal or trifocal lenses, it is necessary to measure two or three **different points** on the lens surface. The SPECTRUM will calculate the addition automatically.

To measure bifocal lenses:

1. Place the lens over the lens head.
2. Lower the lens clamp.
3. Press the **Mode** button to enter the Layout Mode  .
4. Position the lens to measure the **far-vision** point.
5. Press the **Save** button  ; the far vision values are frozen at the bottom corner of the display screen.
6. Move the lens so that the lens head is over the **near vision** area of the lens; instantaneous near vision values appear in the upper box and the Addition appears in the bottom corner.
7. Press the **Save** button  ; all values are frozen. (see Figure 6).

NOTE: The **Add** value is the difference in *power* between the first and second points of measurement.

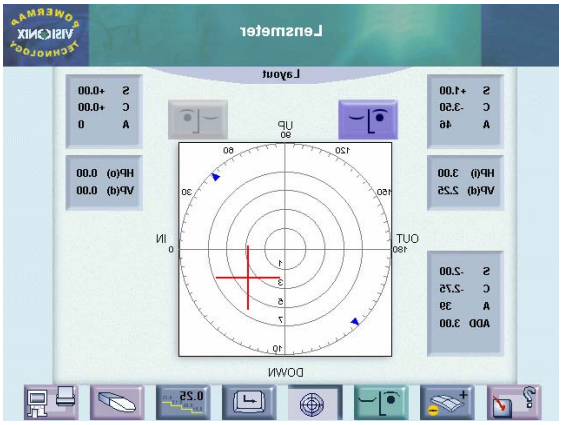


Figure 5

To measure trifocal lenses:

1. Place the lens over the lens head.
2. Lower the lens clamp.
3. Press the **Mode** button to enter, the Layout Mode  .
4. Position the lens to measure the **far-vision** point.
5. Press the **Save** button  ; the far vision values are frozen at the bottom corner of the display screen.
6. Move the lens so that the lens head is over the **intermediate vision** area of the lens.
7. Press the **Save** button  again; the first addition will appear in the bottom corner.
8. Move the lens so that the lens head is over the **near vision** area of the lens. The second addition will appear in the bottom corner.

9. Press the **Save** button  again; all values will be frozen.

NOTE: The **Add** value is the difference in *power* between the first and second points of measurement or the second and third points of measurement.

Progressive Lenses

Progressive lenses have *complex surfaces* in which the *power varies* across the surface.

If the *far and near vision areas* **are marked** on the lens, the measurement procedure is identical to measuring bifocal lenses.

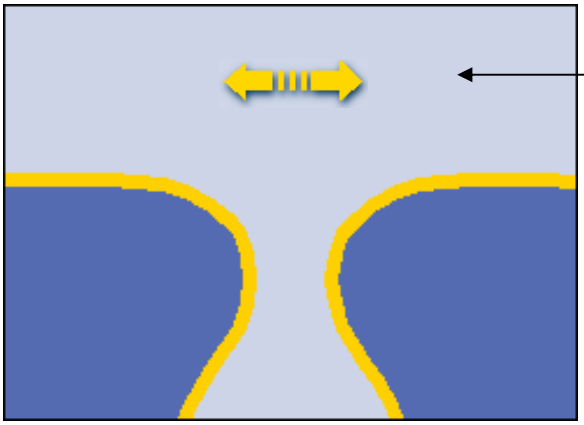
To measure:

1. Place the lens over the lens head.
2. Lower the lens clamp.
3. Press the **Mode** button to enter the Layout Mode  .
4. Position the lens to measure the **far-vision** point.
5. Press the **Save** button  ; the far vision values are frozen at the bottom corner of the display screen.
6. Move the lens so that the lens head is over the **near vision** area of the lens; instantaneous near vision values appear in the upper box and the Addition appears in the bottom corner.
7. Press the **Save** button  ; all values are frozen. (see Figure 6).

However, if there are **no markings** on the lens, the measurement process as well as the Main Screen is different. The Main Screen depicts the **progressive power corridor**. You are prompted to locate and measure the near and far lens power using the guidelines on the screen.

To measure:

1. Place the lens over the lens head.
2. Lower the lens clamp.
3. Press the **Mode** button until the **Guided Addition** button is displayed. 
4. Position the lens **approximately** in the **far-vision** area. See figure below.



5. Move the lens over the lens head using the arrow guidelines until a **down** arrow is displayed on the screen; the far vision point is centered in the corridor.
6. Press **Save** button  ; the far vision values are permanent and are stored in memory.
7. Move the lens through the corridor using the arrows as the guideline; the color bar graph is filled as the lens moves over the lens head.

8. When the color bar approaches the maximum addition point (depicted by the blue triangle above the bar graph), the lens is in the near vision area and you can stop measuring.
9. Press the **Save** button  ; both the near (addition) and far vision values are displayed on the screen in numerical and graphic form.

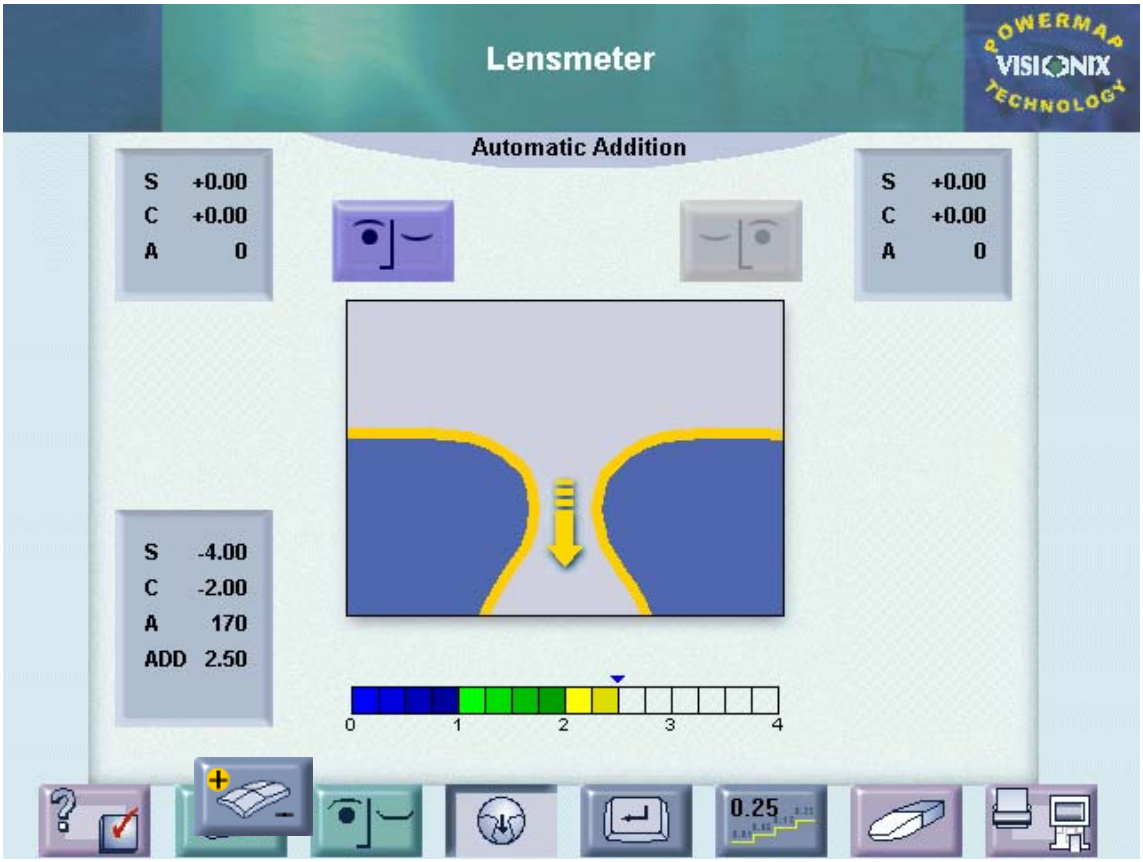


Figure 6

NOTES:

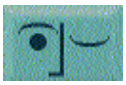
As you move the lens through the color bar, you are prompted

edtorotatetormovethelensaccordingtothearrowguidelines.

As you move the lens through the cor ridor, the color bar is filled up to the point where you stopped moving the lens over the

e le n s h e a d a n d h a v e pr e s s e d th e **S a v e** b ut to n.

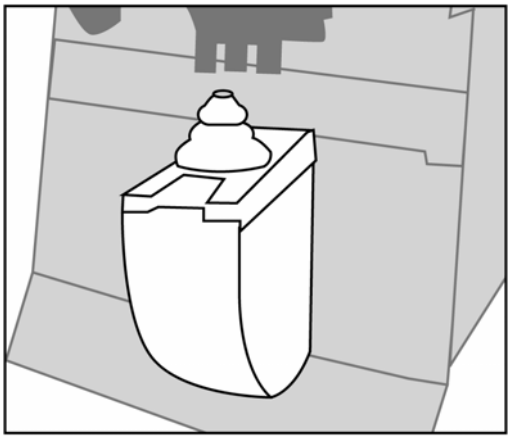
measurement results are displayed on the screen.

4. Press the **Lens Indicator** button  to select the **right** lens; the values for the left lens will be frozen and the selected right lens is highlighted in **blue**.
5. Repeat Steps 1-5 for the **right** lens.

 NOTE: The above procedure measures *single vision* lenses. However, you can measure *specific points* on the lens (see page **Error! Bookmark not defined.**). You can accurately find and mark the optical center (see 4). You can also measure *bifocal* (see page 4), *trifocal* (see page 30).

Contact Lenses

A special lens head is needed to measure contact lenses. Position the contact lens head as shown in the following illustration.



To measure single vision contact lenses:

Spectacles

Measuring spectacles is **identical** to measuring single lenses. **No** special nosepiece is required for the measurement. The selected spectacle lens is positioned directly over the lens head

To measure single vision spectacles:

1. Check that the **Layout mode** button  is depressed.
2. By default, the left lens is measured first. Position the **left** spectacle lens over the lens head.
3. Move the spectacle lens to find the *optical center*; the

1. Press the **mode** button until the contact lens icon appears  .
2. By default, the left lens is measured first. Place the **left** contact lens over the lens head.
3. Position the left contact lens to find the *optical center*; the measurement results are displayed on the screen.
4. Press the **Lens Indicator** button  to select the **right** lens; the values for the left lens will be frozen and the selected right lens is highlighted in **blue**.
5. Repeat Steps 1-5 for the **right** lens.

 NOTE: Soft contact lenses must be dry in order to be measured.

Chapter 4 Lens and Frame Detection Mode

Introduction

The **SPECTRUM**'s lens detection feature is **unique** in the lensmeter market. Many lensometers measure the *optical center* or specific points on the lens surface. However, what makes the **SPECTRUM** unique is its ability to *measure and map the complete lens surface*. The results are displayed in numerical and graphical form as well as in *colored power maps* providing precise and accurate information about lenses and spectacles. The lens and Frame detection measures **single lenses** (**Lens Detection**) as well as **spectacles** (**Spectacle Detection**).

Lens Detection Mode

Introduction

After you have entered, the **Lens and Frame detection** mode, the following screen is displayed (see Figure 8). You must specify which **Measurement Mode** you wish to use. The measuring procedure can be done in 2 easy steps.

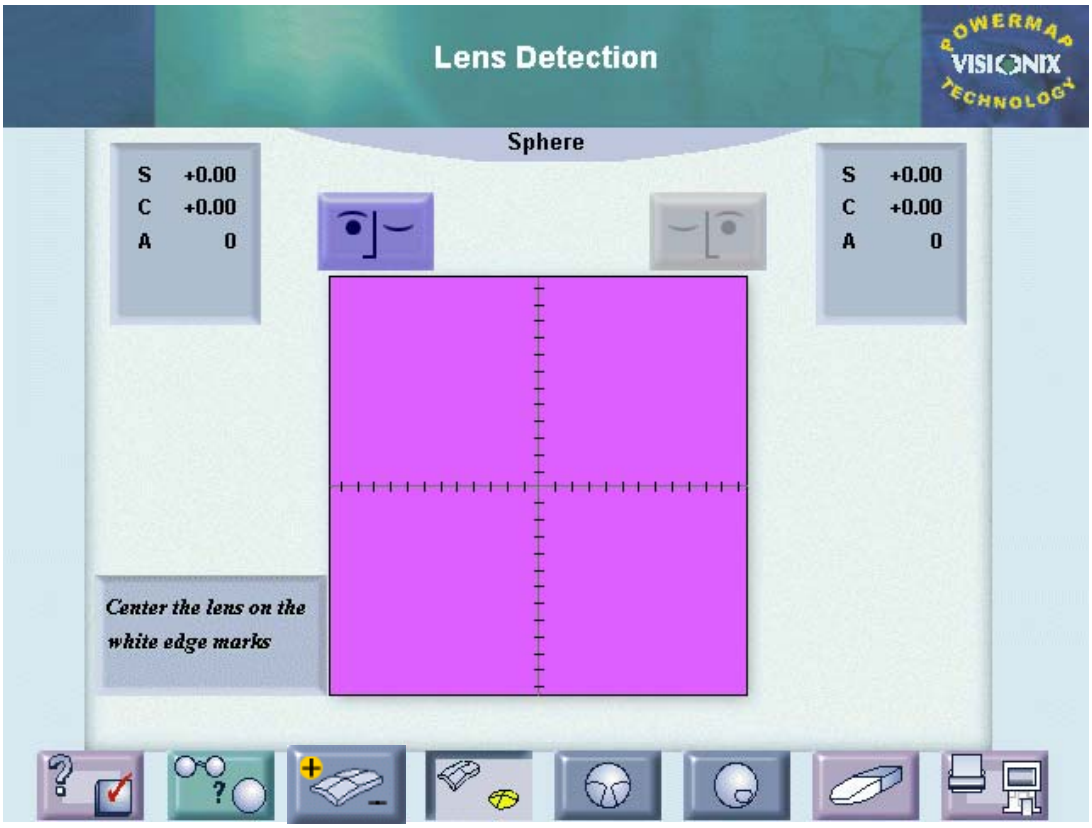
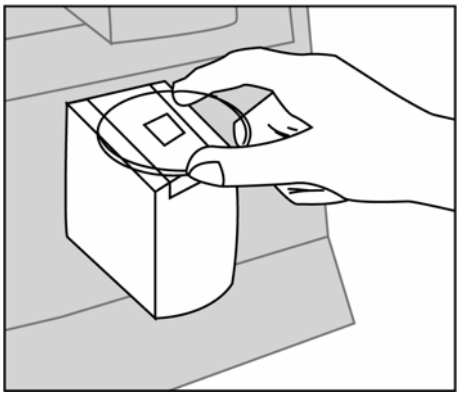

Lens Detection
POWERMAP
VISIONIX
TECHNOLOGY
Sphere
S +0.00
C +0.00
A 0
S +0.00
C +0.00
A 0
Center the lens on the white edge marks

Figure 7

Measuring Basics

Positioning the Lens

Place the lens **over** the **lens detection tray** so that the measuring light beams pass through the center of the lens.



NOTE: As you move the lens over the **lens detection tray**, the color topography and the numerical results change.

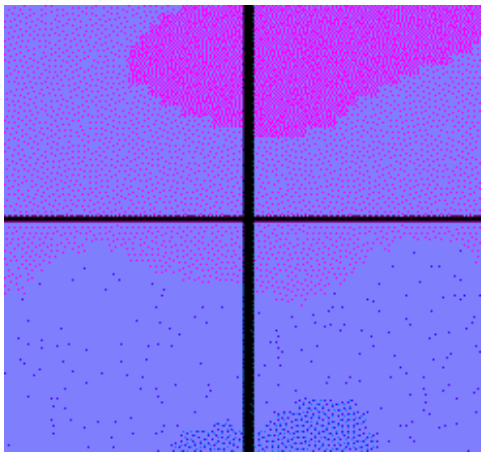
Measurement Results

The **Lens Detection** mode is used primarily for **quick detection** of lens types. Once you have detected the lens type, you have the option of displaying the Sphere or Cylinder Map.

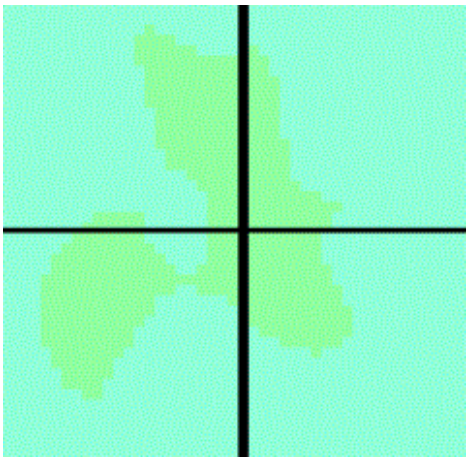
To choose the Sphere Map display:

Press the **Sphere/Cylinder Map** toggle button so that the circle is highlighted  ; the Sphere Map will be displayed.

Progressive Lens



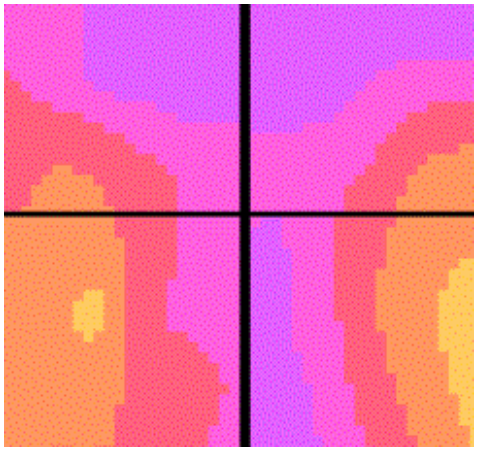
Single Vision Lens



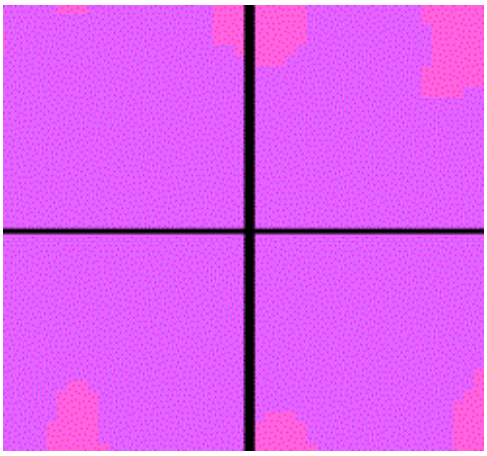
To choose the Cylinder Map display:

Press the **Sphere/Cylinder Map** toggle button so that the rectangle is highlighted  ; the Cylinder Map will be displayed.

Progressive Lens



Single Vision Lens



The *optical center* of the map is the **intersection** of the horizontal and vertical axes.

The *sphere*, *cylinder, axis and prism* values of the *optical center* are displayed above the colored map. If you wish to change the cylinder convention from positive to negative, you can configure this option in the set-up (see Chapter 6)

Each **color** on the map represents a different *power interval.* As you move the lens, the color topography and the power values vary. If you wish to decrease the step value, you can configure this option in the set-up (see Chapter 6)

You can change the cylinder convention easily by pushing the cylinder convention button 

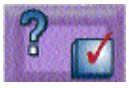
Printing

You have the option of printing the numerical measurement results **directly** from the **SPECTRUM** unit. If you wish, you can print the color map on an **external** printer. However, you must configure this option in the **System Configuration** menu **before** you print (Chapter 6).

To print the numerical measurement results:

Press the **Print** button  .

To print the colored map:

1. Press the **Setup/Help** button  ; the Detection Mode Setup screen window is displayed.
2. Press the **System configuration** button  ; the **System Configuration** dialog window is displayed
3. Press the **Down Arrow**  until the **Printer** option is selected.
4. Press the **Right Arrow**  until the ONLY EXTERNAL or BOTH option is selected.

5. Press the **Save** button  .
6. Press the **Exit** button  ; the **Main Screen** is displayed again.
7. Press the **Print** button  .

Clearing the Screen

To clear the measurement results:

Press the **Clear** button  .

Progressive Lenses

Progressive lenses are characterized by their complex surfaces. Once you have determined that the lens is progressive, additional features are available especially for progressive lenses

To measure progressive lens:

1. Position the progressive lens on the lens detection tray so that the corridor is vertically aligned with the plate and the near vision point is oriented toward the SPECTRUM body.
2. Press the **Progressive Lens** button  ; the **Cylinder Map** is displayed with the additional progressive lens features (see Figure 9).

 NOTE: Position the lens so that the progressive corridor is displayed **vertically** across the screen.

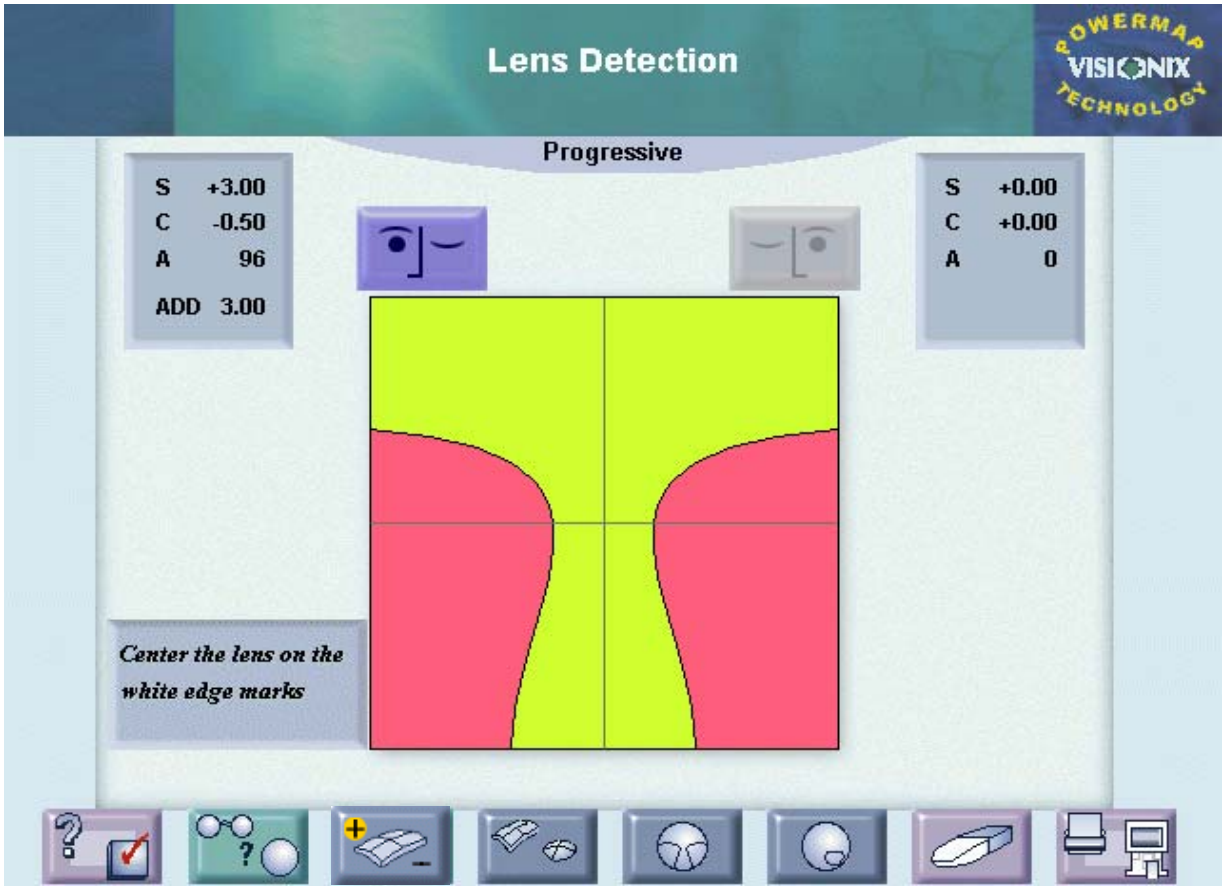


Figure 8

Measurement Results

The *far vision* and *near vision areas* are designated by the **color topography** and the **progressive corridor**.

The *sphere, cylinder and axis* values for the **far vision** measurement are displayed in the upper corner.

The **near vision** measurement is the *addition* value. It is computed by adding the addition value to the sphere value.

Bifocal Lenses

To measure bifocal lenses:

3. Position the bifocal lens on the lens detection tray;
4. Press the **Bifocal Lens** button  ; a Bifocal lens map is displayed with the far vision and segment graphically shown. (see Figure 10).

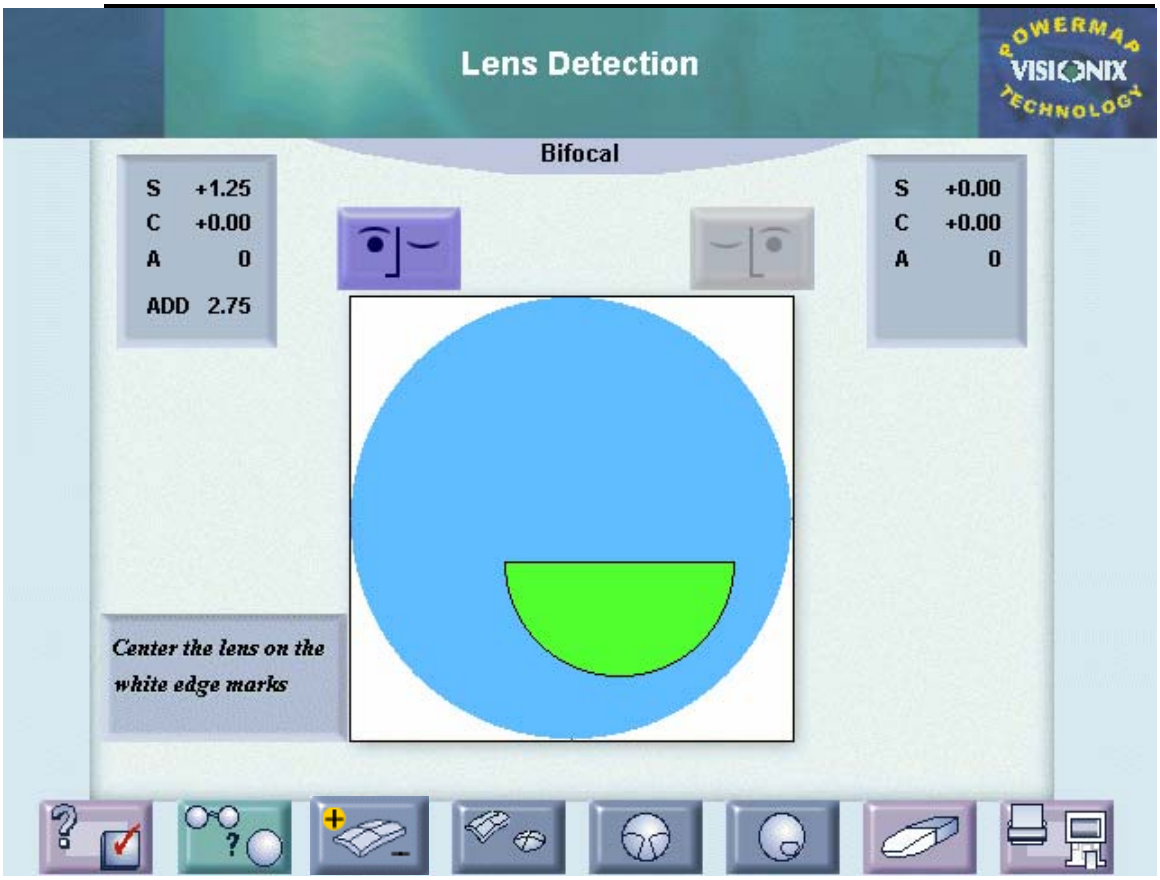


Figure 10

NOTE: Position the lens so that the segment is closest to the SPECTRUM body.

Spectacle Detection Mode

By default, the **Lens Detection Mode** screen is displayed when you enter the **Lens detection** mode. To measure spectacles, you must first position the spectacles holder over the **Lens Detection Plate**; the display will automatically change to **Spectacles Detection**.

Positioning the Spectacle Holder

The Spectacle Holder has several functions:

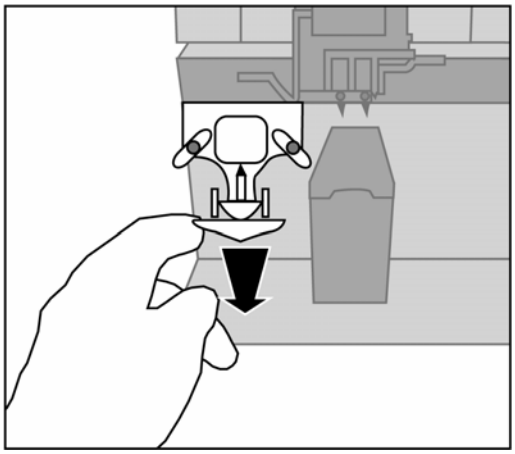
It acts as an artificial nose to correctly position the spectacles.

It signals the **SPECTRUM** whether the right or left lens is being measured.

To position:

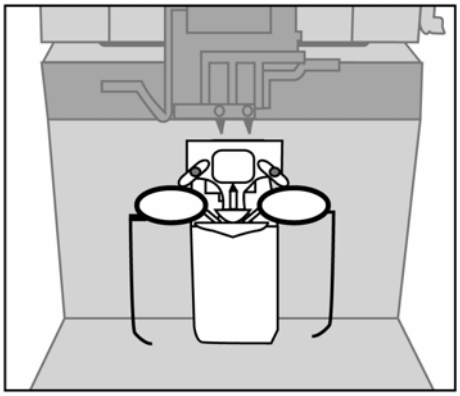
To position:

1. Gently lift up the spectacle holder. You hear a click when it is in horizontally aligned.
2. Slide it to the right until it is over the lens detection tray.



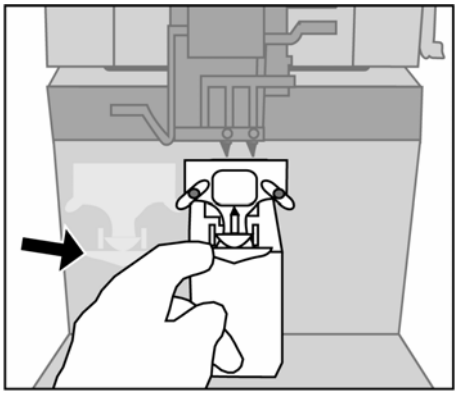
Inserting the Spectacle

1. Pull the front clamp towards you to open.
2. Hold the spectacles with the temples down and place them between the 2 clamps.
3. Position the bottom frame edge of each lens on the right and left grooves of the holder.
4. Push the nose clamp back until the frame is secured between the left and right grooves and the nose clamps.



Positioning the Right Lens

Slide the spectacle holder to the right so that it is in the center of the lens detection tray.



Positioning the Lens

Observe the ruler to the right of the lens table and adjust the position of the table so that lenses are measured at the following positions:

FOR SINGLE VISION AND PROGRESSIVE LENSES: 40

FOR BIFOCALS: 45.

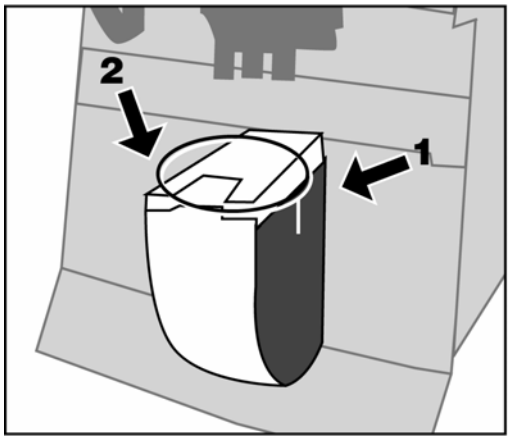
NOTES:

If the lens is **not** properly positioned, an *error message* appears telling you to accurately center the lens again.

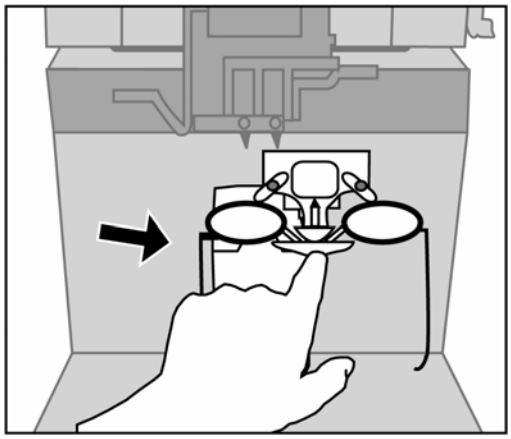
Press the Lens Type Button

The measurement process and results differ for different lens types.

Press the appropriate lens type button (single, progressive, bifocal or prismatic).



Measuring the Left Lens

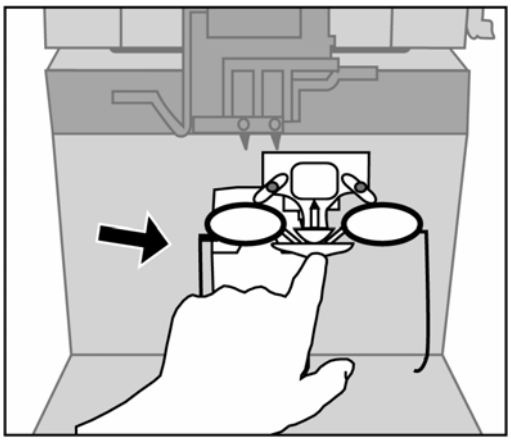


1. Gently slide the spectacle holder to the left to position the left lens over the center of the lens detection tray.
2. Press the appropriate lens type button.

NOTE: Positioning the right or left lens over the lens detection tray *automatically* signals the **SPECTRUM** which lens is to be measured.

Measuring the Left Lens

3. Gently slide the spectacle holder to the left to position the left lens over the center of the lens detection tray.
4. Press the appropriate lens type button.



NOTE: Positioning the right or left lens over the lens detection tray *automatically* signals the **SPECTRUM** which lens is to be measured.

Clearing the Screen

To clear the measurement results:

Press the **Clear** button  .

Single Vision Spectacle Lenses

Measurement Procedure

To measure single vision lens:

1. Position the right lens of the spectacle as described in the previous section, *Measuring Basics* ***(reminder: position table at 40)***.
2. Press the **Single Vision** button  ; the **SPECTRUM** measures the right lens and displays the results on the screen.
3. Repeat the procedure for the left lens.

Measurement Results

The prism map is always displayed for single vision lenses (see Figure 11)

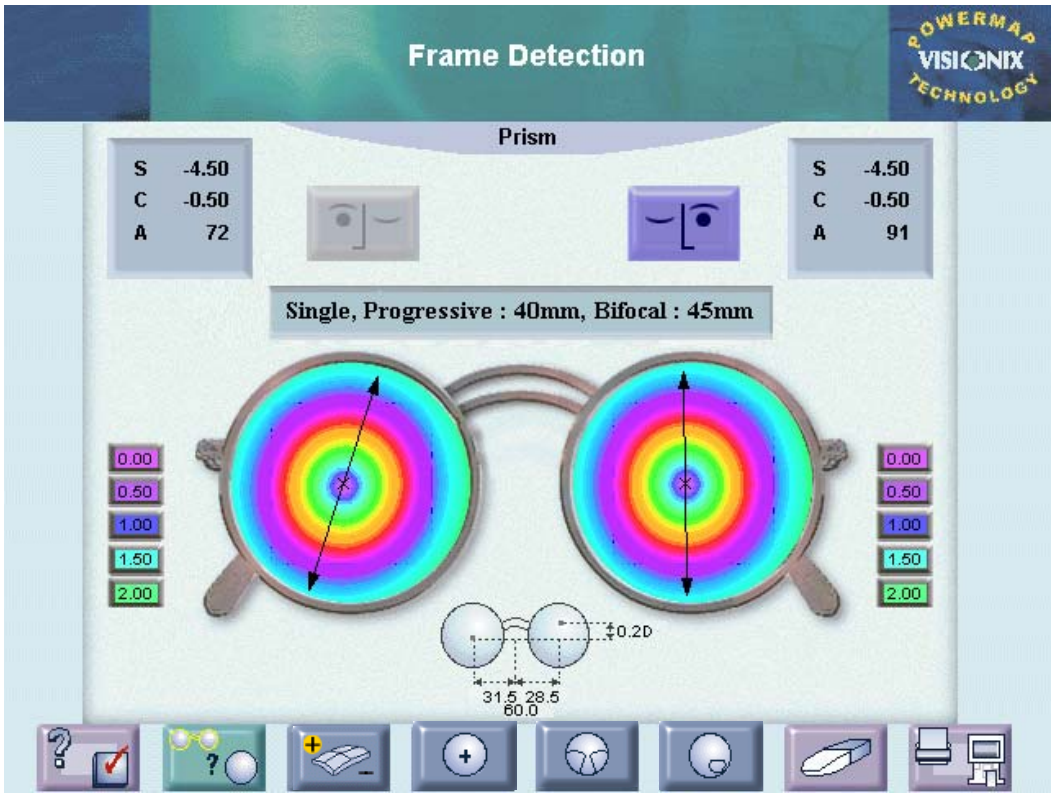


Figure 11

Graphic Results

The **X** on the lens designates the *pupillary distance* (the *minimum prism point*).

The **black diagonal line** that passes through the *minimum prism point* marks the *direction of the axis*.

Each **color** on the map represents a different *power interval*. The color scale, according to their step values, appears below the prism power map. If you wish to decrease the step value, you can configure this option in the set-up (see Chapter 6).

The *horizontal pupillary distance* (**Pd X**) value is displayed on the spectacle diagram below the spectacle map. It is the **distance** between the right and left *horizontal prism points*. The horizontal Pd can be displayed as either in half distances, full distance or both. This can be configured in the setup (see Chapter 6).

The ***vertical pupillary distance*** (**PdY**) value is displayed on the spectacle diagram below the spectacle map. It is the **distance** between the *vertical prism point* and the *central vertical axis* of each lens. It can be displayed either as mm or diopter. This can be configured in the setup (see Chapter 6).

Numerical Results

The *sphere*, *cylinder*, *axis* and *prism* values for the *minimum prism point* are displayed above each lens.

Progressive Lenses

To measure progressive spectacles lenses:

1. Position the right lens of the spectacle as described in the section, *Measuring Basics (reminder: position the table at 40)*.
2. Press the **Progressive** button  ; the **SPECTRUM** measures the right lens and displays the results on the screen. You will be prompted to subsequently measure the left lens.
3. Repeat the procedure for the left lens.

 NOTE:

To measure a single lens, read the section on measuring a single lens in the Detection Setup section (Chapter 6).

Measurement Results

The Cylinder Map is displayed for progressive lenses (see Figure 12).

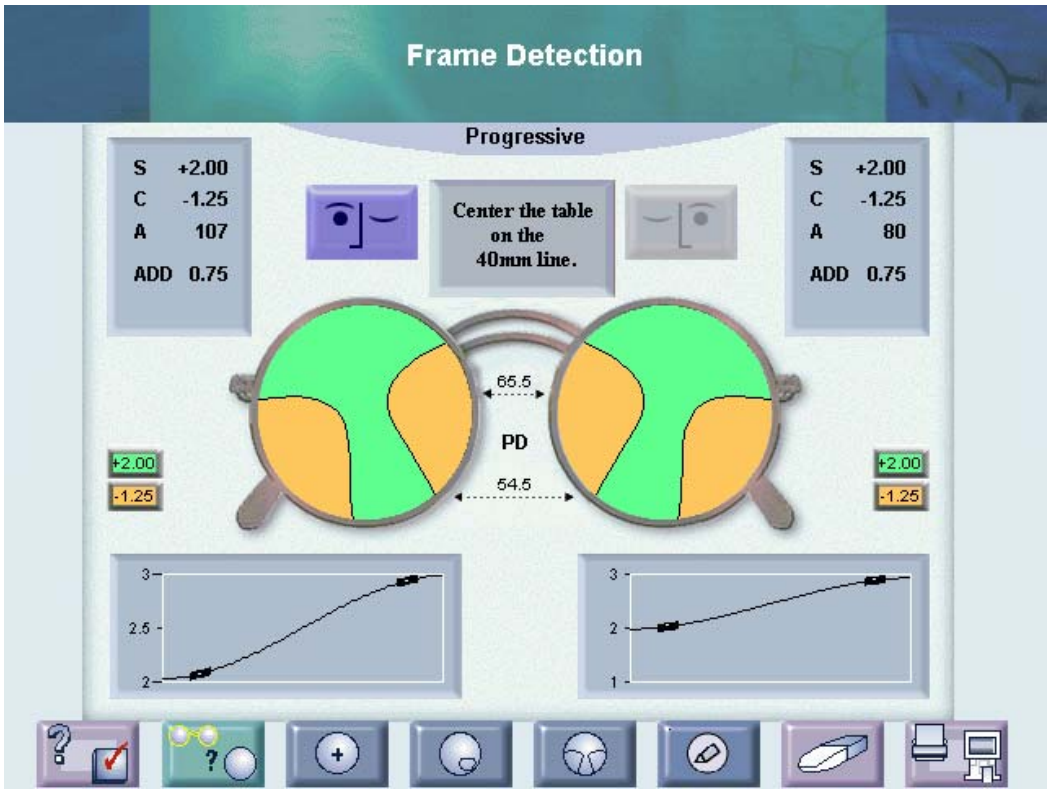


Figure 12

Graphic Results

The *sphere* and *cylinder* for far vision are designated by the *color topography* and the *progressive corridor*.

The *orientation of the cylinder axis* is designated by the **direction** of the **corridor**.

A **cross section graph** depicting the *power of the lens* along the corridor is displayed on the bottom of the screen. The **difference** between the *power* of *near vision* and *far vision* values is displayed on the graph.

Numerical Values

The *sphere*, *cylinder*, and *axis* values for the *far vision* measurement are displayed above each lens.

The *near vision* measurement is computed with the *addition value*. By adding the addition value to the sphere value, you can obtain the near vision measurement.

The Far Vision and Near Vision Horizontal PD values are displayed between the lenses.

If the addition values for the right and left lenses differ, you will be notified of this by the appearance of a red dot in the top center of the display.

Prismatic Lenses

Prismatic spectacles lenses can be measured in Single Vision mode. However, the SPECTRUM is capable of measuring and displaying the horizontal prism at the **patient's PD**. To perform this, a separate interactive mode is used.

 NOTE:

The Prismatic spectacles mode should be used **only for spectacles with no cylinder component.** Attempting to measure Prismatic lenses with cylinder will generate an error message.

Getting into Prismatic Mode:

1. Press the **Setup/Help** button  ; the Detection Mode Setup screen window is displayed.
2. Press the **Down Arrow**  until the **Prismatic mode** option is selected.
3. Press the **Right Arrow**  to change the value to Yes**.**.

4. Press the **Save** button  .
5. Press the **Exit** button  ; the **Prismatic Screen** is now displayed.

To measure prismatic spectacles lenses:

1. Position the right lens of the spectacle as described in the section, *Measuring Basics (reminder: position the table at 40)*.
2. Press the **Measurement** button  ; the **SPECTRUM** measures the right lens and displays the results on the screen
3. Repeat the procedure for the left lens.

Measurement Results

The Prism Map is displayed for prismatic lenses (see Figure 13).

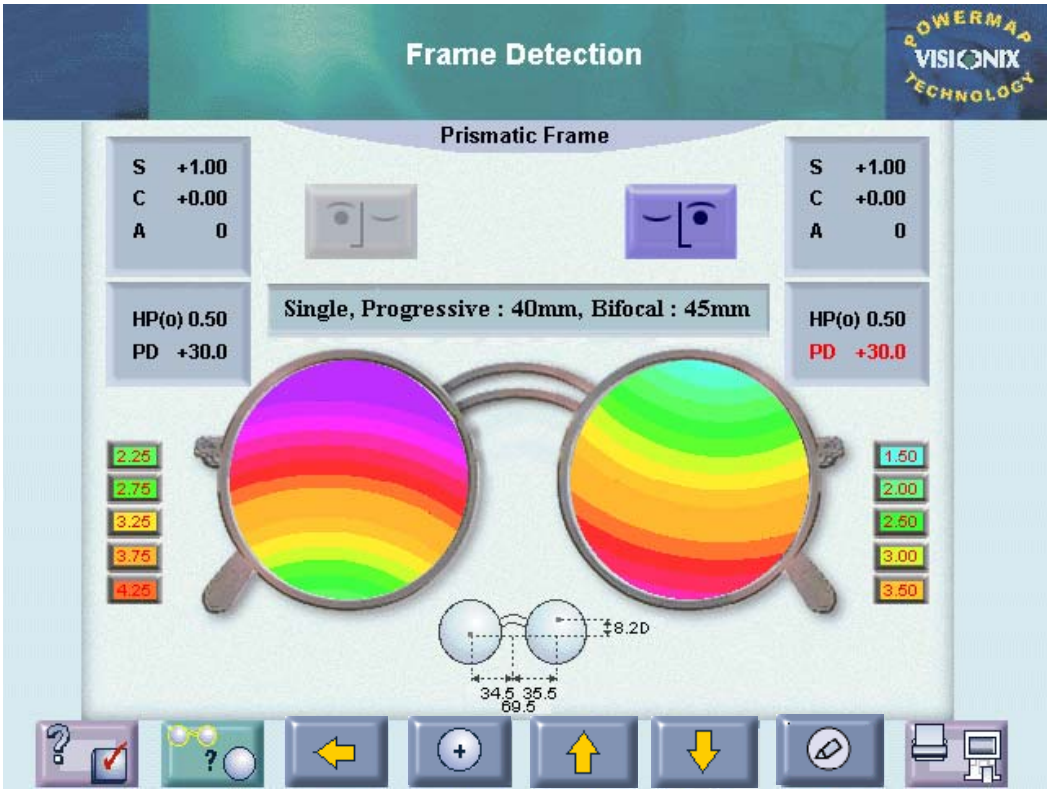


Figure 14

Graphic Results

Each **color** on the map represents a different *prism power interval*. The color scale, according to their step values, appears below the prism power map. If you wish to decrease the step value, you can configure this option in the set-up (see Chapter 6).

The *horizontal pupillary distance* (**Pd X**) value is displayed on the spectacle diagram below the spectacle map. It is the **distance** between the right and left *horizontal prism points*. The horizontal Pd can be displayed as either in half distances, full distance or both. This can be configured in the setup (see Chapter 6).

The ***vertical pupillary distance*** (**PdY**) value is displayed on the spectacle diagram below the spectacle map. It is the **distance** between the *vertical prism point* and the *central vertical axis* of each lens. It can be displayed either as mm or diopter. This can be configured in the setup (see Chapter 6).

Numerical Values

The *sphere*, *cylinder*, and *axis* values for the *far vision* measurement are displayed above each lens.

Measuring Prism at Patient's PD

1. The desired PD of the active lens will be highlighted in red beneath the *sphere*, *cylinder*, and *axis* values. The horizontal prism (in Cartesian coordinates) at that point is displayed in the same box.
2. Increase or decrease the PD value using the **up** and **down**  ,  buttons until it corresponds to the desired patient's PD. The horizontal prism at that point will be displayed.
3. Switch eyes by pressing the  button, and repeat step 2.
4. Return to the main spectacles menu by pressing the prism button once  .

 NOTE:

Once you have left **the Prismatic Spectacles Mode**, in order to return, it is necessary to enter the **Setup Screen** as described above.

Bifocal Lenses

To measure bifocal spectacles lenses:

4. Position the right lens of the spectacle as described in the section, *Measuring Basics (reminder: position the table at 45)*.

5. Press the **Bifocal** button  ; the **SPECTRUM** measures the right lens and displays the results on the screen. You will be prompted to subsequently measure the left lens.
6. Repeat the procedure for the left lens.

NOTE:

To measure a single lens, read the section on measuring a single lens in the Detection Setup section (Chapter 6).

Measurement Results

A Color Map is displayed for bifocal lenses (see Figure 15).

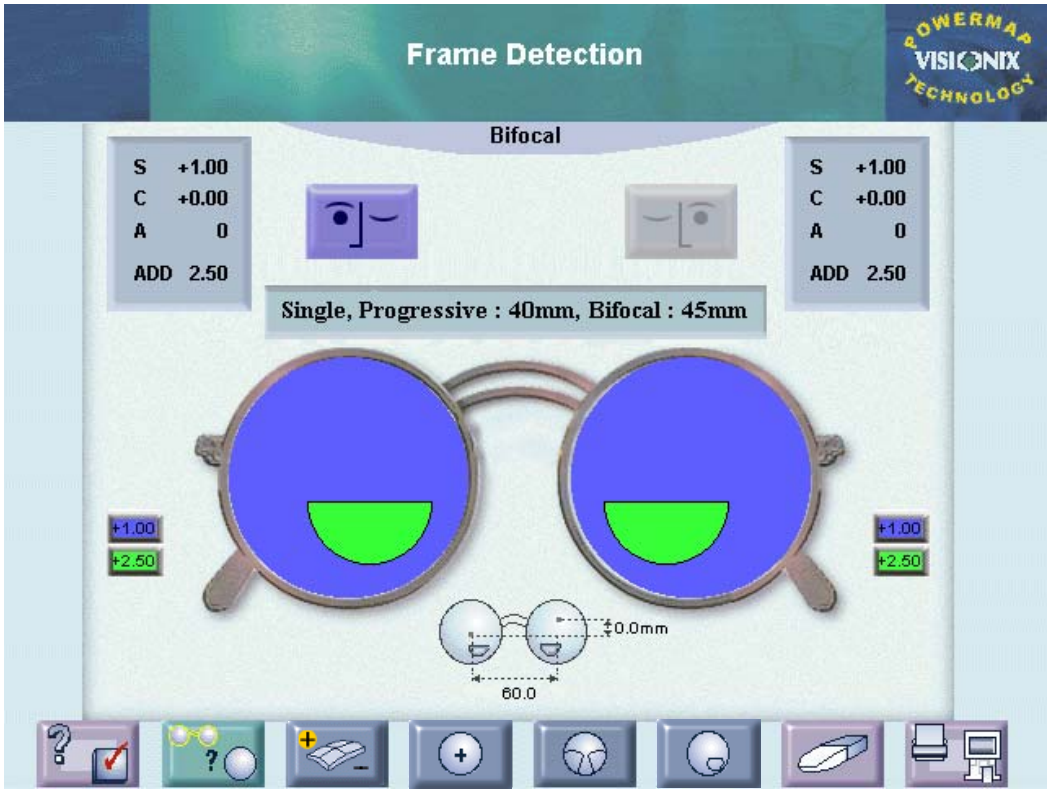


Figure 15

Graphic Results

The *sphere* values for far vision and segment are designated by the *color topography.*

The far vision horizontal and vertical PD values are displayed at the bottom.

Numerical Values

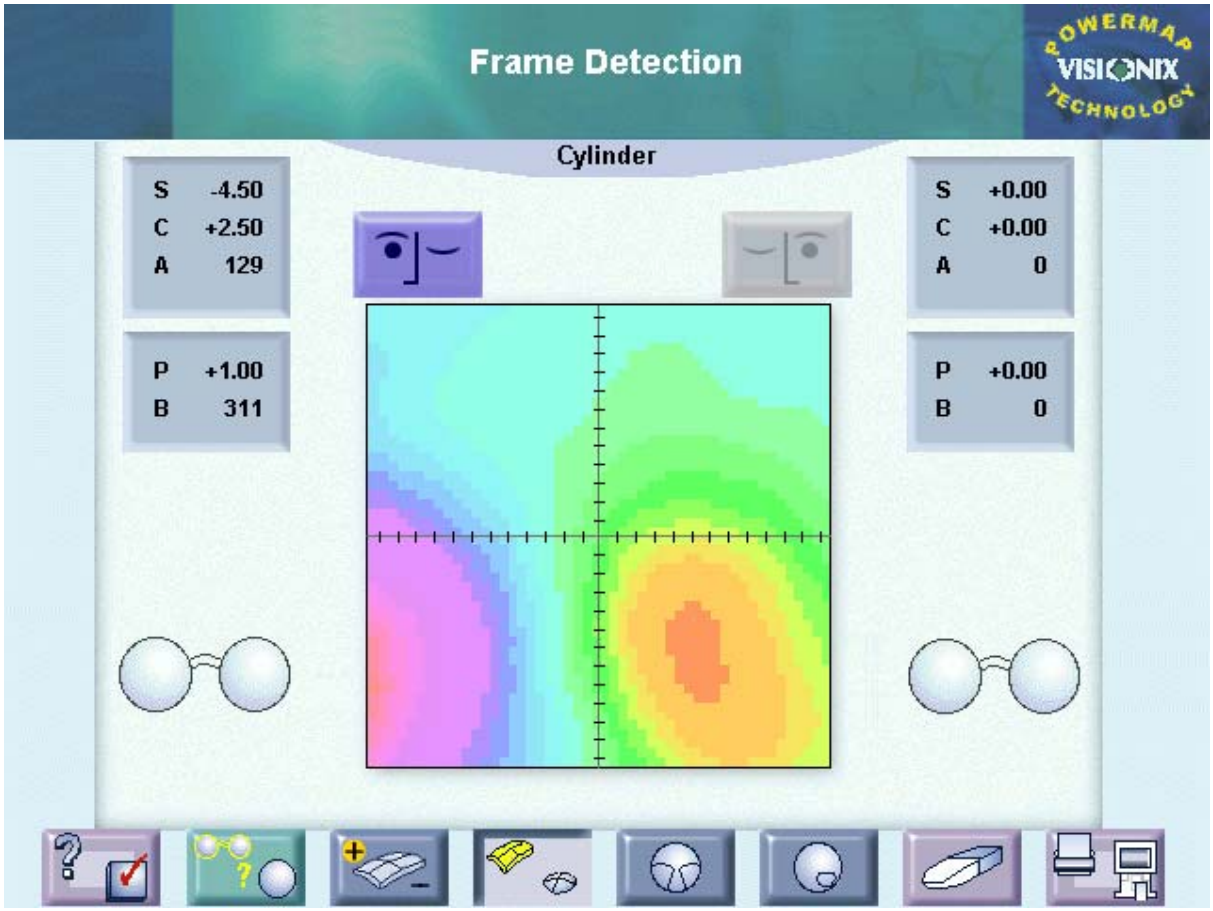
The *sphere*, *cylinder*, and *axis* values for the *far vision* measurement are displayed above each lens.

The segment measurement is computed with the *addition value*. By adding the addition value to the sphere value, you can obtain the segment measurement.

The Far Vision and Horizontal and Vertical PD values are displayed between the lenses.

If the addition values for the right and left lenses differ, you will be notified of this by the appearance of a red dot in the top center of the display.

Real Time Frame Measurement



As an aid to positioning, you can measure the spectacles in real time mode. This is performed by placing the spectacles in the holder and pressing the mode button until a real time map is visible with FRAME DETECTION header. (See Figure 16).

The *optical center* is the **intersection** of the horizontal and vertical axes.

The *sphere*, *cylinder, axis and prism* values of the *optical center* are displayed above the colored map. If you wish to change the cylinder convention from positive to negative, you can configure this option in the set-up (see Chapter 6)

Each **color** on the map represents a different *power interval.* As you move the lens, the color topography and the power values vary. If you wish to decrease the step value, you can configure this option in the set-up (see Chapter 6)

NOTE:

- Measuring spectacles in real time LENS DETECTION mode will generate incorrect values. Spectacles should be measured only in FRAME DETECTION mode..

- Pressing the Bifocal  or Progressive  buttons will automatically initiate a measurement in those modes.

Chapter 5 Refractive Index

Introduction

SPECTRUM is the **only** lensmeter that measures the refractive index in lenses. Until now, information obtainable on an uncut lens from the manufacturer was impossible to receive from one of your customer's spectacle lenses. The procedure is simple and extremely useful when you need to know the refractive index in order to accommodate your customer's vision.

Measuring the refractive index can only be done with **the lensmeter holder**. It is **not** possible to measure lenses of **less than 3 diopter** (-3 to +3).

Measuring Basics

Displaying the Refractive Index (RI) Screen

1. Insert the **lensmeter** plate.
2. Press the **RI/UV Mode** button (third vertical button); the RI/UV screen is displayed (see Figure 17).

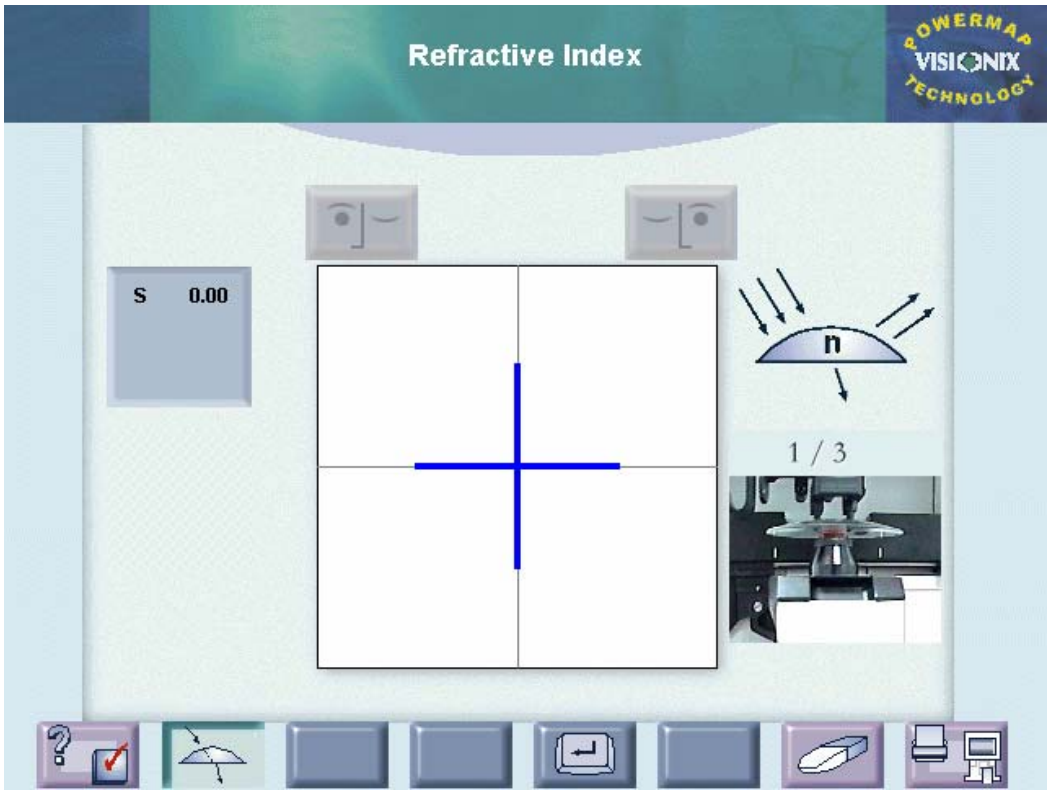
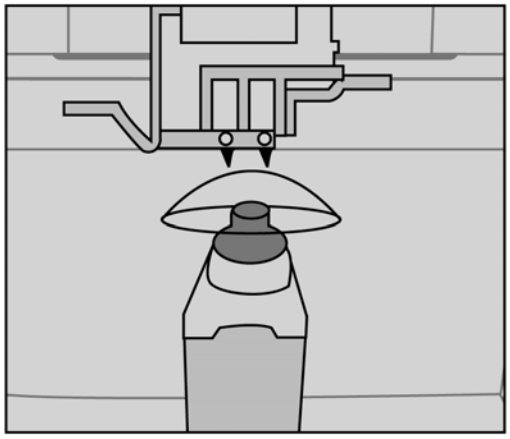
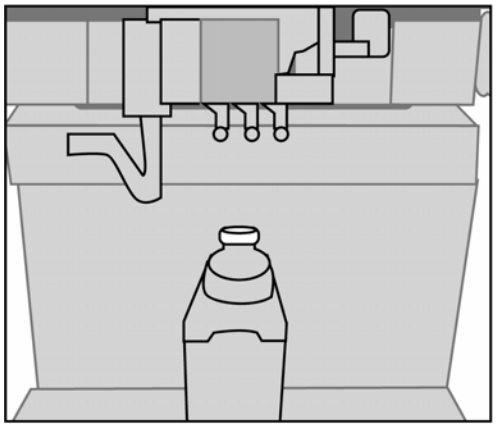


Figure 17



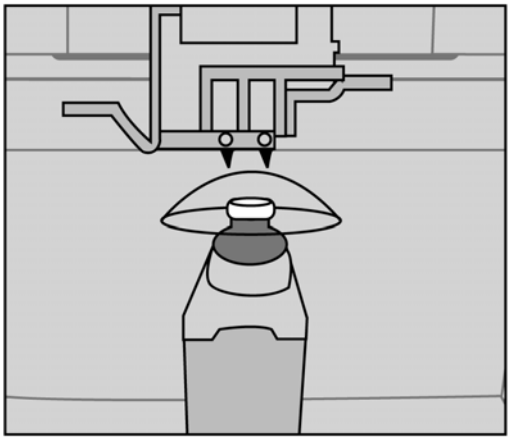
Centering and Marking the Lens

1. Position the lens on the lens head (convex side up).
2. Center the lens so that the BLUE cross is in the center.
3. Lower the lens clamp.
4. Lower the markers over the lens.
5. Press the **Save** button.
6. Remove the **marked** lens from the lens head by raising the markers and then the lens clamp.



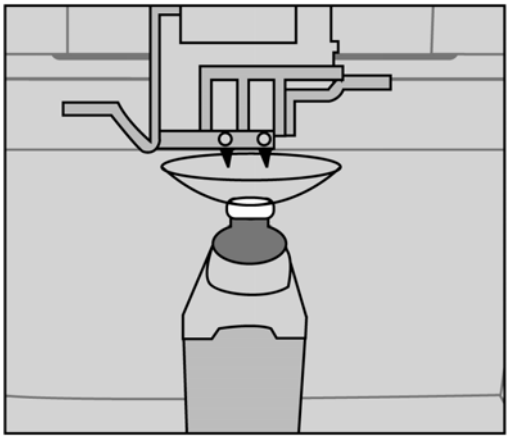
Inserting the RI Holder

1. Place the **RI holder** on the lens clamp.



Positioning the marked lens

1. Position the marked lens (convex side up) on the **RI holder** so that the marking on the lens is in the center of the **RI holder**.
2. Lower the lens clamp and gently press down for better adhesion.
3. Wait until the S1 number is stabilized on the screen.
4. Press the **Save** button.



Positioning the concave side of the lens

1. Turn the lens over and position the marked lens (concave side up) on the **RI holder** so that the marking on the lens is in the center of the **RI holder**.
2. Lower the lens clamp.
3. Wait until the S2 number is stabilized on the screen.
4. Press the **Save** button.
5. Remove the lens and wipe off the markings on the **RI holder**.

NOTES:

Good adhesion between the **RI holder** and lens is crucial for good measurement results. Gently press down on the lens with the lens clamp to enhance adhesion.

It is important that the **RI holder** be clean **before** measurement. Clean the **RI holder** with water and a fresh optic tissue.

Chapter 6 Setup Options

Introduction

SPECTRUM allows you to customize the unit to enhance the display results. These setup options are *different* for the **lensmeter** and **lens detection modes**. They are configured in the **Help** option of each specific mode. Select and set the options, which correspond to your most frequent use.

Lensmeter Configuration

Entering the Configuration mode:

To enter the setup dialog box:

1. Press the **Help/Setup** button  ; the **Setup** screen is displayed. (see Figure 18).

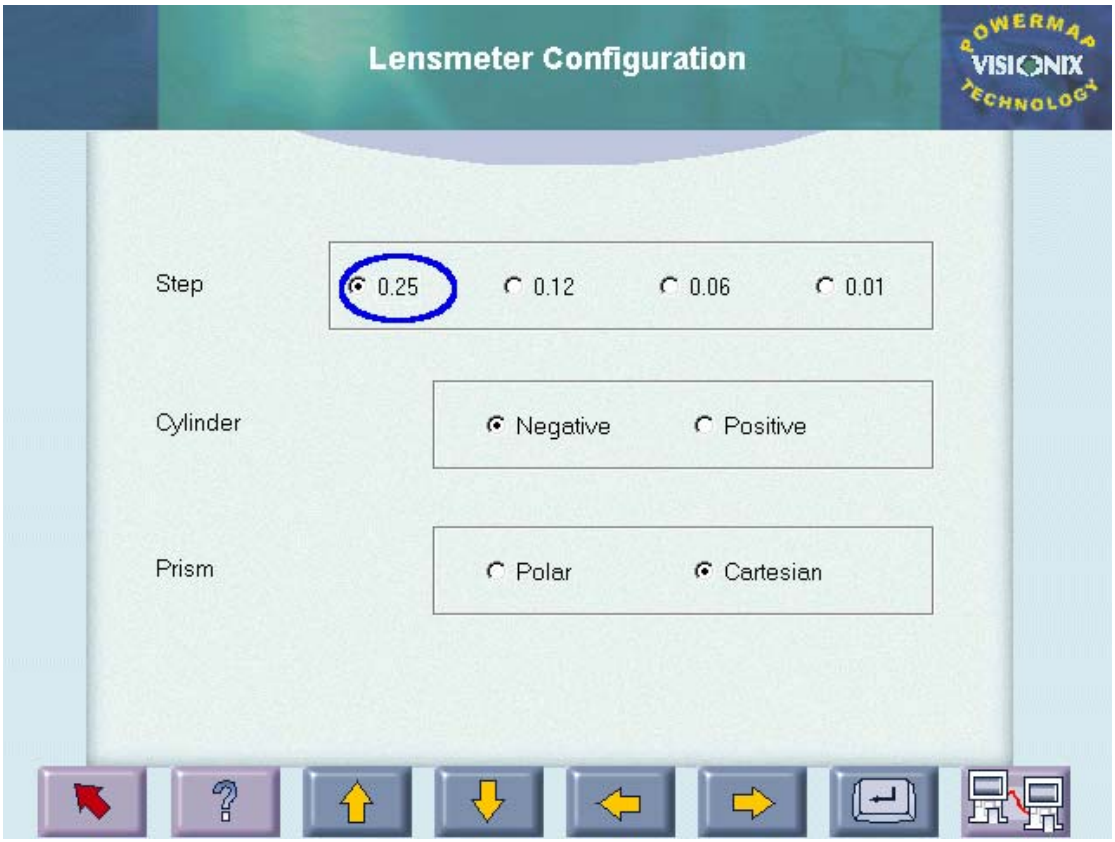


Figure 18

Choosing Configuration options:

To move from category to category:

Press the **Up Arrow**  or the **Down Arrow**  to select a category.

To select an option:

Press the **Right Arrow**  or the **Left Arrow**  to choose an option in the selected category. The blue circle encloses the selected option.

To save the new settings:

Press the **Save** button  ; the *new* options are now the *defaults* settings.

To exit the setup:

Press the **Exit** button  ; the Lensmeter screen is displayed again.

Configuring the Lensmeter options

The following options allow you to control how items are displayed on the screen. A description for each option appears below.

Step: The step defines the numerical resolution of the Sphere, Cylinder and Addition values.

Press the **Right Arrow** or the **Left Arrow** to select a step value.

Cylinder: The cylinder can be defined as *positive* (maximum to minimum) or as *negative* (minimum to maximum).

Press the **Right Arrow** or the **Left Arrow** to select your preferred definition of the cylinder.

Prism: The prism measurement can be defined as either *Polar* or C*artesian* measurement. The **Polar** measurement defines the prism according to its **radius** and **angle** while the **Cartesian** measurement defines it according to the intersection point of the **X and Y coordinates**.

Press the **Right Arrow** or the **Left Arrow** to select either Polar or Cartesian.

Lens and Frame detection setup

The setup options for the Lens Detection and the Frame Measurement are identical.

To enter the Setup dialog box:

1. Press the **Help/Setup** button  ; the **Lens detection Setup** screen is displayed. (see Figure 19).

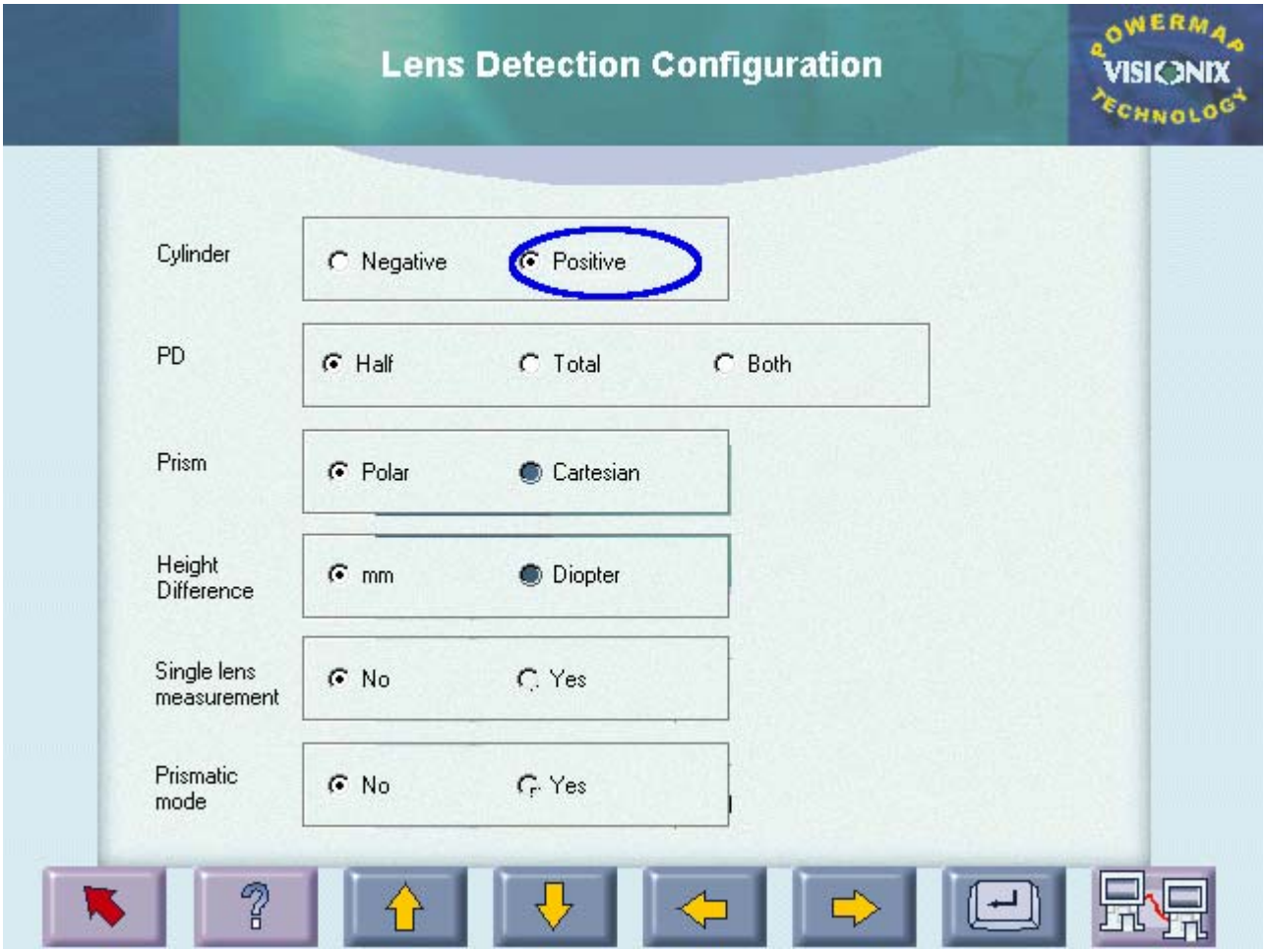


Figure 19

Choosing Setup options:

To move from category to category:

Press the **Up Arrow**  or the **Down Arrow**  to select a category.

To select an option:

Press the **Right Arrow**  or the **Left Arrow**  to choose an option in the selected category. The blue circle encloses the selected option.

To save the new settings:

Press the **Save** button  ; the *new* options are now the *defaults* settings.

To exit the setup:

Press the **Exit** button  ; the Lens detection screen is displayed again.

Configuring the setup options

The following options allow you to control how items are displayed on the screen. A description for each option appears below.

Step: The step defines the *distance* between the *color intervals* i.e. the *density* of the color topography. A higher step value increases the number (density) of the color intervals.

Press the **Right Arrow** or the **Left Arrow** to select the step value.

Prism: The prism measurement can be defined as either *Polar* or C*artesian* measurement. The **Polar** measurement defines the prism according to its **radius** and **angle** while the **Cartesian** measurement defines it according to the intersection point of the **X and Y coordinates**.

Press the **Right Arrow** or the **Left Arrow** to select either Polar or Cartesian.

Cylinder: The cylinder can be defined as *positive* (maximum to minimum) or as *negative* (minimum to maximum).

Press the **Right Arrow** or the **Left Arrow** to select your preferred definition of the cylinder.

Height Difference: The height difference can be used to check if the spectacles are vertically aligned. It is the vertical distance between the left and right PD points. You can view it in diopter or mm.

Press the **Right Arrow** or the **Left Arrow** to select either mm or diopter.

Single Lens Measurement: To measure single lenses with either progressive or bifocal frames, make the first lens measurement. When you are prompted to move to the second lens, enter the setup menu and choose the Yes button in Single Lens measurement. After saving and returning to the mode, the results of the single lens will be displayed. **Note**: This is a single shot option. Each time you want to measure a single lens you must re-enter the setup menu.

Prismatic Mode: To measure prismatic spectacles (without a toric component), choose the Yes button. After saving and exiting you will automatically enter the prismatic spectacles mode. **Note**: This is a single shot option. Once you leave the prismatic mode, you must re-enter the setup menu and set the button to Yes.

General System Configuration

The General System Configuration options can be configured with either accessory in the holder.

To enter the Setup dialog box:

2. Press the **Help** button in either mode  ; a **Setup** screen is displayed.
3. Press the **General Setup** button  ; the **Setup** dialog box is displayed (see Figure 20).
4. Alternatively, from any of the **Mode Setup** screens, you can push the same button to enter the **General System** Configuration

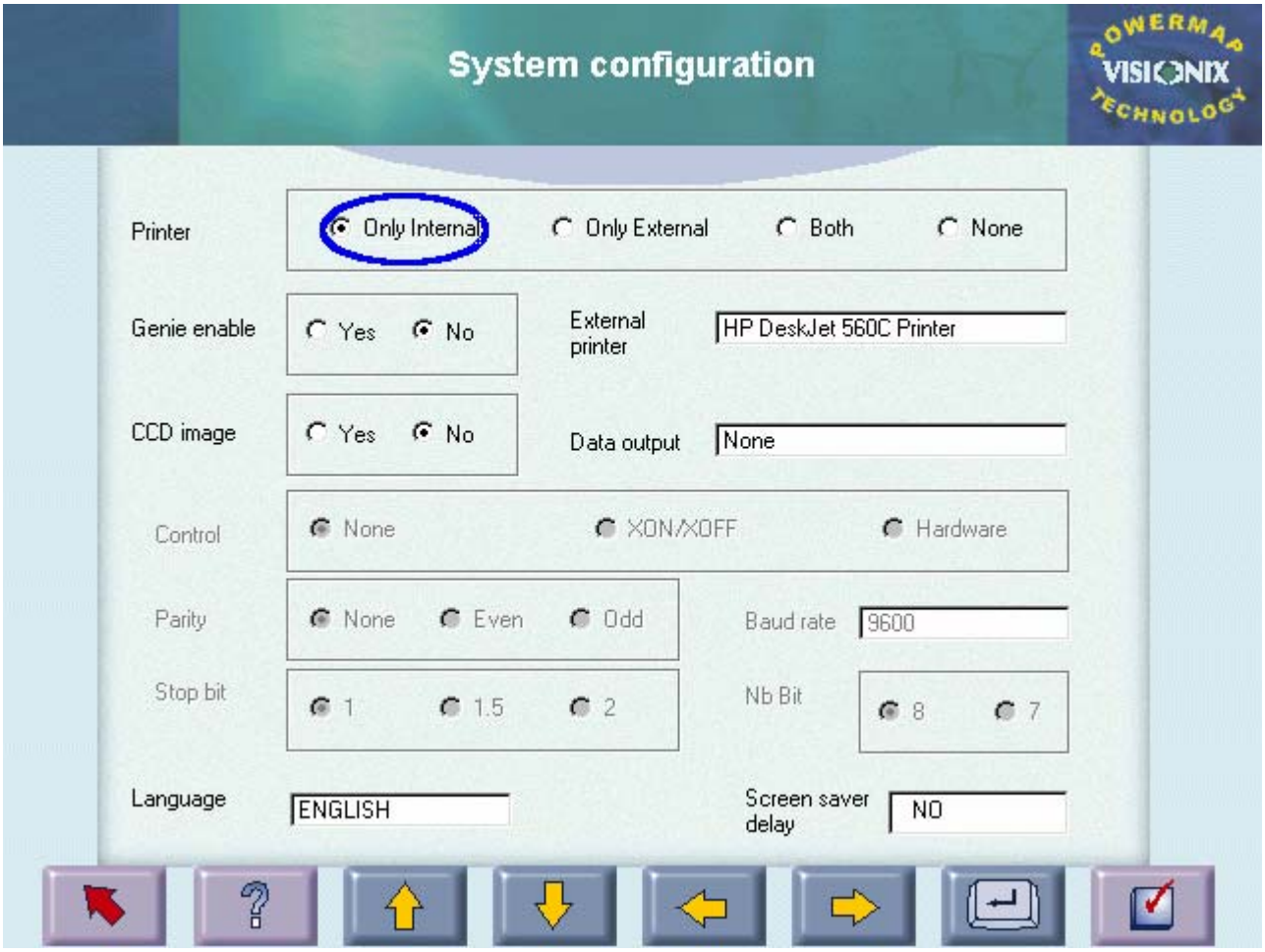


Figure 20

Choosing Setup options:

To move from category to category:

Press the **Up Arrow**  or the **Down Arrow**  to select a category.

To select an option:

Press the **Right Arrow**  or the **Left Arrow**  to choose an option in the selected category. The blue circler encloses the selected option.

To save the new settings:

Press the **Save** button  ; the *new* options are now the *defaults* settings.

To exit the setup:

Press the **Exit** button  ; the Mode screen you were in is displayed again.

Configuring the setup options

The following options allow you to control how items are displayed on the screen. A description for each option appears below.

Printer: You have the option of printing only the numerical measurement results (Internal Printer) or printing the map display (External Printer).

If you want a **numerical print out**, select **ONLY INTERNAL**.

If you want a **map display**, select **ONLY EXTERNAL**.

If you want **both** the map display and the numerical print out, choose **BOTH**.

If you are using digital data output to an external device and do not want a hard copy, choose **NONE**

 **NOTE:**

The External Printer is not active for **the Lensmeter mode**.

External Printer: Choose the type of external printer you are using form the pre-installed list. If you are using a printer not on the list, contact the distributor for instructions.

Genie Enable: Choose Yes or NO to enable or disable the Genie message assistant

CCD Image: For diagnostic purposes, it is possible to view the Lens map CCD camera image. Choosing Yes will automatically enter this mode. Once in the mode, press the Enter button to return to the menu.

Data Output: Choose the type of digital data output device you are contacting to. Your choices are:

EPIC RT2100 Analyzer (Nidek) – The data is automatically configured to communicate with the EPIC whenever the **Print** button is pressed. If this button is selected, all of the data output options will be grayed out.

PC – This allows you to configure data output to any device by configuring the data output stream.

None – If you are not connecting to any external data device.

Data Stream configuration: If you selected PC, you will need to select the data stream configuration using the following options

- **Control** - This selects how the Ready state is determined: None, XON/XOFF, or Hardware.
- **Parity** – This determines the parity of the data stream.
- **Stop Bit** – This determines how many stop bits there are.
- **Baud Rate** – This determines the speed of the connection.
- **Nb of Bits** – This determines the number of data bits per stream.

Those desiring to use the PC option should consult a qualified technician on setting up the communication with the external device.

Language: You have the option of displaying the interface in the language of your choice.

Press the **Left Arrow** or the **Right Arrow** to select your preferred language.

Screen Saver Delay: You can adjust the amount of time (in minutes) that the SPECTRUM remains idle before activation of the Screen Saver. The default setting is “None” meaning now Screen Saver.

- Press the **Left Arrow** or the **Right Arrow** to select the time.

Chapter 7 Maintenance

Daily maintenance of your **SPECTRUM** is important in keeping the unit in peak working condition. It is very simple and can be done in a few minutes before you begin measuring.

Cleaning the SPECTRUM system

To clean:

Wipe the system with a non-abrasive cloth and water or a natural detergent.

 **IMPORTANT:** Do **not** clean your VL 3000 system with chemical cleaning products such as alcohol or other organic or mineral solvents.

Cleaning the Screen

To clean:

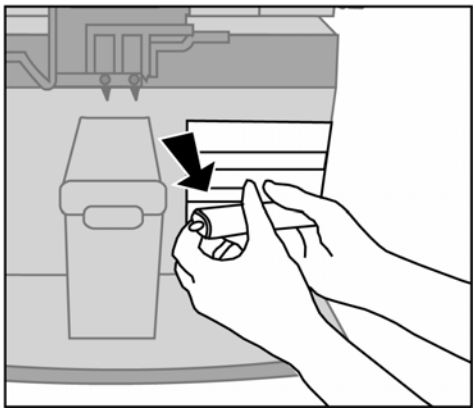
Wipe the screen with clean optic tissue or dry non-abrasive cloth.

 **CAUTION:** The LCD is very fragile. Handle with care.

Replacing Printer Paper

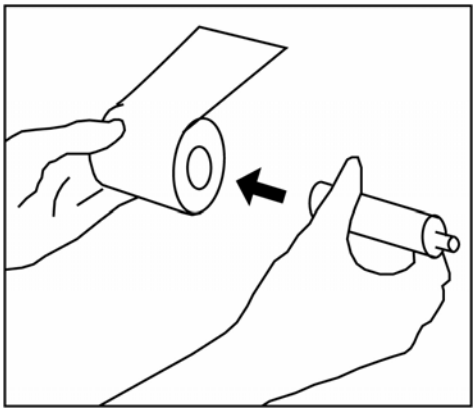
Removing the Old Paper Spool

1. It is not necessary to turn off the power.
2. Open the printer door.
3. Remove the old paper spool.



Inserting paper roll on the spool

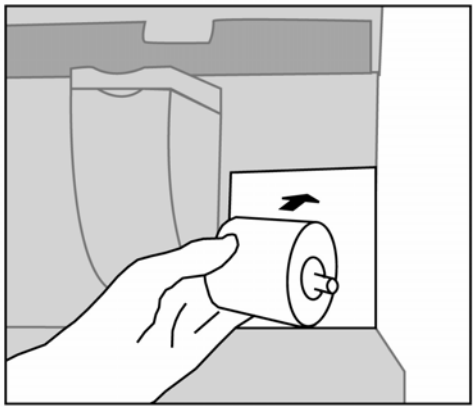
Place a new paper roll on the spool **exactly** as shown in the picture.



NOTE: The smooth side of the paper is the printable side and must be on top.

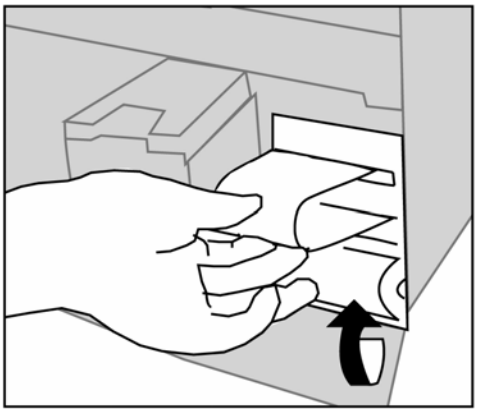
Inserting the new paper spool

1. Insert the new paper spool into the grooves on the side of the paper printer box positioning the paper on the unrolled ribbon.
2. Cut the paper edge diagonally from one of the corners for easier threading.



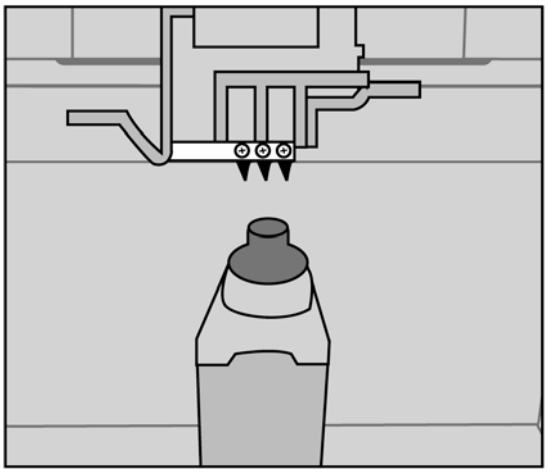
Threading the Paper

1. Thread the paper through the feed slot until it reaches the back panel of the paper box.
2. If done properly, the paper will automatically feed through the roller.
3. Close the printer door and carefully tear off the excess paper.
4. **The SPECTRUM should print properly. If not, reset by turning off then on the machine.**



Replacing the Marker Pens

1. Remove the screw and washer holding the pen.
2. Change the marker pen.
3. Tighten the screw and washer in place.



Replacing the Silicon Head in Refractive Index Holder

To replace the silicon head:

1. Insert a soft tip pointed instrument (e.g. eraser on a pencil) inside the holder and gently push on the silicon until it is dislodged.
2. Remove the black ring from the silicon.
3. Place a new silicon piece in the middle of the ring holder.
4. Replace the black ring on the silicon and press down until it clicks into place.

Replacing Fuses

To replace a burnt fuse (Use only identical fuses):

1. Turn off the **SPECTRUM** unit.
2. Disconnect the power cord from the unit.
3. Place a flat screwdriver inside the small opening on the fuse door.
4. Gently push with the screwdriver to open the fuse door.
5. With the screwdriver, gently push on the red fuse box to dislodge it and pull it out.
6. Replace the burnt fuses.
7. Replace the red fuse box by pushing the fuse box back in place.
8. Push on the fuse door until it clicks into place.
9. Re-connect the power cable and turn on the **SPECTRUM** unit.

Chapter 8 Troubleshooting

General System Failures

Problem: Unit does not power on.

Solution: Check the power cable connection (back of the unit and the wall outlet).

Check for blown fuses.

Problem: Measuring screen does not come on after initial warm-up.

Solution: Call Representative for service.

Operational Problems

Problem: No, incorrect or poor screen display.

Solution: Switch off the unit and after a few seconds, switch it on again.

Call Representative for service if necessary.

Problem: Reset screen not initialized (Values not zero).

Solution: Clean holder and tray and press reset button.

Call Representative for service if necessary.

Printing Problems

Problem: No printout when you depress the **Print** button.

Solution: Check the printer for paper supply.

Check that paper supply is installed properly.

Check that the INTERNAL PRINTER option is selected in the Setup.

Turn off and turn on the machine again to reset printer.

Check that Printer arm on side of printer head is down.

Problem: Paper does not advance through the printer properly.

Solution: Check the paper path. Eliminate any slack.

Problem: Blank printout.

Solution: Check that paper supply is installed properly. The printer only prints on the **smooth** side of the paper.

Mechanical Problems

Problem: Spectacle holder doesn't stop at left stop point.

Solution: Use watchmaker's screwdriver to adjust set screw behind left arm.

Chapter 9 Technical Specifications

Lens Specifications

Lenses: Single, bifocal, trifocal, progressive, hard and soft contact lenses

Spectacles: Single, bifocal, progressive for all known frames

Refractive materials: All commercially available materials; coating down to 10% luminous transmission; high refractive index

Performance

Lens measurements

Range

Mode	Sphere	Cylinder	Prism	Addition
Lensmeter	-20D to +20D	-10D to +10D	-10 to 10	0.25D to 10D
Lens Check	-10D to +10D	-10D to +10D	-10D to +10D	0.25D to 10D
Spectacle Measurement	-10D to +10D	-10D to +10D	-10D to +10D	0.25D to 10D

Increments

Mode	Sphere	Cylinder	Prism	Addition
Lensmeter	0.01D, 0.06D, 0.12D, 0.25D	0.01D, 0.06D, 0.12D, 0.25D	0.01, 0.06, 0.12, 0.25	0.01D, 0.06D, 0.12D, 0.25D
Lens Check	0.25D, 0.5D	0.25D, 0.5D	0.25, 0.5	0.25D, 0.5D
Spectacle Measurement	0.25D, 0.5D	0.25D, 0.5D	0.25, 0.5	0.25D, 0.5D

Cylinder axis range: 0° to 180°

Axis increments: 1°

Abbe Number: Not necessary

Lensmeter

Diameter: 5 mm to 95 mm

Thickness: 2 mm to 20 mm

Minimum back radius: 40 mm

Marker positioning: ±0.2.mm

Lens Detection

Detection of all types of ophthalmic lenses

Auto addition measurement of progressive and bifocal lenses

Frame Detection

Pupil distance measurement: Horizontal and vertical

Bifocal segment orientation and Far vision PD

Progressive corridor orientation and Far and Near vision PD

Auto addition measurement for progressive lenses

Refractive index

Range: Greater than +3D or Less than –3DMeasurement size: 1.50 – 1.90

Step: 0.05

Operator Interface

Screen display

Flat panel (LCD)

10.4 ″ diagonal

256,000 colors

640 × 480 resolution

Internal Printer

Graphic printer

58 mm thermal paper

External Printer

All types of *Windows* compatible printers

Operation Buttons

Operation Mode (3 buttons to select mode of operation: lensmeter, opticmeter, and material meter)

Operating Function

Rear Panel Connectors:

Electricity line

Parallel

Technical Specifications

Physical

Dimensions:	Height	Width	Depth
	510 mm	290 mm	310 mm
Weight:	17 kg		
Operating Conditions:	+10° to +40°C; maximum temperature gradient is 10°C/hour		
Storage Conditions:	-20° to +60°C; maximum temperature gradient is 30°C/hour		

Electrical

Line voltage:	115 or 230 VAC
Frequency:	50 or 60 Hz
Power:	100 Watts

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