

5.5

**Humphrey
Autolensometer**

HUMPHREY LENS ANALYZER

3. MODEL 306

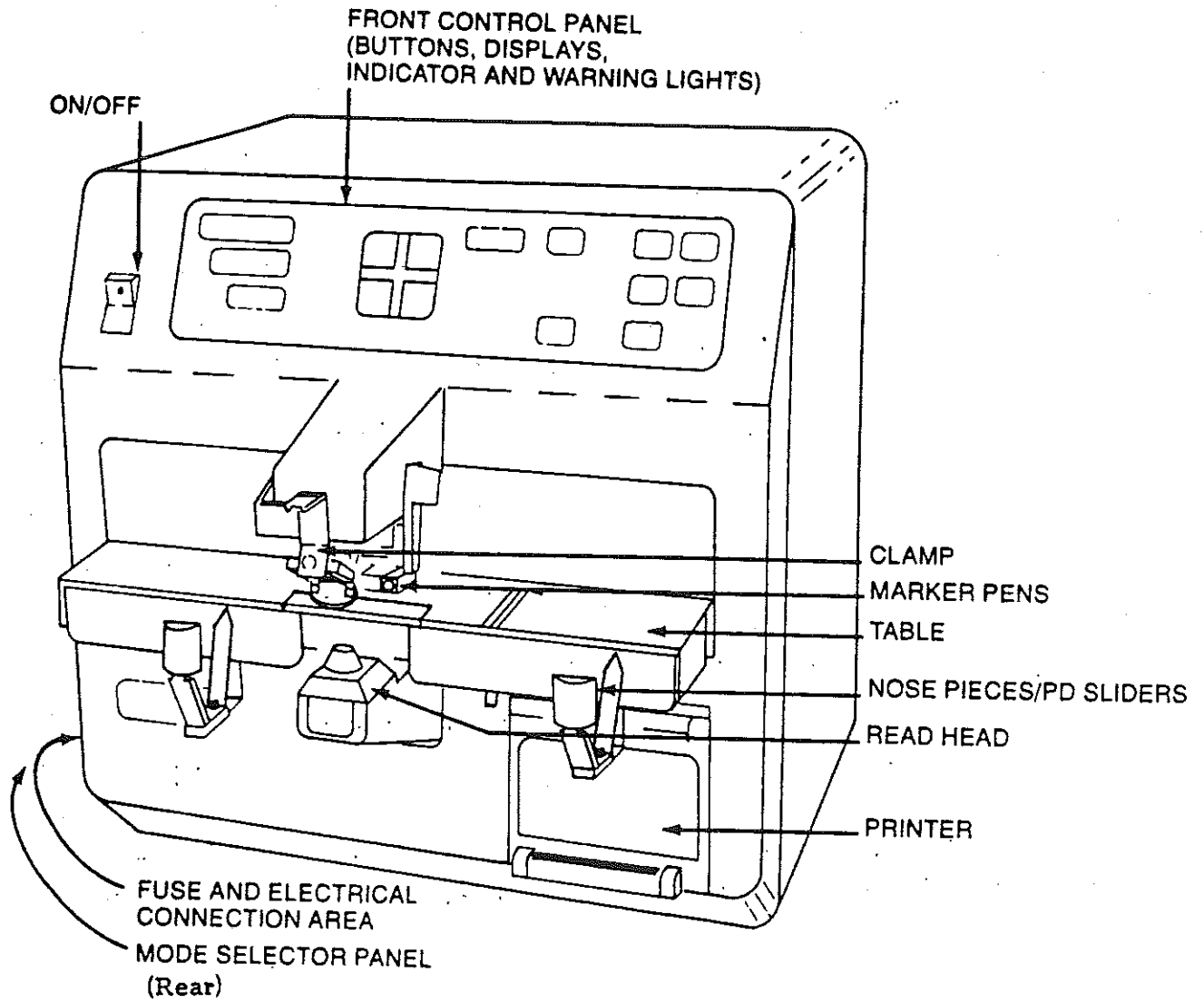
3.1 DESCRIPTION

The operation of the Model 306 Lens Analyzer is similar in many respects to the operation of the Model 330. There are, however, several features which are distinct from the 330. These are:

- reading a lens
- calculating the ADD portion of a lens
- reading verilux lenses
- determining the patient's PD
- clearing the instrument

This section will then discuss the aforementioned features as they pertain to the Model 306 Lens Analyzer. It is important, however, that you read the rest of the manual thoroughly and refer to this section for those features which differ in operation from the Model 330 Lens Analyzer.

3.1.1 Key Elements (Model 306)

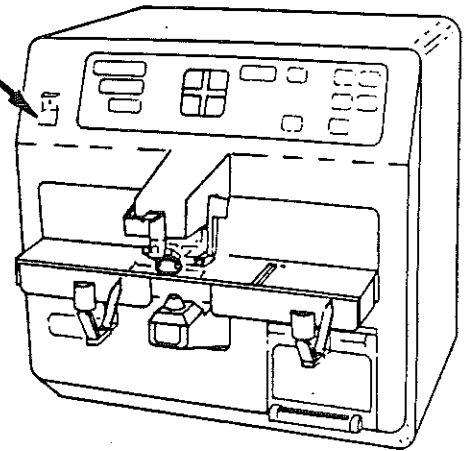


3.2 OPERATION

3.2.1 To Neutralize A Spectacle Pair

1. POWER ON

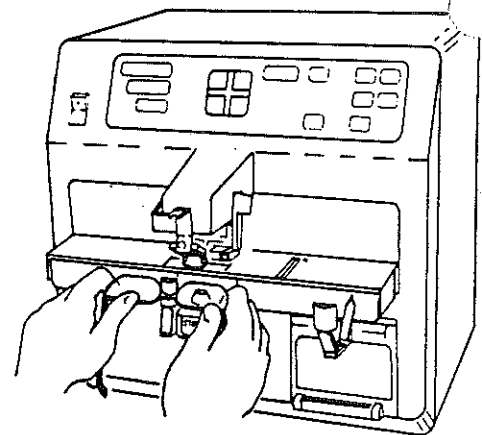
- Proper Cylinder Convention - Press **CYL** until proper sign lights.
- Select proper round-off mode, .12D, .25D.
- Push the table to the desired position with the spectacles and the table will remain there.



2. POSITION SPECTACLES

A. By PD

- Slide nose piece until the pointer is at the monocular PD (Monocular PD = 1/2 I.P.D.).
- Position spectacles, holding temples down as shown, on the nose piece.
- Press firmly against the lens table. Move the table to the desired position. The table may be moved in or out by the finger tabs located on either side of the table.
- ✓ ● All lenses over 8D should be clamped. Lower the clamp and be sure the lens is held firmly against the read head in order to avoid errors due to tilting. The clamp and read head will not scratch the lenses.



B. By Layout

If the IPD is not known or if the operator simply wants to locate the optical center of the lens:

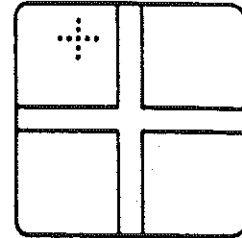
- Press **LAYOUT**.

Prism will be displayed in either polar notation or rectangular coordinates as selected on the rear panel.

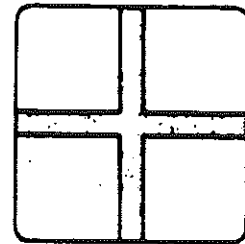
While in the Layout mode, a cross will be displayed on the panel indicating how far from optical center the lens is positioned. To reach optical center:

- Move the lens until the red cross on the display is centered in the hollow fixed cross. At this time, you may mark the optical center of the lens:
- Push the marking pen arm back then down. Three points in a horizontal line will be marked with the center pin positioned at optical center.

OFF OPTICAL CENTER



ON OPTICAL CENTER



3.2.2 Read First Lens

- Hold spectacles firmly on lower measuring head with frames pressed against lens table. (Hold frames as shown.)
- Press **READ**.

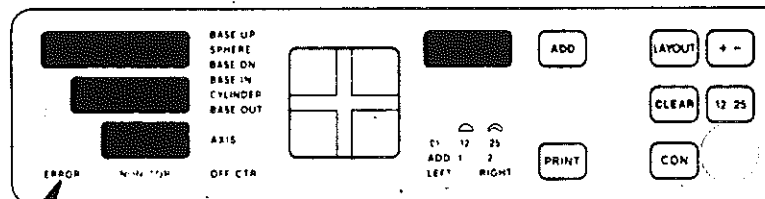
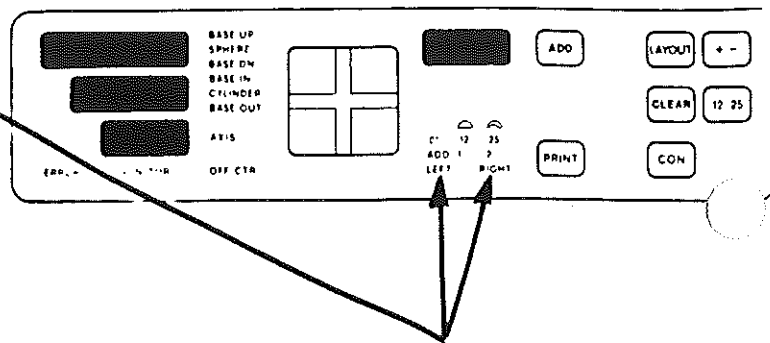
The Sphere, Cylinder and Axis are displayed.

Be sure the **RIGHT** or **LEFT** indicator lights. If it does not, you have not held the frames firmly against the table. Do so and press **READ** again.

Note: It is the pressure of the frame (of the lens **NOT** being measured) against the table that triggers the table switch, indicating to the instrument which lens has been measured; right or left. Your assurance that the Lens Analyzer has this information is the activation of the indicator lights **LEFT** or **RIGHT** on the panel. If each of the indicators do not light after each lens of the spectacle pair has been neutralized, **ONLY ONE LENS WILL PRINT.**

- Check for special indicator lights.

ERROR, NON-TOR, OFF-CENTER. If any of these light, refer to Section 7.3.5 "WARNING LIGHTS."



3. Read Add

- Press **ADD**. **ADD 1** will illuminate.
- Position the lens segment on the measuring head as close as possible to the segment line.
- Press **READ**; the Add is displayed.

If there is a Second Segment

- Press **ADD** - again. **ADD 2** will illuminate.
- Position the second segment over the measuring head as close as possible to the segment line.
- Press **READ** - the Second Add is displayed.

4. Read Second Lens

- Slide the other nose piece until the pointer is at the monocular PD.
- Position spectacles on nose piece.
- Read second lens and the Add.

5. Print Rx

The Sphere, Cylinder, Axis and individual prism along with the Net Prism of the spectacles as a pair will print out. An identification number and the labeling of the information **RIGHT** or **LEFT** is indicated.

Note: When tearing off the printout, be sure to tear up and to the right against the serrated upper lip of the printer. This will insure that the paper will not retract back into the printer but will continue to feed properly. For more information on Net Prism, see Section 8 under "Special Topics."

MLA306 SEQ.NO 03

NAME _____

DATE _____

RIGHT

SPH: -0.22
CYL: -0.41×158
PSM: 0.46 UP
0.18 OUT

LEFT

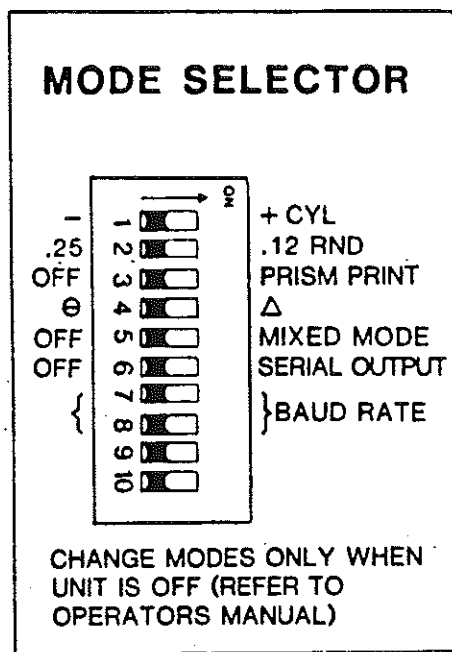
SPH: -1.17
CYL: -0.24× 03
PSM: 1.33 UP
0.32 IN

NET PR 0.87 DWN
0.13 IN

3.2.2 To Neutralize Progressive Addition Lenses

1. Read the distance Rx in the upper third portion of the lens above the progressive addition channel.
2. Press **ADD**.
 - Move toward the Add portion of the lens, usually below and slightly nasal with regard to the distance portion.
 - While passing through the variable or change-over portion of the lens, there will be a **NON-TOR** indicator. **NON-TOR** is triggered by rapid change in the lens power in the progressive change-over from distance Rx to **ADD**. When **NON-TOR** is no longer indicated, the lens has been moved through the progressive addition channel and is now completely within the Add.
 - Press **STORE**.

3.3 MODE SELECTOR PANEL



The Mode Selector Panel, located on the back of the instrument, consists of ten switches which are used to select and set the modes in which the instrument will power on. These switches should be set to correspond with the most frequent or general use of the instrument. The initial mode selection can take place upon instrument installation or after the operator has determined a "most common"

mode of operation. If the modes selected are not the desired modes for a particular neutralization, they can be adjusted. Several of these modes can also be changed via buttons on the front control panel before or after a particular neutralization, but the Lens Analyzer will always power on according to the Mode Selector settings. Mode adjustments made on the front control panel remain in effect until the button is pressed again or until the instrument is turned off. The operation of each Mode Selector switch and the switch selections are as follows:

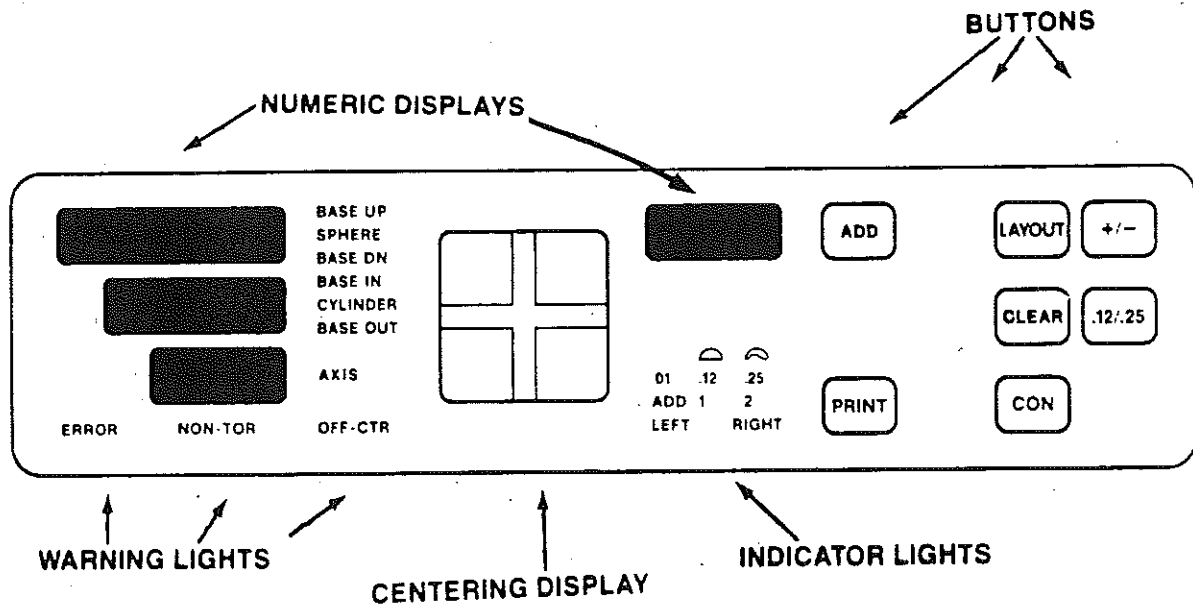
SWITCH	FUNCTION
1	Cylinder convention + or -. Choose either + or - cylinder convention. The instrument will power on in this setting. The convention can be changed by pressing the +/- button on the front control panel. A change remains in effect until +/- is pressed again or the instrument is turned off.
2	Round-off mode .25 D or .12 D. Choose either round-off precision and the instrument will power on at this setting. The precision chosen will be indicated by the corresponding indicator light on the front control panel. The round-off mode may be changed by pressing the .12/.25 button on the front panel.
3	Prism Print On or Off Choose the prism setting for the printout. In the "off" position the instrument will not print any prism values. In the "on" position, prism values will be printed.
4	Prism Notation Δ or θ Choose the prism notation (rectangular or polar) and the instrument will power on in this setting.

SWITCH	FUNCTION
5	<p>Mixed Mode On or Off</p> <p>When mixed mode is on, cylinder will be calculated in + convention for a + sphere lens and cylinder will be calculated in - convention for a minus sphere lens. The instrument will power on in mixed mode, when chosen, and read according to mixed mode when the STORE button is pushed. After a read value is stored, the operator can change the convention generated by the mixed mode, and the displayed value, by pressing the +/- button. But the instrument will always first read a lens according to mixed mode. When PRINT is pressed, the displayed values will be printed.</p> <p>When mixed mode is chosen, it will override the +/- cylinder switch.</p>
6	<p>Serial Output On or Off</p> <p>This switch, when activated, allows data to be transmitted from the Lens Analyzer to other instruments or to a computer. This switch should be off until you want to transmit data. If On, data is transmitted following a print.</p>
7, 8	<p>Baud Rate Selection</p> <p>These two switches in combination set the RS232 (optional) interface frequency for use of the Lens Analyzer with other computerized instrumentation. There are 4 available frequencies. When the RS232 interface is not in use, turn Switch 6 off.</p>
9, 10	<p>Spare switches.</p>

Serial on/off, prism notation, prism print on or off, baud rate and mixed mode on or off can only be changed on the Mode Selector panel. Changes made on the Mode Selector panel will take effect the first time the instrument is turned on after the change. It is therefore recommended that the instrument be turned off before any changes are made to insure that the changes take effect before any further operation of the instrument. Mode Selector switches can be moved with a small point such as the tip of a ball point pen.




3.4 FRONT CONTROL PANEL

The Front Control Panel contains buttons, numeric displays, a centering display, indicator lights and warning lights. All of these elements are described in detail in the text that follows.



Buttons: Functional Description

There are seven buttons on the front control panel of the Lens Analyzer. Their functions are as follows:

BUTTON	FUNCTION
	<p>This button will change the cylinder convention from whatever is displayed (plus to minus, minus to plus). After a lens has been read, the lens values can be converted from one cylinder convention to another by pressing +/- . The instrument will power on in whatever convention has been selected on the Mode Selector panel. The displayed convention will be printed.</p>
	<p>After the distance reading of a lens has been taken, the near vision Adds are measured by first pressing ADD, positioning the lens over the read head in the Add sector as close as possible to the segment line, and pressing the STORE button. The Add value will be displayed, recorded in the memory, and printed. The Add measurement may be carried out in several sectors of the multifocal lens or at different positions along a continuous curve type lens. The lens can be rotated through any angle and the value of the measured Add is not affected by such a rotation.</p>
	<p>Pressing CLEAR will void the instrument of any previous information. Upon clearing the instrument, the display will clear to zero. The instrument will display the Sphere, Cylinder and Axis mode. The CLEAR button can also be used to access and set the sequence number. Whenever the Lens Analyzer is turned on, the sequence number is set at one. To set the sequence number at a value other than one (up to 200),</p>

BUTTON	FUNCTION
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press the **CLEAR** button first after turning on the instrument. Subsequent presses of the **CLEAR** button will increase the sequence number by one. Pressing the **PRINT** button, after pressing **CLEAR**, will adjust the sequence number by ten. After the sequence number has been set, press any other button on the Lens Analyzer and the instrument will return to normal operation.

A press of this button will engage the printer. Repeated presses will result in multiple copies. Print does not clear lens values. After a print is made, when **STORE** is pressed again, the memory will be cleared.

PRINT




The **PRINT** button can also be used to set the Lens Analyzer sequence number. For an explanation of this function, refer to **CLEAR** button.

.12/.25

This button will change the round-off mode setting from what was chosen on the Mode Selector panel (.12 D or .25 D). The precision in use will be displayed to the right of the layout cross when the instrument is on.

LAYOUT

Pressing this button will activate a continuous display of the prism and axis of a lens as it is being positioned, before **STORE** is pressed, instead of a continuous display of sphere, cylinder and axis. **LAYOUT** is an aid to finding the optical center of a lens and can also be used in laying out a lens for prism. **LAYOUT** can be activated during the positioning of a lens. Removing the lens or pressing **STORE** deactivates the **LAYOUT** function. (Prism will be displayed in the notation selected on the Mode Selector panel.)

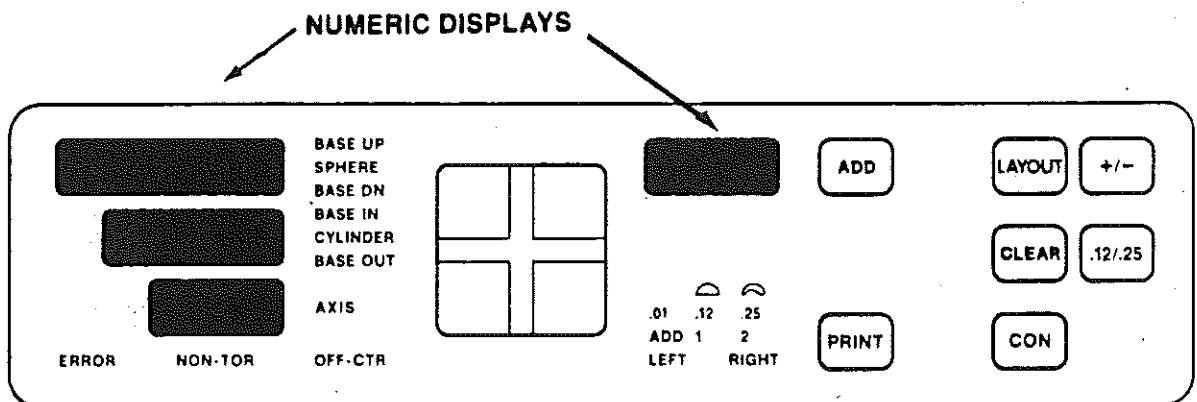
BUTTON	FUNCTION
	<p>This button will activate one of two measuring modes for contact lenses. One press of the button will illuminate the  indicator to the right of the layout cross. This mode is for measuring hard contact lenses. A paraxial calculation is programmed here for calculating hard contact lens values. A second press of the CON button will illuminate the  indicator which is used for measuring soft contact lenses. This mode will display the Spherical Equivalent of a lens measurement. A third press of the CON button turns off the contact mode. Contact modes can be activated before or after a reading is stored.</p>

In general, the buttons on the front control panel are operable at any point before, during or after the measurement cycle, except while reading Adds. In ADD mode only **PRINT**, **STORE** and **ROUND OFF** are active. The operator can even change the button settings after a printout has already been made for a lens or lens pair. For example, if after printing a set of results in quarter diopters the operator wishes to print the results to the nearest eighth diopter, it is only necessary to press **.12/.25** and print again.

3.5 NUMERIC DISPLAY

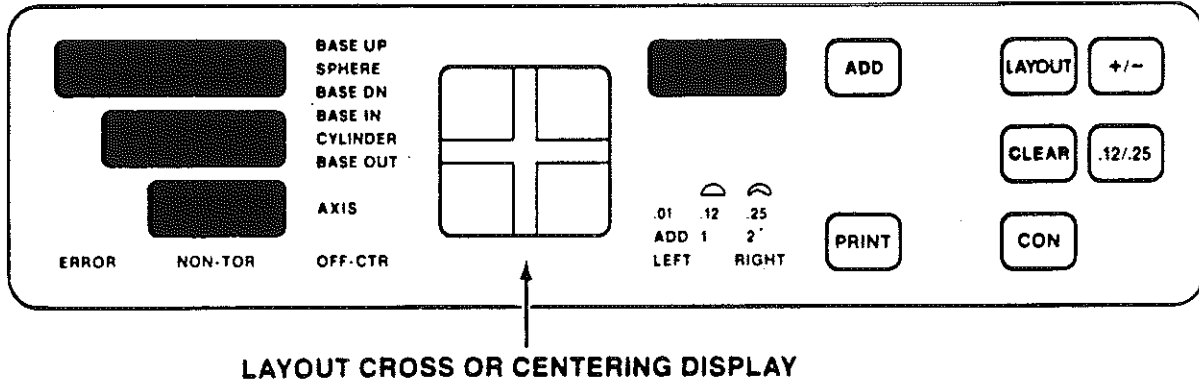
There are four numeric display positions on the front control panel. They are on the left side of the panel and are for displaying the power of lenses.

Normally, sphere power is in the top display, cylinder is in the middle display, and axis is in the bottom display. When prism is displayed in rectangular notation, horizontal prism is in the top display and vertical prism (both in prism diopters) is in the middle display. When prism is displayed in polar notation, prism magnitude (prism diopters) is in the middle display and axis or direction is in the bottom display. The fourth display next to the ADD button sets the sequence number.



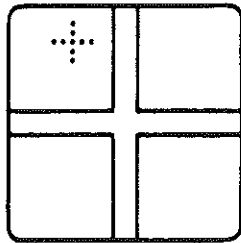
3.6 LAYOUT CROSS OR CENTERING DISPLAY

Located in the middle of the front control panel, this display is used for positioning lenses, and specifically for finding the optical center of a lens.

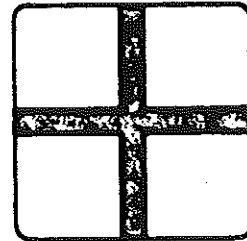


When the instrument begins continuous reading in layout mode, a cross will be illuminated in the centering display indicating how far from optical center the lens is positioned. As you move the lens, the illuminated cross will move.

To reach optical center, move the lens until the red cross on the display is centered in the fixed hollow cross. When optical center has been reached, the full area of the fixed hollow cross will light.



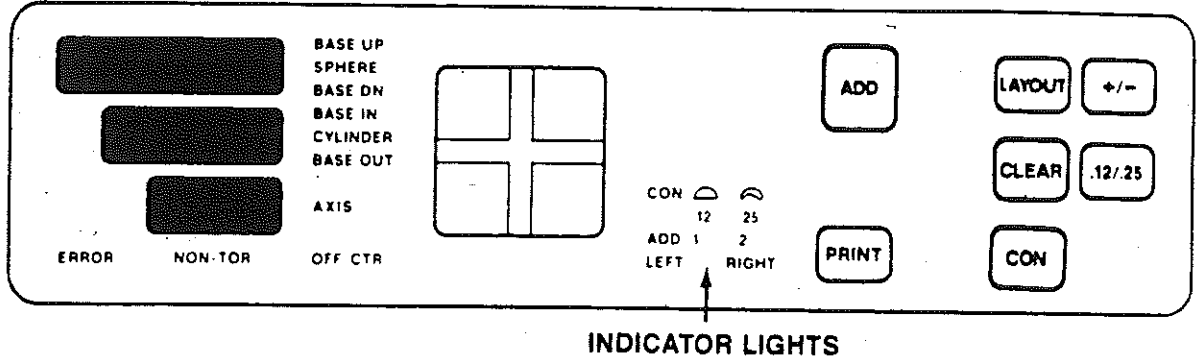
OFF OPTICAL CENTER



ON OPTICAL CENTER

3.7 INDICATOR LIGHTS

There are four sets of indicator lights on the right side of the layout cross on the front control panel.



.12 or .25

One of these lights will be illuminated at all times to indicate the round-off precision chosen.

CON  or
CON 

These lights give the hard and soft contact lens measuring modes. Unless a contact lens measuring mode has been selected, neither indicator will be lit.

LEFT or RIGHT

When reading a spectacle pair, these lights will indicate which lens is being read.

Note: It is the pressure of the frame (of the lens not being measured) against the table that triggers the table switch, indicating to the instrument which lens has been measured; right or left. It is necessary to trigger the table switch while pressing **STORE** for the

instrument to receive this information. Your assurance that the lens analyzer has this information is the activation of the indicator lights **LEFT** or **RIGHT** on the panel when the switch is triggered. If each of the indicators does not light after each lens of the spectacle pair has been neutralized, only one lens will print.

If the operator wishes to designate a single lens or contact lens as a left or right lens, it is only necessary to trigger the opposite table switch while pressing **STORE**.

ADD 1 or ADD 2

These lights indicate when the Add segment of a bifocal lens is being read. **ADD 1** indicates the first Add segment of a trifocal or bifocal lens while **ADD 2** indicates the second Add segment of a trifocal lens.

3.8 MODEL 306 SPECIFICATIONS

Sphere Range

0 to 25D

.12D or .25D increments

Cylinder Range

0 to 12D

.12D to .25D increments

Axis

0 to 180°

1° increments

Prism

0 to 15 Δ

.12D, .25D increments

Physical Dimensions

- 13 $\frac{1}{2}$ " wide, 13 $\frac{1}{2}$ " high, 13 $\frac{1}{2}$ " deep
- Weight: 63 lbs.

Electrical Requirements

- 100/120/220/240 volts AC \pm 10%
- 50-60 Hz
- 300 VA maximum power: 100 Watts (3 wire grounded outlet)

4. MODEL 340

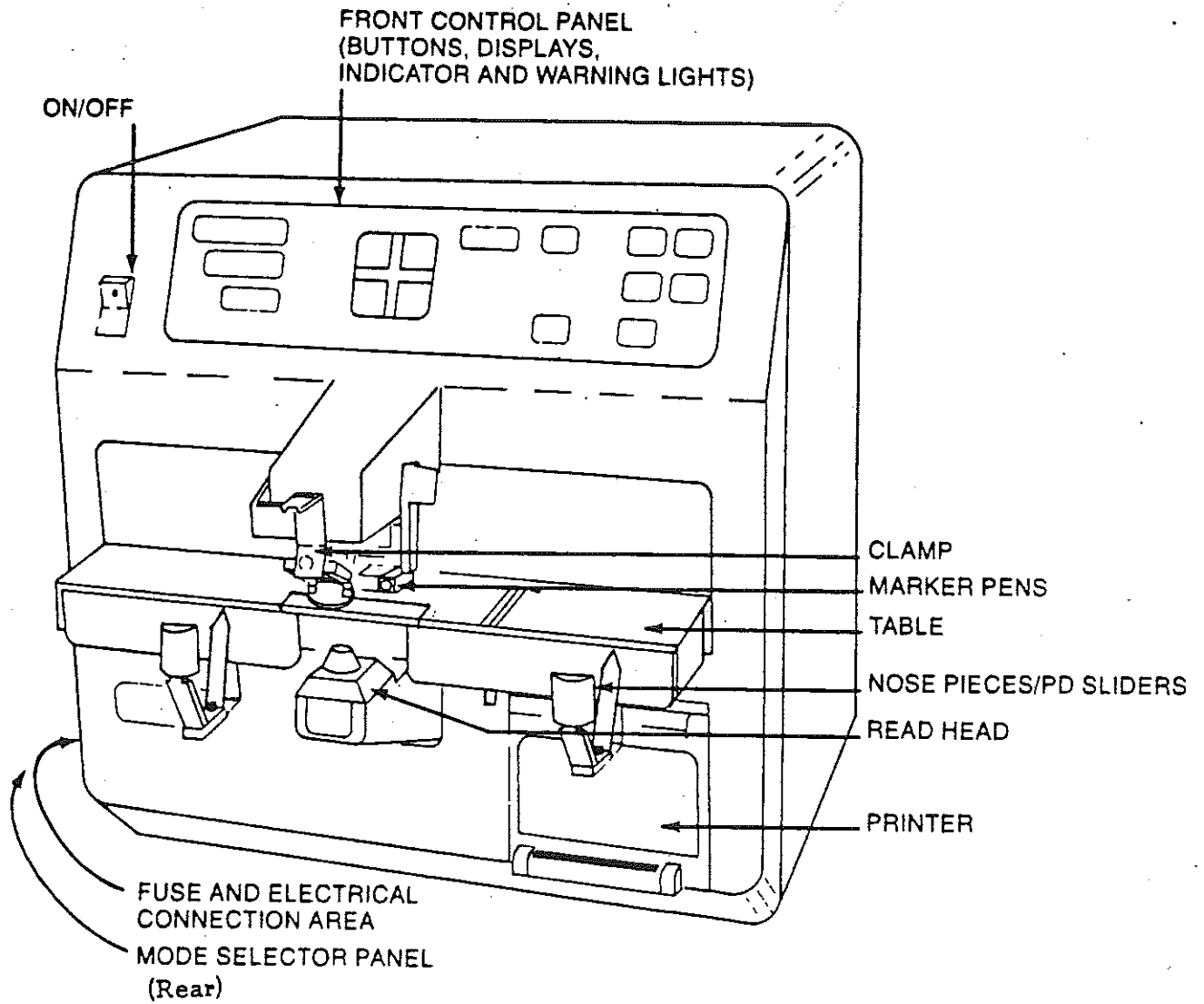
4.1 DESCRIPTION

The operation of the Model 340 Lens Analyzer is similar in many respects to the operation of the Model 330. There are, however, several additional features which are distinct from the 330. These are:

- the ability to read in .01D increments (Section 4.4)
- clearing the instrument (Section 4.4)
- Auto Wave Detector
- Auto Layout function

This section, then, will discuss the aforementioned features as they pertain to the Model 340 Lens Analyzer. It is important, however, that you read the entire manual thoroughly and refer to this section for the features and operational characteristics which differ from the Model 330.

4.1.1 Key Elements (Model 340)



4.2 OPERATION

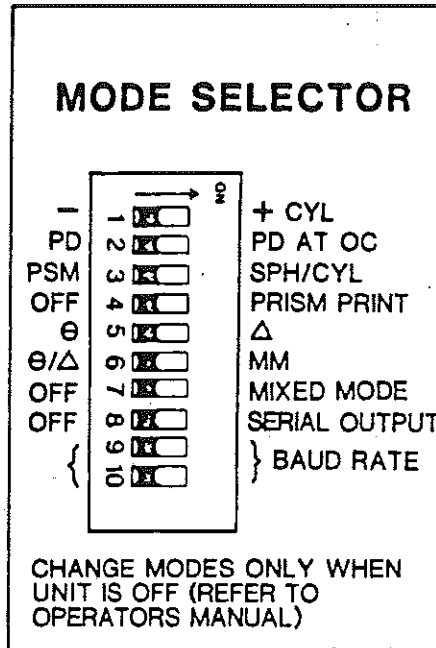
Auto Layout

Setting back panel Switch #3 to PRISM allows you to enter layout mode automatically when a lens is placed over the read head. In this mode, prism is continually displayed as the lens is moved over the read head. You can then switch to AUTO READ (automatic display of sphere, cylinder and axis) by pressing LAYOUT. Auto Layout mode can also be exited by pressing the STORE button or by pressing the footswitch.

Auto Wave

The Model 340 automatically detects aberrations in the lens which differ more than .12D from an initial reference reading. To utilize this feature, you must first place a lens over the readhead and press and hold the footswitch or STORE to obtain a reference reading. While the footswitch (or STORE) is depressed, the WAVE light will be illuminated and if an aberration is detected, the layout cross will be inverted from red on a black field (normal) to black on a red field (wave). When the footswitch or STORE button is released, the analyzer exits the wave mode and a final reading will be displayed. The cross will then be displayed in a normal fashion.

4.3 MODE SELECTOR PANEL



The Mode Selector Panel, located on the back of the instrument, consists of ten switches which are used to select and set the modes in which the instrument will power on. These switches should be set to correspond with the most frequent or general use of the instrument. The initial mode selection can take place upon instrument installation or after the operator has determined a "most common" mode of operation. If the modes selected are not the desired modes for a particular neutralization, they can be adjusted. Several of these modes can also be changed via buttons on the front control panel before or after a particular neutralization, but the Lens Analyzer will always power on according to the Mode Selector settings. Mode adjustments made on the front control panel remain in effect until the button is pressed again or until the instrument is turned off. The operation of each Mode Selector switch and the switch selections are as follows:

SWITCH	FUNCTION
1	<p>Cylinder convention + or -. Choose either + or - cylinder convention. The instrument will power on in this setting. The convention can be changed by pressing the +/- button on the front control panel. A change remains in effect until +/- is pressed again or the instrument is turned off.</p>
2	<p>PD measured at Lens Position or PD at Optical Center. Choose either pupillary distance measuring mode. The instrument will power on in this setting. The chosen mode will be shown by the corresponding indicator light (PD or PD AT OC) beneath the PD display window on the front panel and can be changed using the PD button, also on the front control panel. (A complete description of PD measuring modes is found in Section 7.3.1, "Buttons" with the PD button description.)</p>
3	<p>S, C, A or Prism Display</p> <p>Choose either display mode and the instrument will power on in this setting. S, C, A will cause the instrument to continuously display sphere, cylinder and axis when a lens is placed over the read head. Prism will cause the instrument to continuously display prism power and axis when a lens is placed over the read head.</p>
4	<p>Prism Print On or Off</p> <p>Choose the prism setting for the printout. In the "off" position the instrument will not print any prism values (prism values can still be displayed by pressing PRISM on the front control panel) or PD values. In the "on" position, prism values and PD will be printed.</p>

SWITCH	FUNCTION
5	<p>Prism Notation Δ or Θ Choose the prism notation (rectangular or polar) and the instrument will power on in this setting.</p>
6	<p>Prism Notation Δ, Θ or mm Choose either Δ or Θ as denoted by Switch 5 or mm of prism. If you wish to use Θ or Δ, be sure Switch is set to 5. The instrument will power on in this setting.</p>
7	<p>Mixed Mode On or Off When mixed mode is on, cylinder will be calculated in + convention for a + sphere lens and cylinder will be calculated in - convention for a minus sphere lens. The instrument will power on in mixed mode, when chosen, and read according to mixed mode when the STORE button is pushed. After a read value is stored, the operator can change the convention generated by the mixed mode, and the displayed value, by pressing the +/- button. But the instrument will always first read a lens according to mixed mode. When PRINT is pressed, the displayed values will be printed.</p> <p>When mixed mode is chosen, it will override the +/- cylinder switch.</p>
8	<p>Serial Output On or Off This switch, when activated, allows data to be transmitted from the Lens Analyzer to other instruments or to a computer. It should be off when no data is being transmitted.</p>

SWITCH	FUNCTION
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9, 10

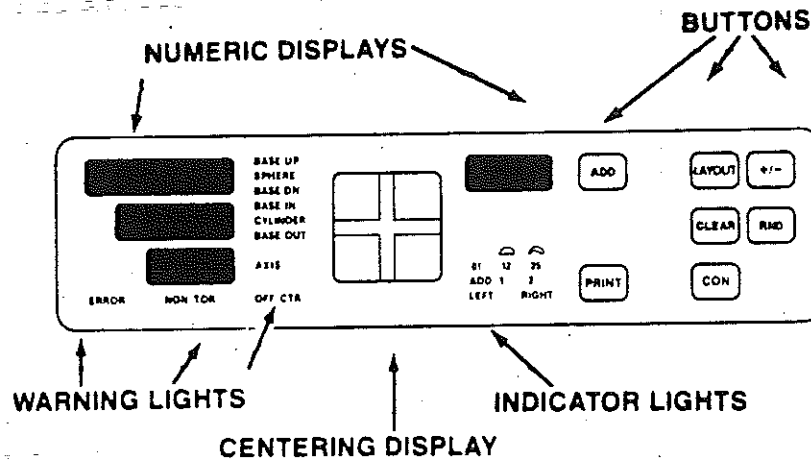
Baud Rate Selection

These two switches in combination set the RS232 interface frequency for use of the Lens Analyzer with other computerized instrumentation. There are 4 available frequencies. When the RS232 interface is not in use, turn Switch #8 off.

Serial on/off, prism notation, prism print on or off, baud rate and mixed mode on or off can only be changed on the Mode Selector panel. Changes made on the Mode Selector panel will take effect the first time the instrument is turned on after the change. It is therefore recommended that the instrument be turned off before any changes are made to insure that the changes take effect before any further operation of the instrument. Mode Selector switches can be moved with a small point such as the tip of a ball point pen.

4.4 FRONT CONTROL PANEL

The Front Control Panel contains buttons, numeric displays, a centering display, indicator lights and warning lights. All of these elements are described in detail in the text that follows.



Buttons: Functional Description

There are seven buttons on the front control panel of the Lens Analyzer. Their functions are as follows:

BUTTON	FUNCTION
	<p>This button will change the cylinder convention from whatever is displayed (plus to minus, minus to plus). After a lens has been read, the lens values can be converted from one cylinder convention to another by pressing +/- . The instrument will power on in whatever convention has been selected on the Mode Selector panel. The displayed convention will be printed.</p>



BUTTON	FUNCTION
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CLEAR

Pressing **CLEAR** will void the instrument of any previous information. Upon clearing the instrument, the display will clear to zero. All other modes, such as **RND**, **+/-**, **LAYOUT**, **PD** and **CON** will continue to function as previously set by the operator.

PRINT

A press of this button will engage the printer. Repeated presses will result in multiple copies. Print does not clear lens values. After a print is made, when **STORE** is pressed again, the memory will be cleared. (For a discussion of what the printouts will include, see Section 6, "The Printout.")



The **PRINT** button can also be used to set the Lens Analyzer sequence number.

RND

Pressing **RND** changes the round-off mode of the Lens Analyzer from **.01D** to **.12D** to **.25D**. This mode can be switched at any time and will remain in the new rounding mode, displaying and printing with the correct round-off until it is once again switched. Layout will always display prism in **.01D**.

BUTTON**FUNCTION**

CON

This button will activate one of two measuring modes for contact lenses. One press of the button will illuminate the  indicator to the right of the layout cross. This mode is for measuring hard contact lenses. A paraxial calculation is programmed here for calculating hard contact lens values. A second press of the **CON** button will illuminate the  indicator which is used for measuring soft contact lenses. This mode will display the Spherical Equivalent of a lens measurement. A third press of the **CON** button turns off the contact mode. Contact modes can be activated before or after a reading is stored.

PD

This button changes the pupillary distance measuring mode from what has been selected on the Mode Selector panel. The mode chosen will be indicated beneath the PD display window.

PD: In this mode, the Lens Analyzer will display the PD value in mm based upon the position of the lens on the read head. The prism measured will be that which exists at the point of measurement. If prism is printed, the individual prism will print for each lens as well as the net prism of the spectacle pair. An operator would use this mode if the patient PD were known and the operator wished to neutralize the spectacle at that specific PD.

PD AT OC: In this mode, the Lens Analyzer will display the PD value in mm based upon the optical center of the lens, without requiring that the lens be positioned at optical center. For instance, the lens could be positioned at approximate

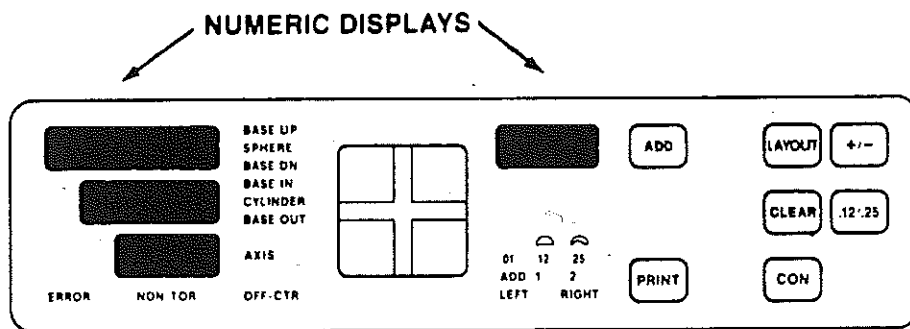
BUTTON**FUNCTION**

geometric center and the Lens Analyzer would calculate and display PD at OC. The prism displayed in this mode is that at optical center which is zero by definition for individual lenses. For a spectacle pair, net vertical prism at OC (over .25 D) is calculated and printed. PD at OC is particularly good for spectacle checking applications. For instance, if the operator wishes to check the position of the optical center of the lens, he/she simply positions the lens over the read head and PD at OC is displayed. This fact makes spectacle checking fast and easy because a minimum of positioning is required. If the PD at OC does not match the patient PD, the operator can return to the PD mode and measure at the desired PD and decide if the net prism is within tolerance.

In general, the buttons on the front control panel are operable at any point before, during or after the measurement cycle, except while reading Adds. In ADD mode only **PRINT**, **STORE** and **ROUND OFF** are active. The operator can even change the button settings after a printout has already been made for a lens or lens pair. For example, if after printing a set of results in quarter diopters the operator wishes to print the results to the nearest eighth diopter, it is only necessary to press **RND** and print again.

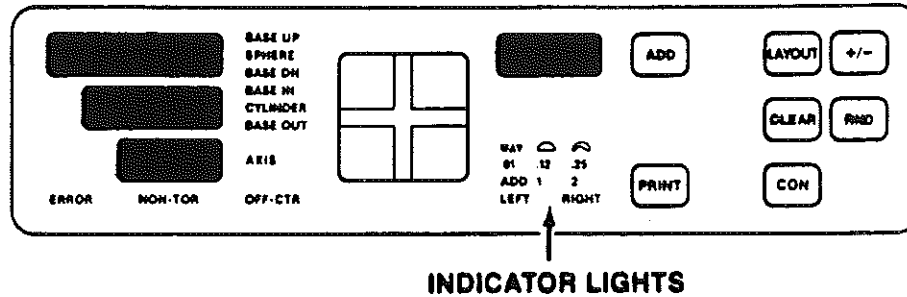
4.5 NUMERIC DISPLAY

There are four numeric display positions on the front control panel. Three of these are on the left side of the panel and are for displaying the power of lenses. Normally, sphere power is in the top display, cylinder is in the middle display, and axis is in the bottom display. When prism is displayed in rectangular notation, horizontal prism is in the top display and vertical prism (both in prism diopters) is in the middle display. When prism is displayed in polar notation, prism magnitude (prism diopters) is in the middle display and axis or direction is in the bottom display. The fourth display position is for sequence number and pupillary distance and is located adjacent to the top right corner of the layout cross display.



4.6 INDICATOR LIGHTS

There are six sets of indicator lights on the right side of the layout cross on the front control panel.



PD or PD AT OC

One of these lights will be illuminated at all times when reading spectacles to indicate the pupillary distance measuring mode which is in effect.

.01, .12, .25

One of these lights will be illuminated at all times to indicate the round-off precision chosen.

WAV

Indicates Wave Mode.

⌒ or ⌒

These lights give the hard and soft contact lens measuring modes. Unless a contact lens measuring mode has been selected, neither indicator will be lit.

LEFT or RIGHT

When reading a spectacle pair, these lights will indicate which lens is being read.

Note: It is the pressure of the frame (of the lens not being measured) against the table that triggers the table switch, indicating to the instrument which lens

has been measured; right or left. It is necessary to trigger the table switch while pressing STORE for the instrument to receive this information. Your assurance that the lens analyzer has this information is the activation of the indicator lights LEFT or RIGHT on the panel when the switch is triggered. If each of the indicators does not light after each lens of the spectacle pair has been neutralized, only one lens will print.

If the operator wishes to designate a single lens or contact lens as a left or right lens, it is only necessary to trigger the opposite table switch while pressing STORE.

ADD 1 or ADD 2

These lights indicate when the Add segment of a bifocal lens is being read. ADD 1 indicates the first Add segment of a trifocal or bifocal lens while ADD 2 indicates the second Add segment of a trifocal lens.

4.7 MODEL 340 SPECIFICATIONS

Sphere Range

0 to 25D
.01D, .12D, .25D increments

Cylinder Range

0 to 12D
.01D, .12D, .25D increments

Axis

0 to 180°
1° increments

Prism

0 to 15 △
.01 , .12 , .25 increments

Physical Dimensions

- 13¾" wide, 13¾" high, 13¾" deep
- Weight: 63 lbs.

Electrical Requirements

- 100/120/220/240 volts AC ± 10%
- 50-60 Hz
- 300 VA maximum power: 100 Watts (3 wire grounded outlet)

5. OPERATION/MODELS 306, 330, 340

5.1 TO NEUTRALIZE A SPECTACLE PAIR

1. POWER ON

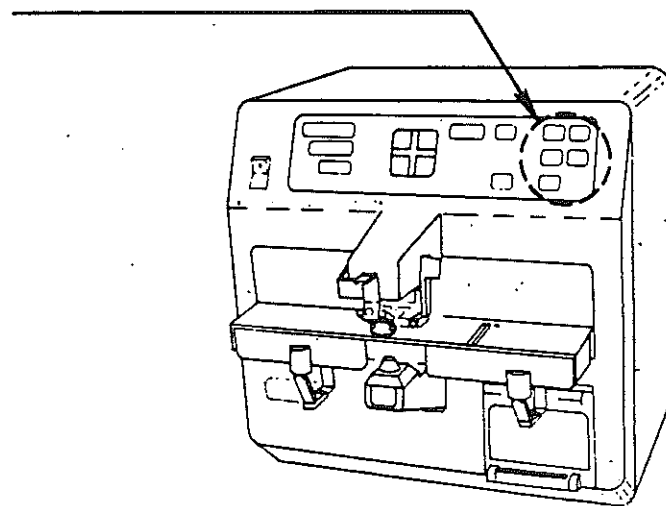
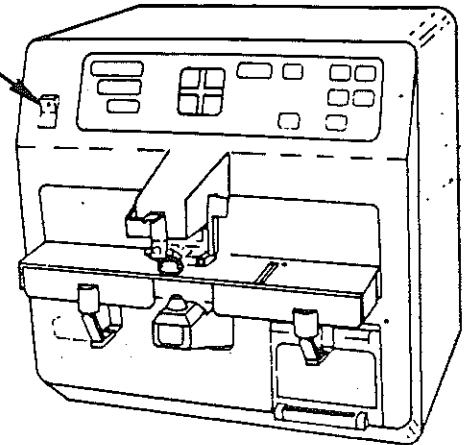
- If necessary, adjust modes from Mode Selector setting.
- ON-OFF Switch.

The instrument will power on in the modes that are selected on the Mode Selector panel which is located on the back of the instrument. (They are: + or - cylinder convention, .12 D or .25 D round-off precision, rectangular or polar prism notation, PD measured at optical center or at lens position, prism print on or off, baud rate and mixed mode on or off.)

Note: Model 340 also reads the .01D round-off precision.

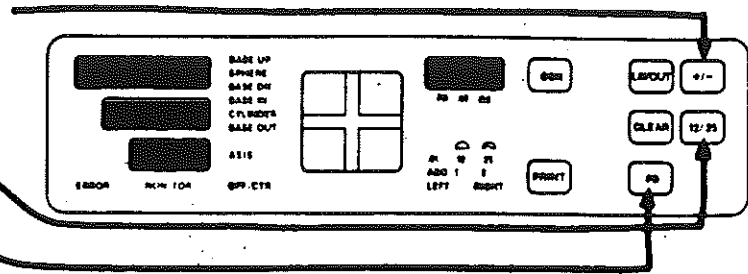
Note: Automatic PD calculation not available on Model 306.

If the start up modes are not the desired modes for the neutralization to be performed, several can be changed via the mode buttons on the front switch panel. They are +/- cylinder convention, round-off precision and PD measurement mode. These mode adjustments will remain in effect until the button is pressed again or until the power is turned off. Prism notation, prism print on/off, baud rate and mixed mode on/off can only be chosen on the Mode Selector panel, though the convention generated by mixed mode can be changed after a reading is taken via the +/- button.



A complete explanation of the Mode Selector control functions is located in Section 2 of "INSTRUMENT DESCRIPTION."

- To change cylinder convention from start-up mode, press +/-.
- To change round-off mode, press .12/.25 until proper mode lights.
- To change PD measurement mode, press PD until desired mode is indicated.
- To change any of the other modes, turn off the power, change the appropriate Mode Selector switch and power on again. Remember that the Lens Analyzer will power on in the new mode setting until it is changed again.
- Pull the lens table all the way forward with the finger tabs located under each side of the table. This action prepares the lens table for spectacle positioning.



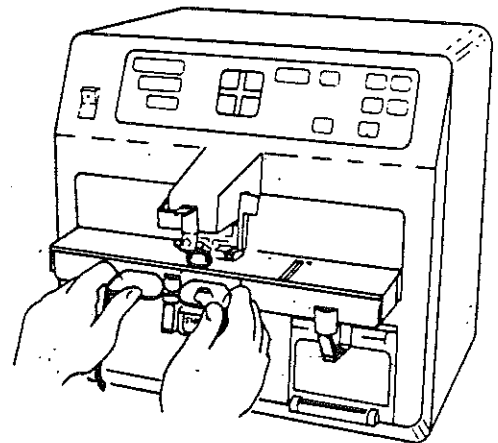
2. POSITION SPECTACLES

Note: Model 306 instructions appear in Section 3.

Initial Positioning

- Position spectacles with temples down as shown, with lens to be read over the read head and the bridge of the glasses against the nose piece.

The instrument will automatically detect the lens and begin a continuous read of sphere, cylinder, axis and PD. (Note: Plano lenses will not always be automatically detected and consequently continuous reading may not be triggered. To read a plano lens, position the lens at

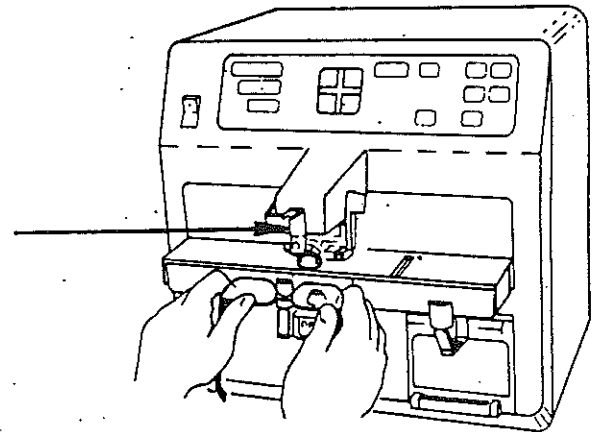
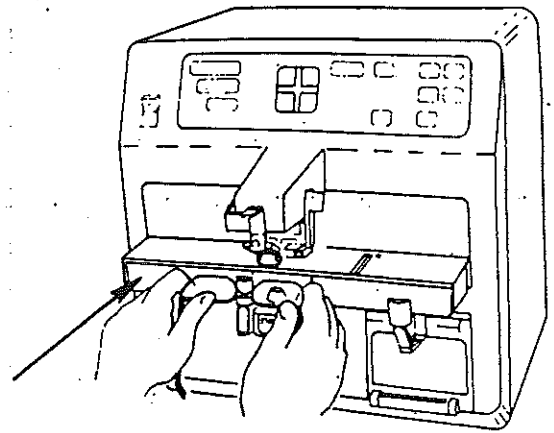


geometric center and press STORE.) In addition, a cross will be displayed on the panel indicating how far from optical center the lens is positioned. When optical center is reached, the full area of the fixed hollow cross will light. (Use of the layout cross display is described in detail in the text that follows.)

- Press firmly against the lens table with the spectacle frames. Move the lens table to desired position with the spectacles and it will remain there. The table may also be moved in or out by the finger tabs located under either side of the table. Gentle pressure of the lenses against the table during measurement insures that the lenses are positioned so as to obtain the correct axis. Also, this pressure triggers the RIGHT/LEFT lens indication.

- All lenses over 8 D should be clamped.
 - 1) Lift up on the clamp to unlatch it.
 - 2) Lower the clamp onto the lens. DO NOT DROP CLAMP as this could damage the lens or the read head.

Be sure the lens is held firmly against the read head in order to avoid errors due to tilting.



Final Positioning

A. By PD (Models 330, 340 only)

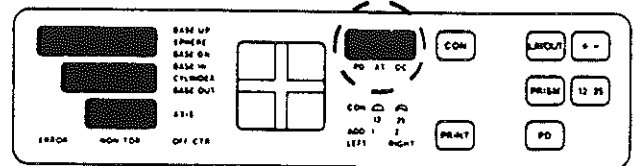
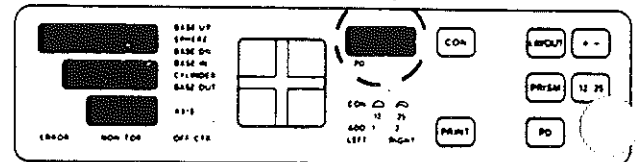
PD Mode vs. PD at Optical Center Mode

There are two modes of pupillary distance measurement on the Lens Analyzer. They are PD mode (PD) and PD at Optical Center mode (PD AT OC). PD mode will measure and display the PD value in mm based upon the position of the lens on the read head. The prism measured will be that which exists at the point of measurement. If prism is printed, the individual prism for each lens as well as the net prism for the spectacle pair (referenced to stronger lens) will be printed in this mode.

In the PD at OC (optical center) mode, the Lens Analyzer will display the PD value in mm at the optical center of the lens without the lens being positioned at the optical center. For instance, the operator could position the lens at approximate geometric center and the Lens Analyzer would calculate and display the PD at OC. In fact, the instrument will calculate PD at OC even if optical center is off the lens (within a range of 0 to 99 millimeters). Prism measured will be that which exists at OC which is zero by definition for individual lenses. For a spectacle pair, the instrument will calculate net vertical prism at OC after reading the second lens. Only net vertical prism at OC greater than .25 D for the spectacle pair will print.

1. To use PD mode -

When patient PD is known and the operator wishes to neutralize the lenses at that specific PD, then PD mode is the appropriate mode choice.

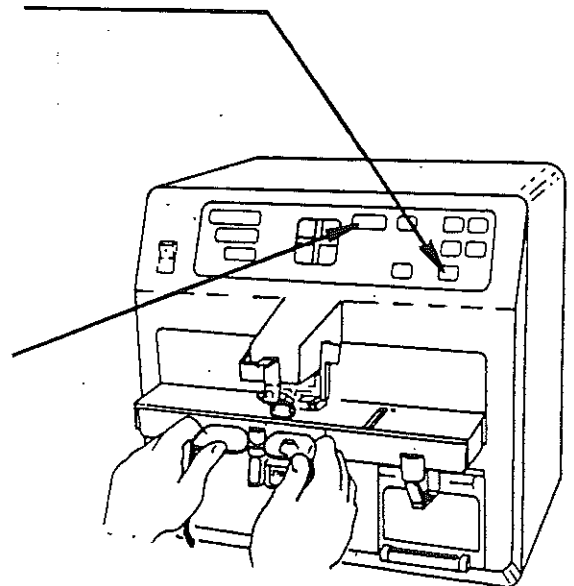


- Select PD mode, if not already selected by the Mode Selector by pressing the PD button until PD is lit.
 - Move the spectacles and nose piece along the table until the patient's PD (monocular or half PD for each lens of the spectacle pair) is achieved in the PD display window.
2. To use PD at OC mode -
 If the operator wishes to check the position of and power at the optical center of a spectacle lens (without having to find optical center), PD at OC mode is the appropriate mode choice.

- Select PD at OC mode if not already selected by the Mode Selector by pressing the PD button until PD AT OC is lit.
- Only initial positioning is required. It is not necessary for the operator to find optical center. For instance, the lens could be positioned at approximate geometrical center. PD at OC mode makes spectacle checking applications fast and easy because minimal positioning is required.

If you wish to mark the patient PD point:

- Push the marking pen arm back then down. Three points will mark the lens along a horizontal line with the center point positioned at PD.



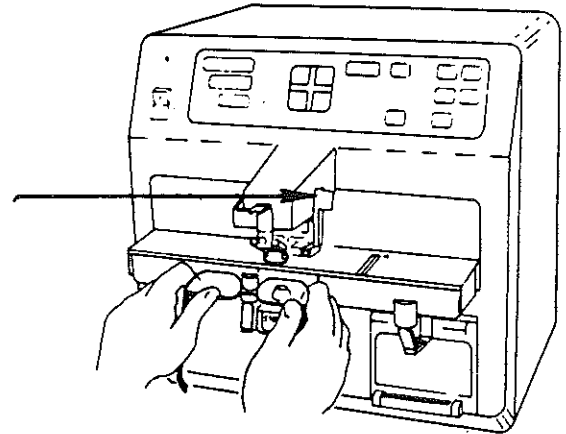
B. By Optical Center

When the instrument begins continuous reading, a cross will be displayed on the panel indicating how far from optical center the lens is positioned.

To reach optical center, move the lens until the red cross on the display is centered in the fixed hollow cross. When optical center has been reached, the full area of the fixed hollow cross will light.

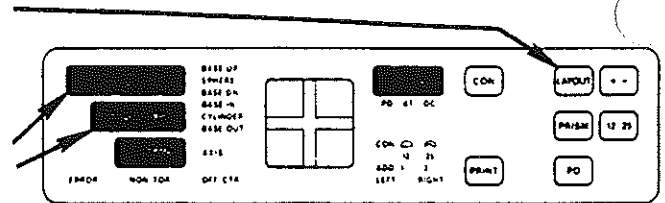
At this time you may mark the optical center of the lens:

- Push the marking pen arm back then down. Three points along a horizontal line will be marked with the center point positioned at optical center.



C. By Layout

- Press **LAYOUT** - The operation is the same as in B, the only difference being that continuous individual lens prism readings are displayed as the lens is positioned.

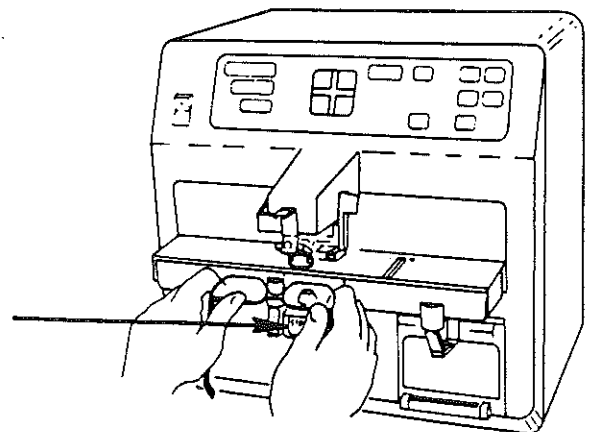


3. READ FIRST LENS (Model 306 - Refer to Section 3)

- When the lens to be read is in the desired position, hold spectacles firmly on lower measuring head with frames pressed against lens table.
- Press **STORE** (most easily pressed with the thumb) or footswitch. It is necessary to store the lens values if they are to be printed.

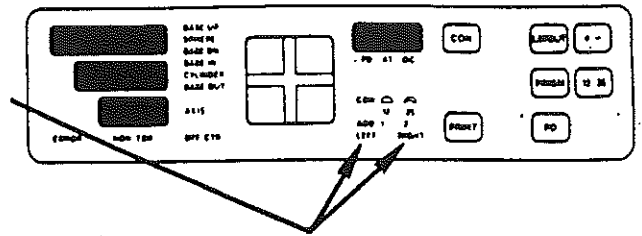
The sphere, cylinder, axis and PD are displayed.

Be sure the **RIGHT** or **LEFT** indicator lights. If it does not, you have not

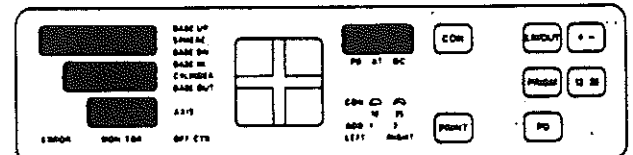


triggered the indicator by holding the lenses firmly against the table. Do so and press **STORE** again.

Note: It is the pressure of the frame (of the lens **NOT** being measured) against the table that triggers the table switch, indicating to the instrument which lens has been measured; right or left. It is necessary to trigger the table switch while pressing **STORE** for the instrument to receive this information. (Requiring the lenses to be positioned firmly against the table when **STORE** is pressed guarantees proper positioning for the axis calculation.) Your assurance that the Lens Analyzer has this information is the activation of the indicator lights **LEFT** or **RIGHT** on the panel when the switch is triggered. If each of the indicators does not light after each lens of the spectacle pair has been neutralized, **ONLY ONE LENS WILL PRINT**.

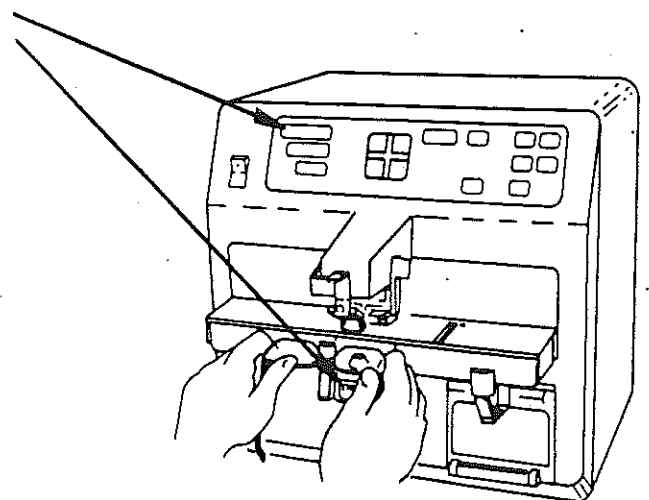
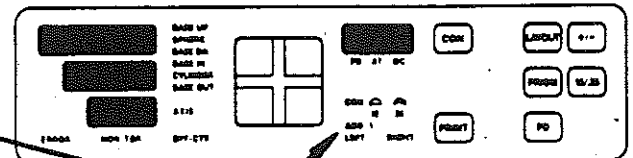


- Check for warning lights: **ERROR, NON-TOR, OFF-CTR**. If any of these light, refer to Section 7.3.5 of "INSTRUMENT DESCRIPTION."



4. **READ ADD** (Model 306 - Refer to Section 3)

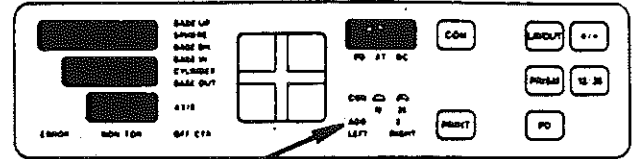
- After storing the distance value, move into the Add portion of the lens, positioning the lens segment on the read head as close as possible to the segment line.
- The instrument will automatically detect the Add and the **ADD 1** indicator will light. The instrument will be reading continuously.
- Press **STORE** or footswitch; the Add is displayed.
- Check for warning lights: **ERROR, NON-TOR, OFF-CTR**. If any of these light, refer to Section 7.3.5 of "INSTRUMENT DESCRIPTION."



Note: If **NON-TOR** lights when reading a lens segment, the lens is probably positioned with the segment line too close to the read head or the read head is even intersecting the segment line. Make sure the read head is positioned completely in the Add and press **STORE** again.

If there is a Second Segment:

- Position the second segment over the measuring head as close as possible to the segment line.
- The instrument will automatically detect the second segment and **ADD 2** will be indicated.
- Press **STORE**; the Second Add is displayed.



5. READ SECOND LENS

- Position spectacles for second lens (as in 2).

Note: When positioning second lens via patient PD, monocular PD will be displayed, as with the first lens. After the second lens is stored though, full PD will be displayed. The table must be kept in the same position for the second lens reading to obtain accurate prism and PD at OC readings.

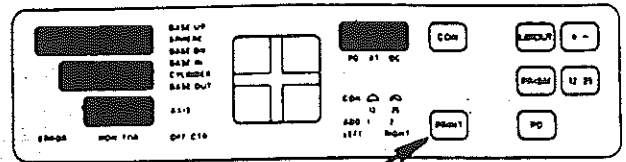
- Read second lens and the Add (as in 3 and 4).

6. PRINT Rx

- Press PRINT.

The printout will include sphere, cylinder, axis and adds if measured. If prism print is on, prism values and full PD (or IPD) will also print (Models 330 and 340 only). In PD mode, the prism printed will be the individual prism of each lens with the net prism of the spectacles as a pair. In PD at OC mode only net vertical prism at OC greater than .25 D for the spectacle pair will be printed (Models 330 and 340 only). An identification number and the labeling of the lens information RIGHT or LEFT is indicated. A space for patient name and the date will also be printed. If "XXX" appears on the printout, a large amount of distortion was detected when the measurement was stored. The measurement was probably taken on or across the segment line. If this occurs, remeasure the lens pair.

Note: When tearing off the printout, be sure to tear up and to the right against the serrated upper lip of the printer. This will insure the paper will not retract back into the printer but will continue to feed out properly.



LA 306, 330, 340

WLA SEQ NO. 03

NAME _____

DATE _____

RIGHT

SPH: -2.25

CYL: -0.75x 23

ADD: +1.25

ADD: +2.62

PSM: 0.12 DWN
0.00 OUT

LEFT

SPH: -3.25

CYL: -0.00x 00

ADD: +1.25

ADD: +2.62

PSM: 0.00 DWN
0.12 IN

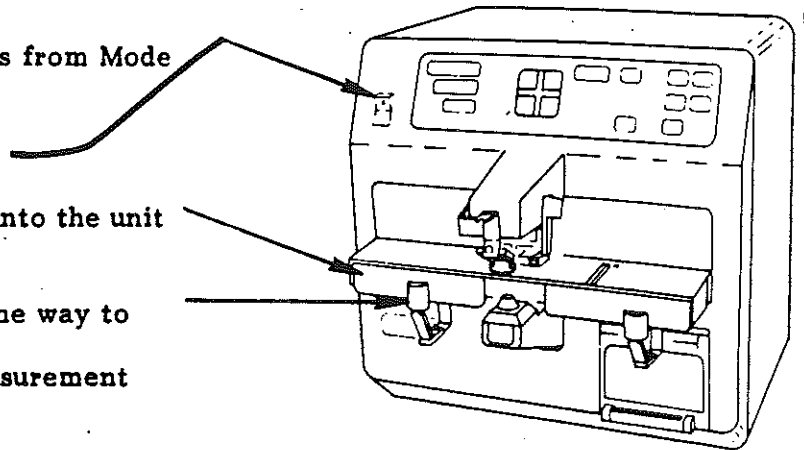
NET PR 0.12 DWN
0.12 IN

PD: 64

5.2 TO NEUTRALIZE A SINGLE LENS

1. POWER ON

- If necessary, adjust modes from Mode Selector setting.
- ON-OFF Switch.
- Push the lens table back into the unit out of the way.
- Slide nose pieces out of the way to the outside of the table.
(This deactivates PD measurement but not PD modes.)



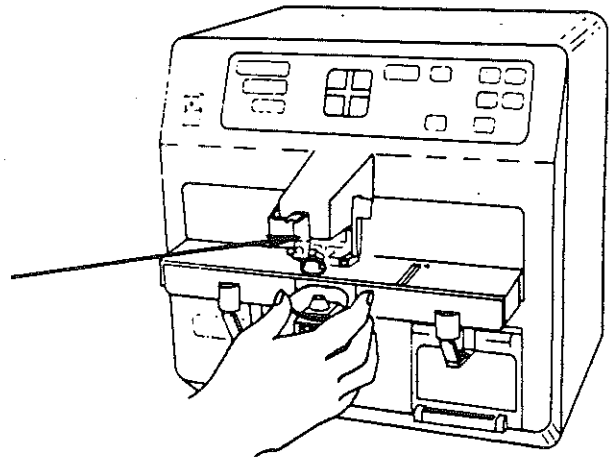
2. POSITION LENS

- Position the lens on the measuring head as close as possible to the segment line.

The Lens Analyzer will automatically detect the lens and begin a continuous read of sphere, cylinder, axis and optical center position (Models 330 and 340 only).

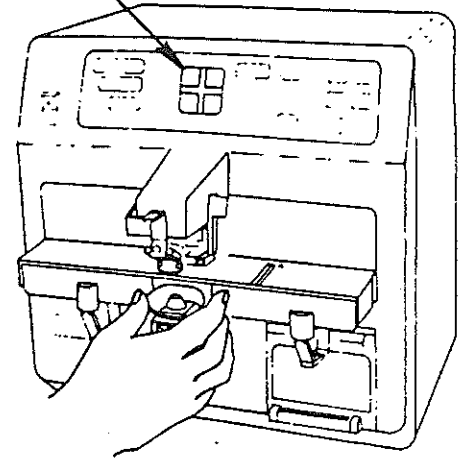
- Clamp lens.
 1. Lift up on clamp to unlatch it.
 2. Lower clamp onto lens. **DO NOT DROP CLAMP** as this could damage the lens or the read head

It is important that all lenses over 8 D be clamped.



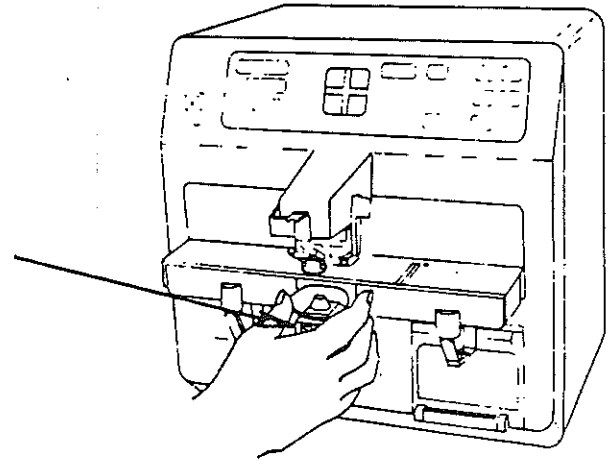
- Find optical center.
Move the lens until the red cross is centered in the fixed hollow cross. At this point, the entire hollow fixed cross will light and the lens is positioned at optical center. (You may display prism during this positioning procedure by pressing **LAYOUT**.)

If you wish to identify the axis, it is displayed on the readout as the bottom number to the left of the cross display in either mode. You can, therefore, rotate the lens until the axis is positioned correctly.



3. READ LENS

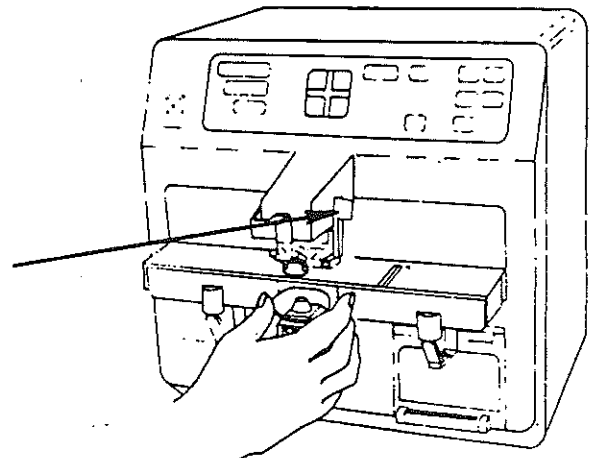
- Press **STORE** with your thumb. Sphere, Cylinder and Axis are displayed.
- Check for warning lights: **ERROR**, **NON-TOR**, **OFF-CTR**. If any of these light, refer to Section 7.3.5 of "INSTRUMENT DESCRIPTION."



4. READ ADDS (if applicable)

5. MARK THE LENS (if desired)

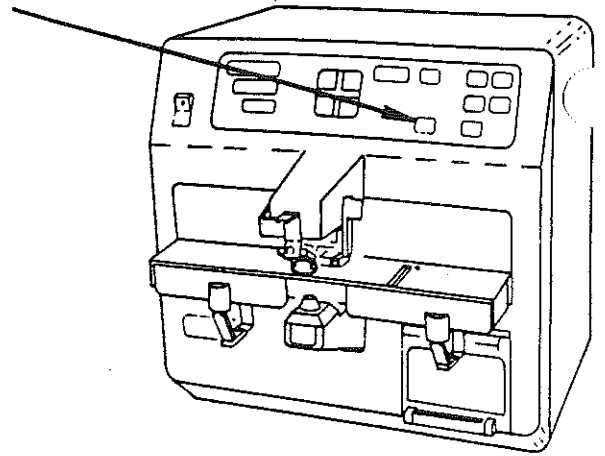
- Push marker lever back then down until the pens mark the lens.



6. PRINT Rx

- Press **PRINT**. The printout will include sphere, cylinder, axis and adds if measured. If prism print is on, individual prism for the lens will also be printed unless you are in PD at OC mode.

Note: If you wish to designate the lens as left or right, trigger the opposite table switch (according to operator left or right) while pressing **STORE**. This designation will appear on the printout. If neither table switch was pressed when **STORE** was pressed, prism values will be signed as a right lens.

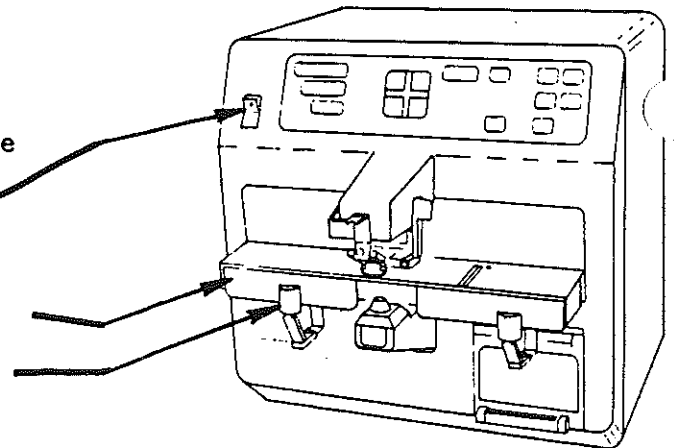


5.3 TO LAYOUT A LENS BLANK

1. Make sure you have the necessary Rx information.

2. POWER ON

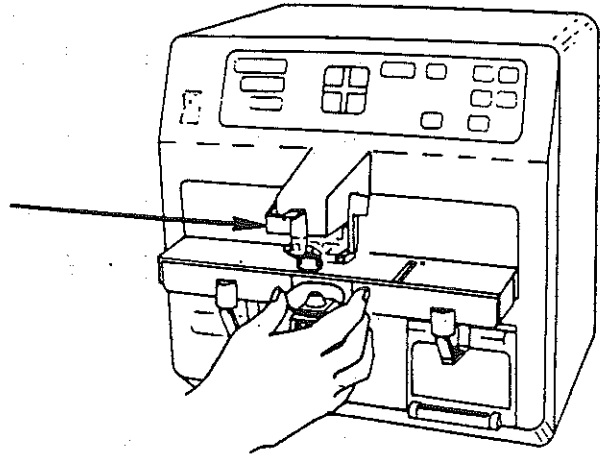
- If necessary, adjust modes from Mode Selector setting.
- ON-OFF Switch.
- Push table into unit out of the way.
- Slide nose pieces to the outside of the table out of the way.



3. POSITION BLANK

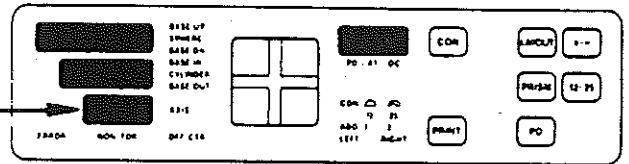
- Position lens on lower measuring head as close as possible to segment line.
- Clamp lens.
 - 1) Lift up on clamp to unlatch it.
 - 2) Lower clamp onto lens. **DO NOT DROP CLAMP** as this could damage the lens or the read head.

It is important that all lenses over 8 D be clamped and held firmly against the read head.



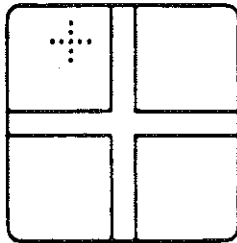
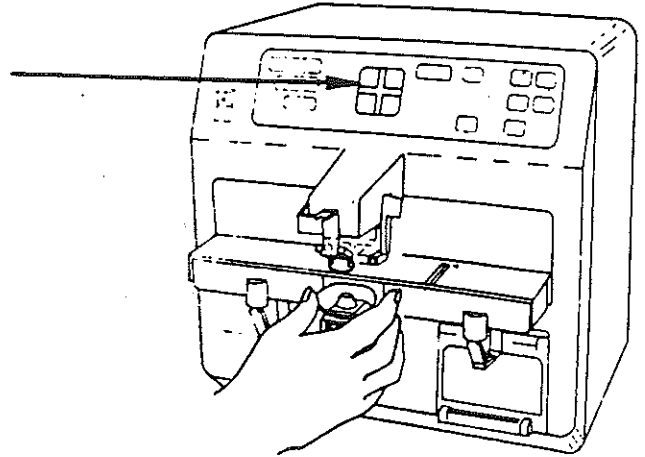
4. LAYOUT AXIS

- Rotate lens until the proper Axis is displayed. The Axis is the bottom number in the numeric display on the left side of the front panel.

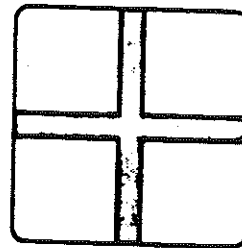


5. CENTER LENS

- Move lens up and down, left or right until the small cross is positioned in the fixed hollow cross on the display.



OFF OPTICAL CENTER

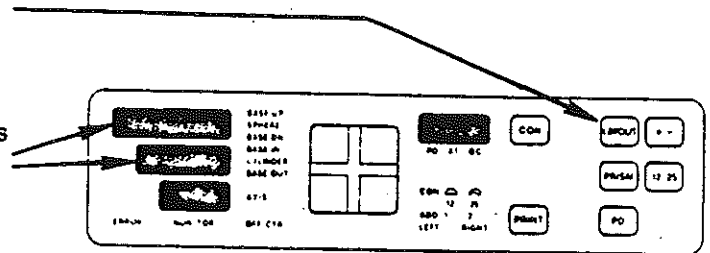


ON OPTICAL CENTER

- or

POSITION THE LENS FOR PRISM

- Press **LAYOUT**.
- Move lens up and down, left or right until the proper prism values are displayed. Notation is polar or rectangular for prism, whichever has been chosen on the Mode Selector panel.

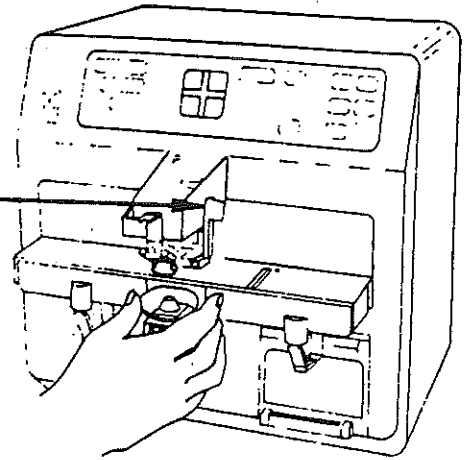


6. CHECK AXIS

- Check the display to be sure the Axis reading is correct. (The bottom number to the left on the display panel is the axis).
- Readjust as necessary.

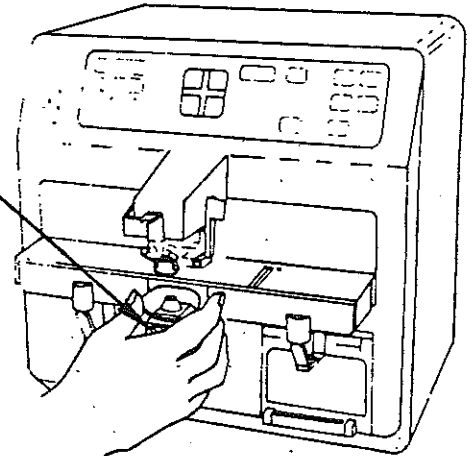
7. MARK LENS

- Push marker lever away and down until pens mark the lens.



8. READ LENS (if desired)

- Press STORE. Sphere, Cylinder and Axis are displayed.



9. READ ADD

- Position lens blank segment over lower measuring head as close as possible to the segment line.

Note: Model 306 - press ADD.

- The instrument will detect the Add and the ADD 1 indicator will light.
- Press STORE; Add is displayed.
- Check to be sure NON-TOR did not come on. If it did, remeasure the segment. This is most likely caused by having the measuring beam pass through both the segment and the distance portion of the lens.

If a second segment is to be read:

- Reposition lens blank with the second segment as close as possible to the segment line.

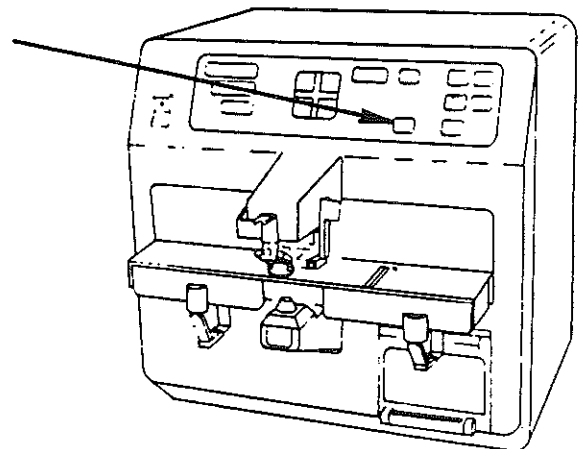
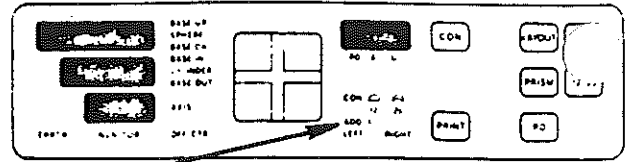
Note: Model 306 - Press ADD.

- The instrument will detect the second Add and ADD 2 will be illuminated.
- Press STORE. Second Add is displayed.

10. PRINT R_x

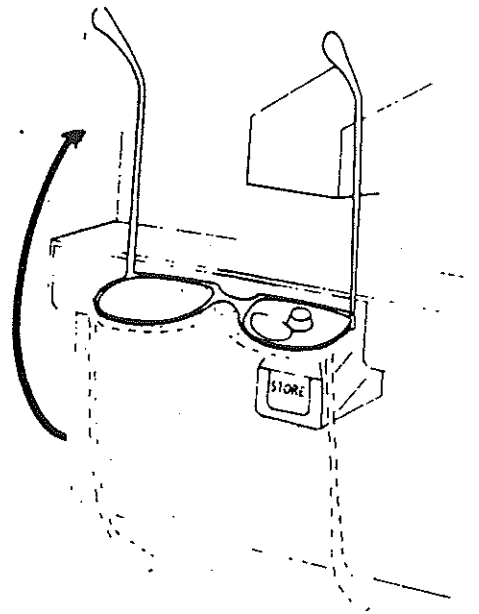
- Press PRINT. The printout will include sphere, cylinder, axis, and adds (if measured). If prism print is on, the prism of the lens will also be printed unless you are in PD at OC mode (Models 330 and 340 only).

Note: If you wish to designate the lens as left or right, trigger the opposite table switch while pressing STORE. This designation will appear on the printout.



5.4 TO NEUTRALIZE APHAKIC ADDS

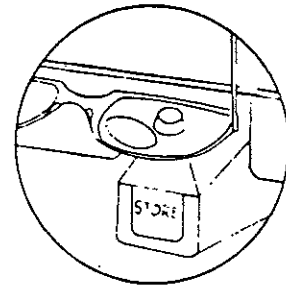
1. MEASURE THE DISTANCE Rx as with any single vision spectacle pair or single lens and print. This is the record of the distance measurements.
2. TURN THE SPECTACLES (or Lens) OVER
 - Turn spectacles over so that the temples curve away from the Lens Analyzer display.



3. REMEASURE DISTANCE PORTION OF LENS from the front side.

(You will disregard this distance measurement using it only for the instrument to calculate the Add.)

- Push the lens table back, if necessary.
- Center distance portion of the lens so that the four measuring beams are as close to the segment line as possible, without intersecting it.
- Insure lens surface is flat on lens stop (hold firmly or clamp).
- Press STORE.



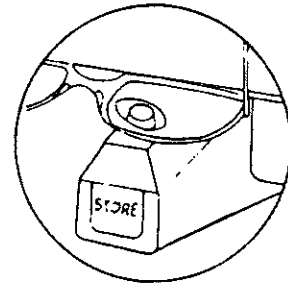
DISTANCE POSITION

4. MEASURE ADD

- Recenter lens so that all four measuring beams pass through the segment but are as close to the segment line as possible.
- The instrument will detect the Add, and the ADD 1 indicator will light.

Note: Model 306 - Pres ADD first.

- Insure lens surface is flat on the lens stop.
- Press STORE; Add is displayed.
- Record the Add on the first printout of the distance Rx. In this way all the correct information will be on one printout.



SEGMENT POSITION

Note: It is sometimes difficult to properly measure the Add on high plus spectacles, the type which are used most commonly for Aphakic patients. However, the task becomes much easier if you will follow the three simple procedures outlined below:

1. **Always make front vertex measurements when checking the Add on high plus lenses.** This means turning the lens over after measuring the back vertex power of the distance portion. Then measure the front vertex power of the high powered lenses because there is a marked difference in power between the front and back vertex measurements.

An Add measured using the recommended method gives the best indication of the way in which the Add will work for the patient.

You might ask, why not measure the Add using the back vertex? That's how the patient uses the spectacles. A back vertex measurement gives the correct values for the distance portion. Since at the time lenses are ground the Add is built into the front surface of the lens, the most precise method for neutralizing high power lenses is to neutralize at the front surface. This eliminates vertex error and problems with the prismatic effect of such high powers.

For high plus lenses the best Add measurement is made by using the front vertex distance power and the front vertex segment power.

2. **Measure the segment as close to the segment line as is possible.** As high powered lenses are decentered, prism is very rapidly induced. Since segments are located in a decentered position, there is generally a large prismatic component no matter where on a high plus segment you measure. This means you cannot optically center the segment, causing problems for both conventional and automatic lensmeters. However, by measuring as close to the segment line as is possible, prism is minimized and you will obtain a more precise measurement. The Lens Analyzer can measure a prism of up to 15 D, but it is best to limit prism if possible.

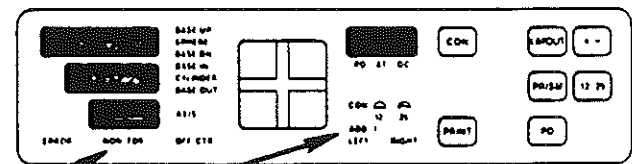
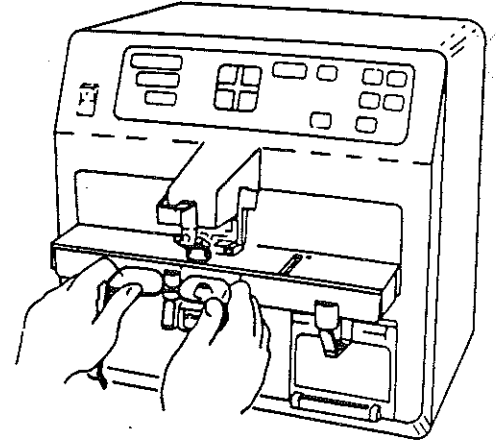
3. **Hold the lens surface flat on the lens stop.** When high powered lenses are tilted, aberrations affecting sphere and cylinder power are rapidly induced. This is a common source of error when measuring a high plus Add on any lensmeter. With standard lensmeters you will find a difference between Adds measured in plus cylinder convention and those measured in minus convention if the segment is tilted during measurement. With automatic lensmeters, such as the Lens Analyzer, you will notice that the Add will change if the tilt of the segment is changed from measurement to measurement. The only way to avoid this problem is to insure that the lens surface sits firmly and flatly on the lens stop during measurement. Sometimes this means you can't use the clamp if the clamp doesn't seat the lens properly when the segment is being measured. In this case, hold the lens so that the lens surface is snugly seated in the lens stop.

5.5 TO NEUTRALIZE PROGRESSIVE ADDITION LENSES

1. MEASURE THE DISTANCE R_x in the upper third portion of the lens above the progressive addition channel.

2. READ ADD

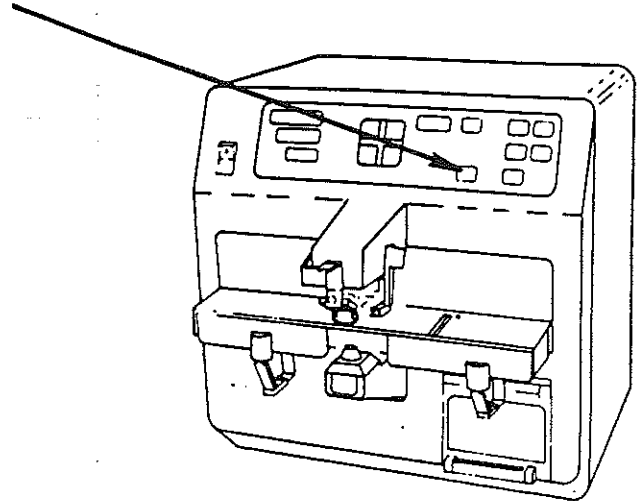
- Move toward the Add portion of the lens, usually below and slightly nasal with regard to the distance portion.
- As you move into the progressive addition or change-over portion of the lens, the ADD 1 indicator will light and the instrument will begin continuous reading.
- While passing through the variable or change-over portion of the lens, readings will be accompanied by a NON-TOR indication. NON-TOR is triggered by rapid change in the lens power in the progressive change-over from distance R_x to Add. When NON-TOR is no longer indicated, the lens has been moved through the progressive addition channel and is now positioned completely within the Add.
- At the position of highest power where ADD 1 is illuminated and the NON-TOR indicator is off, press STORE: Add is displayed.



3. PRINT Rx

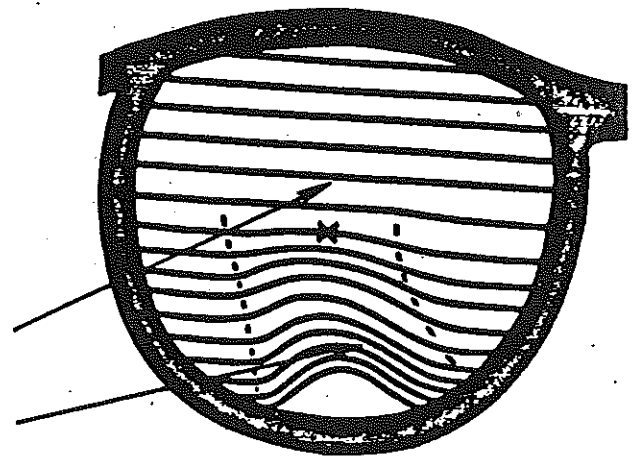
- Press **PRINT**.

The printout will include sphere, cylinder, axis and add. If prism print is on, the prism of the lens will also be printed. For a spectacle pair, net prism, PD and right/left designations will be included in the printout. (In PD at OC mode only net vertical prism at OC over .25 D for a spectacle pair will print.)



4. OTHER METHODS FOR MEASURING PROGRESSIVE ADDITION LENSES

- Look at a straight edge or line through the lens to be neutralized. Hold the lens, or spectacle pair such that a line from temple to temple would be parallel to the edge being viewed. Move the lens so that the edge passes from the top to the bottom of the lens. Mark the point at which distortion or bending of the line or edge first occurs. Take the distance reading for this lens above this point and take the Add reading below and slightly nasal of this point.
- Some manufacturers of progressive addition lenses can provide a template or pattern which when positioned on the lens will give the location of the Add and thus the best position for taking a measurement. Ask your manufacturer if these templates are available.
- There are also progressive addition lenses whose Add power is etched on the lens. Ask your manufacturer if this marking is on your lenses and how to locate it.



5.6 TO NEUTRALIZE A CONTACT LENS

1. POWER ON

- If necessary, adjust modes from Mode Selector setting.
- ON-OFF Switch.
- Push table back out of the way.

2. CHOOSE PROPER LENS MODE

- Pressing the **CON** button will allow you to choose the proper mode for the particular lens you are neutralizing:

HARD: Converts the measured values into a central zone value.

SOFT: Automatically calculates Spherical Equivalent.

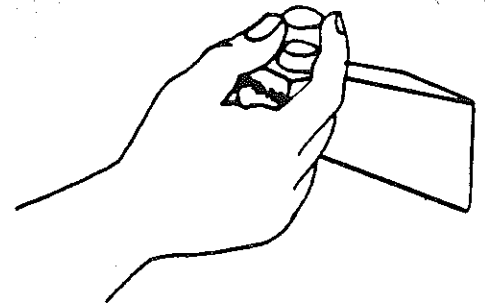
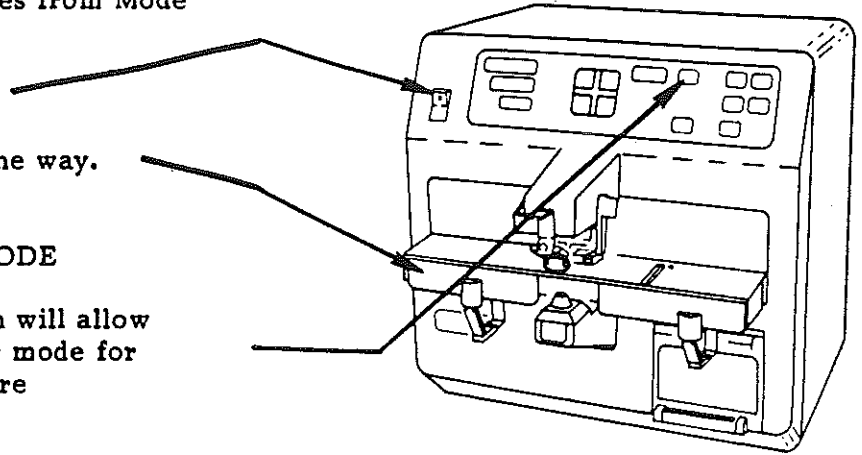
3. POSITION LENS

- Center lens on lower measuring head by finding optical center with the layout cross display.

4. READ LENS

- Press **STORE**.

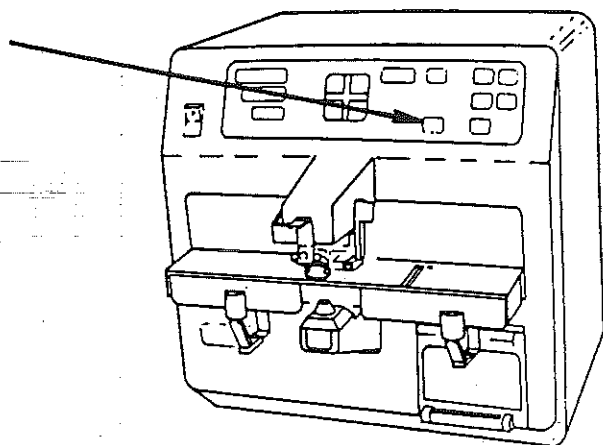
Sphere, Cylinder and Axis are displayed for hard contacts. Spherical Equivalent only is displayed for soft contacts.



5. **PRINT Rx**

- Press **PRINT**. The printer will print out the lens value. The words **HARD CONTACT** or **SOFT CONTACT** will be printed to indicate which lens type was read. If prism print is on, the individual prism of the lens will also be printed.

Note: If you wish to designate the lens as left or right, trigger the opposite table switch while pressing **STORE**. This designation will appear on the printout.



6. THE PRINTOUT

The amount of information printed by the Lens Analyzer will depend upon the type of lens being measured (spectacles, single lens or contact lens) and the modes selected (prism print on or off and PD or PD at OC mode). The possible printouts are shown below.

For a spectacle pair, with prism print on, in measured PD mode:

- Sequence Number
This number will return to one when the instrument is turned off then on again.
- Name space
- Date space

RIGHT EYE

- Sphere Power
- Cylinder Power and Axis
- Add 1 (if an Add is read)
- Add 2 (if a second Add is read)
- Vertical Prism
- Horizontal Prism

LEFT EYE (same as RIGHT EYE)

NET PRISM (computed with respect to right lens)

- Vertical
- Horizontal

PD (millimeters) (Models 330 and 340 only)

LA 306, 330, 340	
MLA	SEQ NO. 03
NAME	_____
DATE	_____
RIGHT	
SPH:	-2.25
CYL:	-0.75x 23
ADD:	+1.25
ADD:	+2.62
PSM:	0.12 DWN
	0.00 OUT
LEFT	
SPH:	-3.25
CYL:	-0.00x 00
ADD:	+1.25
ADD:	+2.62
PSM:	0.00 DWN
	0.12 IN
NET PR	0.12 DWN
	0.12 IN
PD:	64

LA 306, 330, 340

For a single lens net prism and PD will not be printed. (A right or left indication will be printed only if triggered by the operator to designate the lens.)

MLA SEQ NO. 09

NAME_____

DATE_____

SPH: +4.62
CYL: -1.00x 66
PSM: 0.00 DWN
0.00 OUT

LA 306, 330, 340

For a contact lens, the printout will be labelled HARD CONTACT or SOFT CONTACT. (A right or left indication will print only if triggered by the operator.)

MLA SEQ NO. 06

NAME_____

DATE_____

HARD CONTACT
SPH: +2.25
CYL: -1.00x 75
PSM: 0.00 DWN
0.00 OUT

LA 330, 340

When a spectacle pair is neutralized and printed in PD at OC mode, there will be no individual prism for the lenses. Net Vertical Prism at OC over .25 D will be printed. The PD at OC will also be printed. (When a single lens is neutralized in PD at OC mode, no single lens prism will print, by definition.) The PD measuring mode has no effect on contact lens printouts.

Note: Models 330 and 340 only.

When prism print is off, no prism or PD will print.

MLA SEQ NO. 03

NAME_____

DATE_____

RIGHT
SPH: -2.25
CYL: -0.75x 23
ADD: +1.25
ADD: +2.62
LEFT
SPH: -3.25
CYL: -0.00x 00
ADD: +1.25
ADD: +2.62

NET VERT PSM
AT OC: 0.00 DWN

PD AT OC: 65

"XXX" will appear on the printout if a large amount of distortion is detected when the measurement is stored. This notation is most likely caused by reading on or across the segment line. It can also be caused by severe lens aberrations such as large scratches or waves. If this occurs, reposition and reread the lens. For a spectacle pair "XXX" will appear under the appropriate lens, but both lenses need to be reread for both lenses to print.

LA 306, 330, 340

WLA SEQ NO. 09

NAME_____

DATE_____

RIGHT

SPH: +13.37

CYL: -0.12x 19

ADD: +4.12

XXX

LEFT

SPH: +12.25

CYL: -1.25x113

ADD: +3.12

XXX

NET VERT PSM

AT OC: 2.50 UP

PD AT OC: 65

9. TROUBLE-SHOOTING GUIDE

Problem	Corrective Action
ERROR light comes on with no lens in place.	<ol style="list-style-type: none">1. There is an obstruction in the beam path. Check clamp and marker assembly. Check for dirt on the read head.2. The exciter lamp is weak or burned out. Replace exciter lamp. (See Section 10, "MAINTENANCE.")
After printing, the Lens Analyzer is unresponsive for 10 to 20 seconds.	330: Set Mode Selector switches 6, 7 and 8 to the ON position (up). 340: Turn serial output off.
Random measurement errors, fluctuating axis.	<ol style="list-style-type: none">1. Check measuring head prism face for dirt. Clean if necessary (see Section 10, "MAINTENANCE.")2. Check the lens above the reading head in the "nose" of the instrument. Clean this lens with lens paper.
Consistent suspected measurement error, especially on high power lenses.	<ol style="list-style-type: none">1. Check for lens tilt. Clamp the lens if necessary.
ERROR light comes on with each STORE .	<ol style="list-style-type: none">1. Check to be sure the four spots of light come on in the measuring head. If not, change exciter lamp (see Section 10, "MAINTENANCE.") If no light can be produced after changing the bulb, call Humphrey Instruments.2. If the four light spots come on, check to be sure nothing is blocking the beam, i.e., marking pen holder, finger, clamp, etc.3. Check to be sure that you are not inducing enough prism to deflect the

Problem**Corrective Action**

measuring beams out of the instrument. This can easily occur when measuring high plus (aphakic) lens Adds. Try to measure as close to the segment line as possible without activating the NON-TOR indicator.

Complete spectacle information will not print out.

1. If the print out contains a single lens instead of a spectacle pair, the frames did not press hard enough on the table to activate the pressure switch for each lens read. Reread both lenses and print again. If only one lens of the spectacle pair is reread, only that lens will print. If the operator reads the left lens then the right lens and then the left or right lens again before printing, the last lens pair read prints.
 2. If you are sure you are pressing on the lens table faces properly, check operation of table switches (see below).
-

Only LEFT lenses are indicated.

1. Press **STORE** with no lens in the instrument. If **LEFT** indicates, the left lens table switch is stuck shut. (The left switch is actually on the right side of the lens table as you face the instrument.) Check the movement of the table face. You should be able to press it in slightly at the end. If the switch is not free, call Humphrey Instruments.
2. If the left lens table switch is not stuck, press **STORE** while pressing the right lens table switch (left table face). The **RIGHT** indicator light should come on and stay on. If it does not, the right table switch is not working. Call Humphrey Instruments.

Problem**Corrective Action**

Only LEFT lenses are indicated
(continued).

3. If both left and right table switches work properly when test 1 and 2 are done, you are probably not holding the frames firmly against the lens table face when reading right lenses, or
4. The right lens switch will work but takes excessive pressure to operate. If so, call Humphrey Instruments.

Only RIGHT lenses are indicated.

1. Press **STORE** while pressing firmly on the left lens table switch (right table face). **LEFT** indicator should light. If it does not, the left switch is not working. Call Humphrey Instruments.
2. If the left table switch works correctly, you are not holding the frames firmly enough against the lens table face when reading left lenses, or
3. The left table switch will work but takes excessive pressure to operate. If so, call Humphrey Instruments.

RIGHT (or **LEFT**) indicates whenever single lens is read.

1. The right lens (or left lens) table switch is stuck. Check the opposite table face (as you face the instrument) for slight movement. You should be able to press it in slightly on the end and when it is released it should return to its normal position. If the switch is not free, call Humphrey Instruments.

The paper feeds back into the
the printer.

1. Make sure the roll of paper is tightly wrapped and not loose. Feed the paper between the roller and the bar and out the door. Make sure both sides of the door snap shut (see Section 10, "MAINTENANCE.") Tear paper from left to right in an upward motion against the serrated upper lip of the printer. This will prevent the tape from rolling back inside the printer.

Problem**Corrective Action**

Dashes (- - -) in PD display window while reading a spectacle lens in PD at OC mode.

Three situations could generate this display:

1. **OFF-CTR** is lighted. (A description of this condition is found in Section 7.3.5 of "INSTRUMENT DESCRIPTION.")

Reposition lens and read again.

2. The Lens Analyzer can calculate PD at OC whether it is on or off a lens within a range of 0-99 millimeters. Outside of this range dashes will be displayed.

Select PD mode and read the lens at patient PD.

3. For lenses with less than approximately one diopter sphere power (plus or minus), insufficient data is available for the Lens Analyzer to make an accurate calculation of PD at OC.

Select PD mode and read lens at patient PD or optical center.

Dashes (- - -) in the PD display window while reading in PD mode.

1. **OFF-CTR** is lighted.
Reposition lens and read again.
2. One tableswitch is pressed with the opposite nose slider in range (e.g., left tableswitch, right nose slider.)

Blank PD display in either PD mode.

1. PD nose slider is positioned outside of the mechanical range of the PD sensor (50-80 millimeters full PD).

Reposition lens until a PD value is displayed.

2. No PD values will be displayed in ADD mode, LAYOUT or PRISM, or in CONTACT mode.
3. If this occurs after storing a lens, the table switch was not triggered when **STORE** was pressed.

Problem

Corrective Action

Horizontal prism is blank in PD at OC mode.

This display is correct. Only vertical prism is displayed in PD at OC mode.

"XXX" appears on the printout.

This indicates a large amount of distortion was detected when the measurement was stored. This is most likely caused by reading on or across the segment line.

Reposition and reread the lens. For a spectacle pair, reread both lenses.

Dashes flash in the numeric displays when STORE pressed.

This alerts the operator that the light bulb is almost burned out and should be replaced soon.

10. MAINTENANCE

General

Clean the read head often. Lift off the plastic reading head and use the camel hair brush to clean off dust and particles. Be careful not to scratch the reading prism. If necessary, you may use a Q-tip with alcohol. Replace cap. Clean the reading head lens at least once per day. Be careful not to lift black ring under read head. Occasionally it is necessary to clean the lens located above the reading head. You can clean this lens with lens paper.

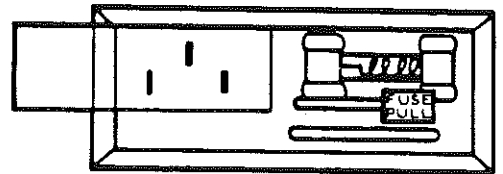
Replacing the Fuse

To remove the power cord:

- Turn Lens Analyzer around
- Pull the power cord out of its receptacle.

To remove old fuse:

- Slide the clear plastic window over the power cord receptacle to expose the fuse.
- Pull the plastic tab marked FUSE PULL: the old fuse will pull out of its holder.
- Check the old fuse to see if it is blown.



To replace fuse:

- Press a new fuse into the fuse clips. Fuse rating 3 amp slo-blo for 120V, 1.5 amp slo-blo for 220V or 240V (also stated on rear cover).
- Slide the clear plastic cover back over the fuse.
- Replace the power cord.
- Plug the power cord into its receptacle.

Replacing Exciter Lamp

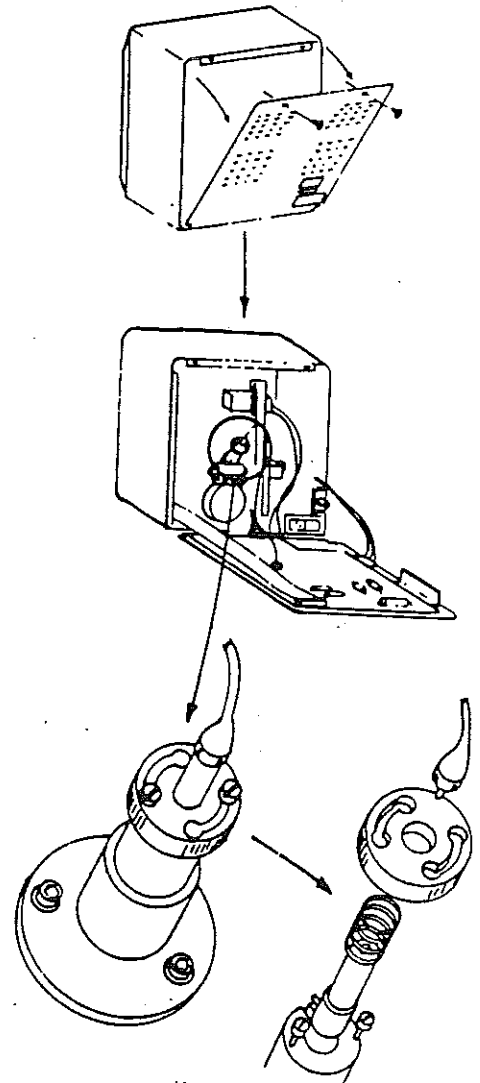
Turn off Lens Analyzer.

To open rear cover:

- Unplug the power cord from the rear of the instrument.
- With a Phillips head screw driver, remove the two cover attachment screws located in the upper corners of the rear cover.
- Carefully fold the rear cover down and set it on the table behind the Lens Analyzer. DO NOT DROP.

To remove old lamp:

- The lamp is in the black cylindrical tube located on instrument centerline, sloping up and back. A wire attached to a cartridge leads into the tube through a black disc which caps the tube.
- To remove the lamp, it is necessary to first release the disc which is held in place by a spring. Press the disc in (against the spring), turn it 1/4 turn counter clockwise until the screws on the cylinder line up with the holes in the disc, and release it (with the spring).
- Grasp the wire lead and pull the lamp cartridge up and out of the cylinder (the spring and black disc will come up and out also).
- When the cartridge is completely out of the tube, separate the wire lead from the lamp cartridge itself. To do this, hold the wire lead tightly and pull the old lamp cartridge out of the connector. The spring and black disc will come apart also.



To replace lamp:

- Assemble the new lamp cartridge (part H.I. #3394) with spring and black disc in position. Plug wire connector back onto lamp cartridge and be sure it is fully seated.
- Insert the cartridge back into the instrument. Notice the alignment pin on the lamp end of the cartridge. As you insert the cartridge you will need to rotate the cartridge back and forth until the alignment pin slides into the slot in the instrument. Then it goes all the way in easily.
- When the cartridge is in, press down on the black spring retaining disc aligning the screw heads on the black cylinder with the holes in the disc. Press the disc down and turn it 1/4 turn in the clockwise direction, until locked. Do not operate the Lens Analyzer unless the Exciter Lamp is properly held in position or erroneous reading may result.
- Close and secure rear cover.
- Plug in the power cord.

The Lens Analyzer is now ready to operate.

Replacing Marker Ink Pad

To remove the marker ink pad:

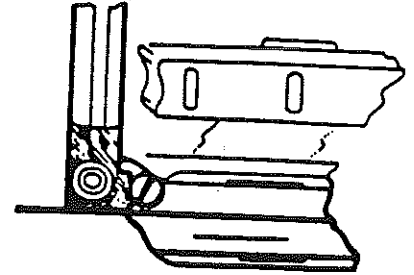
- With the right hand, depress the marker lever to rotate the marker pen away from the ink pad.
- With the left hand, grasp the ink pad between the thumb and forefinger, lifting upward against the spring clip tension and then rotating the ink pad up and out to remove it.

To re-ink the pad:

- With the dropper, fill the ink pad through the marker pen opening. Use standard pad ink or India ink.

To replace the ink pad:

- With the right hand, rotate the marker pen out of the way as before.
- With the left hand, press the ink pad into the spring clip until it snaps firmly into position, both at the top and bottom of ink pad.

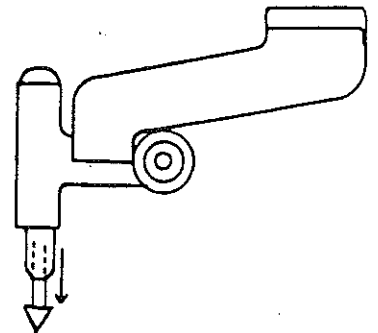


Replacing Marker Tip

If the mark made by any of the marker pens becomes indistinct and loses sharpness, the marker tip can be replaced.

To remove old tip:

- Push back on the marker arm to access the pens. Hold the marker pen assembly firmly in this position with one hand.
- Grasp the marker tip with fingernails, a tweezers or needle nose pliers.
- Pull the marker tip down and out of the marker pen, being careful not to scratch the read head below.

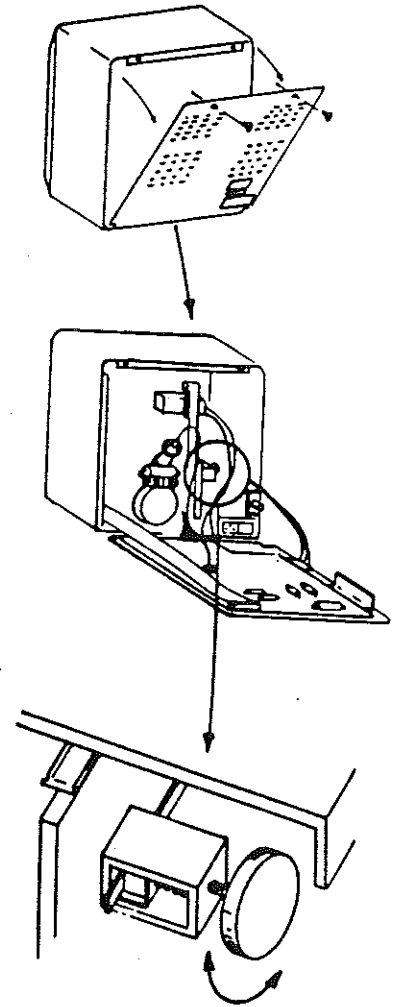


To replace tip:

- Insert a new marker tip into position. (A supply of marker tips is included in your accessory kit.)
- Release the marker assembly and it will return to its normal position.

Adjusting Lens Table Friction

- Turn off Lens Analyzer.
- Disconnect power cord.
- Open rear cover as in replacing exciter lamp.
- A red knob (side view) will be visible to the right of center of the instrument. Turning this knob clockwise will increase the friction of the table. Turning the knob counter-clockwise will reduce the table friction.
- Replace rear cover.



Baud Rate, Interface Frequency Selection for RS232 (optional) - Model 330 Only

Mode Selector Switch Positions

(1=ON, 0=OFF)

6 7 8

0 0 0

0 0 1

0 1 0

0 1 1

1 0 0

1 0 1

1 1 0

1 1 1

Interface Frequency

Humphrey Vision Analyzer

150

300

600

1200

2400

4800

9600

Ventilation of Instrument

Insure that there is a free path for air to enter and exit the ventilation louvers in the rear and side of the instrument.

Thermal Printer

Note: 1. Only Humphrey thermal paper can be used in this printer. If other paper is used, jamming or gradual deterioration of the printhead may occur. In order to keep the warranty in effect for the printer, Humphrey paper must be used.

(Thermal paper varies considerably in its abrasiveness. Inexpensive or poorly manufactured paper will cause rapid wear of the printing elements, in some cases wearing ten times faster than the paper supplied by Humphrey.)

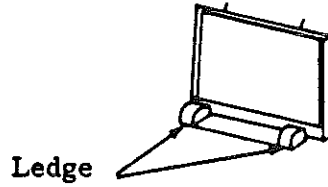
2. It is also important to tear the paper up and to the right against the serrated edge after each printout. This will prevent the paper from tearing or jamming inside the printer.

A. Replace Paper

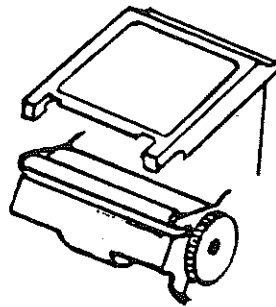
When to do: When the pink line shows along the edge of the paper, it is time to change the roll.

How to do:

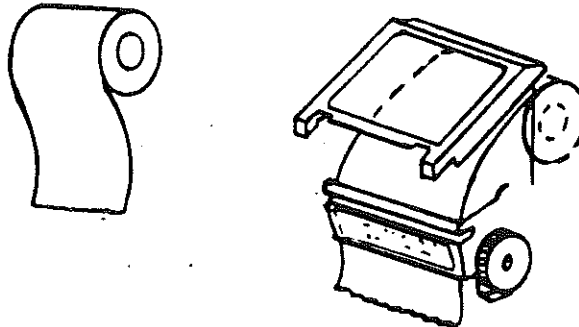
- Press down on ledge on the bottom of printer door. The door will pop open.



- Gently push ledge down further. The roller will pop out.



- Remove old paper roll.
- Insert new paper roll so the paper feeds from the top, leaving 6" of paper hanging out.

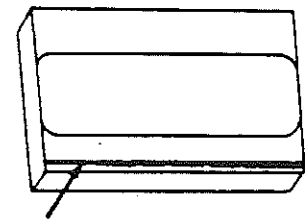
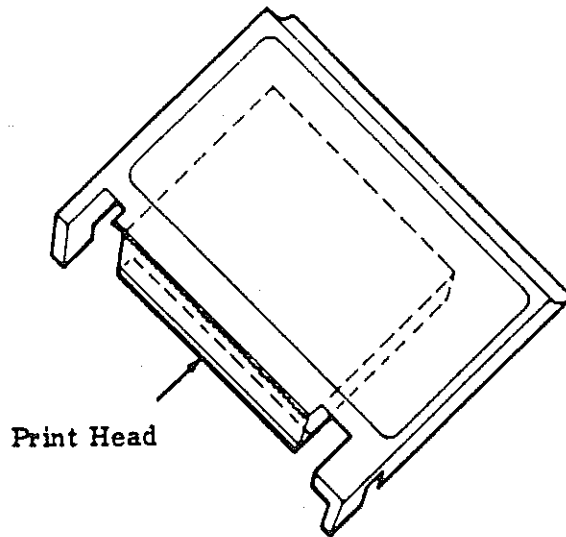


- Feed paper over roller between roller and bar.
- Lift roller back into place and rotate with finger to be sure drive gear is fully engaged.
- Lock door in place. (Be sure both sides are latched.)

B. Clean Print Head

When to do: When printout appears weak or smudged.

- How to do:
- Press down on ledge to open printer door.
 - Wipe print head, which is on the underside of door, with alcohol swab. Do not rub or scrape with anything or the head may be damaged. Use an alcohol wipe only.

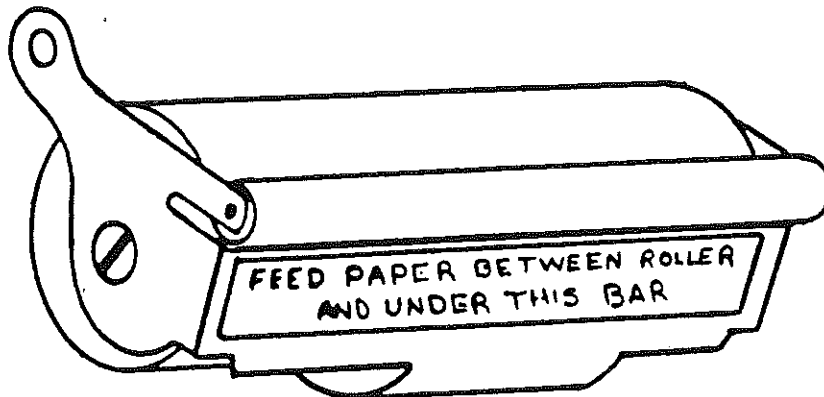


Wipe off any accumulated dirt particularly in this area. (Print head view from bottom.)

C. Clean Roller

When to do: When paper is not feeding correctly.

- How to do:**
- Open printer door. Push down on ledge of printer until roller flips outward.
 - Remove paper.
 - Clean roller with alcohol swab.
 - Replace paper. (See instructions A - Inserting Paper).



**CAUTION: ALCOHOL INTERACTS CHEMICALLY WITH THERMAL PAPER.
EXERCISE CAUTION NOT TO EXPOSE PAPER TO ALCOHOL.**

For Service and Instructional Information, please call:

(800) 227-1508

(800) 826-6566 (in California)