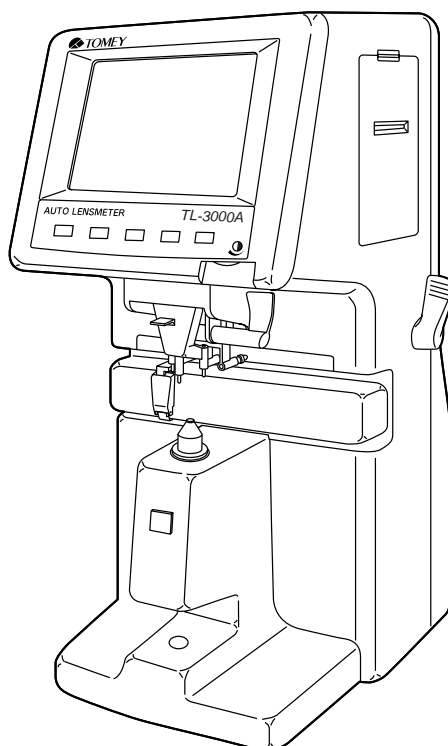


OPERATOR MANUAL

AUTO LENSMETER

TL-3000A



-
- Read this Operator Manual carefully before using this instrument in order to operate it properly and safely.
 - Do not use procedures other than those specified in this manual.
 - Keep this Operator Manual handy when operating this instrument.
 - For any questions about this instrument or about this manual, contact your Tomey representative or local distributor.
-

IMPORTANT PRECAUTION



- *Never install this instrument near locations where explosive or flammable materials are used or stored. Such installation may result in a fire or an explosion.*

SYMBOLS USED IN THIS MANUAL

The symbols used in this manual represent the following messages:



- *This is a precaution that, if unheeded, will result in a hazardous situation where there is an imminent danger of serious injury or death.*



- *This is a precaution that, if unheeded, may result in a situation where there is a possibility of minor or moderate injury or damage to property.*



- *This is an additional instruction, which may contain a special precaution on company policy related, either directly or indirectly, to the safety of personnel or to the protection of property.*

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Europe

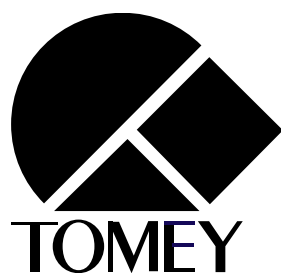
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ID: 0110

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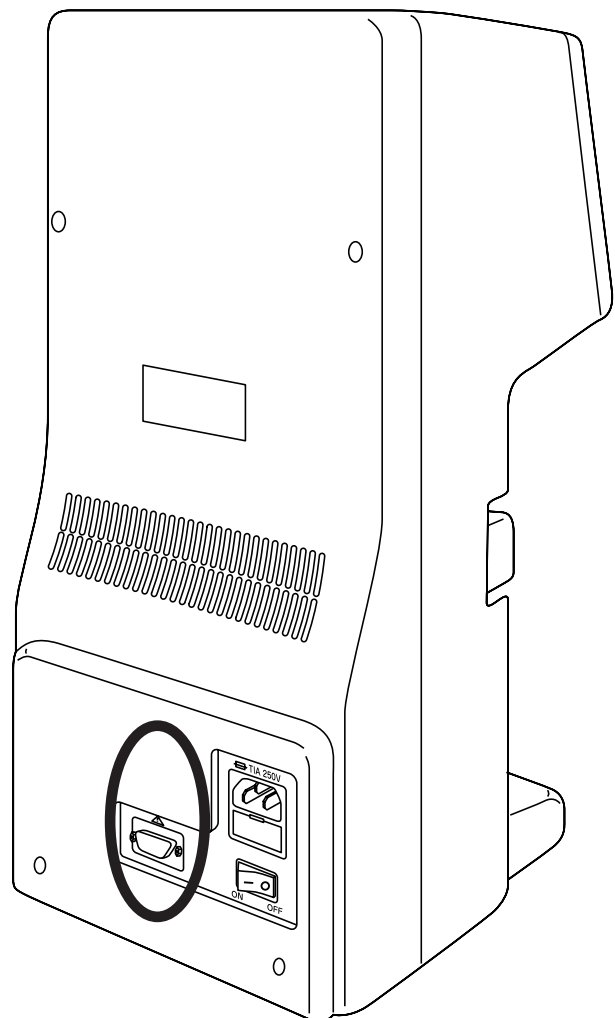
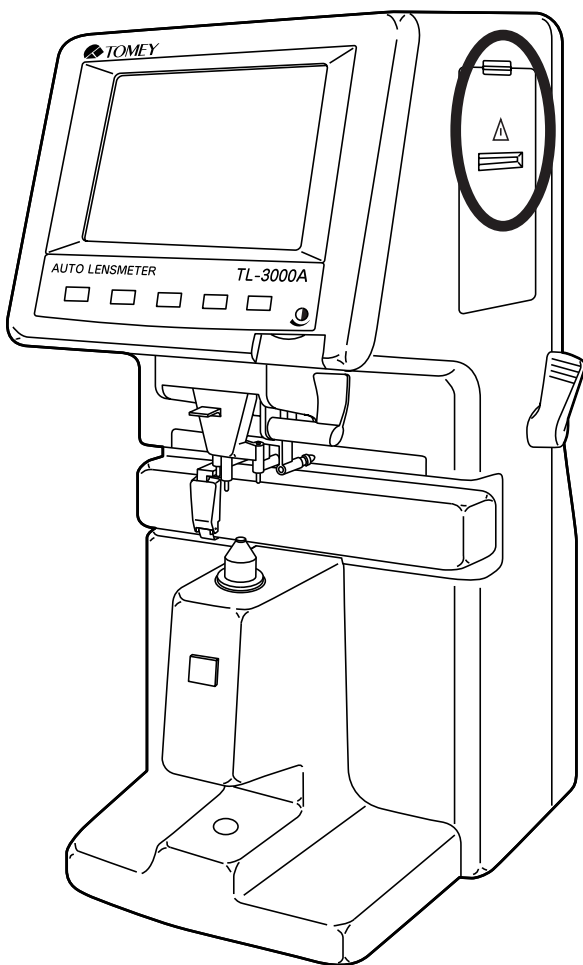
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CAUTION MARKS

- There are caution marks on the side and rear of the main unit .
-



- *Do not mutilate the caution marks.*
 - *The external output terminal is not isolated from the internal circuit. Before connecting any external devices, contact your Tomey representative. Otherwise, the internal circuit may be damaged.*
 - *Do not touch the edge of the paper cutter at the printer paper outlet.*
-



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1. PRIOR TO USE



- *Read this Operator Manual carefully before using this instrument in order to operate it properly and safely.*
 - *Do not use procedures other than those specified in this manual.*
-

1.1 Cautionary notes



- *Only well-trained personnel should operate this instrument.*
 - *When installing this instrument, observe the following items.*
 - Do not install this instrument in a location where it might be exposed to water or chemicals.
 - Do not install this instrument in a location where it might be subject to adverse influences, such as excessive atmospheric pressure, high temperature, excessive humidity, poor ventilation, direct sunlight, dust, salt or sulfur in the air.
 - Ascertain that factors such as excessive slope, vibration and impact will not endanger the instrument (including during transportation).
 - Do not install this instrument near the storage of chemical substances or in a location where gas may be generated.
 - Adhere to the specified mains frequency, voltage and allowable current (or allowable power consumption).
 - *During use of this instrument, observe the following:*
 - Do not move a coated lens when it is held with the clamp. This may result in damage to the coating. The clamp should be used only for marking.
 - Clean the cover glass under the nose piece often with a soft cloth.
 - Always keep the tip of the nose piece clean. Dust on it may result in scratches on a lens.
-



- *When cutting the printout, hold the paper against the edge of the paper cutter, bend the paper upward and tear off the paper by pulling in a lateral direction. Otherwise, a paper jam or malfunction of the printer may result.*
 - *When this instrument is not in use, keep the dust cover over it.*
 - *When the instrument is not used for an extended period of time, unplug the power cord.*
 - *After using this instrument, observe the following:*
 - Do not apply excessive force when unplugging the cords.
 - Refer to the Section 4.4 "Storage" for storage instructions.
 - *If you suspect that this instrument is not functioning properly, do not attempt to repair it. Contact your Tomey representative or local distributor.*
 - *Do not modify this instrument.*
 - *Maintenance:*
 - Inspect this instrument and its accessories periodically.
 - If this instrument has been idle for a long period of time, make sure that it is functioning properly and safely before using it again. For this, TOMEY recommends using a trial lens set for checking accuracy.
 - *Due to vibration during transport and/or environmental changes of storage, the ink may leak out of the marking device cartridge. If you find an ink stain and/or leakage of ink at the tip of the marking device, wipe it off and make sure it is functioning properly.*
-

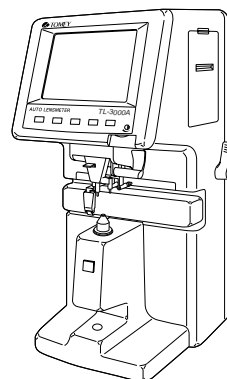
1.2 Unpacking

Upon unpacking , inspect that all the components are present and that there is no visible damage to any of them.

If there are any missing or damaged items, immediately contact your Tomey representative or local distributor.

- Note** • *Be sure to retain all shipping and packing materials for reuse if the instrument will be transported or shipped.*
-

COMPONENTS • Main unit of the AUTO LENSMETER TL-3000A ... 1



- Power Cord 1
- CL (Contact Lens) Nose Piece 1
- Hard Contact Lens Holder 1
- Spare Fuse (250V, 2.0A) 1
- Printer Paper (One roll is already in the unit) 3
- Dust Cover 1
- Operator Manual (this book) 1

1.3 Explanation of terms

- D Diopter (a unit of measurement referring to the refractive power of a lens; reciprocal of the focal length of the lens in meters)
- Δ Prism diopter (a unit of the measurement of angular deviation of light produced by a lens)
- SPH (S) Spherical refractive power (unit: D, diopter)
- CYL (C) Cylindrical refractive power (unit: D, diopter)
- AXIS (A) The position of minimum or maximum power in a lens that has cylinder power. Axis is measured in degrees and is used to specify the orientation of a lens to correct astigmatism. (unit: degree)
- ADD Additional power of a multi-focal lens (including a progressive addition lens).
- L Distance between the point at which the lens is measured and the bottom edge of the lens (or frame), when the bottom edge of the lens/frame abuts the lens table.
- Px, Py (in prism mode) Prism power (Δ) in the horizontal direction (Px) and the vertical direction (Py) in rectangular coordinates. (unit: Δ)
- PSM (in prism mode) Absolute value of prism power in polar coordinates. (unit: Δ)
- BAS (in prism mode) Base direction of prism in polar coordinates. (unit: deg.)
- DCx, DCy (in prism mode) ... Displacement from the optical center (unit: mm)
- P In High Power measurement mode, the spherical equivalent power [$\text{SPH} = 1/2 \text{ CYL}$] (unit: D, diopter)
- bf In High Power measurement mode, the back focus (distance of secondary principle focal point from posterior surface) of the lens (unit: D, diopter)
- CL Contact lens
- PROG mode Measurement mode for progressive addition lens
- HI mode Measurement mode for high index lens
- PD Pupillary distance (unit: mm)
- ROC, LOC Distance between measured point of lens and bottom edge of lens/frame

-
- UV Ultra Violet (< 380 nm)
 - Abbe number Number indicating the dispersive power of a lens. The Abbe number of normal lenses is about 60 and that of high index lenses ranges from approximately 30 to 45.

1.4 Outline of operation

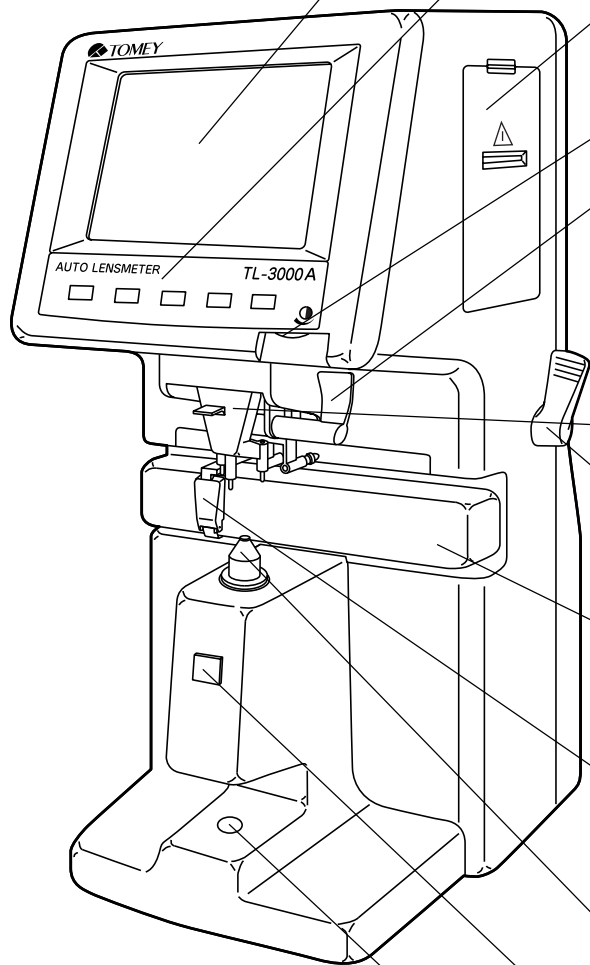
The AUTO LENSMETER TL-3000A is an instrument for the automatic measurement of refractive and prism power of spectacles and contact lenses.

The TL-3000A is composed of a built-in optical system, an electronic processing system, and a mechanical system.

Placing spectacles or contact lenses on the nose piece initiates automatic measurement. The results are displayed on the LCD and the reading can be printed.

2. COMPONENT LIST AND FUNCTIONS

2.1 Front



LCD

Liquid crystal display displays information such as centering of lens, measurement conditions and results.

Control panel

Five buttons are located on this panel to control the unit. The function of each button is indicated above the button on the LCD display.

Printer

Prints out readings.

Contrast adjuster

Adjusts the contrast of the LCD.

Marking device

Marks the center and axis orientation of the lens.

Clamp

Stabilizes the lens when marking it.

Lever

Changes the position of the lens table.

Lens table

Used to standardize the orientation of spectacles for accurate cylinder axis measurement and vertical prism measurement.

Nose block

Used for PD measurement.

Nose piece

Lens is placed on the nose piece.

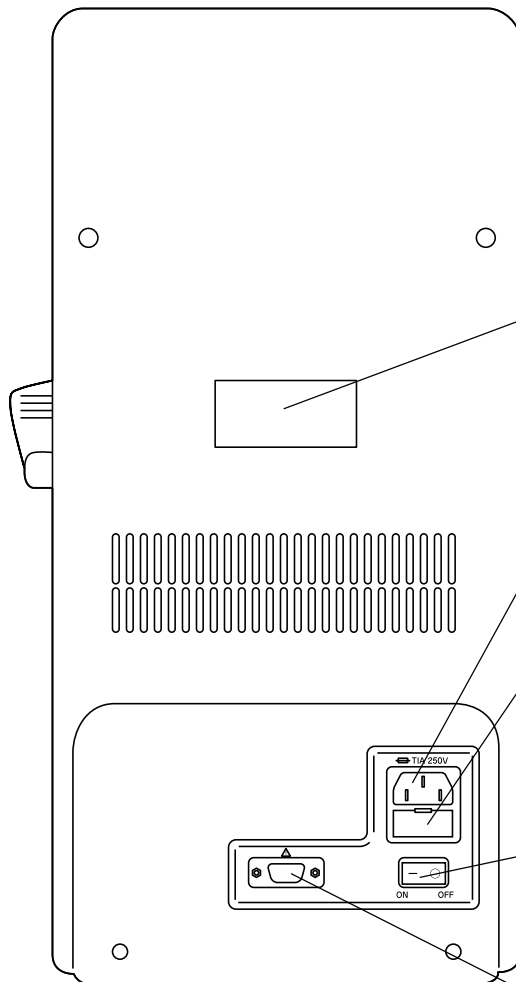
HOLD button

Used for holding and storing the data.

UV checker

Used to measure transmission ratio of Ultra Violet (UV) light.

2.2 Back



Name plate

Shows the serial number.

AC power terminal

The accompanying power cable is connected to this terminal.

Fuse holder

The fuse is mounted in this holder.

Power switch

Turns the power on or off.

External output terminal (RS-232C)

Prints the data when connected to a printer, or transmits the data when connected to a computer.


2.3 Screen layout

Indication of the automatic measurement mode

AUTO : Automatic measurement mode

LEFT reading

Lens Modes

Single Vision mode:	no message
Progressive addition lens mode:	PROG
Bi-focal mode:	Bi
Tri-focal mode:	Tri
Contact lens mode:	CL
Contact Lens mode with a holder:	CL 
High Power Mode	HP

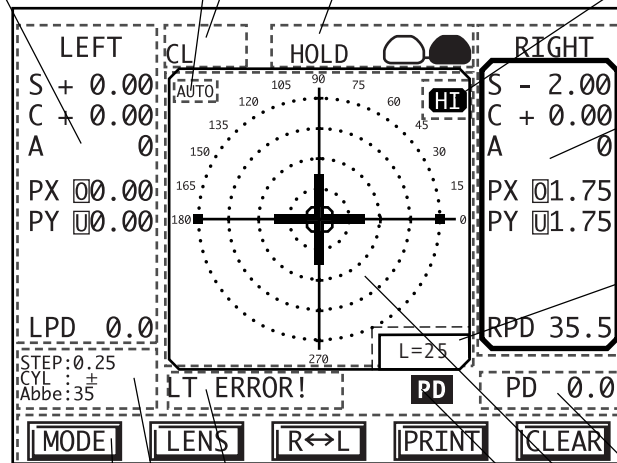
Holding data

HOLD : Indicates that the data are being held.

HI

High index lens mode indicator

RIGHT reading



L Value

Displays distance from measuring point to lens table.

PD (Total pupillary distance)

Alignment screen

Centering with the cross bar

PD status

ON/OFF

Error display

The type of error is shown.

Data representation protocols

Indicates power increment (STEP), cylinder convention (CYL) and Abbe number.

Button indication


In each mode, each button on the panel below the LCD display is assigned a different function; the current function of each button is displayed by these five icons.

2.4 Buttons for operations

1) Display 1 ()

- MODE:** for switching between Control Panel Display 1 and Control Panel Display 2.
for entering Setup mode (by pressing and holding for approximately one second).
- LENS:** for switching between single vision, multi-focal lens, contact lens and high power modes.
- R ↔ L:** for switching from S-mode (for measuring single lenses) to RL-mode (for measuring lenses mounted in spectacle frames) and for switching between the right and left lens.
- PRINT:** for recalling and printing readings.
- CLEAR:** for clearing stored readings (if any readings are in the memory).
for changing from RL-mode to S-mode (if no readings are in the memory).

2) Display 2 ()

- MODE:** for switching between Control Panel Display 1 and Control Panel Display 2.
for entering Setup mode (by pressing and holding for approximately one second).
- + ↔ - :** for changing CYL reading (+, -) for the currently displayed lens(es).
If you go back to Display 1, the CYL reading (+, -) returns to the default setting. It can be changed permanently in Setup Menu 1.
- PD:** for changing PD mode (ON/OFF)
If the PD mode is ON,  is shown on the lower right of the screen.
- UV:** for using UV check function
- PRISM:** for changing prism mode (No display, Px/Py, PSM/BAS, DCx/DCy).
- CAL:** for calibration of UV check function (only appears in UV check function).

3) HOLD button

The HOLD button is used for storing a reading manually.

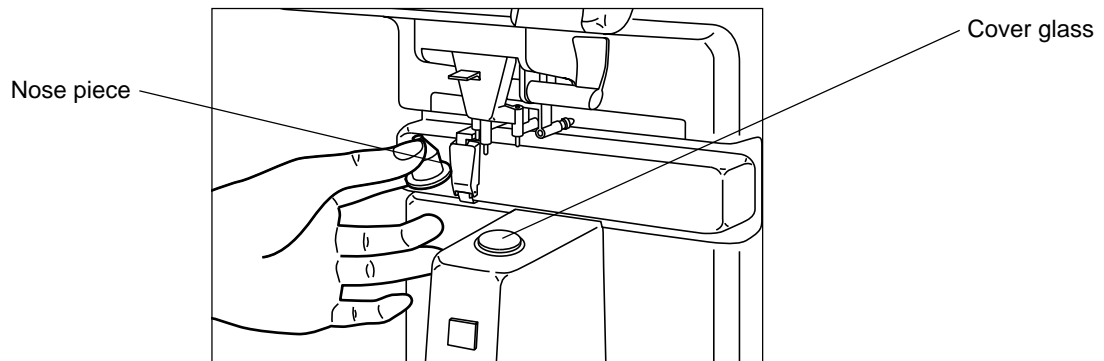
3. METHOD OF OPERATION

3.1 Preparation for operating



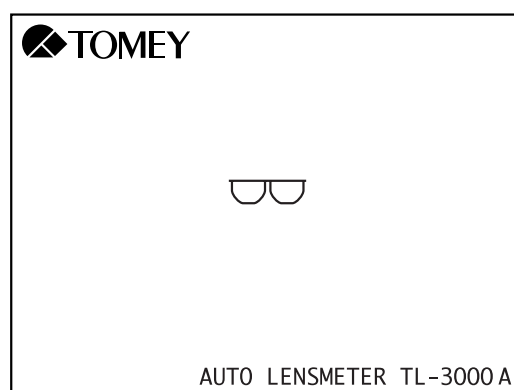
- **Before turning on the power, check the following items:**

- Make sure that the cover glass under the nose piece is clean.



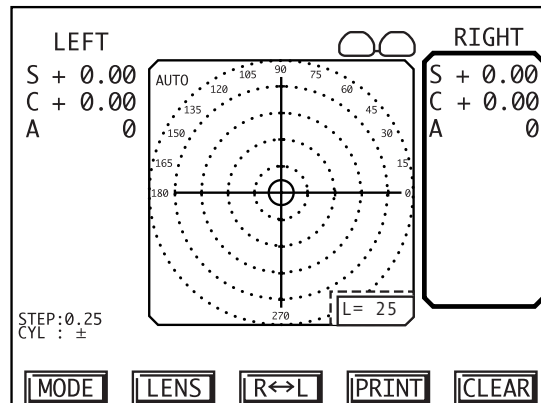
- Make sure that a lens is not on the nose piece.
 - Make sure that the nose piece is seated properly.
-

- 1) Connect the female end of the power cord into the power receptacle on the back of the Autolensmeter and the male end into a 3-prong power outlet.
- 2) Press the power switch ON.
- 3) The initial screen will appear for approximately five seconds.

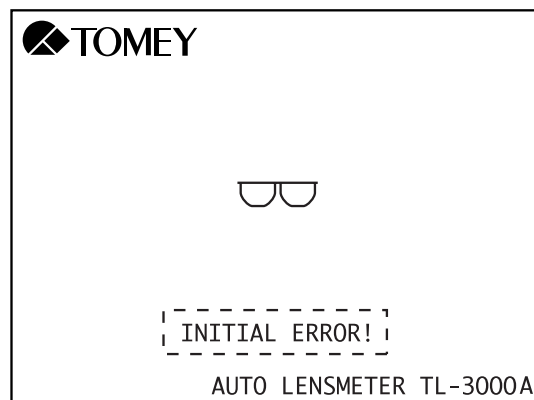


-
-
- Note** • **When the instrument is first turned on, the LCD (liquid crystal display) may appear dim. The brightness will increase as it warms up. This may require extra time if the ambient temperature is low.**
-
-

4) The measurement screen will appear.



- Notes**
- ***Do not place a lens onto the nose piece until after the measurement screen appears.***
 - ***Turning the instrument on with the lens already on the nose piece initiates a beep and indicates "INITIAL ERROR" on the LCD. Remove the lens from the nose piece, then press any button to proceed.***



3.2 Measuring methods

3.2.1 Measuring single vision lenses

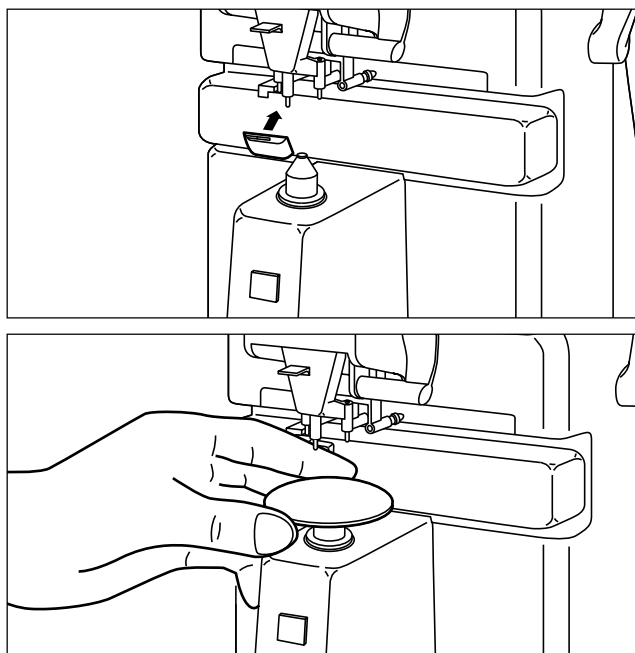
a) Measuring single lenses (lens blanks, S-mode)

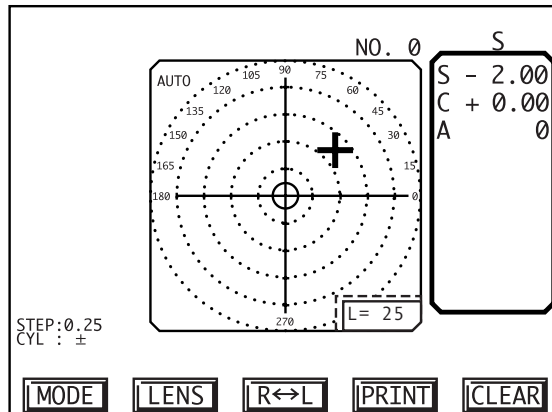
- Note** • *In Auto mode, the reading will be automatically held when appropriate alignment is achieved. Change between AUTO mode and Manual mode by continuously pressing the HOLD button located below the nose piece for approximately one second.*
-
-



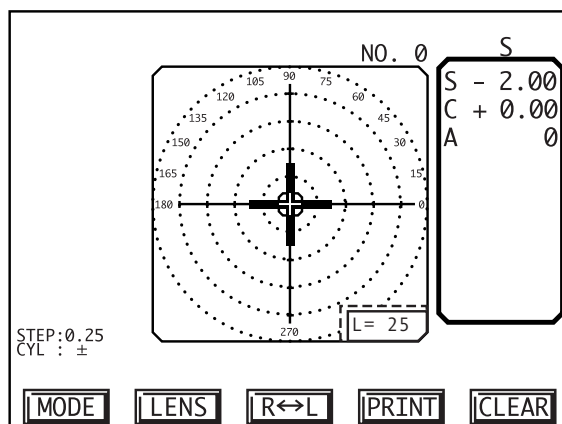
- *Do not push the lens against the nose piece with undue force or move the lens abruptly, which may cause to damage the lens.*
-

- 1) To measure a single lens, SINGLE mode must be set to ON in Setup (see section 3.4, Menu 4). If the instrument is in the RL-mode, press the CLEAR button to change to the S-mode. To change back to RL-mode, press the R ↔ L button.
- 2) The nose block for PD measurement must be locked against the lens table by the clamp (toward the left side of the table).
- 3) Place the lens on the nose piece.

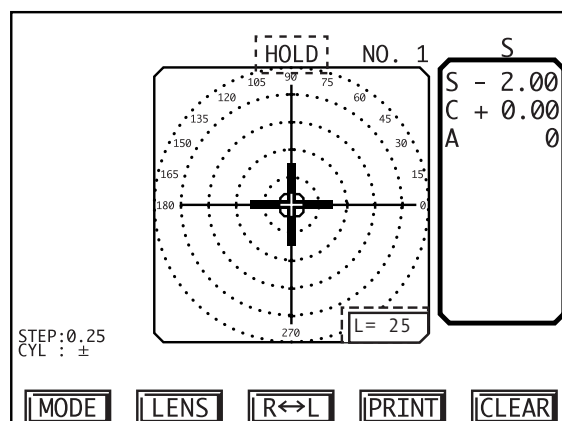




- 4) Move the lens gently right and left, back and forth to center the cursor (+) on the crosshair.



- 5) Measured data are displayed in real time. If the lens table is used, "L" (displayed at the bottom right of the alignment screen) indicates the distance between the measured point (center of nose piece) and the bottom edge of the lens.
- 6) In Auto mode, the reading will be automatically acquired and held. In Manual mode, press the HOLD button when the lens is aligned to hold the measured data. The memory display will show HOLD and the stored data will be displayed. Up to 50 measurements can be stored (S-mode only).



-
- 7) After removing the lens from the nose piece, the target ("+" mark) will disappear. It will reappear when another lens is placed on the nose piece.
 - 8) Press the PRINT button to print all the data that have been stored. Until HOLD button is pressed next time, all data are retained.
-
-

Notes

- *Pressing the HOLD button will allow the instrument to return to the measuring mode for taking new readings. ALL data for previously measured lenses are retained. However, if 50 measurements have been stored and the HOLD button is pressed, the message "OVER FLOW!" is displayed and indicates that there is no room to store additional readings. To continue measurement, it is necessary to either press the CLEAR button or print out the stored measurements by pressing the PRINT button before taking another reading.*
 - *Pressing the CLEAR button erases ALL data that have been stored, i.e., data for all previously measured lenses are erased.*
 - *If the SINGLE MODE menu setting is off, the S-mode cannot be activated. (See Section 3.4, Setup, Menu 4)*
 - *Single lenses with power exceeding +/- 25D (up to +/- 80D) can be measured using the High Power Lens Mode (see Section 3.2.7 and Section 3.4, Setup Menu 2).*
 - *If the PRINT menu setting is off, no printout can be made. (See Section 3.4, Setup, Menu 1).*
-
-

b) Measuring framed lenses (RL-mode)



- *Do not push the lens against the nose piece with undue force or move the lens abruptly, which may cause damage to the lens.*
-

Note

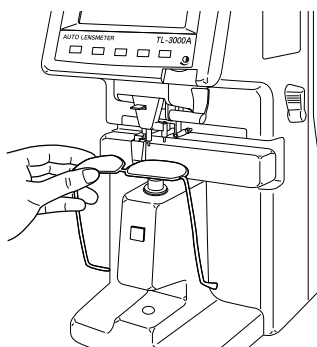
- *In Auto mode, the reading will be automatically held when appropriate alignment is achieved. Change between Auto mode and Manual mode by continuously pressing the HOLD button located below the nose piece for approximately one second.*
-

- 1) If the instrument is in S-mode, Press the R<->L button to change to RL mode. The right lens is expected to be measured first and then the left lens. If you wish to measure the left lens before the right lens, press the R<->L-button again. A rectangle indicates the lens (R or L) to be measured. (Auto R/L may be turned ON or OFF; see Section 3.4, Setup Menu 3. The default setting is ON).
-

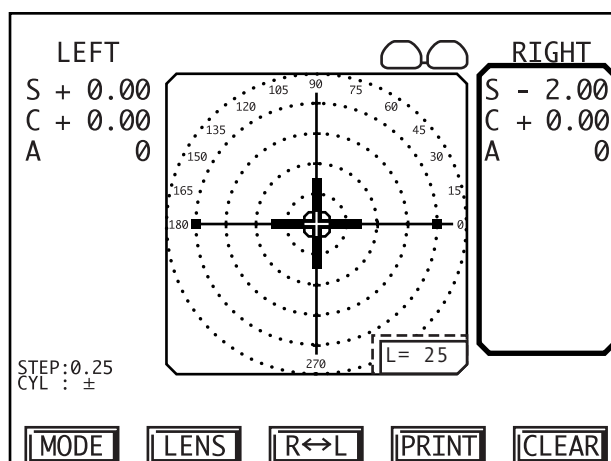
Notes

- *If the nose block is not at the home position, the unit is in PD measurement mode and the R<->L-button is not functional (i.e., pressing it does not change between Right and Left).*
-

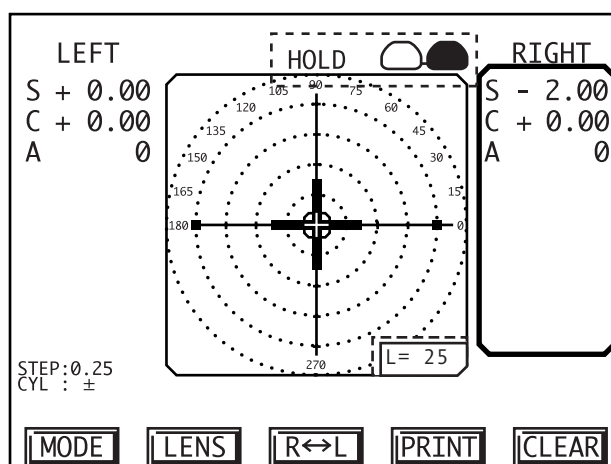
- 2) Place the right lens on the nose piece with the bottom of the frame away from you and the temples downward (as shown below).



- 3) Move the lens back and forth to center the cursor (+) on the crosshair.

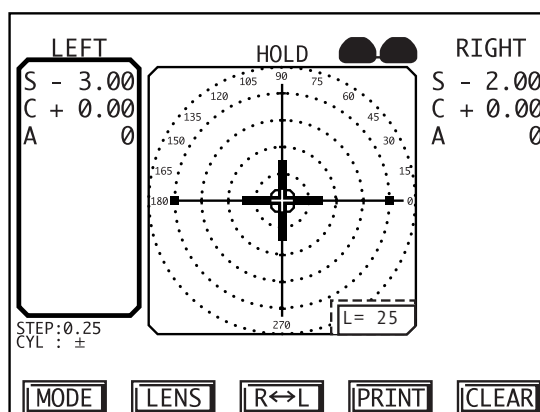
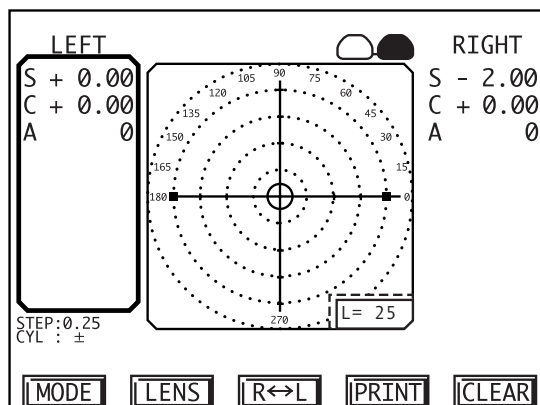


- 4) Measured data are displayed in real time. If the lens table is used, "L" (displayed at the bottom right of the alignment screen) indicates the distance between the measured point (center of nose piece) and the bottom edge of the lens or frame.
- 5) In Auto mode, the reading will be automatically held when alignment is achieved. In Manual mode, press the HOLD button when the cursor is centered to store the data.
- 6) HOLD is shown in the memory display and the lens that has been measured becomes dark on the spectacle icon.



- 7) When the lens is removed from the nose piece, the target (+) disappears. The "active" lens automatically switches to the other side, i.e., after the right lens has been measured, the instrument is ready to measure the left lens. If you wish to re-measure the right lens, press the R<->L button to reactivate "R" measurement.

8) When measurement of the right lens is completed, repeat the above steps to measure the left lens.



9) After both lenses have been measured, press the PRINT button to print the measurement.

10) The instrument is now ready to measure a right lens

Notes

- Pressing the **HOLD** button will allow the instrument to return to the measuring mode for taking new readings. ALL data for previously measured lenses are retained until you take the next reading. The new reading will replace the old reading that was stored in memory.
- Pressing the **CLEAR** button erases ALL data that have been stored, i.e., data for both the right and the left lens are erased.
- If a lens is placed on the nose piece without clearing the previous measurements, the stored data are cleared and the new reading will be displayed.
- If the **PRINT** menu setting is off, no printout can be made (See Section 3.4, Setup, Menu 1).

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3.2.2 Measuring Multi-Focal Lenses

There are four multi-focal options (see Section 3.4, Setup Menu 2):

- | | |
|-----------------|---|
| 1) Progressive: | for measuring progressive lenses |
| 2) Bi-focal: | for measuring bifocal lenses |
| 3) Tri-focal: | for measuring trifocal lenses |
| 4) Prog+Bi: | for measuring progressive and bifocal lenses
(default setting) |

(Note that the above options are for framed or single multi-focal lenses, not for multi-focal contact lenses.)

To change from Single Vision mode to Multi-Focal mode on the measurement screen, press the LENS button.

When the Single Vision option selected in Setup is Spectacle+CL, pressing the LENS button displays the measurement screens in the following order: Single Vision Mode for framed/single lenses, Multi-focal mode(s) for framed/single lenses and Contact lens mode. For example, if the PROG+Bi Multi-focal option is selected, pressing the LENS button changes the screen successively from Single Vision mode to Progressive mode to Bifocal mode to Contact lens mode.

When the Single Vision option selected in Setup is Spectacle, if the selected Multi-focal option is PROG+Bi, pressing the LENS button changes the screen successively from Single Vision framed/single lens mode to Progressive mode to Bifocal mode. If the selected Multi-focal option is Progressive or Bifocal or Trifocal, pressing the LENS button alternately changes between Single Vision mode and the selected Multi-focal mode.

a) Measuring progressive addition lenses (PROG mode)

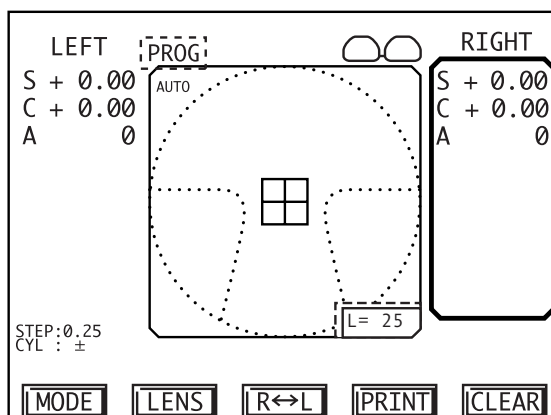


- *Do not apply the lens to the nose piece with undue force or move it abruptly, which may cause to damage lens.*
-

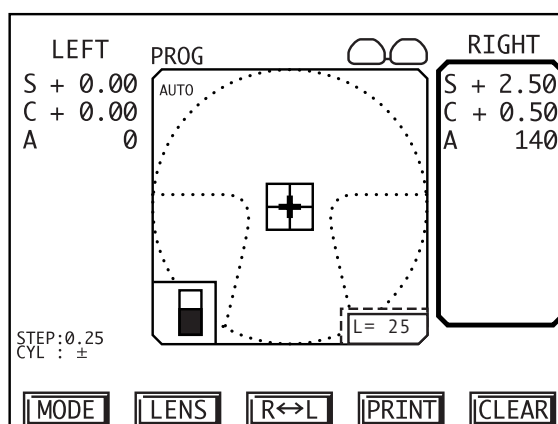
Notes

- *When measuring in the Auto mode, the reading at the far area and ADD data at the near print area are held automatically. Press the HOLD button for approximately one second without a lens on the nose piece to alternately change between the Auto and the Manual mode.*
 - *If you cannot make a proper measurement of progressive addition lenses, see "5.1 TROUBLESHOOTING".*
-

- 1) Select Progressive mode on the measurement screen by pressing the LENS button. (If Progressive mode is not available, go to Setup Menu 2 and change the Multi-Focal mode setting; see Section 3.4.)
- 2) Determine the extent of the progressive addition area.
 - a. Place the lens on the nose piece with the bottom of the frame away from you and the temples downward as illustrated on p.3-6 and, with the progressive addition area, which is located slightly below the center of the lens, above the nose piece.



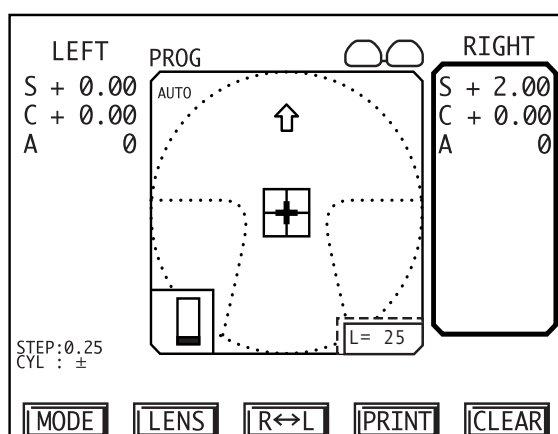
- b. A bar graph indicating refractive power change at the point being measured in the progressive area appears at the left lower part of the target area.



Notes • *If the add power is low, it may not be possible to center the target. In this case, place the center of the lens above the nose piece and press the HOLD button to proceed to far point measurement.*

3) Measure the far point area.

- a. Since the far point area is located in the top portion of the lens, move the lens away from you so that the top portion is over the nose piece. Move it back/forth and left/right to center the cursor (+) on the crosshair.

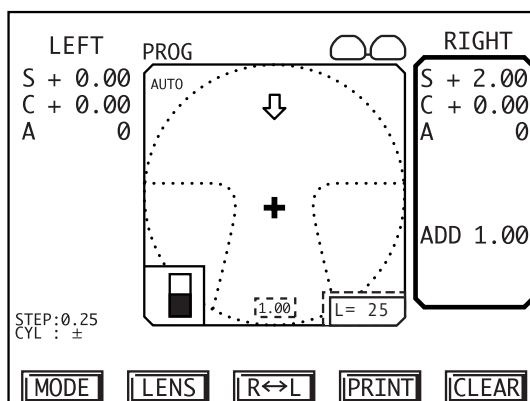
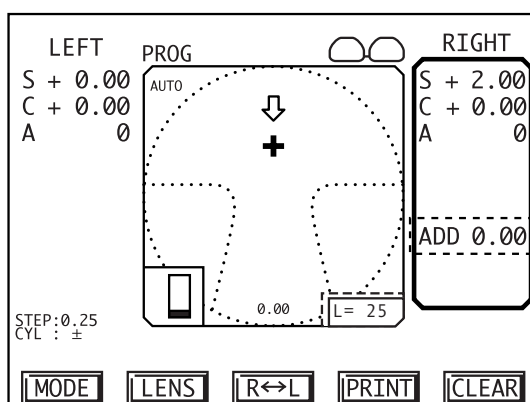


- b. When centering of the target is achieved, if in the Auto mode, a beep sounds and the far point power is automatically stored. If not in the Auto mode, it is necessary to press the HOLD button when the target is centered to store the data. (See 3.4 Setup, Menu 3.)
- c. The display is next changed to that for measurement of the near point

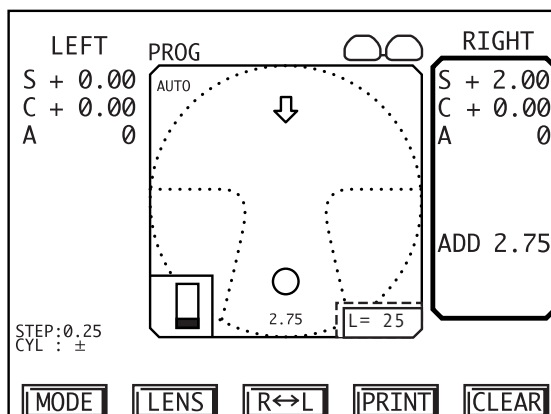
- c. Move the lens back/forth and left/right to center the target (+) on the crosshair until a beep sounds. The display is changed to the far point measuring screen, indicated by an upward pointing arrow.

Note • *There are some lenses for which centering cannot be achieved. In case of such a lens, move the lens back/forth and left/right with the area approximately 6 to 10 mm above the center of the lens (in the center of the frame in case of a framed lens) positioned above the nose piece and measure the far point area in the position where there is the least variation of SPH and CYL values. Then press the HOLD button.*

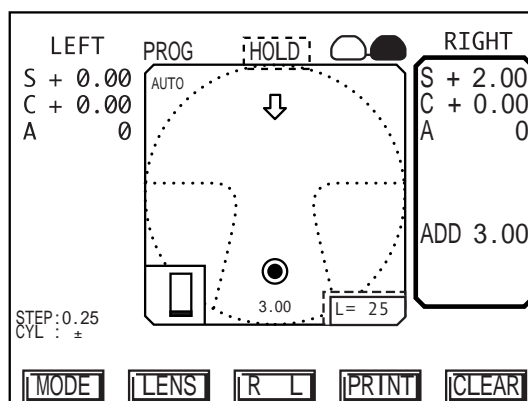
- 4) Measuring the near point area.
- a. Move the lens toward you so that the add portion is positioned over the nose piece. Move the lens back/forth and left/right to find the maximum value. The add value is displayed in the lower portion of the target area.



- b. When the location of the near point (maximum add) is approximated, the cursor (+) changes to an open circle (○).



- c. When the near point is found, the open circle (○) changes to a filled circle (●).



- d. In the AUTO mode, a beep sounds and the add value is automatically acquired and held. In the manual mode, press the HOLD button. The display shows HOLD.
- 6) Remove the right lens from the nose piece. After the target disappears, place the left lens on the nose piece again, and repeat the above steps.

Note

- *There are some progressive addition lenses mounted in the frame such that their near point area is very close to the lower edge of the frame. In such cases, the target may not change from "+" to "○" followed by "●". If so, regard the maximum addition value in the progressive addition zone as the near point and press the HOLD button.*

b) Measuring bifocal and trifocal lenses

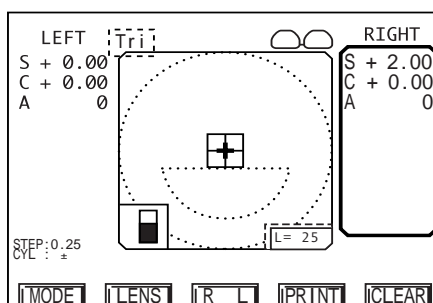
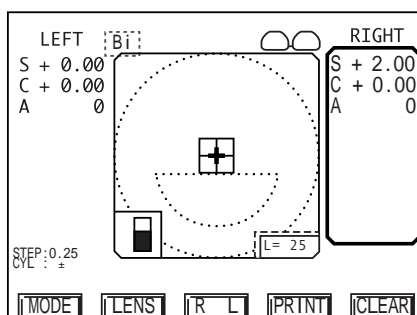


- *Do not push the lens onto the nose piece with undue force or abruptly move the lens, which may damage the lens.*

Note

- *When measuring in the Auto mode, the reading at the far area and the add values at the near point area are held automatically. Pressing the HOLD button continuously for approximately one second alternately changes between Auto and Manual modes.*
-

- 1) Select Bifocal or Trifocal mode on the measurement screen by pressing the LENS button. (If the desired mode is not available, change the Multi-Focal mode setting on Setup Menu 2; see Section 3.4). "Bi" or "Tri" will be indicated above the measurement screen, depending on which has been selected on Setup Menu 2.



-
- 2) Place the right lens on the nose piece with the bottom of the frame away from you and the temples downward (See illustration on p. 3-6)
 - 3) Measure the far point area.
 - a. Move the lens back/forth and left/right to center the cursor (+) on the crosshair.
 - b. When centering is achieved, if in the Auto mode, a beep sounds and the reading in the far point area is held . If in the manual mode, it is necessary to press the HOLD button when the target is centered to store the reading. (See 3.4, Setup, Menu 3.)
 - 4) Measure the near point area.
 - a. Move the lens toward you to position the near segment over the nose piece. For a tri-focal lens, move the intermediate area over the nose piece.
 - b. The "+" mark moves downward as you move the lens and changes to a filled circle (●) when the near (or intermediate) point is centered.
 - c. In AUTO mode, a beep sounds and the add (or intermediate) value is automatically stored. In MANUAL mode, press the HOLD button to store the value.
 - d. In case of a trifocal lens, after measuring the intermediate segment, draw the lens closer to you to move the near point area over the nose piece. Press the HOLD button to store the add value.
 - 5) Remove the lens from the nose piece. After the target disappears, repeat the above procedure for the next lens.
-
-

Note • *Removing the lens while measuring the near point area automatically returns the display to that for the far point area.*

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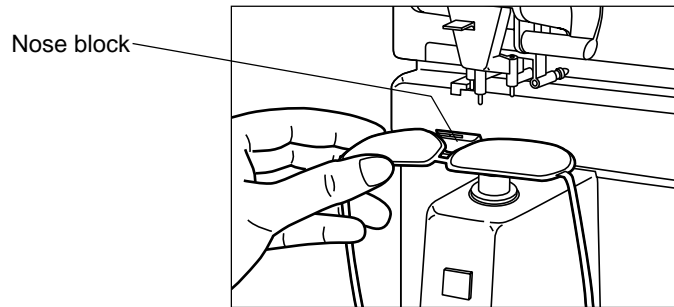
3.2.3 Measuring Interpupillary Distance (PD)

- Note**
- *In Auto mode, the reading will be automatically held when appropriate alignment is achieved. Change between Auto mode and Manual mode by pressing the HOLD button located below the nose piece continuously for approximately one second.*
 - *When the distance measurements are automatically held (Auto mode for single vision lenses and for multi focal lenses), the lens PD is measured from the optical centers of the right and left lens. When the distance measurements are manually acquired by pressing the HOLD button, the lens PD is measured from the location at which the readings were taken.*
 - *Monocular lens PDs (RPD and LPD) measured from the point at which the distance reading was taken to the center of the nose block.*
-

For measuring lens interpupillary distance (PD), **PD measure** must be turned ON, as described in Section 3.4, Setup, Menu 1. If PD is ON, "PD" appears at the lower right of the screen (above the PRINT button).

Setup Menu 4		
SINGLE mode	:	OFF ON
TOTAL PRISM	:	OFF ON
PD measure	:	OFF ON
UV check	:	OFF ON
Beep	:	OFF ON
MODE	←	→ NEXT END

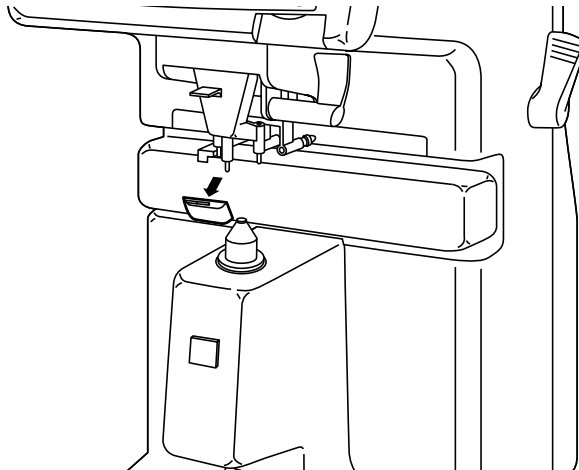
- To obtain correct PD measurement, the nose block must rest securely against the frame between the two spectacle lenses.

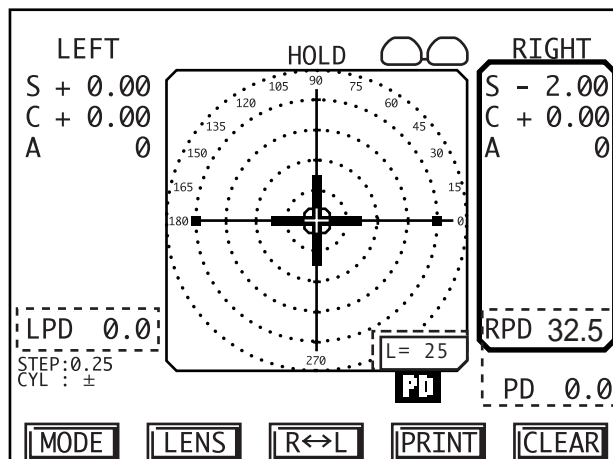


- To obtain PD measurement, the lens table must abut the lower end of the frame. Correct PD measurement cannot be obtained if the frame is tilted.
- PD data are displayed in real time; they are displayed when the data are stored.
- If you do not wish to measure PD, move the nose block up and to the far left and lock it in place against the lens table.

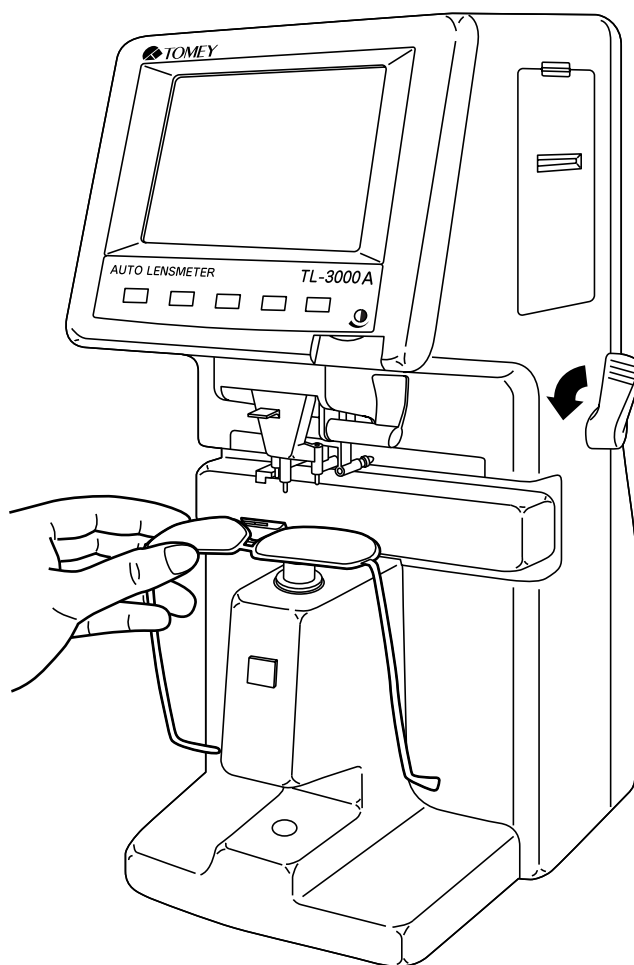
1) If the instrument is in Single mode, change to RL mode by pressing the R<->L button.

2) Unlock the nose block by moving it slightly to the right and allowing it to drop down.

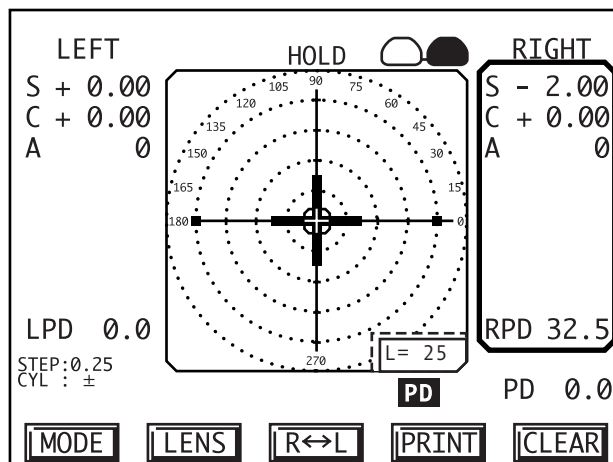




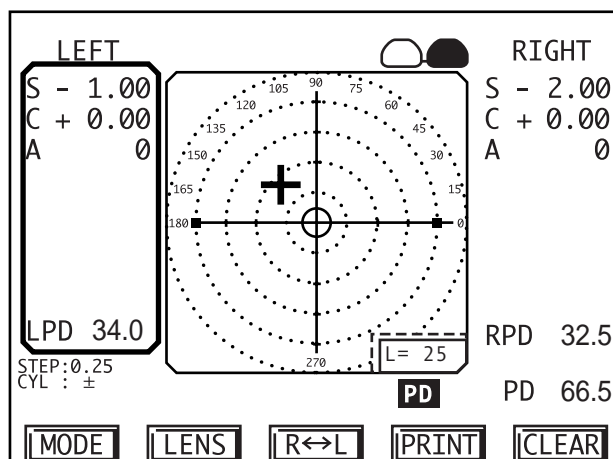
- 3) Place the right lens on the nose piece with the bottom of the frame away from you and the temples downward (as shown on the next page).



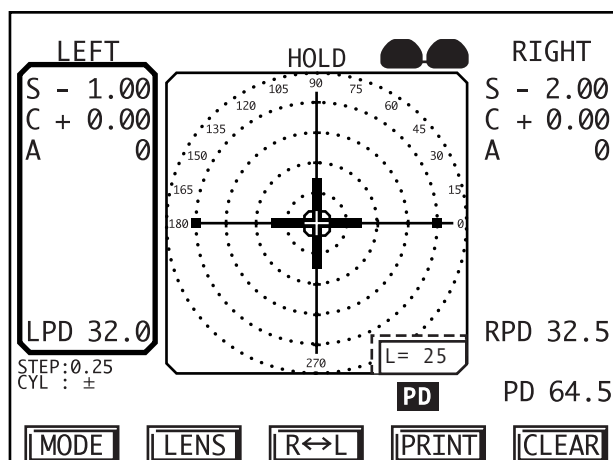
- 4) Move the lens table to abut the lower edge of the frame by pulling the lens table lever toward you.
- 5) Place the nose block between the two nose pads.
- 6) Measure the right lens, making sure that the lower edges of the frame touches the lens table at all times.
- 7) In Auto mode, the reading will be automatically held when alignment is achieved. In manual mode, press the HOLD button when the cursor is centered
- 8) Measured data are stored and the monocular PD value (RPD) for the measured lens is displayed.



- 9) Move the frame to the left lens with the nose block still resting on the frame between the nose pads. (Lift the frame upward to clear the nose piece.) Measurement is automatically changed for measurement of the left lens.



- 10) Measure the left lens using in the same procedure as for the right means.

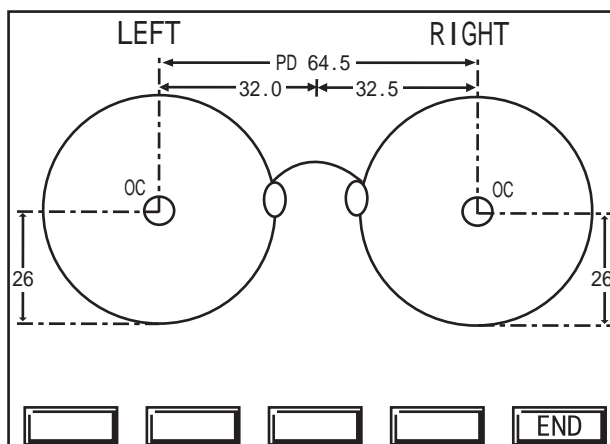


-
- 11) Measured data are stored, and the monocular PD value for the left lens (LPD) and the total PD value (RPD + LPD) are displayed.
 - 12) Press the PRINT button to print the measurement.

a) Center to Bottom Display

To display a diagram showing the distance between the location at which the measurement was taken and the bottom edge of each lens/frame, as well as the monocular and total PD measurements. This display only shows on the single vision mode and must measure both lenses.

-
-
- Note**
- ***In order for the center to bottom distance to be accurately measured, the lower edge of the spectacle frame must rest against the lens table during the entire measurement procedure.***
 - ***This feature is available only after measuring PD for single vision spectacle lenses. It is not available for multi-focal lenses.***
 - ***If the PD setting is OFF, PD is not shown at the lower right of the screen. To activate PD measurement, quickly press the Mode button, then press the PD button or turn PD measure ON in Setup Menu 4 (see section 3.4).***
-
-



To display the above diagram, after measuring PD, press the R ↔ L button for a second.

To exit this screen, press the End button.

If the Center to Bottom Display is activated (OPTICAL CENTER ON in Setup Menu 5), the distance between the measured point of the right and left lens and the bottom lens/frame edge will appear on the printout (ROC and LOC).

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3.2.4 Measuring prism

To measure prism, select one of the three prism measurement options (see below) according to the instructions given in section 3.4, Setup Menu 1. If you have already selected a prism option and wish to change it, press the Mode button to enter Mode 2 and press the prism button to view / select a different prism option. When the prism option is activated, prism values are displayed below the sphere, cylinder and axis values.

Three prism display options are available:

- PX, PY (Δ): Rectangular coordinates
- PSM, BAS(Δ , deg.): Polar coordinates
- DCX, DCY (mm): Displacement from the optical center (mm)

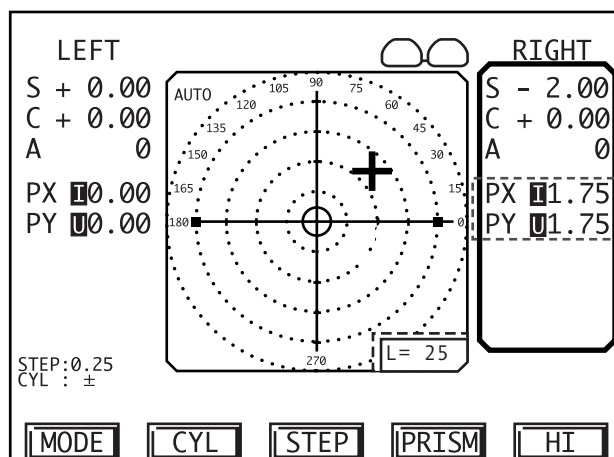
- Rectangular coordinate

PX: horizontal base direction (in or out) and prism magnitude (prism diopters).

PY: vertical base direction (up or down) and prism magnitude (prism diopters).

Prism base direction is expressed as:

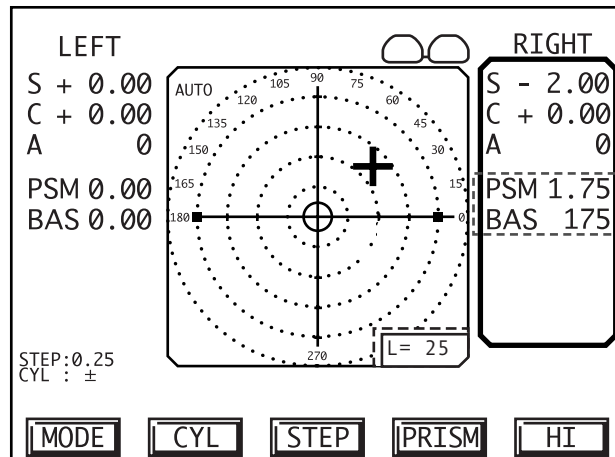
- O** : base out **I** : base in
U : base up **D** : base down



- Polar coordinates

PSM: prism magnitude (prism diopter)

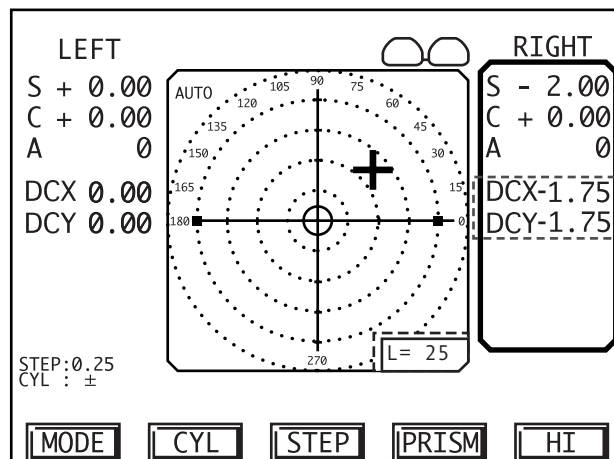
BAS: base orientation (angle in degrees)



- Displacement from the optical center

DCX: Horizontal displacement (mm) from optical center

DCY: Vertical displacement (mm) from optical center



- Total Prism Display

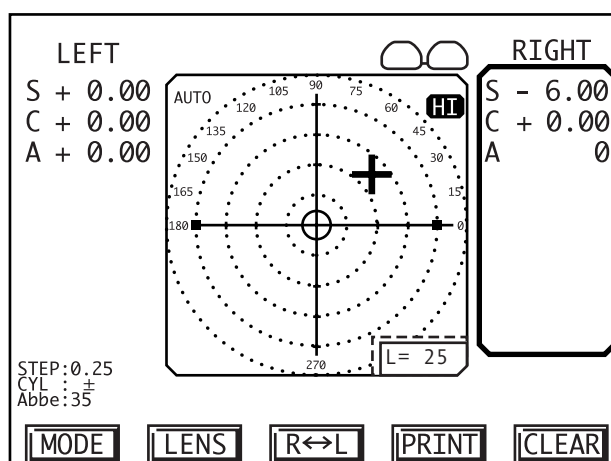
If the TOTAL PRISM option is ON (see Section 3.4, Setup Menu 4), the total (net) horizontal and vertical prism in a pair of spectacle lenses will be displayed after both lenses have been measured. The values are expressed in rectangular coordinates (BI/BO, BU/BD), regardless of which prism display option you have selected. The total prism values are displayed below the right lens data. The total vertical prism value is given for the right lens.

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3.2.5 Measuring high index lenses (HI mode)

- Notes**
- *It is recommended to use the High Index (HI) mode when measuring high index lenses. In general, a lens with refractive index of 1.6 or higher, is considered as a high index lens. The correct Abbe number should be used to obtain the most accurate reading (see Section 3.4, Setup Menu 1).*
 - *The industrial standard wavelength used in measuring lenses is slightly different from the wavelength used in TL-3000A. Because of this, if the High Index mode is not used, the TL-3000A reading of high index lenses may be different from the reading provided by the lens manufacturer.*
-

- 1) The default abbe number value for normal index mode is 60. The default Abbe number for HI mode set at the factory is 35. To change the value of the Abbe number for HI mode, see the instructions given in Section 3.4 Setup, Menu 1. To obtain accurate Abbe number of the lens, please read the lens data sheets provided by the manufacturer.
- 2) Hold the LENS button for approximately one second.
- 3) "HI" is displayed at the upper right of the target area.



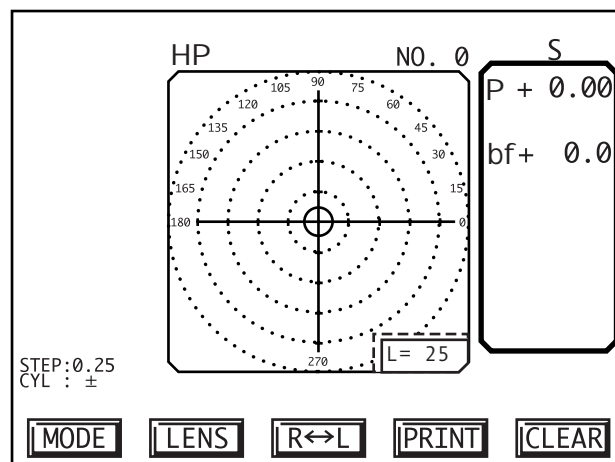
- 4) When "HI" is displayed, the measured values are automatically corrected using the Abbe number set for high index.
- 5) To exit HI mode, press and hold the LENS button for approximately one second.

3.2.6 Measuring high power lenses (HP mode)

Notes

- *The HIGH POWER option is available only for measuring single lenses (S-mode); It is not available for framed lenses (RL-mode).*
 - *When the HIGH POWER option is ON (see Section 3.4, Setup Menu 2), the only available lens modes are single vision single (not framed) lenses and HIGH POWER CONTACT LENS is use the CL nose piece to measure the high power contact lens.*
 - *The sperical equivalent power $[SPH + 1/2 CYL]$ of the lens is displayed; cylinder values are not given.*
-

- 1) To measure a lens with power exceeding +/- 25D, both SINGLE mode (see Section 3.4, Setup Menu 4) and HIGH POWER single vision mode (see Section 3.4, Setup Menu 2) must be ON. "HP" will appear at the upper left of the alignment screen.



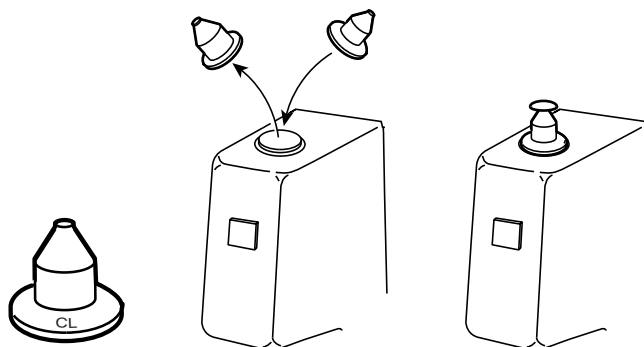
- 2) Measure the lens as described in Section 3.2.1a [Measuring single vision lenses, Measuring single lenses (lens blanks, S-mode)].
- 3) In Auto mode, the reading will be automatically acquired and held. In Manual mode, press the HOLD button when the lens is aligned to hold the measured data. The memory display will show HOLD and the spherical equivalent power ($P=SPH + 1/2 CYL$) in diopters and the length of the back focus (bf) of the lens in millimeters will be displayed. Up to 50 measurements can be stored.

3.2.7 Measuring contact lenses (CL mode)

Note

- *Because the measurement conditions for contact lenses are different from those for spectacles, be sure that the following requirements are met:*
 - *Be sure to use the Contact Lens nose piece when measuring contact lenses. Using the standard nose piece may result in errors.*
 - *Be sure to use the Contact Lens mode (CL mode) when measuring contact lenses. Measuring in Spectacle mode may result in errors.*
 - *Be sure that the appropriate Contact Lens mode is selected in Setup (see Section 3.4, setup Menu 2). To measure soft or rigid contact lenses without the contact lens holder, the Single Vision option SPECTACLE + CL should be selected. To measure rigid contact lenses using the contact lens holder, the Single Vision option SPECTA + CL should be selected. Using the wrong CL mode may result in errors.*
 - *If the AUTO CL feature is turned ON (see Section 3.4, Setup Menu 3), the Contact Lens mode will automatically be activated when the contact lens holder is placed on the nose piece. When the contact lens holder is removed, the mode will automatically change to Spectacle mode.*
-

1) Remove the standard nose piece and install the Contact Lens nose piece.



2) Change to Contact Lens mode, indicated by "CL" at the upper left of the measurement screen.

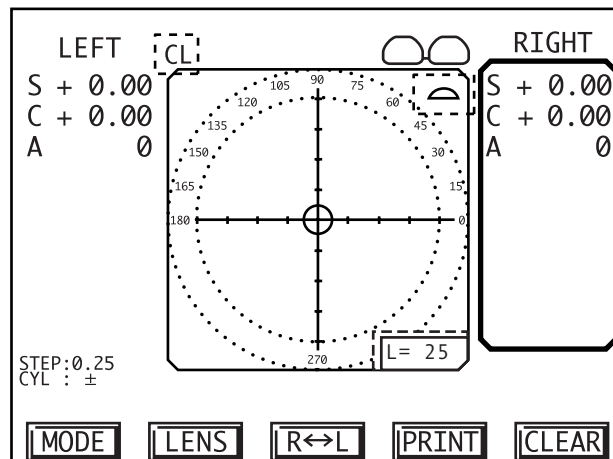
- If either SPECTACLE + CL or SPECTA + CL is select in Setup Menu 2, simply press the Lens button to select the Contact Lens mode.
- If neither Contact Lens option is selected in Setup Menu 2, follow the instructions in section 3.4 to select SPECTACLE + CL if you do not plan to use the CL holder and SPECTA + CL if you plan to measure rigid lenses using the CL holder. When you return to the measurement screen after making your selection, press the LENS button to select the Contact Lens mode.
- If the AUTO CL feature is ON, the Contact Lens mode will automatically be activated when a contact lens or nthe CL holder is placed on the Contact Lens nose piece.

3) Measure soft or rigid contact lenses as described below.

a. Measuring Hard Contact Lenses


1) To measure rigid contact lenses without the CL holder:

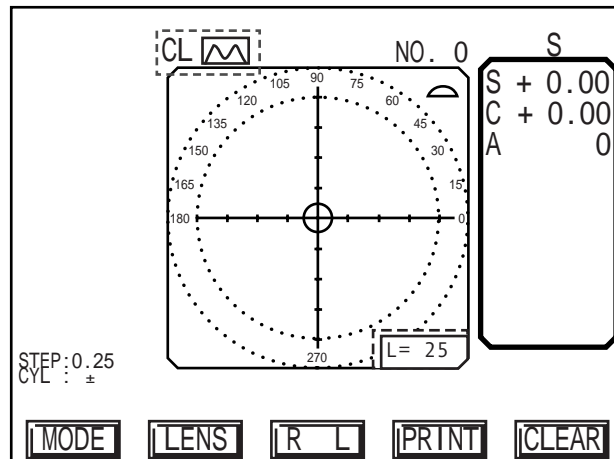
- With the SPECTACLE + CL option selected on Setup Menu 2 and the instrument in Contact Lens mode, place the lens on the contact lens nose piece with its front convex surface up.



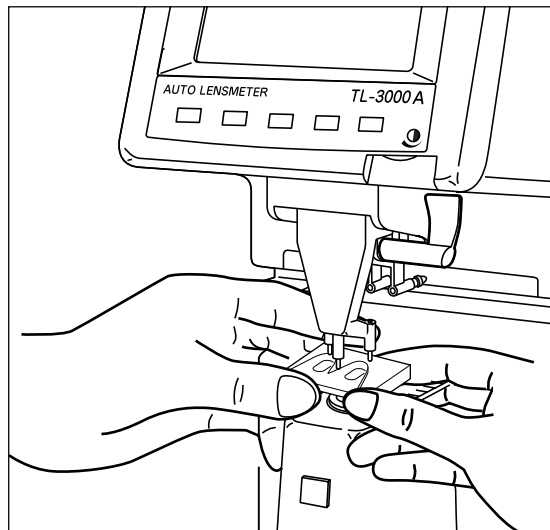
b. Find the optical center of the lens by moving it back/forth and left/right, following the procedure givin in Section 3.2.1a [Measuring single vision lenses, Measuring single lenses (lens blanks, S-mode)].

2) To measure rigid contact lenses using the CL holder:

- With the SPECTA + CL  option selected on Setup Menu 2 and the instrument in Contact Lens mode, place the contact lens on the CL holder with its front convex surface up.



- Place the CL holder on the contact lens nose piece, stabilizing it using the clamp as shown below.



- Find the optical center of the lens by moving the CL holder, following the procedure given in Section 3.2.1a [Measuring single vision lenses, Measuring single lenses (lens blanks, S-mode)].

Note

Measurement error may increase for lenses that fall outside the following ranges:

- *Power: +/- 15D*
 - *Base Curve: 7.35 to 8.35mm*
 - *Diameter: 8.0 to 9.6mm*
-
-

b) Measuring Soft Contact Lenses

Note

- *Due to the physical properties of soft contact lenses, the readings may be inaccurate.*
-
-

- 1) Wipe off the water from the soft contact lens.
- 2) With the SPECTACLE + CL option selected on setup Menu 2 and the instrument in Contact Lens mode, place the lens with its front surface up on the contact lens nose piece.
- 3) Find the optical center of the lens by moving it back/forth and left/right, following the procedure given in Section 3.2.1a [Measuring single vision lenses, Measuring single lenses (lens blanks, S-mode)].

3.2.8 Auto hold mode

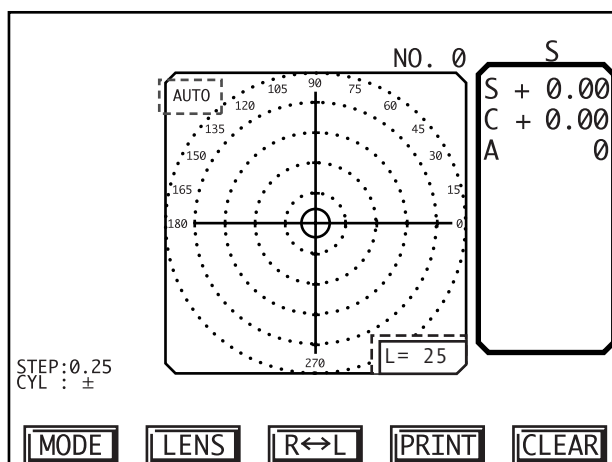
When the instrument is in Automatic hold mode, "AUTO" is displayed on the left side above the target area. When centering is achieved in Single Vision mode, the distance data are automatically held and stored in the memory.

In Multi-Focal mode, the reading at the far area and the add value is at the near point area automatically held and stored. In order for the distance value to be automatically held and stored, the Auto Far option must also be ON (see Section 3.4, Setup Menu 3).

1. Setting of the Auto Hold mode:

The auto hold mode can be set by either of the following two procedures.

- a) Set AUTO HOLD as discribed in Section 3.4, Setup, Menu 3.
- b) Continuously press the HOLD button located below the nose piece for approximately one second. When "AUTO" is displayed on the left side above the target area, release the HOLD button. Return to Manual mode by continuously pressing the HOLD button again for approximately one second. Note that this method changes the Auto Hold status temporarily. When the instrument is turned off and back on, the status will revert to that set on Setup Menu 3.

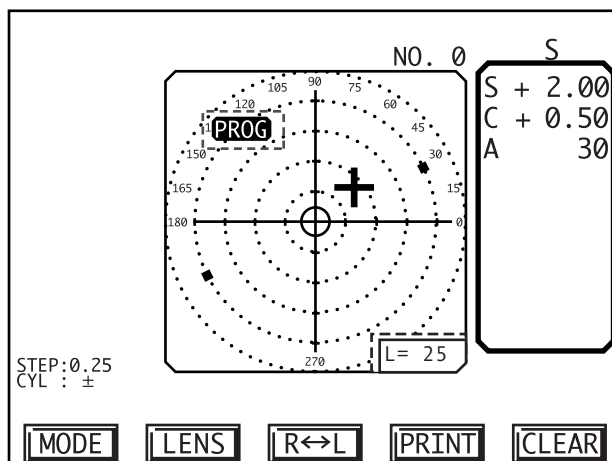


3.2.9 Detecting progressive lenses

If Auto Prog is turned ON (see Section 3.4, Setup Menu 3), the TL-3000 identifies a progressive lens (by sensing the existence of the progressive channel which is located at approximately the center of a lens) and the measurement mode automatically switches to Progressive. In order for a progressive addition lens to be properly detected, first place the center of the lens onto the nose piece. (Detection of the progressive addition cannot be made in the periphery of the lens.)

Single Vision

1. In Single Vision mode, place the center of the lens onto the nose piece with the near zone away from you.
2. **PROG** is shown in the upper left corner of the screen when a progressive lens is detected and the mode automatically changes to Progressive. (If Auto Prog is OFF, **PROG** will appear in the upper left corner of the screen, but the measurement mode will not change to Progressive.)
3. See 3.2.2a, Measuring Progressive Addition Lenses for instructions.
4. Press the PRINT or CLEAR button to return to Single Vision mode.

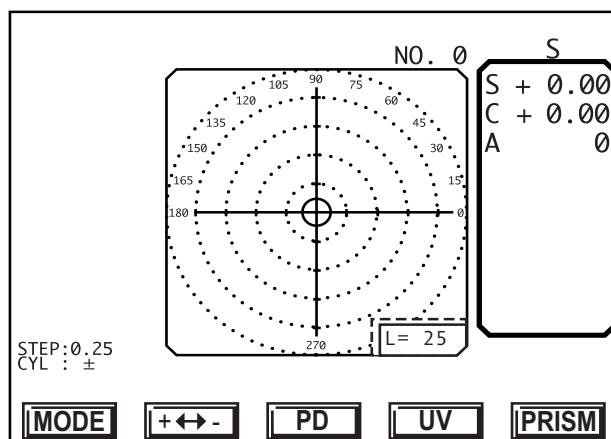


Note • *Identification or detection of a progressive addition lens may be difficult when the ADD value is low.*

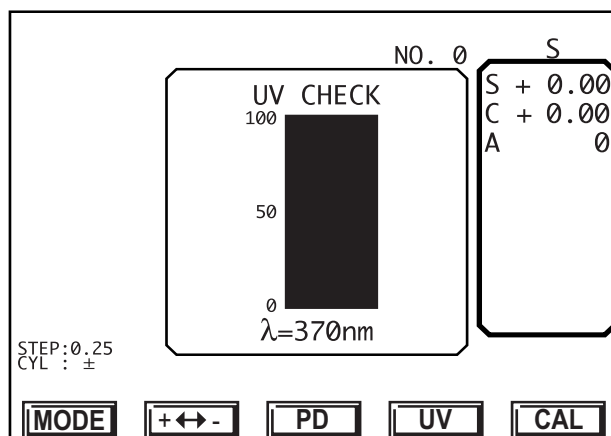
3.2.10 UV checking function

The percent transmittance of light in the ultraviolet portion of the spectrum (wavelength=370nm) may be shown in a bar graph. (Note that the bar graph does not cover transmittance in the entire UV zone. It indicates only the % transmittance at 370 nm.)

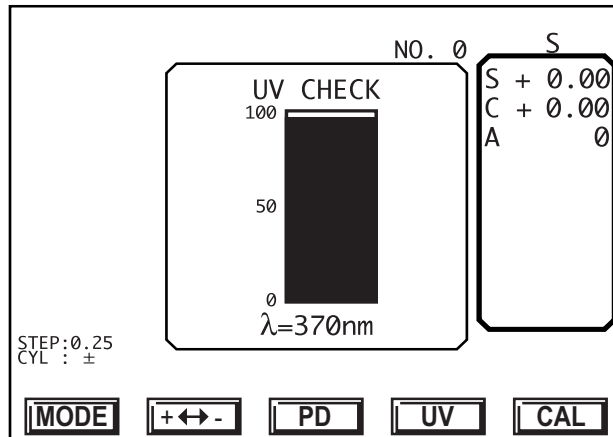
1. Press the MODE button to enter Mode 2.



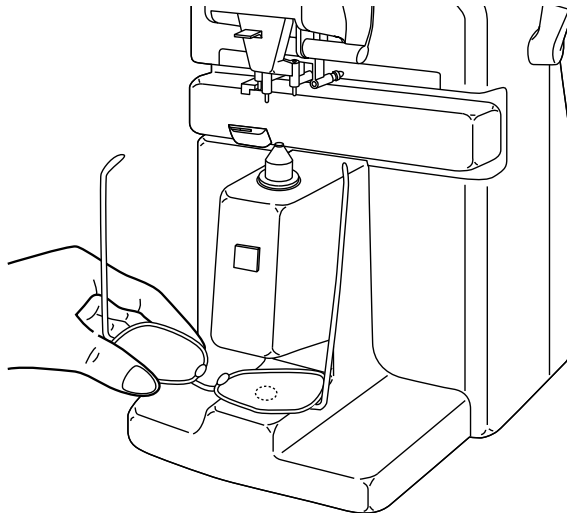
2. Press the UV button. A bar graph is shown in the target area.



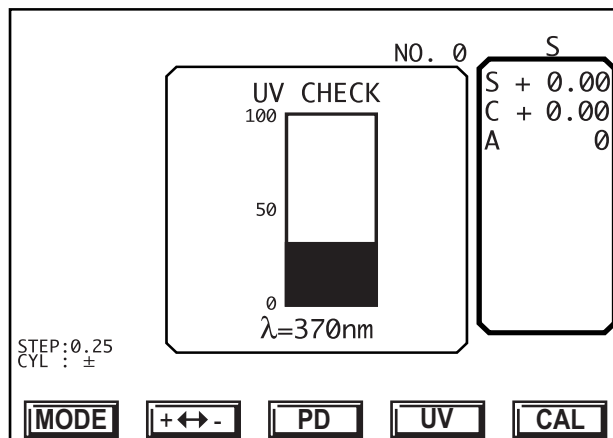
3. When no lens is present, the bar graph should indicate 100% transmittance (no blockage of the UV light). If this is not the case, press the CAL button to calibrate the instrument.



4. Insert the lens in the UV checker at the bottom of the instrument, placing the center of the lens over the UV detector. Measurement taken in the surrounding area may be incorrect.



5. The bar graph shows the percent of UV light transmitted by the lens.



Notes

- *Avoid direct sunlight when using UV check function, or the reading may not be accurate.*
 - *In UV checking mode, when the instrument is not used for more than 3 minutes, it automatically returns to Measurement mode.*
-
-

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3.3 Operating the clamp, marking device and lens table

3.3.1 Clamp

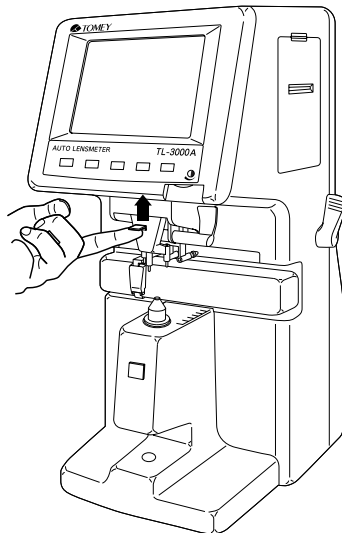


- *Lower the clamp slowly.*

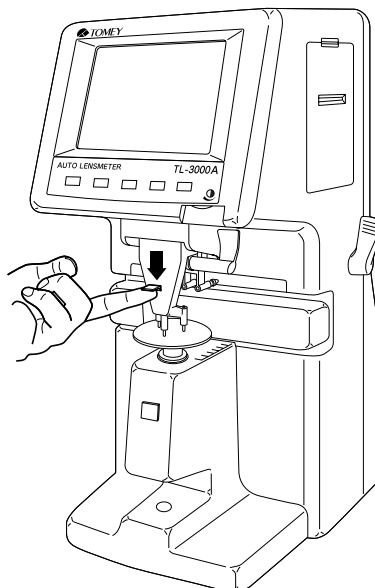
Quick lowering of the clamp may result in damage to the lens.

Use the lens clamp to stabilize the position of the lens when marking it. (See Section 3.3.2, Marking device.)

- 1) Raise the lens clamp with your finger to release the lock.



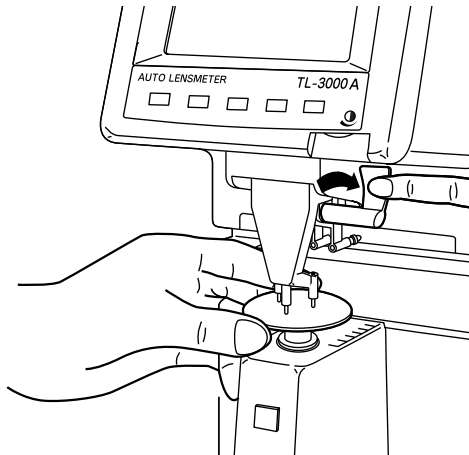
- 2) Lower the clamp gently onto the lens.



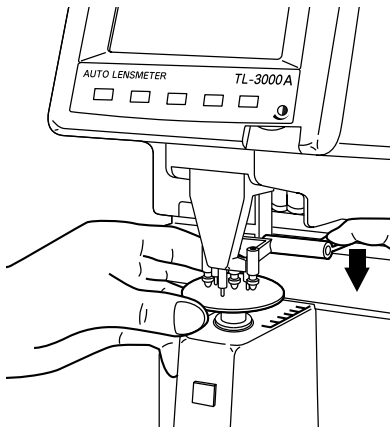
3.3.2 Marking device

The marking device places three marks on the lens, one in the center of the lens and one approximately 16 mm lateral to the center on each side along the lens axis.

- 1) Turn and press down on the marking lever, causing the pens to descend and mark the lens surface.



- 2) Carefully release the marking lever, so it will return to its initial position by its spring force.

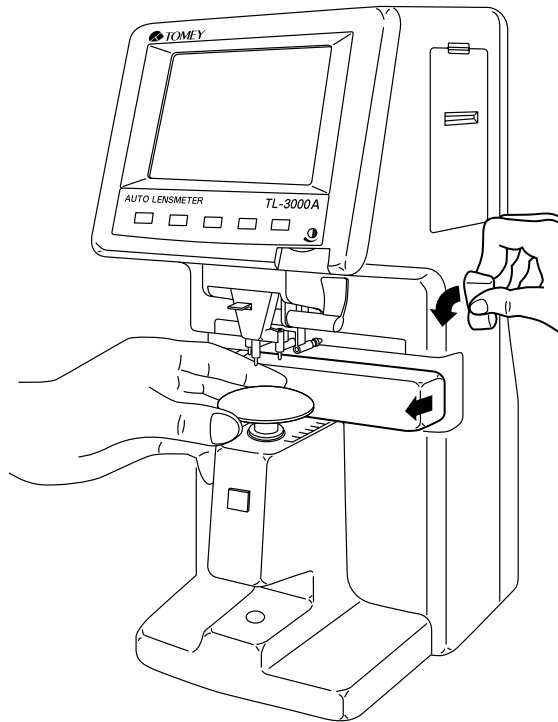


The three (3) marking pens are self-contained cartridges. When the ink supply becomes depleted, replace the cartridge. (See Section 4.3.2, Ink cartridge.)

3.3.3 Lens table

The lens table serves to standardize the axis of cylindrical lenses and the height of the frame for measuring vertical prism. It must also be used when measuring interpupillary distance (PD).

- 1) Turn the lens table lever on the right side of the unit to move the lens table so that the table abuts the bottom edge of a single lens or the left and right lower edges of a frame.



- 2) The outer diameter of a circular lens is indicated on the scale printed on the upper surface of the nose section.
- 3) The distance from the lens table to the measuring point (center of nose piece) is displayed at the lower right of the alignment screen (L).

3.4 Setup

Note

- *Since the information which has been set is stored in the memory, it need not be reset after the power has been turned off and back on.*
 - *In Setup mode, if the instrument is not used for more than 3 minutes, it automatically returns to the Measurement mode.*
-
-

Indication units and measuring conditions are modified by menu selection.

- 1) Press and hold the MODE button for approximately one second until the Setup Menu 1 display appears.
- 2) There are six Setup Menus.
- 3) To change from one item to the next in the menu, press the MODE button.
- 4) To select the desired option for each item, press the horizontal or vertical arrow buttons.
- 5) To change to the next menu, press the NEXT button.
- 6) To return to the measuring display after setup, press the END button.

Display of Setup Menu 1

Setup Menu 1

PRISM : **NON** PXY r/θ DXY

CYL : **-** ± +

STEP : **0.25** 0.12 0.01


ABBE : 35 (in the **HI** mode)

PRINT : OFF **ON**

MODE **←** **→** **NEXT** **END**

Display of Setup Menu 2

Setup Menu 2

SINGLE VISION : SPECTACLE
MODE **SPECTACLE+CL**
 SPECTA+CL 
 HIGH POWER

MULTI-FOCAL : PROGRESSIVE
 MODE Bi-focal
 Tri-focal
 PROG+Bi+CL

MODE **↑** **↓** **NEXT** **END**

Display of Setup Menu 3

Setup Menu 3

AUTO HOLD : OFF **ON**

AUTO R/L : OFF **ON**

AUTO PROG : OFF **ON**

AUTO CL : **OFF** ON

MODE **←** **→** **NEXT** **END**

Display of Setup Menu 4

Setup Menu 4

SINGLE mode : **OFF** ON

TOTAL PRISM : OFF **ON**

PD measure : OFF **ON**

UV check : OFF **ON**

Beep : OFF **ON**

MODE **←** **→** **NEXT** **END**

Display of Setup Menu 5

Setup Menu 5 (Print Setting)

PRINT DENSITY : +0

PRINT TITLE : **OFF** ON

OPTICAL CENTER : OFF **ON**

MODE **←** **→** **NEXT** **END**

Display of Setup Menu 6

Setup Menu 6 (Title Layout)

↔ **0123456789-.**
ABCDEFGHIJKLM
NOPQRSTUVWXYZ
abcdefghijklm
nopqrstuvwxyz

TL-3000A

HOLD:decision

MODE **←** **→** **NEXT** **END**

Setup Menu 1

The selected parameter and option are highlighted.

Select the item by pressing the MODE button.

Select the desired option by pressing the "←" and "→" buttons.

The selected option will be in effect when the instrument is turned ON.

The parameters which can be set on Setup Menu 1 are as follows:

Setup Menu 1				
PRISM :	NON	PXY	r/θ	DXY
CYL :	-	±		+
STEP :	0.25	0.12		0.01
ABBE :	35 (in the HI mode)			
PRINT :	OFF		ON	
[MODE] [←] [→] [NEXT] [END]				

a) PRISM (Prism mode)

NON:	No prism display
PXY:	PX, PY display (Rectangular coordinates)
r/θ:	PSM, BAS display (Polar coordinates)
DXY:	DCX, DCY display (Displacement from the optical center in millimeters)

b) CYL (CYL mode)

-:	Minus Reading
±:	Mixed Reading
+::	Plus Reading

c) STEP (Size)

0.25:	0.25D step
0.12:	0.12D step
0.01:	0.01D step

d) ABBE (Abbe number for high index (HI) mode)

The Abbe number to be used for high index (HI) mode is set here. It can be changed in 5 steps ranging from 35 to 60. The pre-set value is 35. The Abbe number in the normal mode is pre-set at 60 and cannot be changed.

e) PRINT (Printout ON/OFF)

ON: Printout enabled

OFF: Printout disabled

Press the NEXT button to advance to Setup Menu 2.

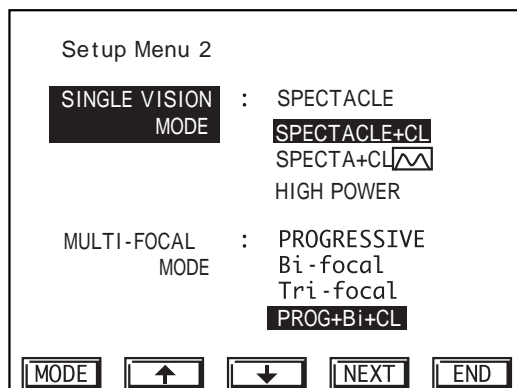
Setup Menu 2

The selected parameter and option are highlighted.

Select the item by pressing the MODE button.

Select the desired option by pressing the "↑" and "↓" buttons.

You may choose the types of lenses you plan to measure in Setup Menu 2. Subsequently, these lens types can be selected on the measurement screen in the following sequence by pressing the LENS button: The Single Vision mode for single or framed lenses is displayed first, the selected Multi-focal mode option(s) for single or framed lenses is (are) displayed next and the Contact Lens mode (if selected) is displayed last. (See examples below.)



a) SINGLE VISION MODE

b) MULTI-FOCAL MODE

PROGRESSIVE: Progressive addition lenses

Bifocal: Bifocal lenses

Trifocal: Trifocal lenses

PROG+Bi: Progressive addition lenses + Bifocal lenses

The default selections are Spectacle+CL and PROG+Bi. When these options are selected, as the LENS button is pressed, the measurement screen will sequentially switch from Single Vision mode to Progressive mode to Bifocal mode to Contact Lens mode.

If SPECTACLE+CL and PROGRESSIVE or Bifocal or Trifocal are selected, as the LENS button is pressed, the measurement screen will sequentially switch from Single Vision mode to the selected Multi-Focal mode to Contact Lens mode.

When SPECTACLE is selected in Single Vision mode, contact lenses cannot be measured. When the LENS button is pressed, the measurement screen will change from Single Vision framed/single lens mode to the selected Multi-Focal mode(s). For example, if SPECTACLE and PROG+Bi are selected, the measurement screen changes successively from Single Vision framed/single lens mode to Progressive mode to Bifocal mode as the LENS button is pressed. If SPECTACLE and PROGRESSIVE (or Bifocal or Trifocal) are selected, pressing the LENS button alternately changes between Single Vision mode and Multi-focal mode (Progressive, Bifocal or Trifocal, whichever is selected).

When HIGH POWER is selected in Single Vision mode, multi-focal lenses cannot be measured. When the LENS button is pressed, the measurement screen alternately changes between High Power mode and High Power Contact Lens mode.

Press the NEXT button to advance to Setup Menu 3.

Setup Menu 3

The selected parameter and option are highlighted.

Select the item by pressing the MODE button.

Select the desired option by pressing the "←" and "→" buttons.

The parameters which are set by Menu 3 are as follows:

Setup Menu 3		
AUTO HOLD :	OFF	ON
AUTO R/L :	OFF	ON
AUTO PROG :	OFF	ON
AUTO CL :	OFF	ON
<div>MODE ← → NEXT END</div>		

a) AUTO HOLD

- ON: Automatic hold mode. For Single Vision lenses, the reading will be held and stored to the memory automatically. For multi-focal lenses, the reading at the far area and the add value at the near point area will be held automatically.
(see AUTO FAR below).
- OFF: Manual mode. The HOLD button must be pressed to store data.

b) AUTO R/L

- ON: Automatic RIGHT/LEFT change
(when not measuring PD)
- OFF: No automatic RIGHT/LEFT change
(when not measuring PD)

When measuring PD, RIGHT/LEFT changes automatically even if AUTO R/L is OFF. To change to the other eye when AUTO R/L is OFF, press the R ↔ L button on the measurement screen.

c) AUTO PROG:

- ON: Automatic change to the PROG mode when a progressive addition is detected.
- OFF: No automatic change to the PROG mode when a progressive addition is present.

d) AUTO CL:

- ON: Contact Lens mode automatically activated when contact lens placed on CL nose piece. Mode automatically changes to spectacle mode when CL or CL holder removed.
- OFF: No automatic changing of CL mode and spectacle lens mode.

Press the NEXT button to advance to Setup Menu 4.

Setup Menu 4

The selected parameter and option are highlighted.

Select the item pressing the MODE button.

Select the desired option by pressing "←" and "→" buttons.

The parameters which can be set by Menu 4 are as follows:

Setup Menu 4		
SINGLE mode	:	OFF ON
TOTAL PRISM	:	OFF ON
PD measure	:	OFF ON
UV check	:	OFF ON
Beep	:	OFF ON
<div>MODE ← → NEXT END</div>		

a) SINGLE mode

ON: The instrument starts up in Single lens mode.

OFF: The instrument starts up in RL (framed lens) mode.

b) Total Prism:

ON: Total horizontal and vertical prismatic effects are displayed.

OFF: Total prismatic effects are not displayed.

c) PD measure:

ON: PD measurement may be activated by releasing the nose block.

OFF: PD measurement cannot be activated.

d) UV check:

ON: The UV check function is available.

OFF: The UV check function is not available.

e) BEEP:

ON: Beep sounds when measurement is stored and press the buttons.

OFF: Beep does not sound when measurement is stored and press the buttons.

Setup Menu 5

The selected parameter and option are highlighted.

Select the item by pressing the MODE button.

Select the desired option by pressing the " ← " and " → " buttons.

The parameters which are set by Menu 5 are as follows:

Setup Menu 5 (Print Setting)

PRINT DENSITY : +0

PRINT TITLE : OFF ON

OPTICAL CENTER : OFF ON

MODE

←

→

NEXT

END

a) PRINT DENSITY

The density of the printed characters may be changed.

The default setting is +0.

Press the right arrow button to increase the density (+5 is darkest).

Press the left arrow button to decrease the density (-5 is palest).

b) PRINT TITLE

ON: Printer will print the title set by Setup Menu 6.

OFF: A title will not be printed.

c) OPTICAL CENTER

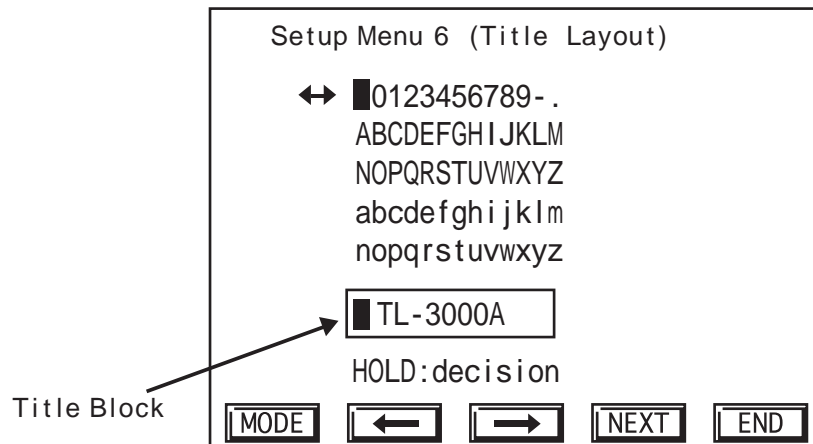
ON: Distance between measured point and bottom edge of lens will appear on printout (ROC, LOC).

OFF: Distance between measured point and bottom edge of lens will not be printed.

Setup Menu 6

Setup menu 6 allows you to create a title to appear at the top of each printout.

This menu can be accessed only when the PRINT TITLE option is ON in Setup Menu 5. If PRINT TITLE is OFF, this menu will be skipped.



A title consisting of up to 13 characters may be created as follows:

- 1) Select the first character by pressing the " ← " and " → " buttons. The selected character will be highlighted.
- 2) Press the HOLD button to enter the character, which will be displayed in the title box.
- 3) Repeat steps 1 and 2 until the title is complete.
- 4) Press the NEXT button or the END button to save and exit.

To edit the title:

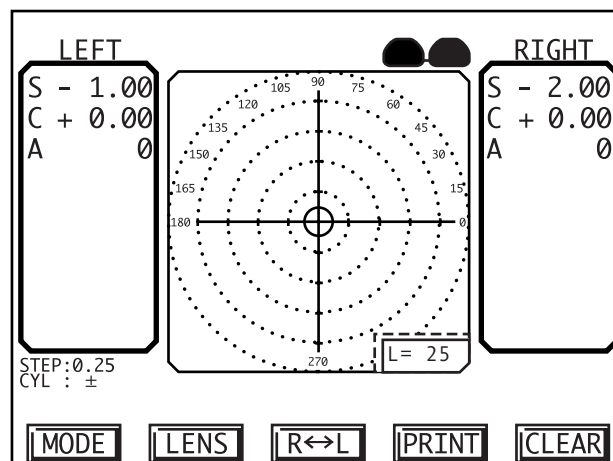
- 1) Press the MODE button. The double arrow (↔) will move down so that it is adjacent to the title box.
- 2) Press the " ← " and " → " buttons to select the character you wish to change.
- 3) Press the MODE button again. The double arrow (↔) will move back up to the character will be highlighted.

-
- 4) Select the replacement character by pressing the " ← " and " → " buttons. The selected character will be highlighted.
 - 5) Press the HOLD button to enter the character, which will replace the previous entry.

3.5 Printout

Note • *No printout can be obtained if the PRINT setting is OFF.*

- 1) Set the PRINT mode ON in Setup. (See Section 3.4, Setup, Menu 1)
- 2) After the measurements have been acquired and held, press the PRINT button to obtain a printout.
- 3) When measuring both R and L lenses, press PRINT after both lenses have been measured.



- Note** • *If the PRINT button is pressed when no data are stored in the memory, paper feeding is carried out.*
- *If no new measurements have been stored following the previous printout, the same data are printed out each time the PRINT button is pressed.*
 - *To print a title on each printout, see instructions in Section 3.4, Setup Menu 5 (PRINT TITLE) and Setup Menu 6.*
-

3.6 Data communication (RS-232C)

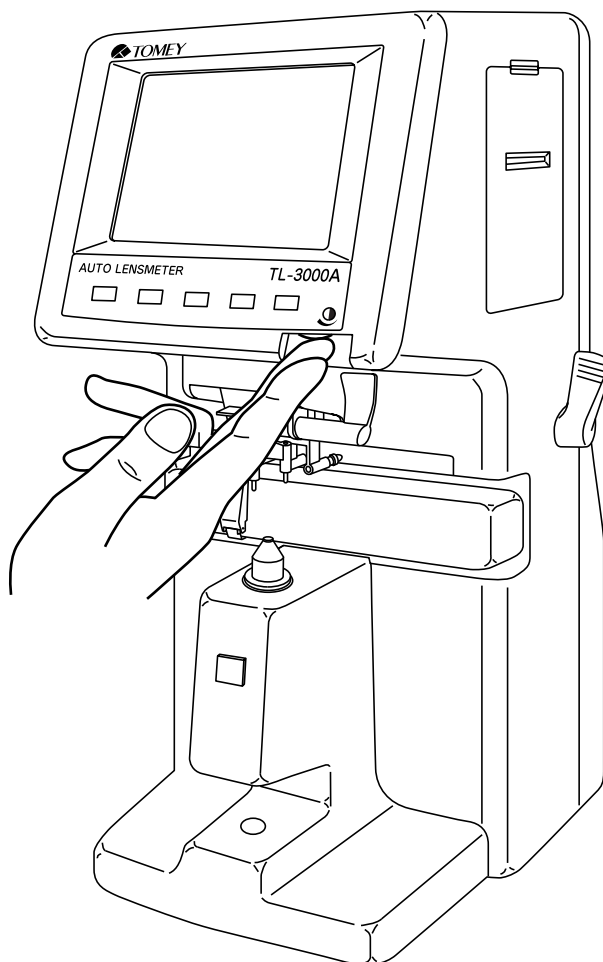
The RS-232C Data Communication feature allows measurement data to be sent to an external device, such as a computer.

Whenever the PRINT button is pressed, data are sent to the RS-232C port regardless of the PRINT mode setting. If you would like to disable the built-in printer to use the RS-232C port only, turn the PRINT mode OFF (see Section 3.4, Setup Menu 1).

-
-
- Note** • *The data communication terminal is not isolated from the internal circuits. Connecting inappropriate device(s) with TL-3000 which do not follow RS-232C protocols, may damage the instrument. It is recommended to contact a TOMEY representative or a local distributor before using the data communication terminal.*
-
-

3.7 LCD contrast adjustment

Adjust the LCD contrast by turning the contrast adjuster at the lower right of the operation panel.



3.8 AUTO POWER OFF

(Automatic Power saving function)

- 1) When the instrument is not used for more than 10 minutes (i.e., no lens is placed on the nose piece and no operation button is pressed), the back light of the display screen, the internal motor and the light source are automatically turned off. The following screen is displayed.



- 2) Press any of the operation buttons to reactive the instrument.

Note

- *Turn off the power switch when you do not intend to use this instrument for a long period of time.*
-
-

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4. MAINTENANCE AND INSPECTION

4.1 Warranty

One-Year Limited Warranty

The Seller warrants this product to be free from defects in material and workmanship under normal use for one year from the date of invoice issued by Seller to the original purchaser.

This warranty shall apply only to the original purchaser and shall not, in any way, be transferable or assignable to any party other than the original purchaser.

Lamps, paper and other consumable items shall not be covered by this warranty.

This warranty also shall NOT apply if the product has not been installed, operated or maintained in accordance with the OPERATOR MANUAL of Tomey Corporation (hereinafter called "Tomey"). Neither Seller nor Tomey shall be liable for any damages caused by purchaser's failure to follow instructions for proper installation, use and maintenance of the product.

This warranty is only applicable to the new product and DOES NOT cover any damage resulting from or caused by accident or negligence, abuse, misuse, mishandling, improper installation, improper repair or improper modification of this product, by persons other than personnel duly authorized by Tomey, nor to a product whose serial number or batch number is removed, altered or effaced.

THIS WARRANTY IS EXPRESSLY IN LIEU OF ANY AND ALL OTHER WARRANTIES, EXPRESS OR IMPLIED (INCLUDING SPECIFICALLY, WITHOUT LIMITING THE GENERALITY OF THE FOREGOING, ALL WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE), AND ALL OTHER OBLIGATION AND LIABILITY ON THE PART OF SELLER AND TOMEY. NEITHER SELLER NOR TOMEY SHALL BE LIABLE FOR INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES UNDER ANY CIRCUMSTANCES OR FOR MORE THAN REPAIR, REPLACEMENT OR REFUND OF THE PURCHASE PRICE OF DEFECTIVE GOODS.

4.2 Routine maintenance

- Do not touch the optical elements, such as the cover glass, with your fingers. Keep them clean. Accuracy of the reading may be adversely affected by dust or a dirt.
- Keep the dust cover over the instrument when the instrument is not in immediate use.
- Use a dry cloth to clean the cover, screen and front panel. Use diluted non-organic detergents for any heavy stains. Do not use organic solvents, such as thinners, which may cause damage to the surface of the instrument.
- Disconnect the power cord if you do not plan to use the instrument for a long time.

4.2.1 Cleaning cover glass

Clean the cover glass periodically.

- 1) Remove the nose piece.
- 2) Clean the cover glass as follows:

Remove the dust on the cover glass by using blower (i.e., compressed air). If dirt still remains, gently wipe it off using a soft cloth or other lens cleaning accessories.



- *Scratches on the cover glass may result in inaccurate readings.*
-

4.3 Replacing spare parts

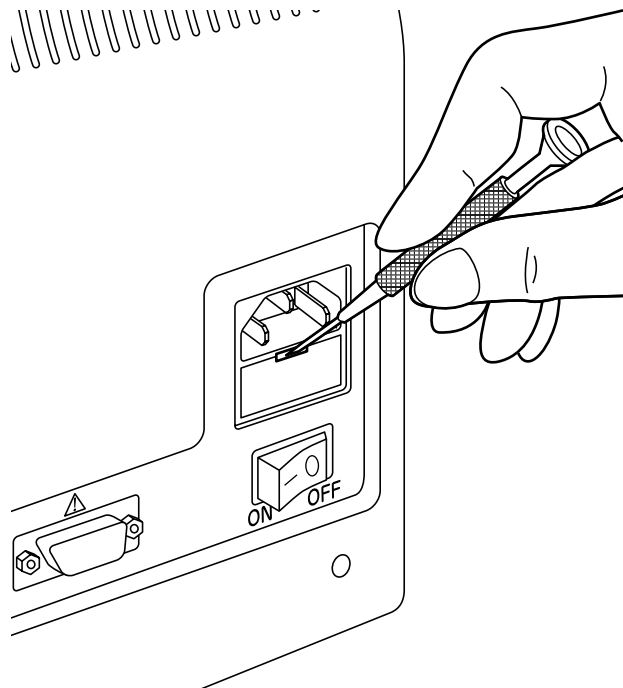
4.3.1 Fuse

It may be necessary to replace the fuse if the instrument panel does not light up when the instrument is turned on. (Before changing the fuse, check the LCD contrast to make sure it is not turned all the way down; see Section 3.7.)

- 1) Turn off the power.
- 2) Unplug the power cord.
- 3) As shown in the diagram below, remove the cover of the fuse holder on the back side of the unit by using a flat screwdriver.
- 4) Remove the defective fuse from the fuse holder.
- 5) Place a new fuse into the fuse holder.
- 6) Push the fuse holder back in place.



- ***Disconnect the power cord immediately if the problem persists after replacing the fuses. Contact your Tomey representative or local distributor.***



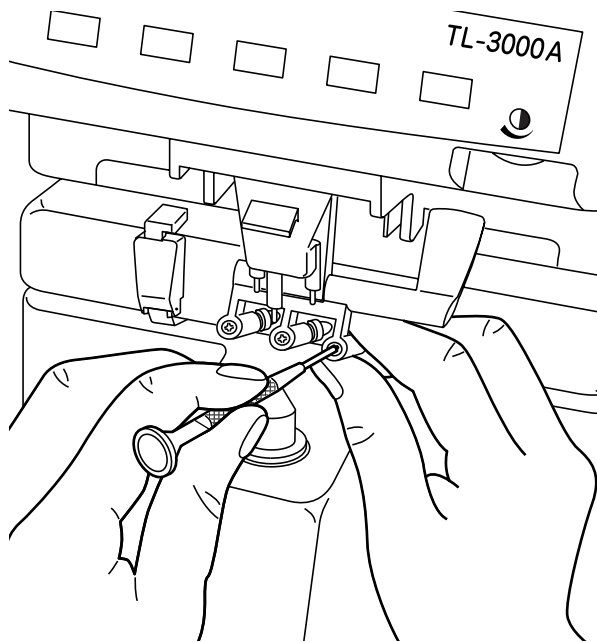
4.3.2 Ink cartridge

Replace the ink cartridge with a new one when ink is low. Replacement cartridges can be obtained from your Tomey representative or local distributor.

Note • *Be sure to use genuine ink cartridges (as specified in this manual).*

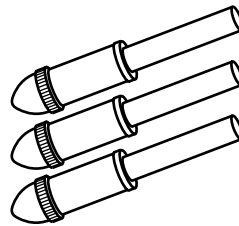
- 1) Lift up the lens clamp.
- 2) Pull the marking device straight downward by its handle and continue to hold it down (If you let go, it will spring back up.).
- 3) Remove the screw from the ink cartridge.

While holding the ink cartridges down, remove the screw by turning it counter clockwise using a Philips screwdriver.



- 4) Remove the ink cartridge and the spring from the marking device.

5) Place a new ink cartridge and the spring in the marking device.



6) Firmly attach the cartridge to the marking device with the screw.



- ***Do not touch the tip of the pen while replacing the ink cartridge. Touching the tip may result in damage to the tip of the pen and the dots marked on the lens may not be accurate.***
- ***Fastening the screw too tightly may result in damage to the ink cartridge. Use the accompanying screws and springs only. If the screws and/or the springs are lost , contact your Tomey representative or local distributor.***

4.3.3 Replacing the printer paper

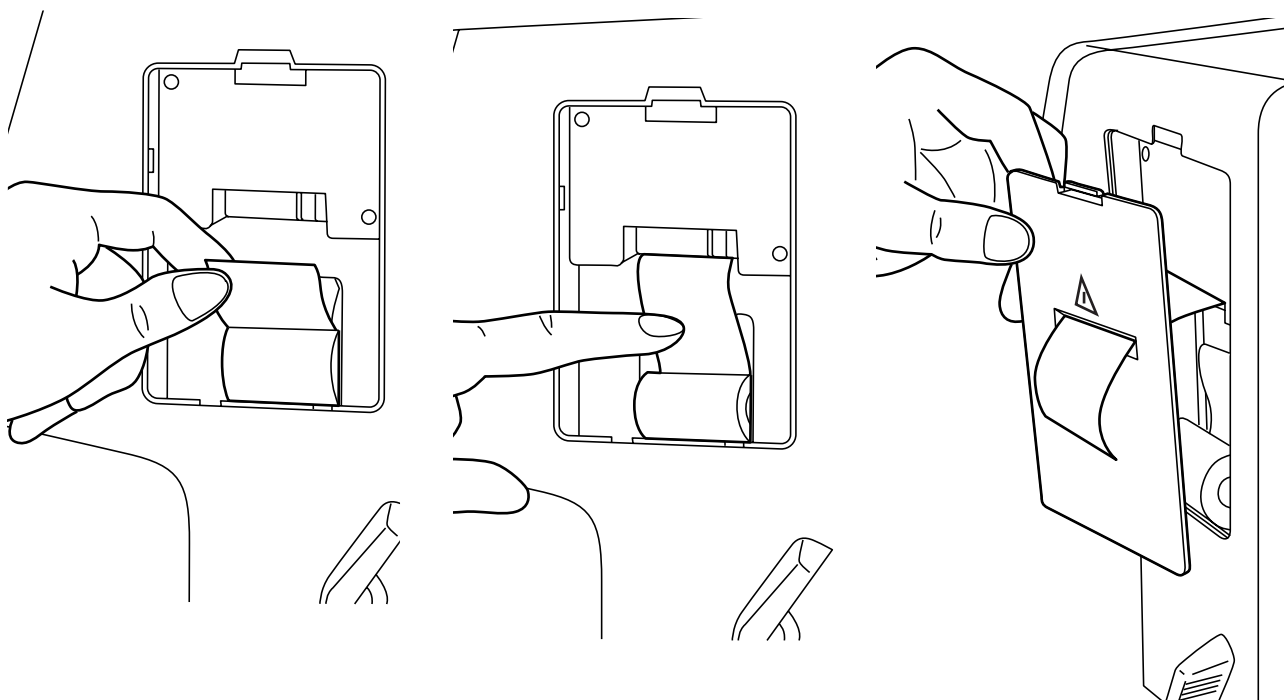
Replace the paper when red lines appear on both sides of the paper.

Note • *Be sure to use the genuine printer paper (specified below).*

Model : TP-102C-2

Manufacturer: Seiko Electric Co. Ltd. JAPAN

- 1) Open the printer cover by pressing down on the latch at the top of the cover and pulling the cover outward.
- 2) To remove the printing paper that remains, advance the paper by pressing the PRINT button.
- 3) Cut the edge of the new roll of paper straight using scissors.
- 4) Put the new roll into the resessed area of the printer unit as shown below.
- 5) Insert the end of the paper through the paper outlet.
- 6) Press the PRINT button to advance the paper.
- 7) Close the printer cover.



4.4 Storage



- *Do not store this instrument in a location where it might be exposed to water.*
- *Avoid excessive atmospheric pressure, high temperature, excessive humidity, poor ventilation, direct sunlight, dust, salt or sulfur in the air.*
- *Ascertain that factors such as excessive slope, vibration and impact will not endanger the instrument (including during transportation).*
- *Do not store this instrument near chemical substances or in a location where the gas may be generated.*

4.5 Packing materials

Notes

- *Keep the containers and packing materials for future use.*
 - *If you discard the packing materials, be sure to comply with local ordinances and regulations.*
-
-

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5. TROUBLESHOOTING

Before calling service personnel, check the following and restart the unit (turn power OFF, then ON).

Notes

- ***Do not attempt measures other than those described below.***
 - ***If the problems persist after checking the following, stop using the unit and immediately contact your Tomey representative for inspection or repair.***
-
-

5.1 Troubleshooting guide

5.1.1 General operation

1) The LCD does not light up after turning ON.

Cause 1: Failure in connecting the power cord.

Action: Insert the female end of the power cord securely into the AC inlet terminal of the instrument.

Insert the male end of the power cord securely into an AC outlet.

Cause 2: The fuse is blown.

Action: Replace with a new fuse (See Section 4.3.1, Fuse)

Cause 3: Improper adjustment of the screen contrast.

Action: Adjust the contrast of the screen properly by using the contrast adjuster at the lower right of the operation panel (see Section 3.7, Controlling the LCD contrast).

2) Freezes at the initial screen.

Cause 1: There was an object on the nose piece when the instrument was turned ON.

Action: Remove the object from the nose piece and press any button.

Cause 2: The nose piece is not seated properly.

Action: Seat the nose piece properly and press any button.

Cause 3: The cover glass under the nose piece is not clean.

Action: Turn off the power. Remove the nose piece and then clean the cover glass. Replace the nose piece and turn the power on again.

3) "INITIAL ERR!" is displayed.

Cause 1: A lens was on the nose piece when the power was turned on.

Action: Remove the lens and press any button.

Cause 2: The nose piece is not seated properly.

Action: Seat the nose piece properly and press any button.

Cause 3: The cover glass under the nose piece is not clean.

Action: Turn off the power. Remove the nose piece and clean the cover glass. Replace the nose piece and turn the power on again.

Cause 4: Turn on the power with the CL nose piece.

Action: Turn off the power and replace the CL nose piece to the regular nose piece then turn on the power.

4) a) The S, C or A value is not ZERO (0.00) with no lens on the nose piece.

b) The readings are inaccurate.

Cause 1: The nose piece is not seated properly.

Action: Seat the nose piece properly.

Cause 2: The cover glass under the nose piece is not clean.

Action: Turn off the power. Remove the nose piece and clean the cover glass. Replace the nose piece and turn the power on again.

Cause 3: When the measurement mode is not CL mode, the CL nose piece is on the cover glass.

Action: Replace the nose piece to the regular nose piece.

5) Printer does not work when the PRINT button is pushed.

Cause 1: PRINT setting is OFF.

Action: Set PRINT setting ON. (See Section 3.4, Setup Menu 1.)

Cause 2: Printer paper has been installed incorrectly, with the wrong side up.

Action: Install the paper correctly. (See to Section 4.3.4.)

6) Print density is too light or too dark.

Cause 3: Setting of the print density is not appropriate.

Action: Change the setting

(See 3.4 Setup, Setup Menu 5)

7) PD values are not displayed when moving the nose block.

Cause 1: The nose block has not been reset.

Action: Move the nose block all the way to the left end (stopper

position) before starting PD measurement.

Cause 2: "PD measure" setting is OFF.

Action: Set "PD measure" parameter ON. (See Section 3.4, Setup Menu 4.)

5.1.2 Progressive addition lens measurement

1) The cursor cannot be centered in the progressive channel.

Cause 1: With progressive lenses which have a small power difference between the far point area and the near point area, aligning the cursor to the center may not be achievable.

Action : The beginning of the progressive channel is located in approximately the center of the lens or the center in the frame. Take measurement around that position and press the HOLD button.

2) The cursor cannot be centered in the far point area.

Cause 1: Progressive lenses are sometimes dispensed for intermediate and near correction only. In such lenses, the progressive area extends into the far point area and it is difficult to accurately measure the far point area.

Action: Take a reading near the top of lens.

Slightly move the lens back and forth, right and left, near the central top portion of the lens. Regard the area where the SPH value varies the least as the measurement of the far point area. Press the HOLD button when this location is found.

3) The near point area is not detected. (The cursor does not change to "○" or "●" .)

Cause 1: The near point area is NOT automatically detected if the ADD power is less than 1.0 diopter.

Action: Press the HOLD button when judging the highest addition value when the cursor is in the progressive zone.

Cause 2: The near point area in frame lenses with a long progressive zone may be positioned very near the edge of the frame or even outside of the frame. It may not be possible to detect the near point in such lenses.

Action: Press the HOLD button when judging the highest

addition value when the cursor is in the progressive zone.

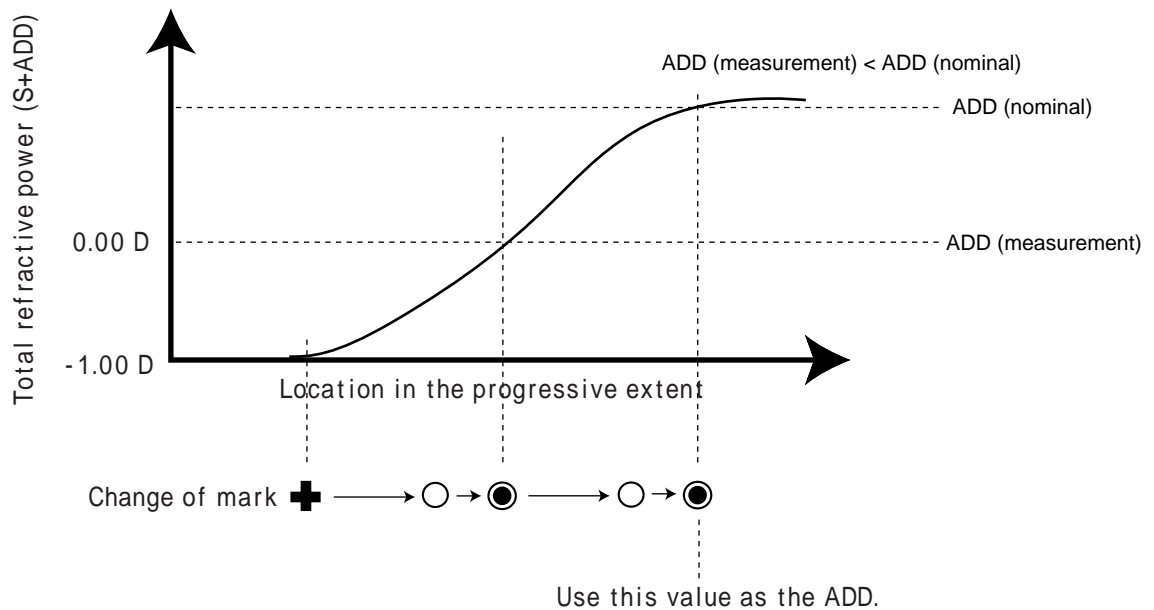
Cause 3: The near point area in a small frame lens may be positioned very near to the edge of the frame or even outside of the frame. It may not be possible to detect the near point area in such lenses.

Action: Press HOLD button when judging the highest addition value when the cursor is in the progressive zone.

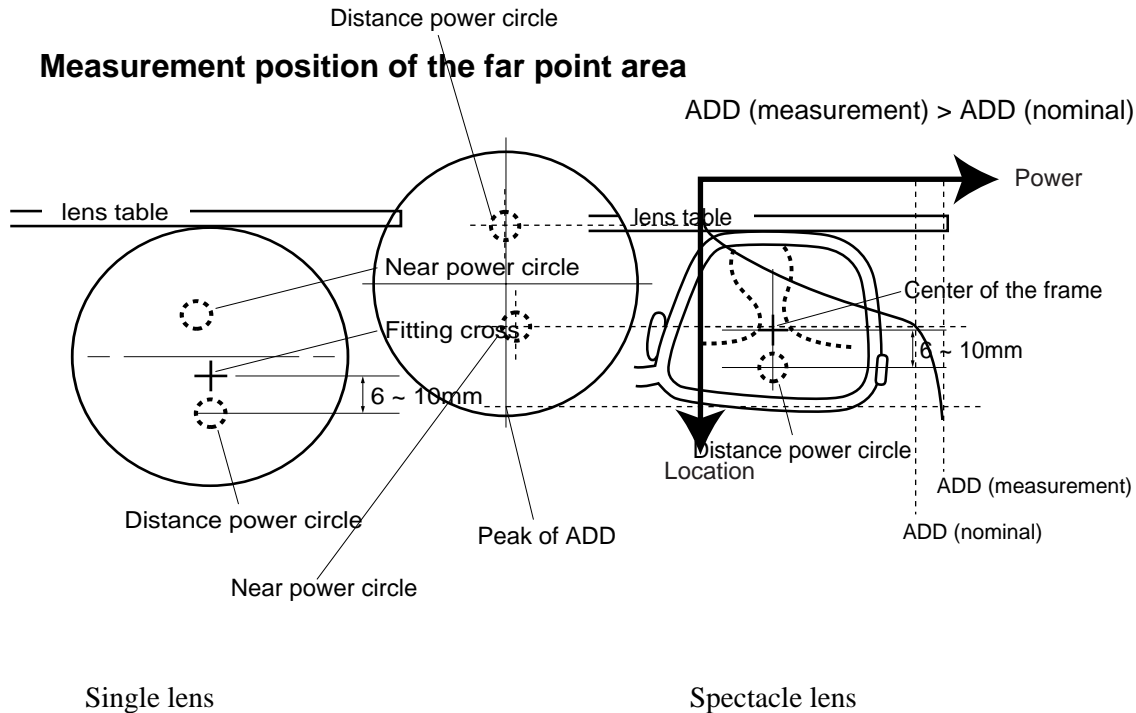
4) The ADD readings are significantly lower (> 0.5 diopters) than the nominal values.

Cause 1: The far point area was not measured properly.

Action : With some lenses, the far point area may not be measured accurately if AUTO HOLD mode is used. Disable the AUTO HOLD mode in the menu Setup (See Section 3.4, Setup Menu 3), and measure the far point area manually.



If it is still difficult to measure, slightly move the lens back and forth, right and left to measure the portion where variation of SPH readings is minimum and press the HOLD button.



Cause 2 : TL-3000A senses refractive power change along the progressive extent. If the power change is close to 0 diopter, TL-3000 treats it as a near point.

Example:

When a lens with SPH reading of -1.00 diopters and the add reading of 2.00 diopters is measured, there is a point where the total refractive power ($S + ADD$) equals zero (0) diopters. As a result, the ADD value would be displayed as 1.00 diopter.

Action : Use manual mode for these lenses.

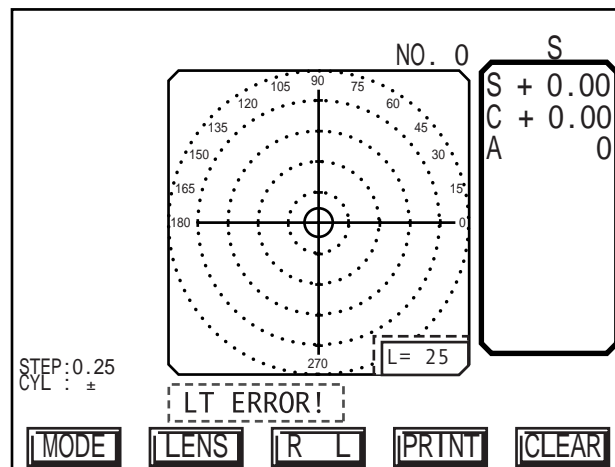
If the cursor changes twice from “+” to “○” (or “●”), use the highest reading as the ADD.

If ~~the lens table changes only once~~ to “○,” take the highest reading as the ADD.

5) The ADD readings are higher than the nominal values.

Cause: Some progressive lenses may have a peak of ADD below the near power circle. With these lenses, the ADD readings may be higher than the nominal values.

5.2 Error messages



1) LT ERROR!

Cause: Amount of light is not sufficient.

Action: Clean both the lens to be measured and the cover glass located under the nose piece.

It may not be possible to measure heavily tinted lenses.

Make sure that the frame of the spectacle does not cover the nose piece.

2) MT ERROR!

Cause: Malfunction of the DC motor.

Action: Contact your Tomey representative or local distributor.

3) OVER FLOW!

Cause: Over/Under flow

Action: The power of the lens is out of the measuring range.

4) PR ERROR!

Cause: Paper jam.

Action: Remove jammed paper.

5) INITIAL ERROR

Cause: Initial error.

Action:

1. Remove the lens from the nose piece and press any button.
2. Seat the nose piece properly and press any button.
3. Clean the cover glass located under the nose piece and press any button.

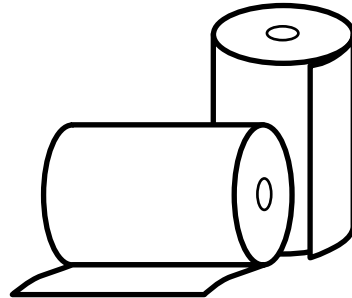
6) MODE ERROR! Cause: Mismatch of the measurement mode and the nose piece.

Action: Check the measurement mode and the nose piece. Make sure the measurement mode and the nose piece are match to measure the lens.

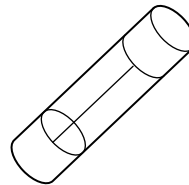
6. SPARE PARTS

The following spare parts can be purchased from your Tomey representative or local distributor.

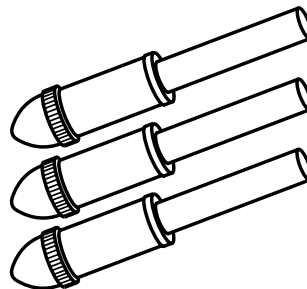
- Printer Paper



- Spare fuse (250V, 2.0A)



- Ink cartridges



- Dust cover

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7. SPECIFICATIONS

7.1 Measurement

- Range
 - Spherical power (S): $\pm 25D$
 - High power : $\pm 80D$
 - Cylindrical power (C): $\pm 10D$
 - Axis of cylindrical power (A): 0 to 180 degrees
 - Addition reading (ADD): 0 to 10 D
 - Prism power (P reading): 0 to 10 Δ
- Units
 - Power: 0.01/0.12/0.25 D
 - Prism: 0.01/0.12/0.25 Δ
- Modes
 - Cylinder: + / \pm / -
 - Prism: Rectangular Coordinates
Polar coordinates
Displacement
- Lens types: Single vision lenses, Bi-focals, Trifocals, and Progressives
- Sampling speed: 0.035 seconds
- Measurement wavelength: 660 nm
- Diameter of the beam: 2.5/5.0 mm
- Pupillary Distance (PD): 50 to 86 mm
- Lens diameter: 20 to 100 mm
- Abbe numbers: 30 to 60 (5-unit increment)
(30,35,40,45,50,55,60)

7.2 Data control

- Display: Monochrome LCD display
(320 x 240 pixels)
- Alignment: Cross cursor
(Thickens when lens is aligned.)
- Printer: Thermal printer (MTP type)
- External communication port: RS-232C

7.3 Physical dimensions and electrical requirements

- Dimensions: 220 (W) x 259.5 (D) x 437.5 (H) mm
[8.7 (W) x 10.2 (D) x 17.2 (H) in]
- Weight: approx. 6.8 Kg (14.9 lbs)
- Main supply voltage: 100 to 240 V AC
(adjusts automatically)
- Power consumption: 35 VA
- Frequency: 50/60 Hz

7.4 Environmental conditions

- Installation site: indoor
- Operating temperature range: +10°C to + 40°C (+ 50 °F +104 °F)
maximum relative humidity 80% for
temperatures up to 31°C decreasing
linearly to 50% relative humidity at
40°C
- Main supply voltage fluctuations: ±10% of the normal voltage
- Installation Category: II
- Pollution degree: 2 (based on IEC664)

7.5 Approved international standards

- Electrical safety: IEC -1010-1; +A1; +A2
- Electromagnetic compatibility: EN61326
EN61000-3-2
EN61000-3-3
FCC (Part15 Class B)

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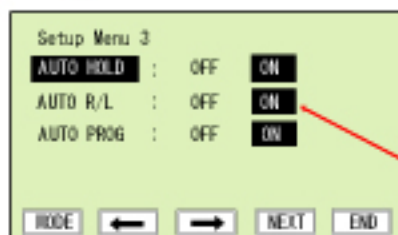
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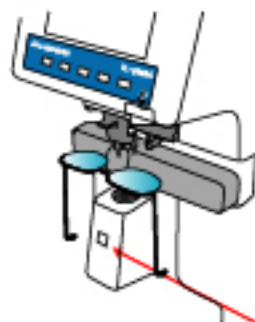
1 「Framed Lenses」 Measurement (R/L MODE)

STEP 1



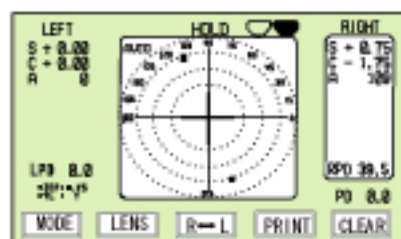
Press & hold the MODE button to enter the Setup Menu. Then press the NEXT button to enter Setup Menu 3 and select AUTO R/L ON on this menu or simply press the R/L button before measure the glasses.

STEP 2



Hold the glasses(lens) with lens table & attach the lens on the table.

STEP 3



Put the cross cursor on the center to take the measurement, automatically. Press **HOLD** to take it manually.

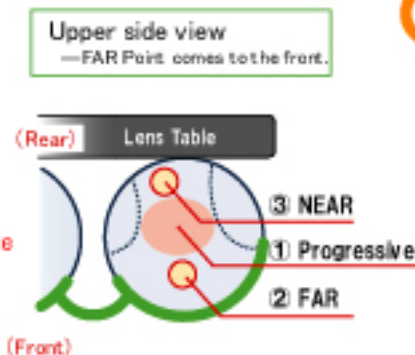
2 「Progressive Addition Lenses」 Measurement (PROG MODE)

STEP 1

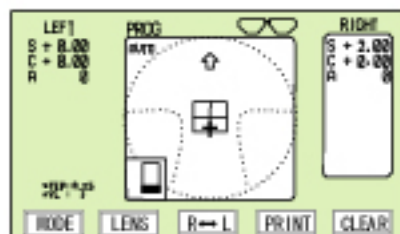


Press & hold the MODE button to enter the Setup Menu. Then press the NEXT button to enter Setup Menu 2 and select PROGRESSIVE or PROG+Bi+CL on this menu or simply press the LENS button before measure the glasses.

STEP 2



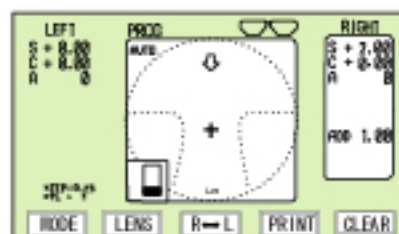
Measurement Order
1. Progressive Part
2. FAR Point
3. NEAR Point



To measure the far point area, move the glasses(lens) away from you and put the cross cursor on the center to take the measurement automatically. Press **HOLD** to take manually.

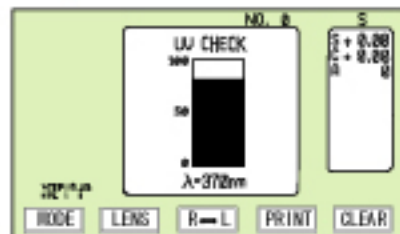
3 「UV Check」 & 「PD Measurement Diagram」

STEP 3



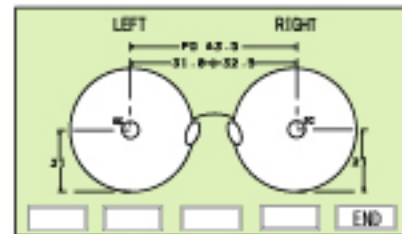
To measure the near point area, move the glasses(lens) toward to you and put the cross cursor on the center to take the measurement. When the near point is approximated, the cursor changes to an open circle(O). Press **HOLD** to take manually.

UV



Press the MODE button to enter Mode 2 and insert the lens in the UV checker at the bottom of the instrument. The bar graph shows the percent of UV light transmitted by the lens.

PD



To display the above diagram, after measuring PD, press the R=L button for a second. To exit this screen, press the End button.