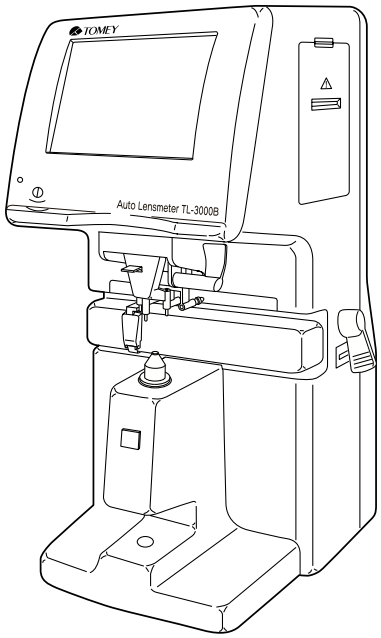
OPERATOR MANUAL

Auto Lensmeter

TL-3000B



Read the Operator Manual carefully before using the TL-3000B for proper and safe operation. If you have any questions, please ask your Tomey representative or local distributor for assistant.

Notes

- **Do not use the instrument by any procedures other than those specified in the Operator Manual.**
- **Keep the Operator Manual at a place where it is easily accessible while you are operating this instrument.**
- **When you lose the Operator Manual, please ask your Tomey representative or local distributor for a new copy.**

TOMEY

IMPORTANT PRECAUTION

Never install or use this instrument in a place where any explosive or flammable materials are used or stored, or the instrument may be subjected to a fire or explosion.

HOW TO READ THE OPERATOR MANUAL

SYMBOLS USED IN THE OPERATOR MANUAL

The symbols used in the Operator Manual imply the precautions.

Precaution, if unheeded, may cause extremely high dangers, such as serious injuries or death.

Precaution, if unheeded, may possibly cause serious injuries or death.

Precaution, if unheeded, may possibly cause light or medium injuries, or property damages.

Additional instruction, which may contain a special precaution on company policy related, either directly or indirectly, to the safety of personnel or property protection.

THE COMPOSITION OF THE OPERATOR MANUAL

The Operator Manual is composed of the following parts.

1. PRIOR TO USE

Precaution and confirmation items related to the installation and usage of the instrument.

2. COMPONENTS AND FUNCTIONS

Names and functions of the components of the instrument

3. OPERATING PROCEDURES

Vital information required for installing and using the instrument

4. MAINTENANCE AND INSPECTION

Routine replacement, maintenance, and inspection of spare parts

5. TROUBLESHOOTING

Countermeasures for troubles

6. SPARE PARTS AND OPTIONAL PARTS

Accessories and optional parts

7. SPECIFICATIONS

Specifications for the instrument

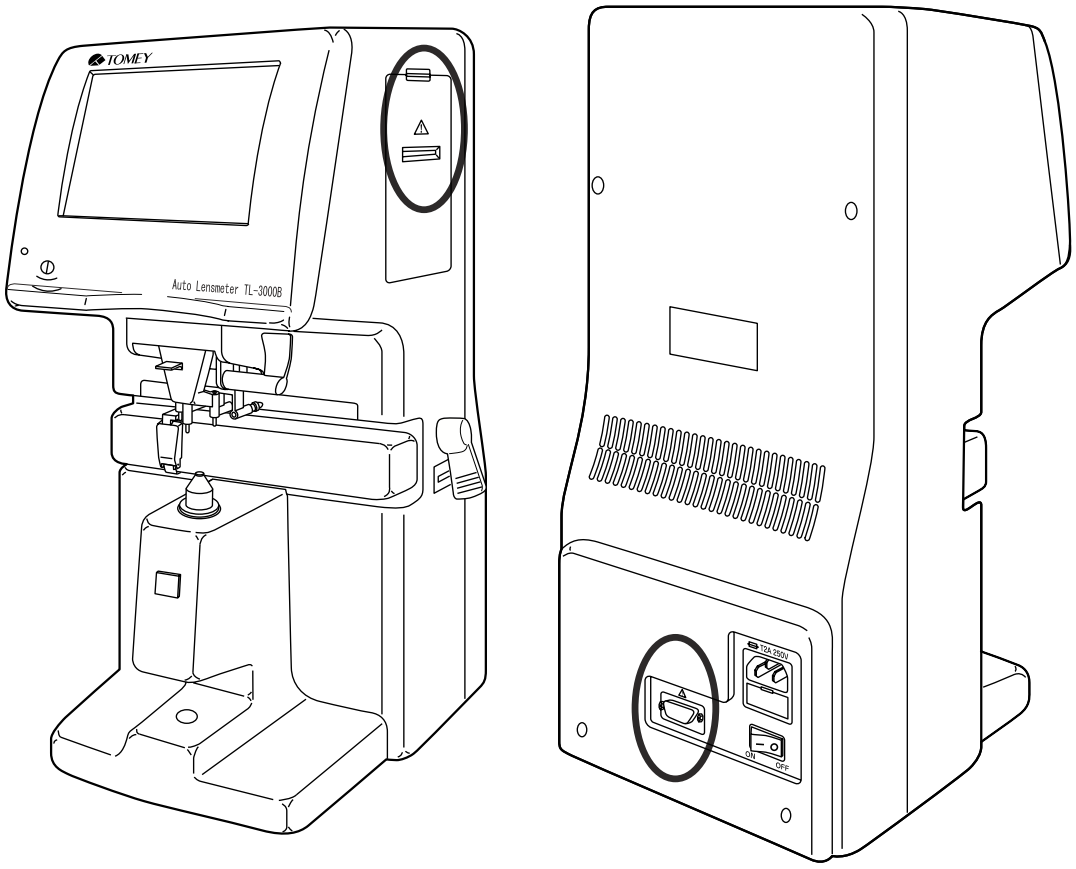
8. INDEX

Refer to the index as a guide, if necessary.

CAUTION MARKS

Notes

- **Care must be taken not to stain and damage the caution marks applied to this instrument.**
  Identify one caution mark applied on the side of the instrument and on the rear side.
- **The Printer Cover is attached with a metallic blade. Sufficient care must be taken not to touch the blade with yourself, or you may otherwise suffer from injuries.**
- **The external output terminal is not insulated with an internal circuit of this instrument. Therefore, the internal circuit may be disordered depending on its connecting mode. Be sure that, if any external output terminal is used for this instrument, ask Tomey for appropriate advice.**
- **The Caution Mark is also used for the switch, which is used for the maintenance service of the instrument. The switch must not be changed over by any personnel other than authorized serviceman.**



Contents

1. PRIOR TO USE

Notes

- **It is suggested that the Operator should read the Operator Manual throughout before using this instrument for safety as well as for proper use.**
- **Do not use this instrument for any procedures other than specified in this Operator Manual.**

1.1 Cautionary Notes

- **Only skilled person is allowed to use this instrument.**
- **Observe the following items, when installing this instrument.**

- Install the instrument in a place where it is free from water and chemicals.
- Install the instrument in a place where it is free from any adverse influences, such as direct sunbeams, high temperature, excessive moisture, dust, salts, or sulfur contained air.
- Install the instrument in a place, which is not subjected to inclination vibration, and/or shocks.
- Do not install the instrument in or near the storage of chemical substances or in a place where any gas is generated.
- Make sure that the frequency of power source. Voltage, and allowable current (or consumption power) are properly provided for the operation of this instrument.
- Make sure that the conditions of power source (such as electric discharge and polarity) are proper.
- Make sure that the grounding wire is properly connected.

- **The following cares shall be taken before using this instrument.**

- Check to see if the switch contact, polarity, and dials are proper so that the instrument accurately operates.
- Make sure that all the cables are properly connected to the instrument for the safe operation of this instrument.

- **Observe the following items after using this instrument.**

- After operation is finished, return the instrument to its initial state used before operation and next turn the power off in specified procedures.
- Care shall be taken not to apply undue force to the cables and cords in such a manner of forcedly pulling.
- As for storing the instrument, refer to "4.4 Storing".
- The accessories and cords shall be cleaned and stored in specified order.
- The instrument shall be cleaned so that it will be ready for use.

- **In the event the instrument is disordered, do not intend to repair it, but place an appropriate warning label and ask your local representative or distributor for repair.**

- **Do not try to repair or redesign the instrument.**

- **When reusing this instrument after a certain period of recession, make sure before its reuse that it operates properly and safely.**

1.2 Unpacking

Upon unpacking the shipment, check to see if the instrument, accessories, and spare parts have arrived in such conditions and quantity as specified. Also check to see if there is any damaged with the shipments.

In the event any quality defect or short quantity with the shipments is found when unpacking, immediately report to your representative or distributor.

Notes

- **Be sure to retain all the shipping and packing materials, since they will be necessary when the instrument is moved or transported in future.**

- **Vibration in transportation or environmental change while being stored may have caused a leak from the ink cartridge. Check to see when unpacking if the pen point and, if any ink leak or smear is found, wipe to remove the ink and give a few times of trial marking.**

- Auto Lensmeter, TL-3000B main unit
- Power Source Cord
- Nose Piece for Contact Lens Measurement
- CL Holder
- Fuse (250V, 2.0A)
- Printer Paper
  (3 rolls, including one role placed in the main unit.)
- Dust Cover
- Operator Manual

1.3 Glossary

- **D (diopter)**
  Unit which refers to refractive power and is inverse to meter
- **△ (prism diopter)**
  Unit which represents the quantity of prism
- **SPH (S)**
  Spherical refractive power (unit: diopter)
- **CYL (C)**
  Cylindrical refractive power (unit: diopter)
- **AXIS (A)**
  Axial angle which represents the direction of astigmatism (unit: deg.)
- **ADD**
  Additional power of a multi-focal lens (including progressive addition lenses)
- **PX, PY (Prism mode)**
  Prism (△) in the horizontal direction (PX) and the vertical direction (PY) in the rectangular coordinates
- **PSM (Prism mode)**
  Absolute value of prism (△) in the polar coordinates
- **BAS (Prism mode)**
  Base direction angle of prism in the polar coordinates (unit: deg.)
- **DCX, DCY (Prism mode)**
  Displacement (DCX) from the measurement position to the optical center in the horizontal direction and that (DCY) in the vertical direction (unit: deg.)
- **CL**
  Contact lens
- **PRG mode**
  Measuring mode for progressive refractive power lens

- **HI mode**
  Measurement mode for high index lens
- **PD**
  Pupillary distance (unit: mm)
- **UV**
  Ultraviolet
- **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.
- **D1**
  Lens anterior refractive power (unit: D)
- **D2**
  Lens posterior refractive power (unit: D)
- **n**
  Refractive index of the lens measured
- **ne**
  Refractive index of the curve meter
  (The default value for this instrument is set at 1.523.)

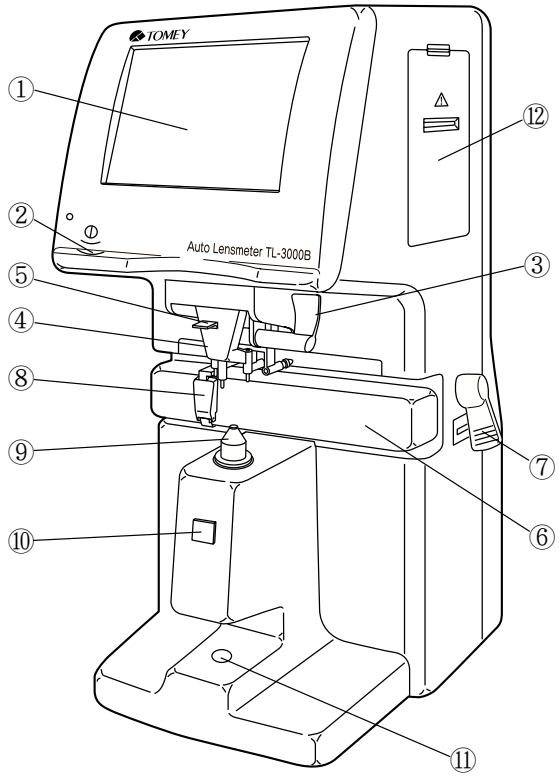
1.4 Outline of Operation

The AUTO LENSMETER TL-3000B is designed and built for the automatic measurement of refractive and prism powers of spectacles and contact lenses.

- The TL-3000B is composed of a built-in optical system, an electronic processing system, and a mechanical system.
- Placing the 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. COMPONENTS AND FUNCTIONS

2.1 Front



① Monitor Screen/Touch Panel

Display and operation of measurement data and operation keys

② Contrast Adjusting Volume

The contrast of the display screen is adjusted.

③ Marking Device

Lens "Center" and "Axial direction" are marked.

④ Lens Holder

The lens is secured when marked.

⑤ Lens Holding Lever

The lens holder is moved up and down.

⑥ Lens Table

Used as the reference of "astigmatism axis" of spectacles.

⑦ Lens Table Stopper

The lens table is fixed in the appropriate position.

⑧ Nose Block for PD Measurement

Applied to the nose rest of the spectacle frame when PD is measured.

⑨ Nose Piece

The lens is placed.

⑩ Hold Button

Measured data is retained and saved in the memory.

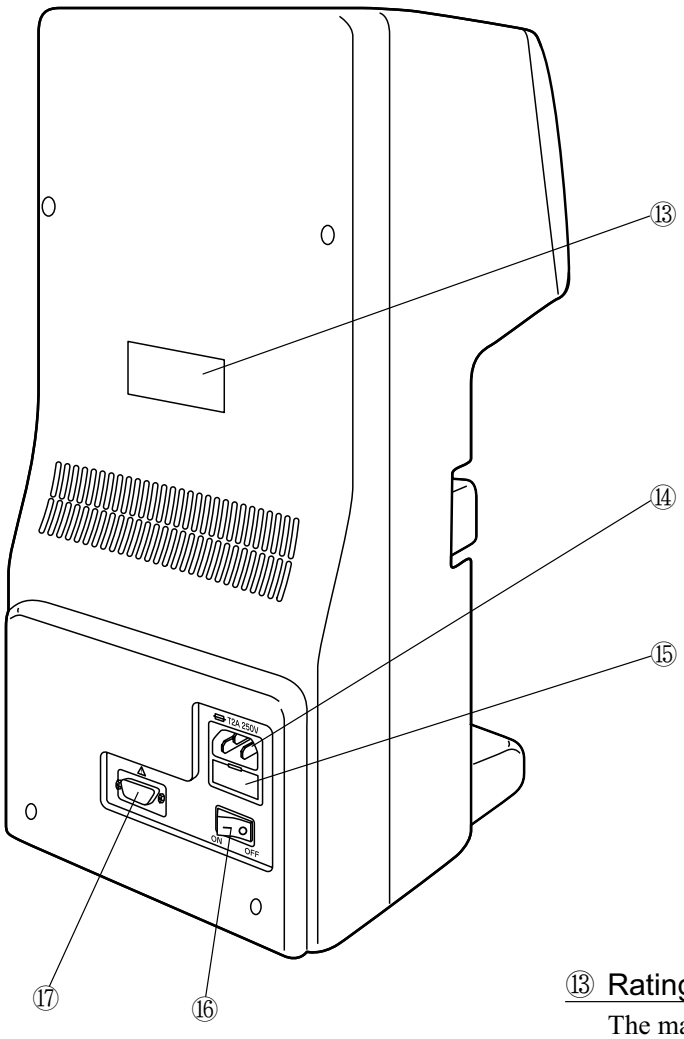
⑪ UV Checker

The lens is inserted to measure the permeability of ultraviolet rays.

⑫ Printer

Measurement data is printed out.

2.2 Back



⑬ Rating Plate

The manufacturing number is placed in.

⑭ Power Terminal

The power cord is connected to.

⑮ Fuse Holder

The fuses are retained.

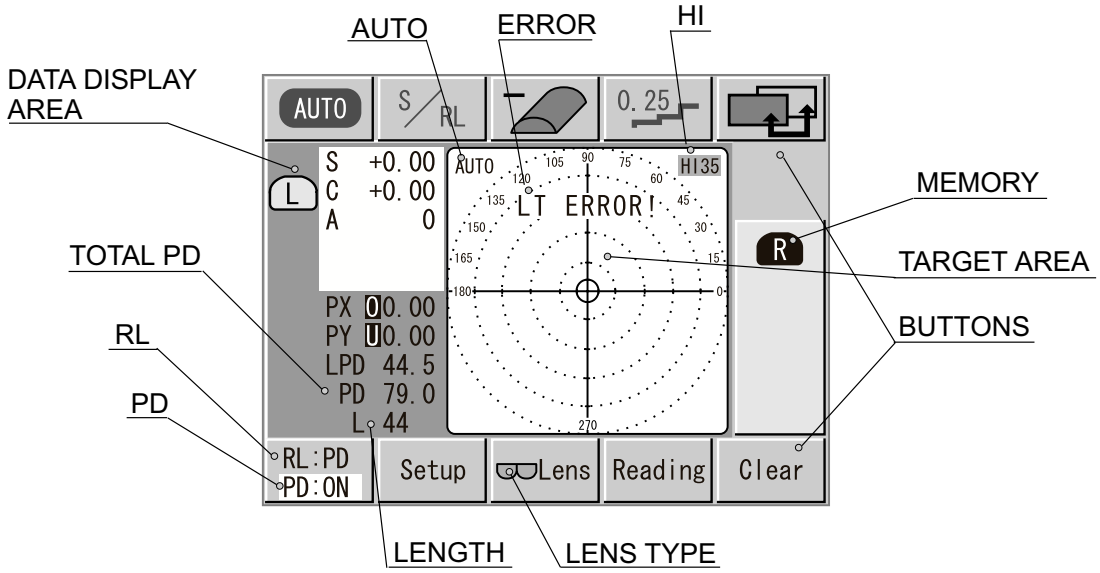
⑯ Power Switch

The power is turned ON/OFF.

⑰ External Output Terminal (RS232C)

The computer is connected to this terminal to be used for sending various data.

2.3 Screen Display Layout



● Lens Type

The lens types for measurement, such as normal and PROG, are displayed.

● Memory

The retaining and memory conditions of measurement data are displayed. Data saved in the RL mode is displayed as highlighted reversely with black and white. In the S-mode, the number will be increased after "hold" is released.

● Target Area

The display area where the target (+) is centered.

● "AUTO"

Displayed at the time of auto hold

● "HI"

Displayed at the time of high refractive lens measurement (HI mode)

● Data Display Area

"R" and "L" are displayed in the RL-mode. Measurement can be made on the side which displays measured data.

● ERROR

The details of "ERROR" is displayed when an error, such as overflow, are displayed.

● Total PD (when PD is measured)

Total PD (for both eyes) measurement data is displayed.

● Button

The function of operation buttons is displayed.

● RL

Changing-over of the R vs L screens is displayed. If the auto RL is set at ON, "A(uto)" is displayed, while OFF, M(annual) is displayed. If PD measurement is in process, "PD" is displayed due to the priority of PD.

● PD

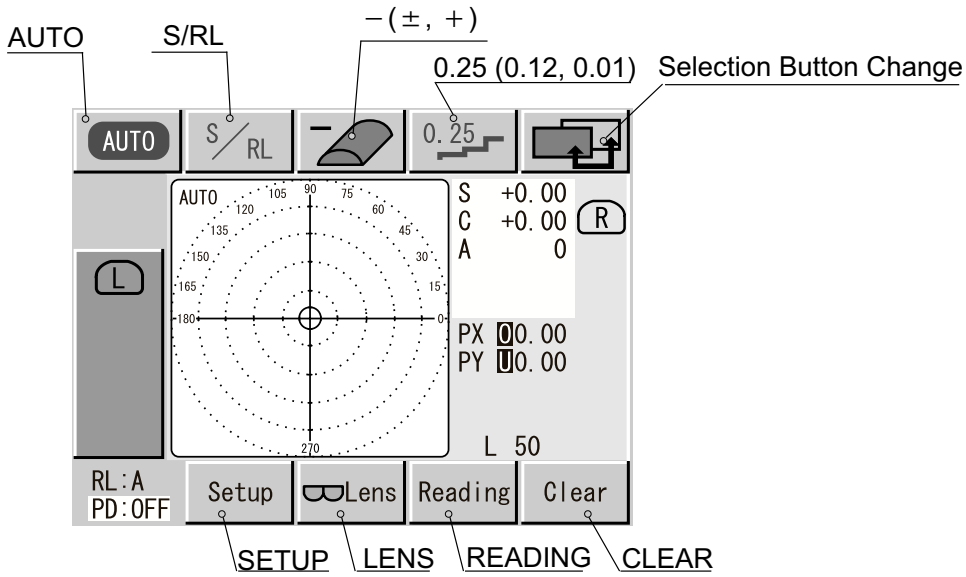
Displayed when the PD measuring function is effective, of which "ON" is displayed while in PD measurement, or "OFF" is if not so. No display is made while the PD mode is OFF.

● Length

The length (to the center of the nose piece) from the face of the lens table is displayed.

2.4 Operation Buttons

2.4.1 Operation Button Mode 1 (First Menu)



- **AUTO**

  The setting of auto hold is changed over.

- **S/RL**

  The S mode ⇔ RL mode is changed over.

- **−(±, +)**

  Reading of CYL is changed over.

- **0.25 (0.12, 0.01)**

  Reading of STEP is changed over.

- **Selection Button Change**

  The operation button mode 2 is changed over.

- **Setup**

  The menu is changed over to the setting screen.

- **Lens**

  The measurement mode is changed over to the menu for various spectacle lenses and contact lenses.

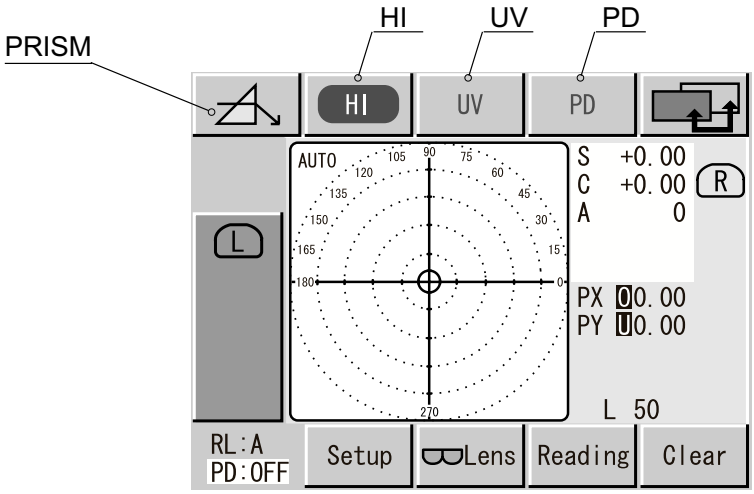
- **Reading**

  The menu is changed to that for measurement results view.

- **Clear**

  The measurement data saved in the memory is deleted.
  The data saved lastly is deleted in the S mode, while RL data is deleted in the RL mode. Also, in the RL mode, if Data Link in the Output setting screen is for TOMEY Link selection, the menu will be changed to the TOMEY Link ID input screen after the data is deleted.

2.4.2 Operation Button Mode 2 (Second Menu)



● PRISM

Changing-over of prism display and prism mode is made.

● HI

The menu is changed to the high refractive lens mode (HI mode).

● UV

The UV check function is set.

● PD

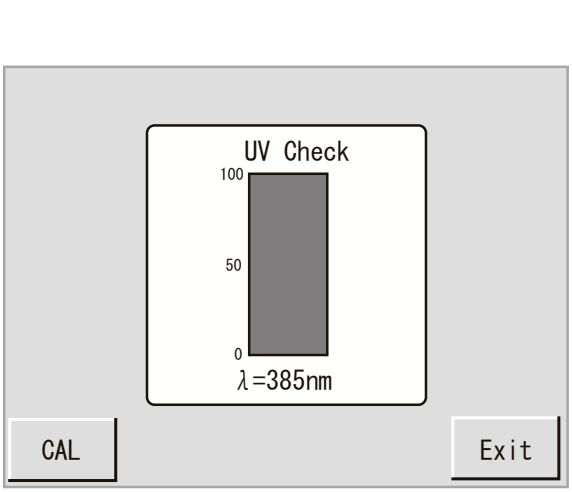
The PC measuring function is set. While the measuring function is set, "PD : ON" or "PD : OFF" is displayed in the left lower part of the screen.

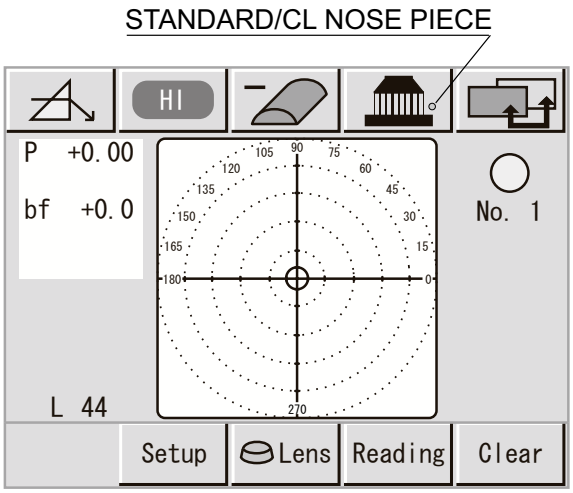
● CAL

Calibration for UV check function is made (which is displayed when the UV check function is in operation).

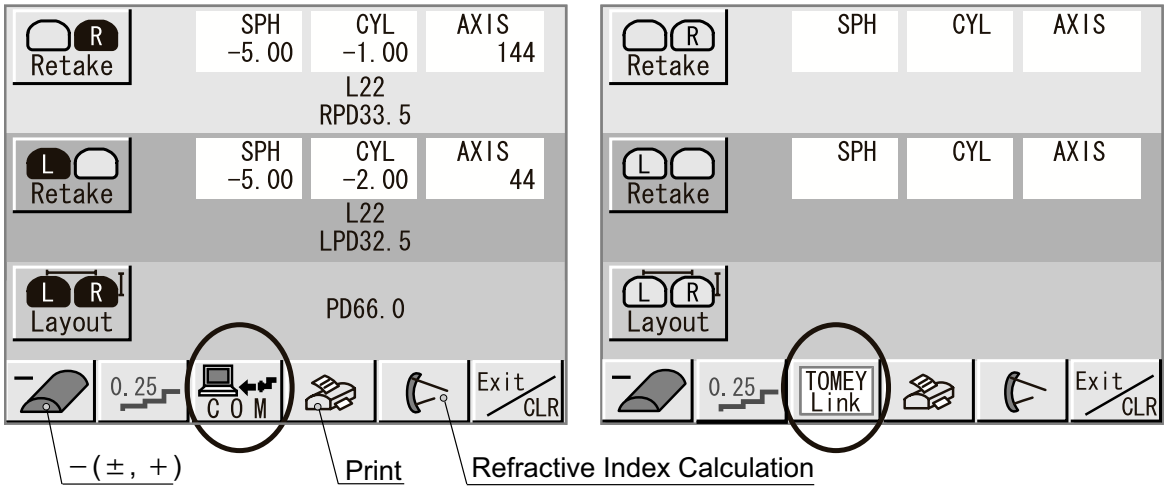
● Standard/CL Nose Piece

Standard nose piece or CL nose piece is selective when high power lens is measured.





2.4.3 Operation Button Mode 3 (Measuring Result Display View Screen)



● Retake

Pressing of "Retake R(L)" returns the screen for re-measurement.

● Layout

Pressing of "Layout" after measurement of between-pupils changes over to the layout view screen.

● −(±, +)

CYL reading for saved measurement data is changed over.

● 0.25 (0.12, 0.01)

STEP reading for saved measurement data is changed over.

● COM

Data communications with external equipment is made with the use of RS232C.

● TOMEY Link (Assistant System for Electronic Medical Record)

Sending and receiving of individual information, measurement data, etc. can also be performed with the use of TOMEY Link **(NOT AVAILABLE CURRENTLY)**.

● Print

Data being displayed in the screen is printed out.

● Refractive Index Calculation

The menu is changed over to the mode of refractive index calculation for measured lens.

3. OPERATING PROCEDURES

3.1 Precautions for Operation

The external output terminal is not isolated for the internal electric circuits of this instrument. The internal circuits may, therefore, be disordered depending on their wiring mode. Be sure to consult with Tomey, if intending to use an external output terminal for this instrument.

Notes

- **It is noted that the lens holder can only be used when marking the lens. When measuring a coated lens and if moving it as being held with the holding pressure, the coated surface of the lens may be damaged.**
- **The protective glass provided under the nose piece should be cleaned with soft cloth from time to time.**
- **The tip of the nose piece should always be cleaned. The tip stained with dust may damage the lens surface.**
- **When cutting the printed paper with the cutter, first extend the paper over the blade and then pull it to cut. Cutting the paper without touch with the blade may cause to clog or damage the printer itself.**
- **Always place the dust cover after using the instruments.**
- **If the instrument is not used for an extended period, disconnect the power plug from the receptacle and place the dust cover.**

3.2 Preparation Before Use

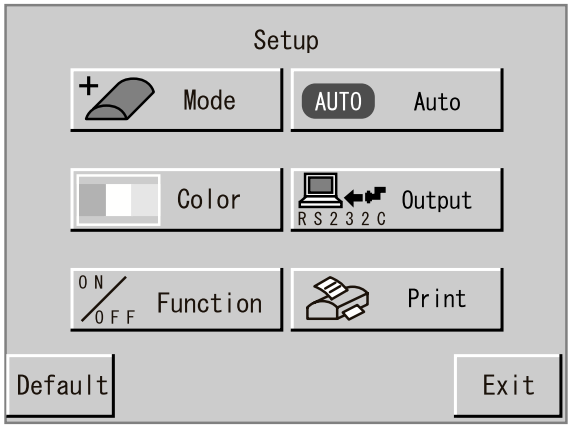
3.2.1 Setting-up of the Setup Screen

The setup screen is used to change such measuring conditions as the display units, and CYL mode, the color mode, the auto hold, and the external output.

1) Press Setup button on the "Setup Screen" to enter "Setup Screen".

Notes

- **The setup values are saved in the internal memory; therefore, no resetting of the values is required.**



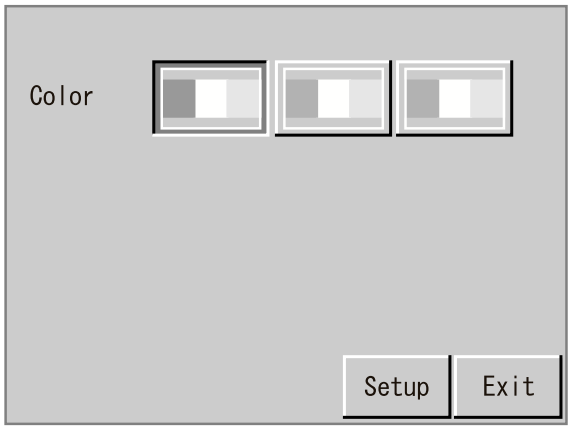
2) The setup is composed of six setup screens.
3) Pressing of the Setup Screen button changes in each screen.
4) If desiring to return all of the setups to the initial conditions, press the Default button.
5) When finishing setting up and returning to the Measurement Screen, press the Exit button.

Notes

- **No default is made for color setting.**
- **No default is given, if "CL MODE" setup has been made in the Function Setup Screen.**
  If default is desired to be set up, set "CL MODE" "OFF" once and then turn the power on.
  At the same time, change the nose piece with that for spectacles.

Color Setting Screen

Press Color button on the "Setup Screen" to enter "Color Display Setup Screen".



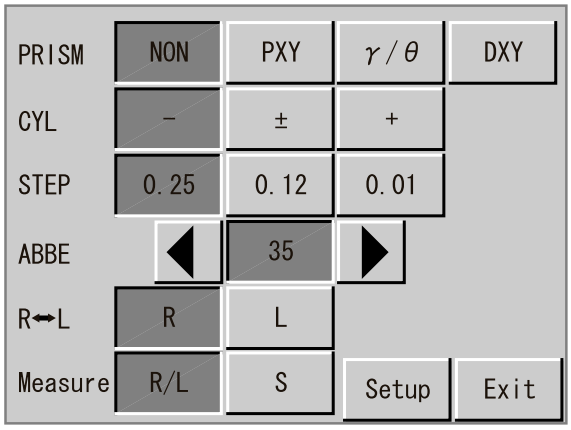
For color setting, three background colors are selective.
The modes which are set up in the "Color Setting Screen" are as follows.
Pressing of the button for the mode to be set up turns the button color to black to indicate the state of selection.
Pressing of the Setup button returns the screen to the Setup Screen, while pressing of the Exit button does the screen to the Measurement Screen.

a) Colors

Yellow:	A bright background color based on yellow
Blue:	A fresh background color based on blue
Brown:	A calm background color based on brown

Mode Setting Screen

Press Mode button on the "Setup Screen" to enter "Mode Setup Screen".



The modes which are set up in the "Mode Setup Screen" are as follows:
Selecting of the button for mode to be set up turns the color of the button color to black to indicate the state of selection.

b) PRISM (Setting of the Prism modes)
   NON: No Prism display
   PSY: PS, PY display (rectangular coordinates display)
   γ/θ: PSM, BAS display (pole coordinates display)
   DXY: DCZX, DCY display (eccentricity)
c) CL (Setting of the CYL modes)
   −: Minus reading
   ±: Mixed reading
   +: Plus reading
d) STEP (Setting of measurement units)
   0.25: 0.25D step
   0.12: 0.12D step
   0.01: 0.01D step
e) ABBE (Setting of ABBE number)
   For changing the ABBE number, pressing of "◀" decreases the number and that of "▶" increases the number. The ABBE number can be set up in five steps of 30~65.
   (The initial ABBE number has been set at "35".)

Notes

- **The ABBE number to be set in this section is that used for the HI mode. In case of measuring in the HI mode, the measured data is compensated with the ABBE number, which is set in this section.**
- **The ABBE number used for the normal mode has been set at "60".**

f) R⇔L

R: Measurement of the framed lenses mounted is given from the lens for right eye.

L: Measurement of the framed lenses is given from the lens for left eye.

g) Measure

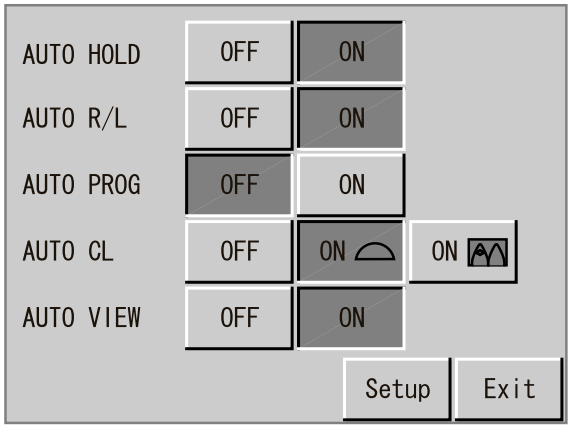
R/L: The measurement screen for framed lens is set.

S: The measurement screen for mono-focal lens is set.

Note **The default setting must setup on the "Setup Screen" to keep setting condition but the instrument is able to change the setting on the measurement screen as temporary also.**

AUTO Setup Screen

Press Auto button on the "Setup Screen" to enter "Auto Setting Screen".



The modes which are set up in the "AUTO Setup Screen" are as follows. Selecting of the button of the mode to be set up turns the button color to black to indicate the state of selection.

Pressing of the Setup button returns the screen to the Setup Screen. And pressing of the Exit button returns the screen to the Measurement Screen.

h) AUTO HOLD
   OFF: Sets the Manual Hold mode (which is held with the HOLD button).
   ON: Sets the Auto Hold mode.

i) AUTO R/L (Effective for the RL mode only)
   OFF: No automatic change-over for RIGHT/LEFT (Used for no PD measurement)
   ON: Automatic change-over for RIGHT/LEFT (Used for PD measurement)

j) AUTO PROG
   OFF: No automatic change-over to PROG at the time of automatic identification of the progressive lens is made.
   ON: Automatic change-over to PROG at the time of automatic identification of the progressive lens is made.

k) AUTO CL

OFF: Changing-over of the mode to CL Nose Piece does not automatically change the mode to the CL mode.

ON (CL): Changing-over of the mode to the nose piece mode automatically changes over the mode to the CL mode.

ON (CL Holder):

Replacing of CL Nose Piece automatically changes the mode to the CL Holder mode.

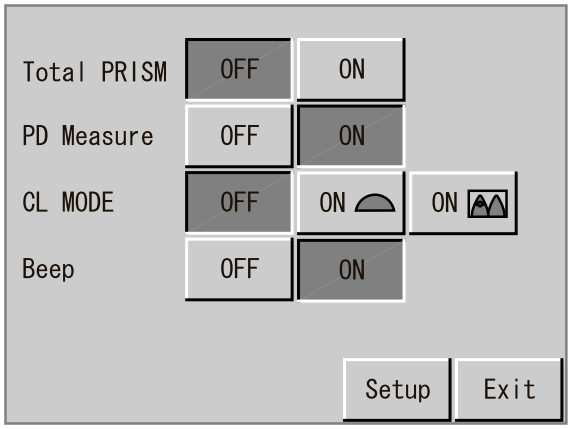
i) AUTO VIEW (Effective for the RL mode only)

OFF: Both measurements of R and L does not automatically change the screen to the Measurement Results View Screen.

ON: Both measurements of R and L when taken automatically change the screen to the Measurement Results View Screen.

Function Setup Screen

Press Function button on the "Setup Screen" to enter "Function Setting Screen".



The modes which are set up in the "Function Setup Screen" are as follows:

Selecting of the button for the mode to be set up change the button color to black to indicate the state of selection.

Pressing of the Setup button returns the screen to the Setup Screen. And pressing of the Exit button returns the screen to the Measurement Screen.

m) Total PRISM

OFF: In the prism measurement, the sum of both eyes prism powers (of the left and right prism powers) is not displayed.

ON: In the prism measurement, the sum of both eye prism powers (of left and right prism powers) is displayed.

n) PD Measure

OFF: PD measurement is not given.

ON (CL): PD measurement is given.

o) CL MODE

OFF: All the lens types are selective.

ON (CL): CL or CL holder is selected.
(CL when power is turned on.)

(CL Holder): (CL Holder when power is turned on.)

Notes

- **Setting-up of "CL MODE ON" only allows no selection other than CL or CL Holder Since setting-up of "CL MODE" "ON" is of an exclusive mode, always use the nose piece for CL.**
- **When "CL MODE" is "ON", the Default button will not be able to function. To reset the setting, enter "Function Setting Screen" and select "CL MODE OFF" before press the Default button. When you turn on the power to re-start, makes sure the nosepiece have been replaced to the standard nosepiece.**

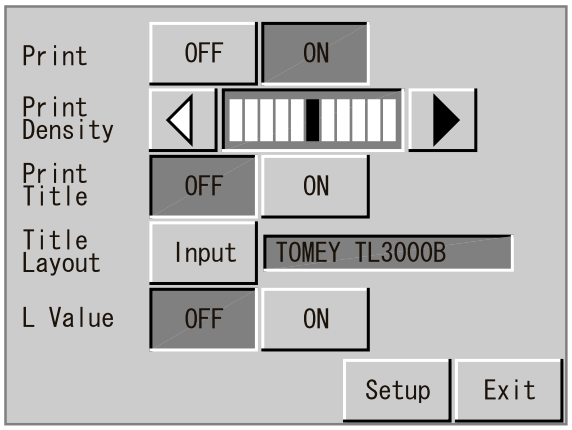
p) Beep

OFF: No beep sound

ON: Beep sound

Print Setup Screen

Press Print button on the "Setup Screen" to enter "Print Setting Screen".



The modes which are set up in the "Print Setup Screen" are as follows:

Selecting of the Setup button returns the screen to the Setup Screen, while pressing of the Exit button returns the screen to the Measurement Screen.

q) Print

OFF: No printout is made.

ON: Print out is made.

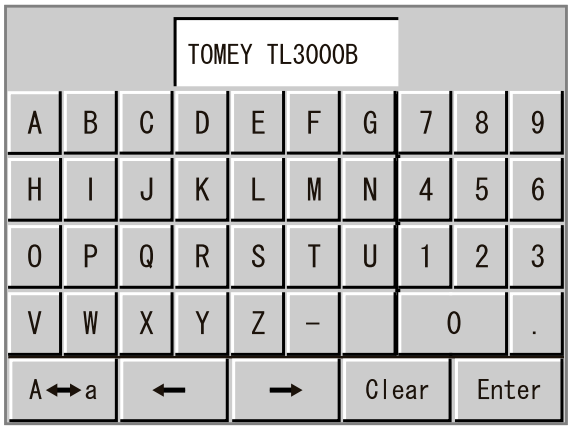
r) Print Density

The thickness of printing-out ink is controlled in 11 steps. The thickness is also controlled with the "▶" button to increase the thickness of ink and the "◁" button to reduce.

s) Print Title

OFF: The title is not printed in the last row of the printout.

ON: The title is printed in the last row of the printout.



t) Title Layout

Pressing of "Input" allows the Title Layout Screen to be displayed.

The title of a printout to be printed in the last row can be inputted with up to 13 letters. Inputted title is displayed in the upper part of the screen. (The title is displayed in the name of "TOMEY TL-3000B" for shipment of the instrument.)

The title is inputted in the following procedure.

1. First select the letters to be inputted. Switching of capital vise versa small letter is done with the "A⇔a" button. (The first letter is always inputted with a capital letter.)
2. Press the Enter button when inputting has been finished, to return the screen to the Print Setup Screen, by which the title inputted will be displayed.

Inputted letters are deleted by pressing the Clear button. In case inputted letters are edited, use the "←" and "→" buttons by placing them on the left side of the letter to replace with the letters to be renewed.

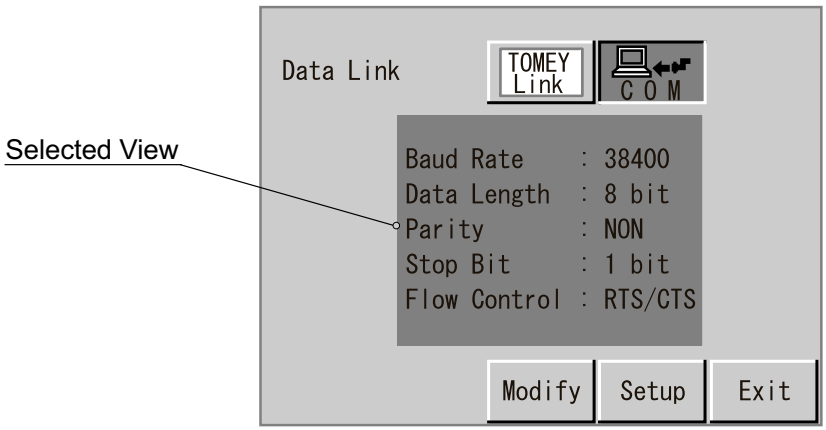
u) L Value

OFF: The distance from the lower end of the spectacle frame to the optical center is not printed when printing-out.

ON: The distance from the lower end of the spectacle frame to the optical center is printed when printing-out.

Output Setup Screen

Press Output button on the "Setup Screen" to enter "Output Setting Screen".



The modes which are set up in the "Output Setup Screen" are as follows:

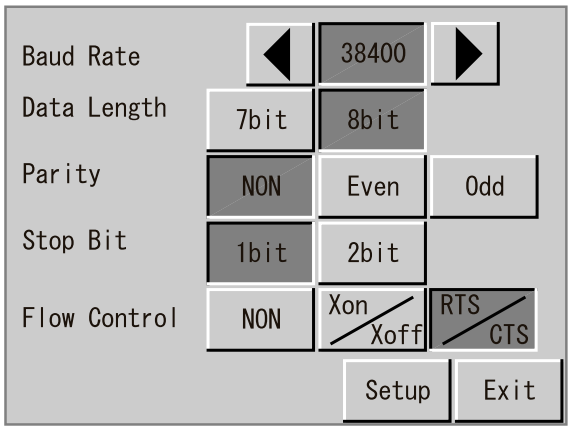
Selecting of the button for mode to be set up changes the button color to black which indicates the state of selection.

Pressing of the Modify button changes the setup of communication conditions being displayed. Pressing the Setup button returns the screen to the Measurement Screen.

v) Data Link

COM: Data communications (for sending and receiving of data) can be carried out with the external equipment by using RS232C.

[Details of setup for communications]

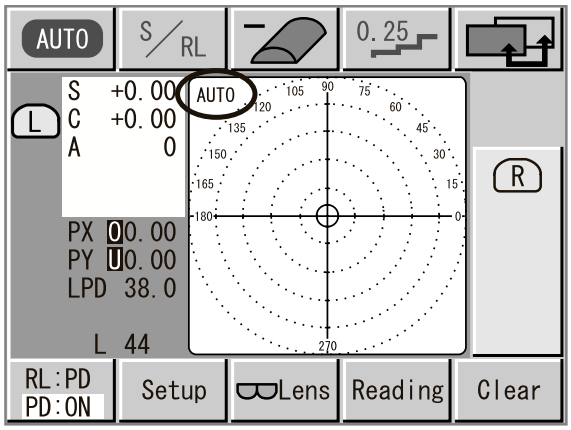


Baud Rate:	2400, 4800, 9600, 19200, 38400
Data Length:	7 bit, 8 bit
Parity:	NON, Even, Odd
Stop Bit:	1 bit, 2 bit
Flow Control:	NON, Xon/Xoff, RTS/CTS

See 3.6 External Output (RS-232C Output)/page 3-70 for more details.

3.2.2 Setting of the Auto Hold Mode

If "AUTO" is displayed in the left upper part of the target area, the Auto Hold Mode is active. In the mono-focal lens mode, centering of the target automatically retains measured data and stores the data in the memory. In the PROG mode, when measuring a near-sight area, the additional power (ADD power) measuring data is automatically retained to be stored in the memory.



The Auto Hold Mode is set up by either of the following two ways.

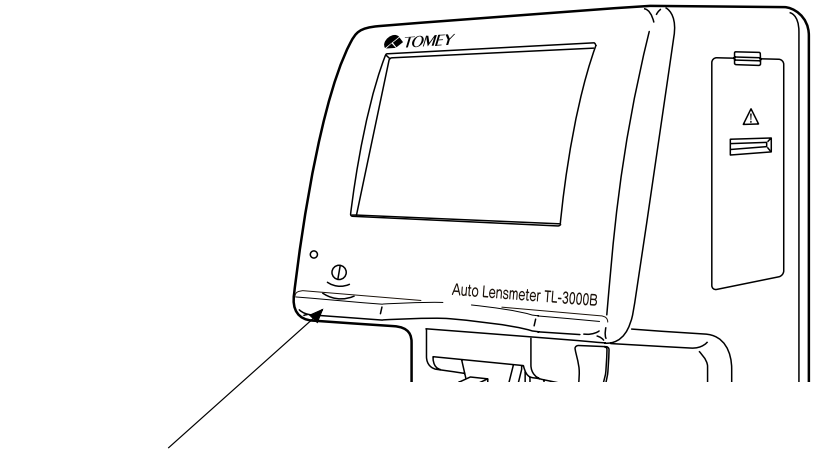
① Press the AUTO button in the First Menu to display "AUTO" in the left upper part of the target area.

② Set the setup of "AUTO HOLD" ON in the AUTO Setting Screen.

Note **The Auto Hold mode is exited by pressing "AUTO" in the First Menu of the Measurement Screen. If setting-up "AUTO HOLD" ON in the setting-up menu, the initial setup given when turning power on will thereafter provide the Auto Hold mode.**

3.2.3 Adjusting of Display Screen Contrast

The display screen contrast is adjustable by turning the Contrast Adjusting Volume.



3.2.4 AUTO OFF Function

If measurement is not carried out for longer than 10 minutes with the instrument as being energized with power, the internal motor, the back light for liquid-crystal display, and the power source for measuring light will all be turned "OFF" to prevent these components from being deteriorated.
Touch the liquid-crystal display to reactivate the screen display.

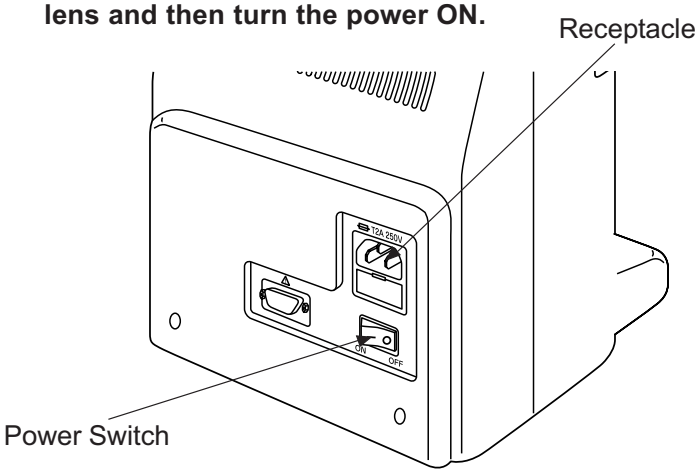
Note **In case the instrument is rested as being unoperated for a while, turn the power for this instrument off and place the protective cover over the instrument.**

3.3 Measuring Procedures

3.3.1 Turning Power ON

Notes

- **Place the lens on the Nose Piece after the measurement screen is displayed.**
- **When the power is turned ON with the lens as left on the Nose Piece or if the setup of "CL MODE" in the "Function Setup Screen" has been set at "OFF", the screen will display its start followed by beeping, by showing an error sign of "INITIAL ERROR" as left. If this occurs, dismount the lens or replace the Nose Piece with that for framed lens and press the "Retry button and, after the starting screen is displayed, the Measurement Screen will be displayed.**
- **If "CL MODE" in the Function Screen has been set up for "ON", replace the Nose Piece with that for contact lens and then turn the power ON.**



1) Connect the power cord of the instrument to the receptacle by inserting the power plug.
2) Before turning the power ON, check to see if the following items are proper.
   - Make sure that the Nose Piece is securely fixed in position.
   - Make sure that the Protective Glass under the Nose Piece is clean.
   - Make sure that the lens is not placed on the Nose Piece.
3) Turning the power "ON" displays the starting screen for approximately 5 seconds, followed by the Measurement Screen.

3.3.2 Single Vision Lens

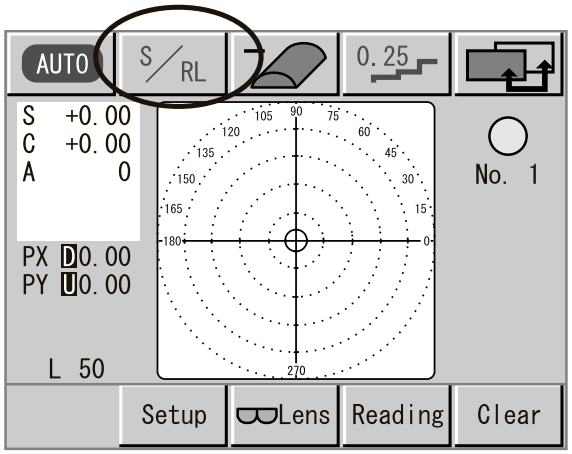
Centering of the lens in the Auto Hold mode automatically retains and save measurement data.
When measurement is given in the Manual Hold mode, press the AUTO button referred in the first menu to change over the mode to the Manual Hold mode.

a) Measurement of Single Vision Lens (S-mode)

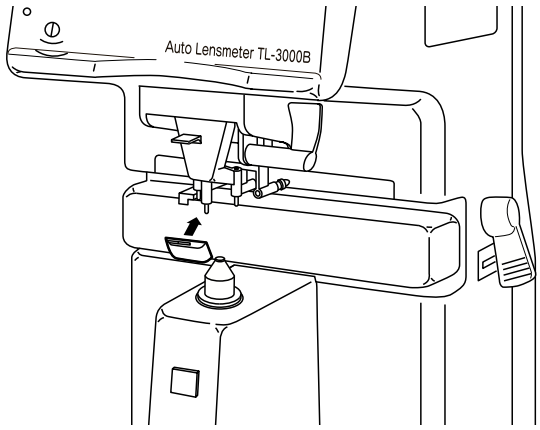
Notes

- **Care must be taken neither to forcedly press the lens against nor to abruptly move over the Nose Piece, which may otherwise damage the lens.**
- **The target for the cylinder lens and lenses having no refractive power may not be centered, since these lenses have no optical center.**
- **Pressing the CYL or STEP button in the First Screen changes readings.** (See 2.4.1 Operation Button Mode 1 / page 2-5 for more details)

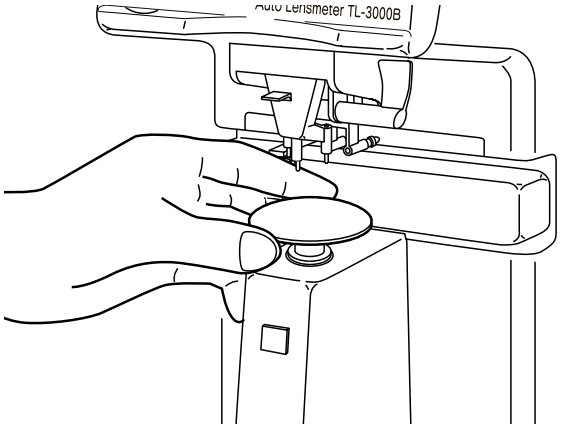
1) If the RL mode is shown in the Measurement Screen, press the S/RL button in the First Menu to change the mode to the S-mode.



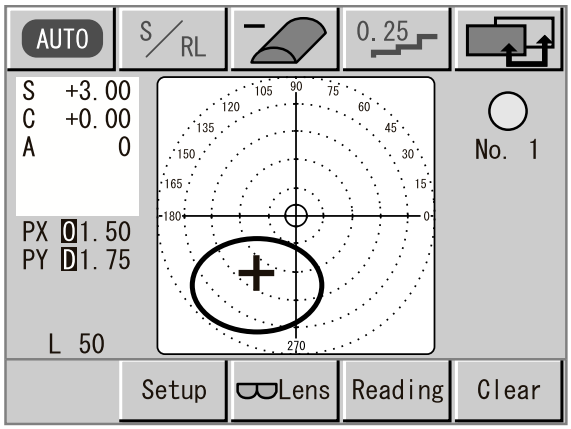
2) Check to see if the Nose Block for PD measurement leans forward. If so, lock the Block to the Lens Table.



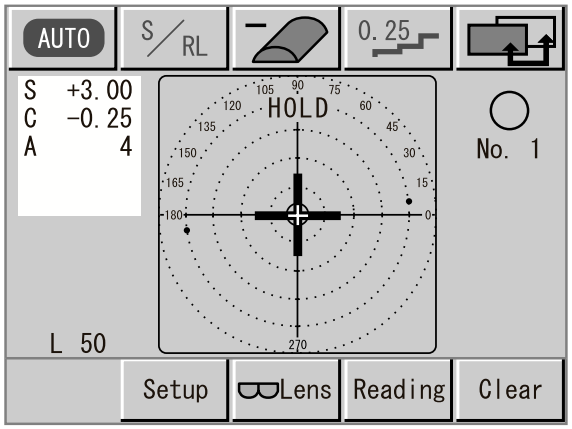
3) Place the Nose Piece with the lens front as turned up.



4) Moving of the lens in the front/rear/left/right directions so as to center the target displays measurement data in the data display area at real time.



5) Centering of the target and next pressing of the HOLD button retain measurement data (in the Manual Hold mode), changing the color of the target area and displaying HOLD. Up to 99 measurement data can be saved. The message "DATA OVER FLOW" will appear when the data have been taken more than 99 times.



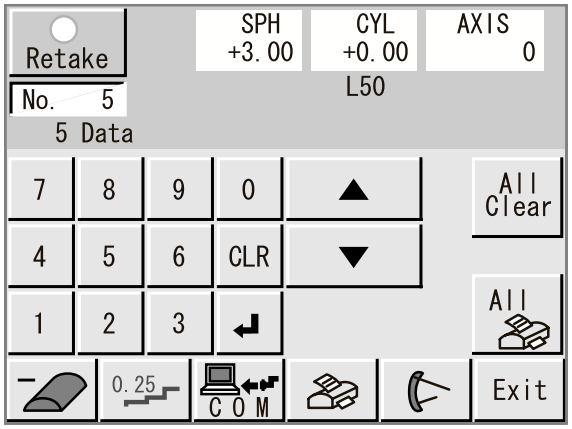
Notes

- **If pressing the HOLD button while measurement data being retained, such data retaining state will be released to change the screen to the Measurement Screen mode.**
- **Pressing of the Clear button deletes newest data.**

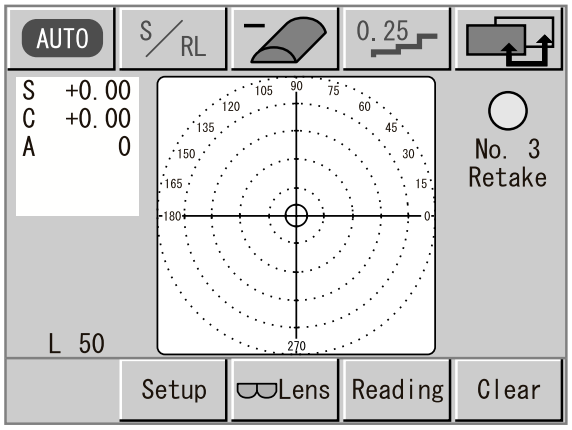
6) The target disappears when the lens is removed from the Nose Piece. And when again placing of the lens on the Nose Piece measurement data are released from their retained state to return the operation to the state ready for measurement.

b) Single Vision Lens Measurement Results View Screen (S-mode)

1) Pressing of the Reading button after measurement returns the screen to the Measurement Results View Screen which displays newest data.



- Retaking of Particular Measurement Data (Retake)
  Display data numbers for retaking measurement in the screen with the UP/DOWN buttons. In case of using the numeric keys for this purpose, delete displayed data numbers with the CLR button. After this, input the numbers with the numeric keys and press the Enter key for confirmation. After data numbers are determined, press the Retake button to return to the Measurement Screen.
  After retaking measurement is finished, the screen will automatically return to the View Screen.



- Changing of Data Readings Being Displayed (CYL, STEP)
  Reading of data being displayed can be changed by pressing the CYL or the STEP button.
- Data Communications (when setting-up of COM)
  Pressing of the COM button allows all saved measurement data to be sent to the external equipment. (See 3.2.1 Setting-up of the Setup Screen / page 3-2 for more details)
- Printout (Print)
  Press the Print button to print measurement data being displayed.
  If pressing the All Print button, measurement data will be printed out in the order of measurements. (When stopping the printing out on its way, press the Cancel button while the All Print button is in display.)
- Calculation of Refractive Index
  (See 3.3.13 Calculation of Refractive Index / page 3-61 for more details)

Notes

- **The Default of 1.523 is used for the refractive indexes with the curve meter. If a different curve meter is used, change the figure with that for such curve meter used.**
- **As for the refractive power measurement procedures (D1 and D2) with the curve meter** (see 3.3.12 Refractive Power / page 3-59 for more details)**.**
- **All saved measurement data are deleted with the All Clear button.**

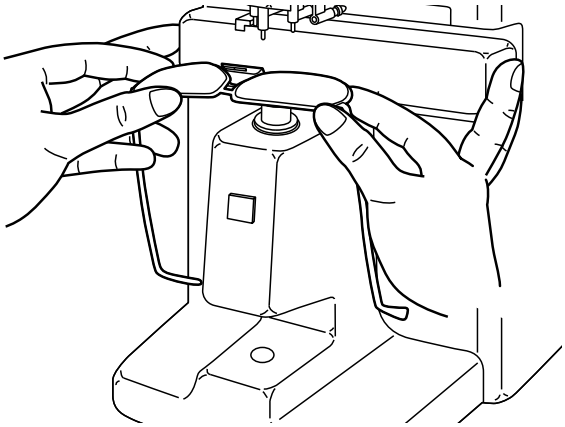
c) Measurement of Framed Lens (RL mode)

Note **Care must be taken neither to forcedly press the lens to the Nose Piece nor abruptly move the lens over the Nose Piece in such a manner of rubbing, which may otherwise damage the lens.**

1) In case of the S Mode, press the S/RL button in the First Menu to change the mode to the RL mode. The initial setup has been set up for right eye lens measurement (R). When measuring the left lens, press the L button to change for left eye measurement (L).

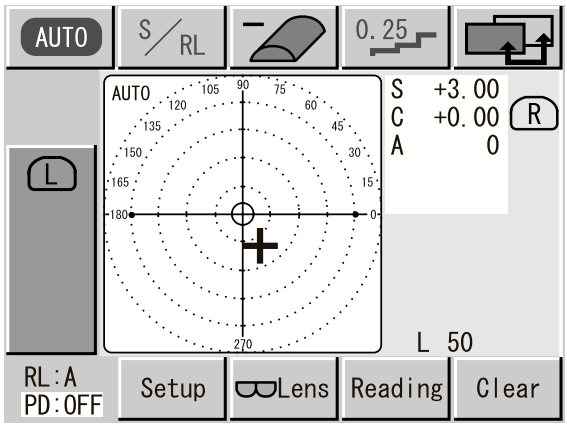
Note **In case of PD measurement (ON) (which is displayed in the left lower part of the screen), R ⇔ L is not changed.**

2) Place the lens on the nose piece with the upper part of the spectacle frame turned to this side and the front side of the lens to be measured as turned to the upper side.

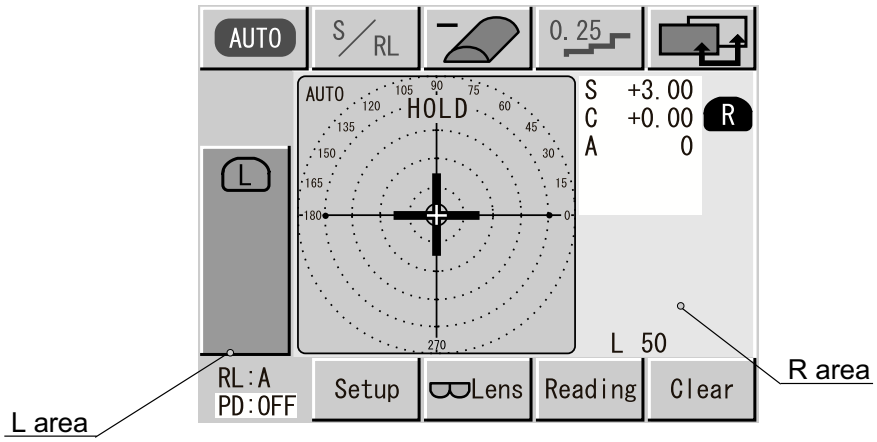


3) Move the lens to the front/back/left/right so that the target (+ mark) is aligned to the center of the target area.

4) Apply the lens table to the lower end of the right and left lens frames of the spectacles.



5) Align the target to center to the target area and next press the HOLD button, so measurement data will be retained (when set for Manual mode) and the color in the target area will is changed to display HOLD. The spectacle mark on the side of measurement made is displayed as colored black.



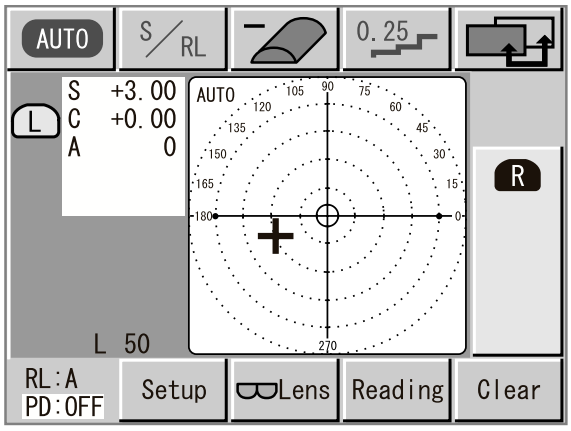
Notes

- **If the HOLD button is pressed while measured data are already retained, the retaining state will be released.**
- **All saved measurement data are deleted by pressing the Clear button.**
- **Press R/L button to change Right and Left side of measurement screen.**

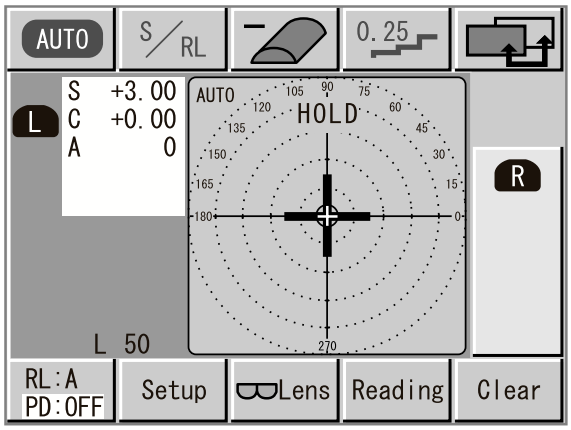
6) If the lens is removed from the Nose Piece, the target will exit and next when the lens is placed on it again, the retaining data will be released and the lens on the opposite side will be ready for measurement.

Note

When "AUTO R/L" is "OFF", the measurement side will not change automatically so simply touch the Right or Left area to change the measurement side manually. When you switch the side, the "HOLD" will release.



7) Measure the lens on the opposite side in a similar manner.



Notes

- **When AUTO VIEW in the AUTO Setup Screen is ON and if measurement data for both lenses are retained, the screen will automatically be changed to the Measurement Results View Screen.**
  As for RL Measurement Results View Screen (see 3.3.2 e) Framed Lens Measurement Results View Screen / page 3-29 for more details)**.**
- **Press Right or Left area to change the measurement side.**

d) Measurement of Pupillary Distance (PD)

Notes

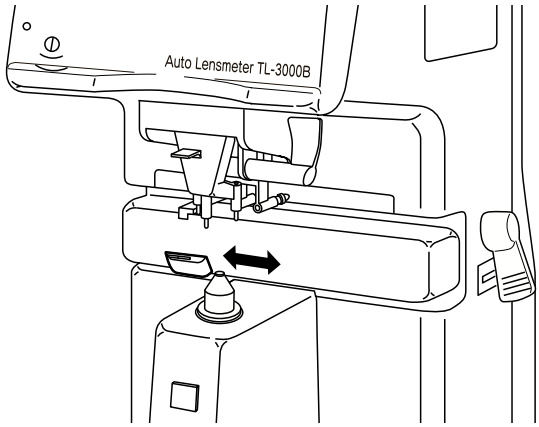
- **PD measurement shall be made by securely placing the Nose Piece to the nose rest of the spectacle frame, which may otherwise make measurement incorrect.**
- **Measurement shall also be given with the lower ends of the left and right frames as always being applied to the Lens Table. No correct measurement can be obtained with the lens frame as being tilted.**
- **The PD is displayed in real time. Also, the total PD is displayed after either of the left and right measurements is made.**
- **If no PD measurement is given, lock the Nose Block for PD measurement to its left end.**

1) Press the S/RL button to change to the RL mode.
2) When "PD: NA" is displayed on the left bottom of the screen, enter the Second Menu and press "PD" to check the display will change "ON" and "OFF".

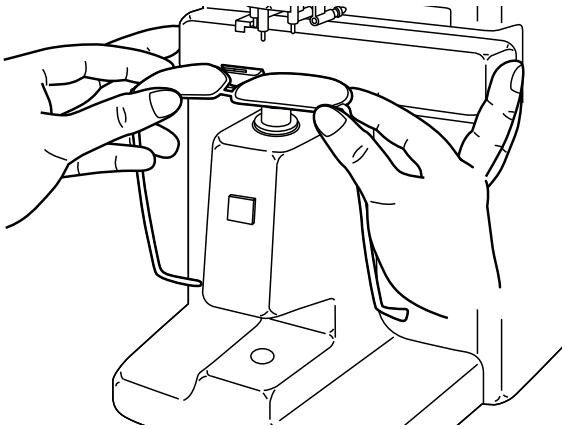
Notes

- **When "PD: NA" is displayed on the left bottom of the screen, PD function is not available to use any condition. When "PD: OFF" is displayed on the left bottom of the screen, PD function is stand-by condition and when PD Blocker removed from the lock, PD function is available to use it which displayed "PD: ON" on the left bottom of the screen.**
- **If "PD: NA" is displayed even if the Nose Block is in the state of measurement (when the lock is out), no PD measurement can be made. In case the power is turned on with the Nose Piece as being in the measurement state (when the lock is out), "PD: NA" will be displayed even the nose block is in the state of measurement.**
  Return the Nose Block to its locked state (left end) once to disengage the lock. If "PD: ON" is displayed, measurement is ready.
- **"PD: NA" is displayed in the left lower part of the display screen, if the PD Function has not been set up. Press the PD button in the Second Menu, or make the setup of "PD" ON.**

- **If RPD, LPD and PD are not displayed, once move the Nose Block to the left end again move it to right, so they will be displayed in the screen.**
- **When you take a measurement on the "S Mode", PD function will not be available.**

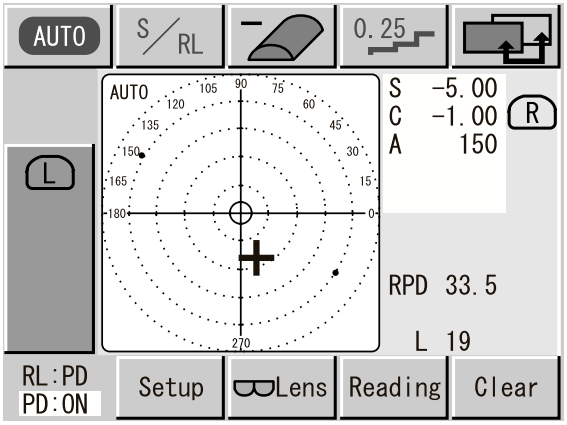


4) Apply the Nose Block for PD measurement to the nose rest of the spectacles frame with the upper part of the frame as turned to this side.

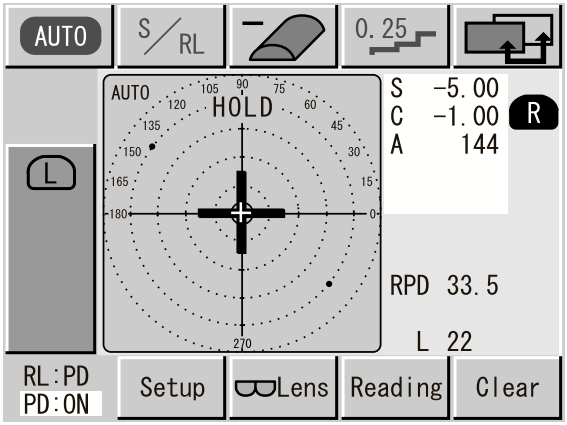


5) Place the lens to be measured on the Nose Piece with its front face turned up. Switching of right and left (R/L) is automatically performed by instrument.
6) Apply the Lens Table to the lower ends of the left and right lens frames of the spectacles.

7) Move the lens to the front, rear, left, and right so that the target (+ mark) will be aligned to the center of the target. At the same time, move the Lens Table so that the lower ends of the left and right lenses of the spectacle frame always touch the Lens Table.

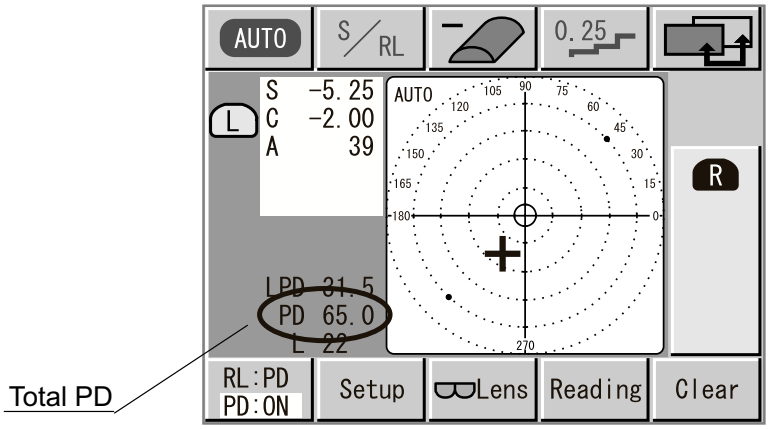


8) By pressing the HOLD button as aligning the target center, measurement data are retained (in the Manual Mode) and, at the same time, the PD value is retained.

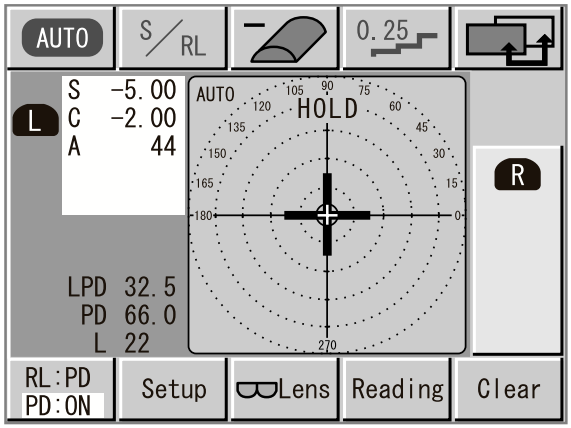


Note **Press Right or Left area to change the measurement side.**

9) When the lens on the opposite side is placed on the Nose Piece with the nose rest of the spectacle frame as being applied to the Nose Block for PD measurement, left and right (R/L) are automatically changed.



10) If the HOLD button is pressed as centering the lens on the opposite side to the target, measurement data will be retained and, at the same time, the PD value taken on the side measured and the total PD value (PD value for both eyes) will also be retained.



Notes

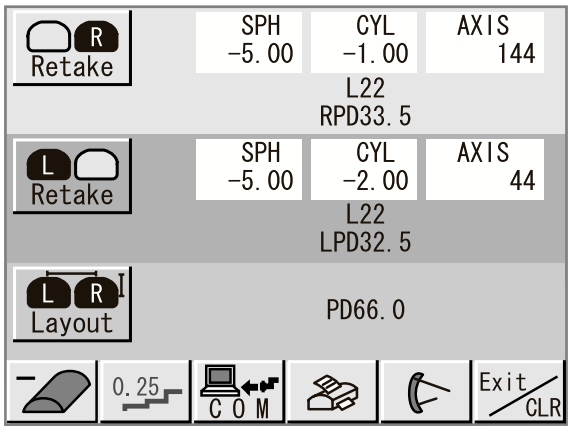
- **In case turning the power on with the Nose Bloc not being fixed to the Stopper, the PD value is not displayed even if the PD button is pressed. If this occurs, move the Nose Block to the left end of the Stopper in order to move it.**
- **Press Right or Left area to change the measurement side.**

Notes

- **If turning the PD Measure ON in the Function Setup Screen, the condition of PD will always be displayed in the screen to make PD measurement always possible. If the PD value is not displayed by moving the Nose Block, move the Nose Block to the left end of the Stopper once and then start measurement.**
- **When AUTO VIEW in the AUTO Setup Screen is ON and also if both data are retained, the screen will automatically be changed to the Measurement Results View Screen. As for the RL Measurement Results View Screen (see 3.3.2 e) Framed Lens Measurement results View Screen / page 3-29 for more details).**

e) Framed Lens Measurement Results View Screen (RL Mode)

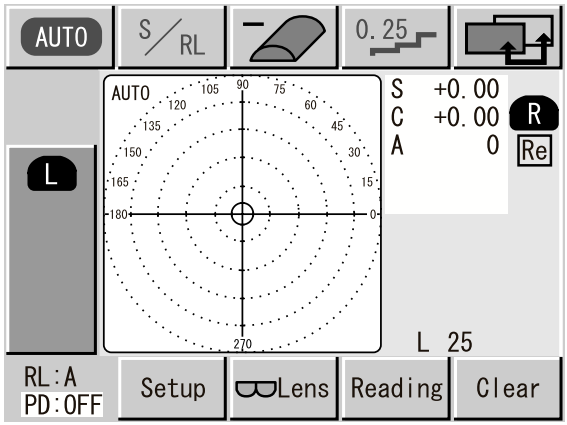
1) Pressing of the Reading button after measurement is finished changes the screen to the Measurement Results View Screen which displays latest measurement data.



Notes

- **If both data are retained when AUTO VIEW is ON, the screen will automatically be changed to the Measurement Results View Screen.**

- Retake measurement data. (Retake)
  Pressing of the Retake button for the date to be retaken changes the screen to the Measurement Screen for the side of data to be retaken. When data retaking is finished, the screen will automatically be returned to the View Screen.



Note **When the Nose Block is located on left side but press the right side of Retake button, the background of measurement data will be gray color instead of white color, please remove the Nose Block to right side to retake the measurement.**

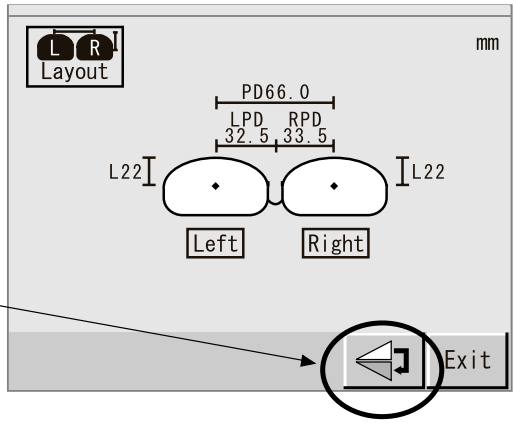
- If changing the reading (CYL, STEP) of data being displayed or if pressing the CYL or STEP button, reading of data can be changed.
- Data communications (COM)
  All the measurement data being stored can be sent to external equipment by pressing the COM button.
- Printout (Print)
  Pressing of the Print button prints measurement data left being displayed.
- Calculation of refractive index
  As for refractive index calculation (see 3.3.13 Calculation of Refractive Index / page 3-61 for mor details).

Notes

- **A default of 1.523 is used for the refractive index of the Curve Meter. Change the refractive index of the curve meter to that for your curve meter.**
- **As for the refractive power measurement procedures (D1, D2) using a curve meter** (see 3.3.12 Refractive Power / page 3-59 for more details)**.**

- Exit/CLR
  Pressing of the Exit/CLR deletes measurement data for left and right eyes and returns the screen to the Measurement Screen.

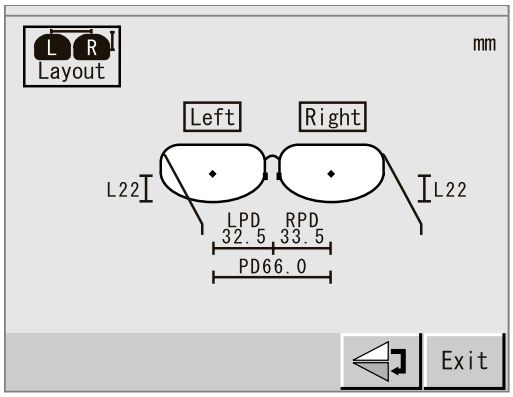
f) Layout View



Reverse Mark button

After measuring the pupillary distance, change the screen to the Measurement Results View Screen. Press the Layout button, so measured pupillary distance and the distance from the lower end of the frame to the optical center will be displayed. Next press the Reverse Mark button, so the screen will show the layout viewed from the inside of the spectacles. If, next pressing the Exit button, the screen will return to the Measurement Results View Screen.

Note **If L Value is turned ON in the Print Setup Screen, the distance from the lower end of the frame to the optical center will be printed in process of printing out. This operation is only effective in the Mono-focal Mode, but not for other lens modes.**



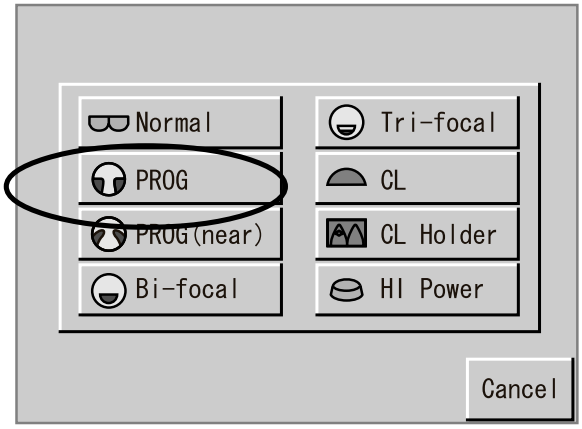
3.3.3 Progressive Lens

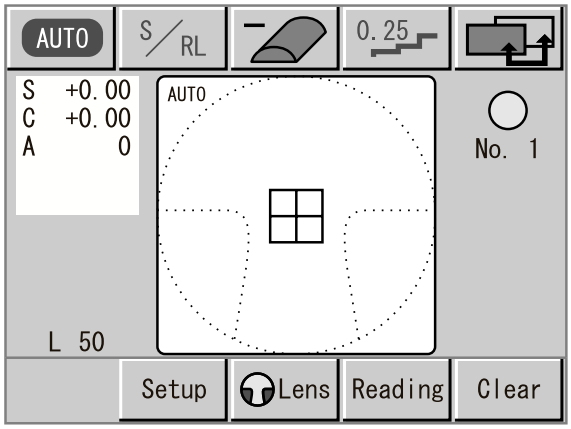
Notes

- **Care must be taken neither to apply undue force to the lens against the Nose Piece nor to rub it over the Nose Piece, which may otherwise damage the lens.**
- **If measurement is not carried out properly. (see 5.2 Progressive Lens / page 5-6 for mor details)**

In the Auto Hold Mode, measurement data for addition is automatically retained when measuring the near sight.
In case of measurement in the Manual Hold Mode press the AUTO button of First Menu to change the mode to the Manual Mode.

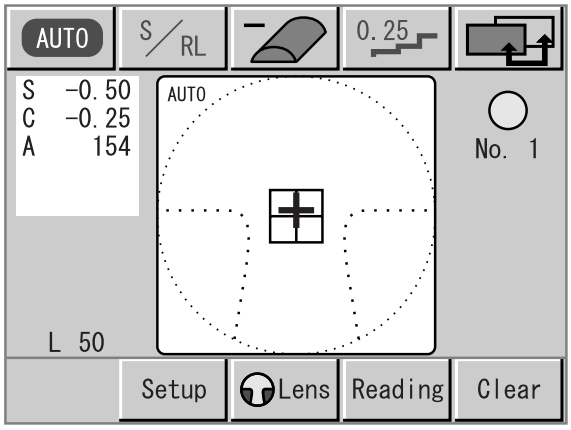
1) Press the LENS button to select the mode of PROG.





2) The progressive zone is detected in the following procedure.

1. Place the lens on the Nose Piece in such a manner that the far part will come to face this side.

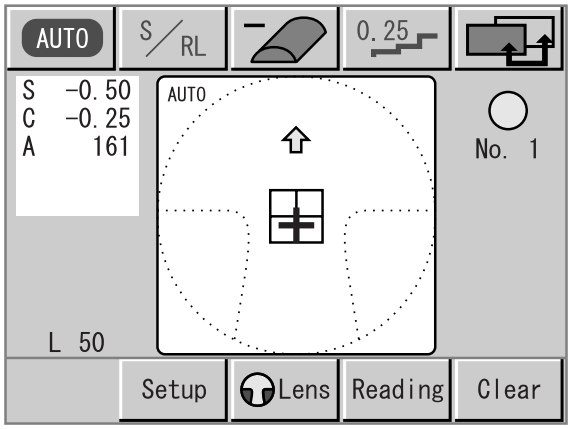


2. Adjust the target (+ mark) by moving the lens to the front, rear, left and right directions so that the target is aligned to the center of the target area. The progressive zone is located slightly lower than the center of the lens, where to the lens should be positioned.
3. When the target is centered, the beep and the screen changes to the Measurement Screen.

Note **If the lens has a large ADD, the target may not be centered. In such a case, center the lens nearby the lens center and press the HOLD button.**

3) Measure the far area of the lens in the following procedure.

1. Adjust the target (+ mark) by moving to the lens to the front, rear, left and right directions. Since the far part is positioned short, move the target to the rear part of the lens as per the arrow mark provided in the upper part of the target area.

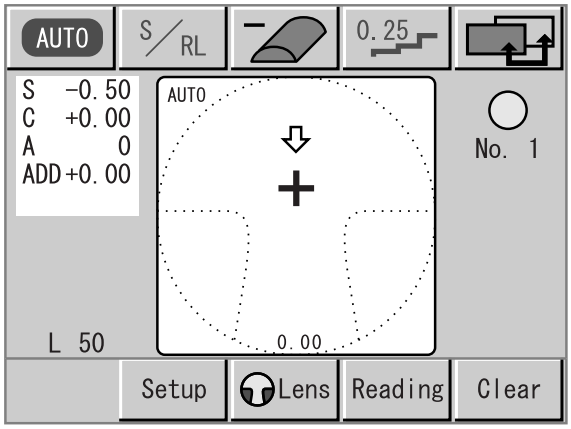


2. When the target is aligned to the center, the beep and measurement data for far part are retained.
(when AUTO HOLD is "ON")

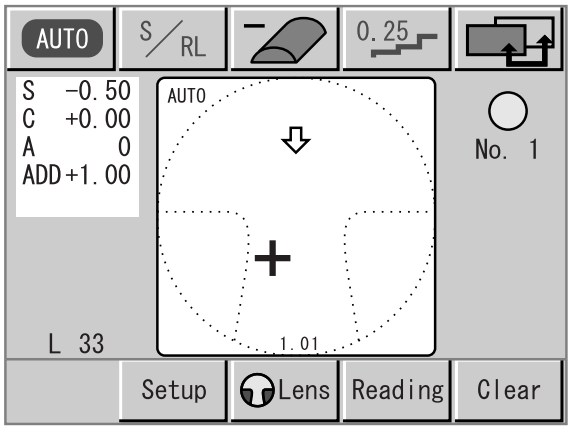
Notes

- **If "AUTO HOLD" in the AUTO Setup Screen is turned "OFF", measurement data for far application will not automatically be retained, even if the target is centered. In such case, press the HOLD button with the target as being centered.**
- **Such lenses as those of which far degree is 0D cylinder lens may not occasionally be centered. In such cases, move the lens to the right, left, front, and back from the lens center part (the lens frame, in case of a framed lens) to the position that is approximately 6 to 10mm above the lens center to use the position where the variations of SPH value and cylinder value are of the least, as the far area, to press the HOLD button.**

3. The screen is changed to the Measurement Screen for near application, to display the addition (ADD values).

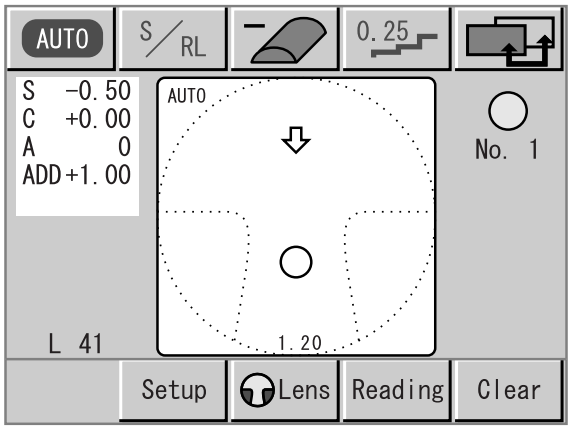


4) Measure the near area in the following procedure.
   1. Slowly move the target (+ mark) toward yourself so that the target always comes in the progressive range.
   2. The maximum value of ADD is displayed in the lower part of the target.

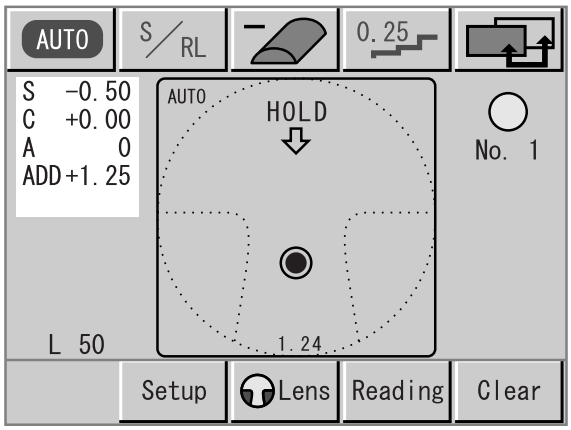


   3. The target moves downward on the addition power (ADD).

4. The target changes to the "○" mark in the nearby of the near area.



5. Slowly move the lens furthermore short (or leftward or rightward) still maintaining mentioned state, so the "○" mark will change to the "◉" mark.
6. At this moment, the beep in the Auto Hold Mode to automatically retain measurement data of ADD values, which is displayed in the HOLD Screen. In the Manual Hold Mode, the HOLD button is pressed.



Note **The near area of the framed progressive multi-focal lens has been set in the nearby area of the framed lens, by which the target may not be changed to the "○" mark and, furthermore, to the "◉" mark. If this disorder occurs, press the HOLD button by using the position having the largest degree as the near area by maintaining the target as being entered in the progressing range.**

5) The target exits when the lens is removed from the Nose Piece. If placing the lens on the Nose Piece again, the retaining of measurement data will be released so that the detection of progressive range becomes effective.

Notes

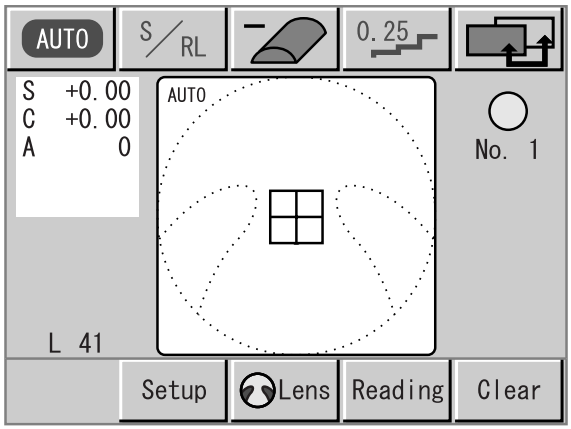
- **Removing of the lens from the Nose Piece while measuring the far or near area automatically returns the screen to the Progressive Range Detection Screen.**
- **Deviation may be caused between the value which is displayed by lens maker and the measured value with the TL-3000B, due to the nature of lens design. If such deviation arises, measure the data in the Manual Hold Mode, by referring to the hidden mark or similar.**

3.3.4 Progressive Lens (Near)

Note **Care must be taken neither to forcedly push the lens against the Nose Piece nor to abruptly move or rub the lens to the Nose Piece, which may damage the lens.**

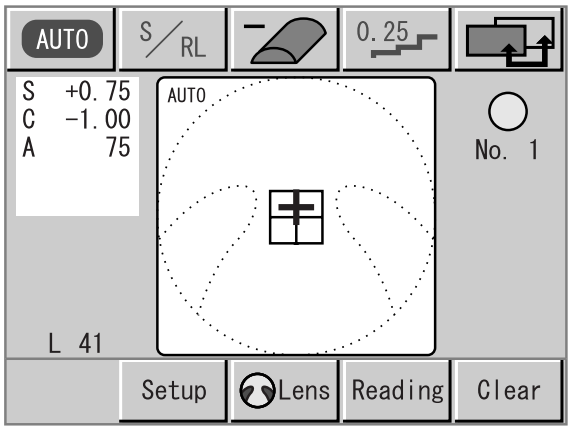
In the Auto Hold Mode, measurement data of ADD are automatically retained when measurement of the far sight area is taken.
To carry out measurement in the Manual Hold Mode, change the operation by pressing the AUTO button for First Menu.

1) Press the LENS button to select the PROG (near) Mode.



2) Detection of the progressive range is carried out in the following procedure.

1. Place the lens in such a manner that the far area comes short.

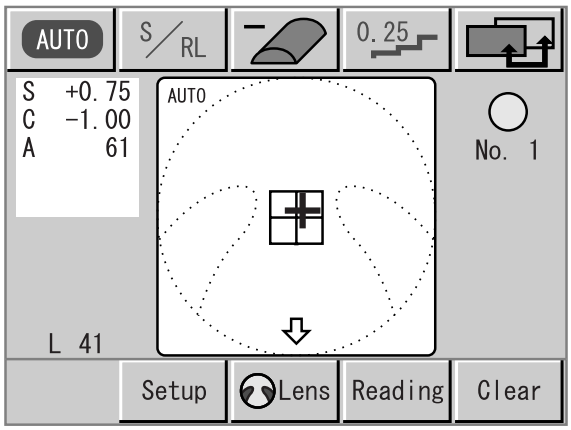


2. Move the lens to the front, rear, left, and right directions so that the target (+ mark) is centered in the target area. Since the progressive range is located slightly lower than the center of the lens, position the lens in such nearby place on the Nose Piece.
3. When the target is centered, the buzzer busses and the screen changes to the Measurement Screen.

Note **In case the lens has a small addition power, the target may not come to the center. In such case, position the target in the nearby area of the center of the lens and next press the HOLD button.**

3) Measure the near area consecutively in the following procedure.

1. Move the lens to the front, rear, left and right directions so that the target (+ mark) comes to the center of the target area. Since the near area is in the rear area, move the lens short along with the arrow mark located in the upper part of the target area.

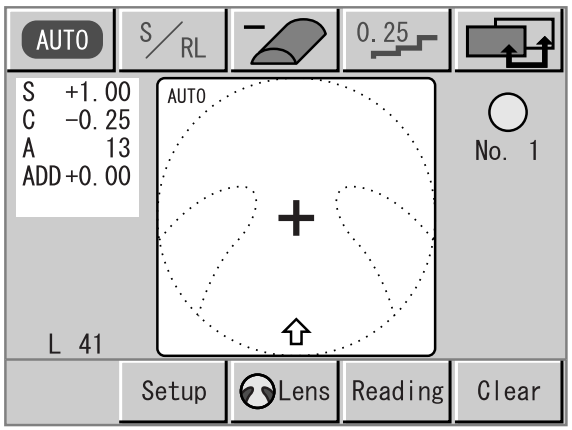


2. When the target is centered, the beep and measurement data for near area are automatically retained (When AUTO HOLD is "ON").

Notes

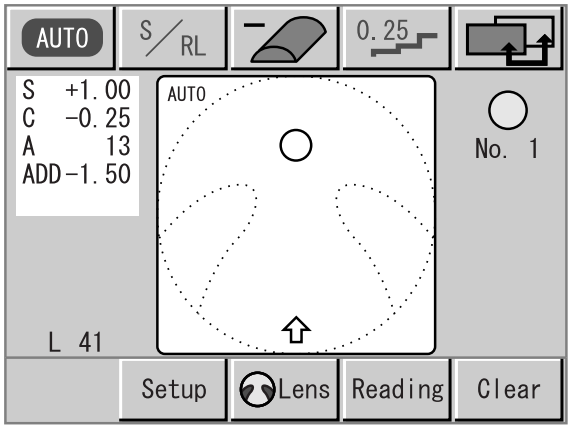
- **If "AUTO HOLD" is turned "OFF" in the AUTO Setup Screen, measurement data for near area will not automatically be retained, even if target centering is given. In this case, press the HOLD button as the target being centered for retaining the data.**
- **There are such cases as OD for near refractive power and cylinder lens, of which centering cannot be made. In such cases, move the lens to the front, rear, left, and right directions as much as approximately 6 to 10mm lower from the center part of the lens (from the center of the lens frame) in case of framed lens to use the position having the least deviations of SPH and CYL values as the near area to press the HOLD button.**

3. The screen is changed to the Measurement Screen for far sight area, of which ADD value is displayed.



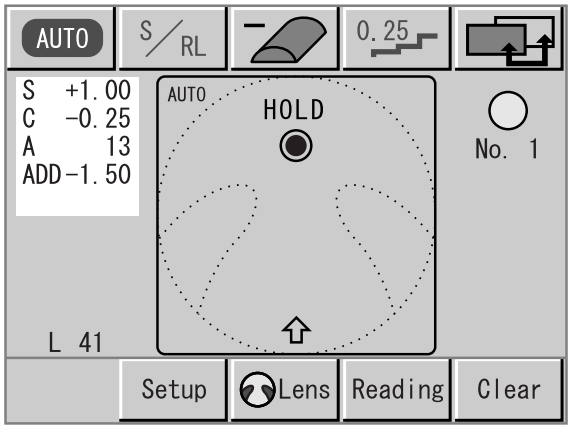
4) Measure the far area in the following procedure.

1. Gradually move the lens forwards in such a manner that the target (+ mark) always come inside of the progressive area.
2. The target moves upward depending on the addition (ADD) power.
3. The target changes the "○" mark when it comes close to the far area.



4. If the lens is, furthermore, gradually moved forwards (or to the left and right) with the display state as being maintained, the "○" mark changes to the "◉" mark.

5. At this point in the Auto Hold Mode, the beep and the measurement data for addition power (ADD value) are automatically retained. "HOLD" is displayed in the screen. In the Manual Hold Mode, press the HOLD button to retain measurement data.



Note **The framed near-distance progressive lens may possibly be set with its far area close to the lens frame due to the lens forming process. For this reason, the target may possibly change to the "○" or to "◉". If this occurs, Press the HOLD button by setting the largest absolute value of power as the target being inside of the progressing zone.**

5) When the lens is removed from the Nose Piece, the target exits the screen. If the lens is again placed on the Nose Piece, the retaining of measurement data will be released and the detection of the progressive corridor will be returned ready for operation.

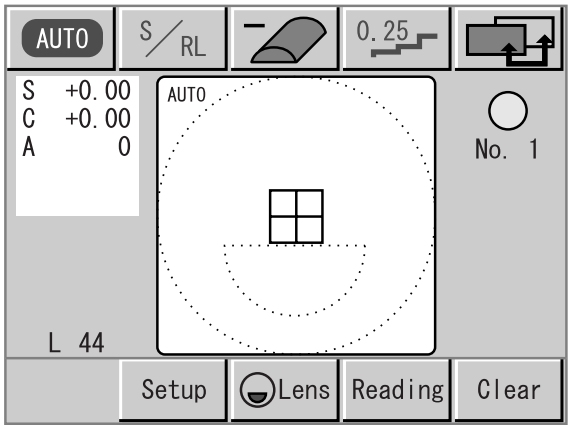
Notes

- **If the lens is removed from the Nose Piece while measurement of the far or near area is in process, the screen will automatically returned to the Progressive Zone Detection Screen.**
- **The value provided by lens maker may differ from measurement data with the TL-3000B. If this occurs, measurement should be made in the Manual Hold Mode.**

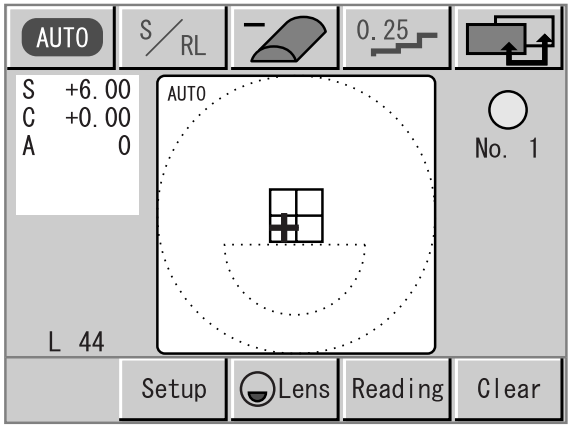
3.3.5 Bi/Tri Focal Lens

Note **Care must be taken neither to apply undue pressure to the lens nor forcedly rub the lens against the Nose Piece, by which the lens may otherwise be damaged.**
In the Auto Hold Mode, measurement data for ADD power are automatically retained when measurement is taken for near area.
In the Manual Hold Mode, the screen is changed by pressing the AUTO button of the First Menu.

1) Press the Lens button to select the Bi-Focal or Tri-Focal mode.



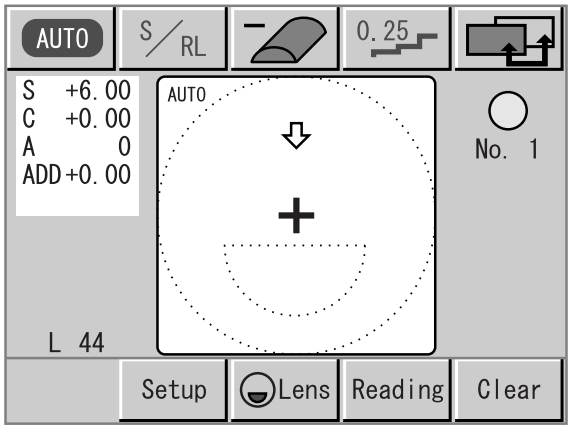
2) Place the lens on the Nose Piece in such a manner that the far area is positioned toward the side of the Operator.
   1. Move the lens in the front, rear, left and right directions so that the target (+ mark) is aligned to the center of the target area.



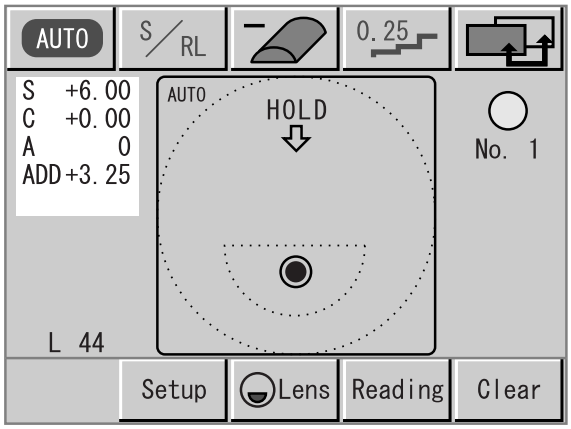
2. When the target is centered in the screen, the beep starts beeping measurement data for the far area are retained.

Note **In case turning the "AUTO HOLD" "OFF" in the setting of menu, far area measurement data are not automatically retained even if the target is centered. In such case, press the HOLD button to retain the target position as centered.**

3. The screen is changed to the Measurement Screen for near area and the addition power (ADD value) is displayed.



3) Measure the near area consecutively in the following procedure.
   1. By drawing the lens rearward, move the lens over the Nose Piece, in case of the bifocal lens, while move the center part of the lens over the Nose Piece, in case of the trifocal lens.
   2. The target moves downward on the progressive power (ADD value).
   3. When the near area or the center area is displayed, the target changes in the "◉" mark.
   4. At this time the beep in the Auto Hold Mode, to automatically retain measurement data for addition power (ADD value), when "HOLD" is displayed in the screen. In the Manual Hold Mode, measurement data are retained by pressing the HOLD button.



   5. In case of the trifocal lens, furthermore draw the lens rearward to your side and move the near area of the lens on the Nose Piece, the second addition power (ADD value) is retained.

4) The target disappears by removing the lens from the Nose Piece, and thereafter if replacing of the lens, the retaining of measurement data will be released to return the operation ready for measurement of the far area.

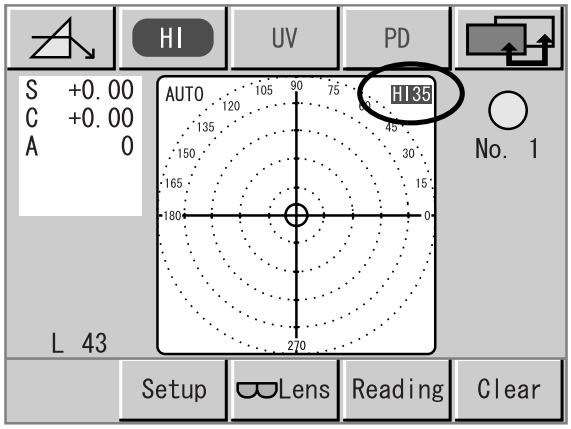
Note **If the lens is removed while measurement of the near area is in process, the screen will automatically return to the Far Area Measurement Screen.**

3.3.6 High Refractive Index Lens (HI mode)

It is recommended to take measurement in the HI mode when measuring high refractive index lens. (see 3.3.2 Single Vision Lens / page 3-17 for more details).

Note **Since the reference wavelength of the lens differs from that for LED, an error may arise in measurement value in the high refractive index lens measurement.**

1) Set the "Abbe Number" in the Mode Setup Screen normally at "35" (as set "35" for shipment).
   As for the setting procedure, see 3.2.1 Setting-up of the Setup Screen / page 3-2 for more details).
2) Press the HI button in the Second Menu, the mode changes to the HI mode and "HI35" is displayed in the right upper part of the target area. If this display is shown, measurement values will automatically be corrected.



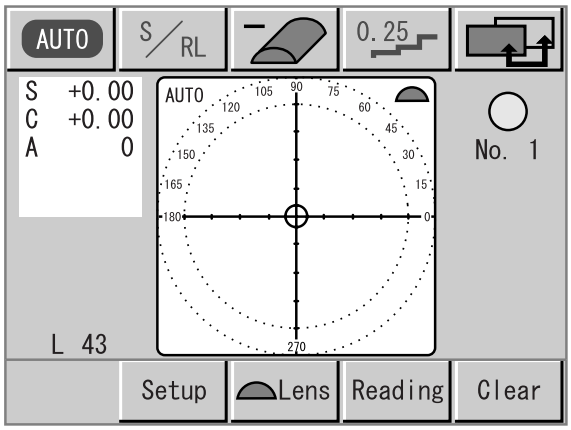
3) If returning the mode to the normal mode, again press the HI button in the Second Menu.

3.3.7 Contact Lens (CL mode)

Note **Because the measuring conditions for contact lens are different from those for spectacles, if measurement taken in the single focal lens mode arises an error. In case of measuring a contact lens, be sure to change the Nose Piece to that for contact lens and to use the CL mode for measurement. As for measuring procedure, follow 3.3.2 Single Vision Lens / page 3-17. When the contact lens measurement taken by the normal nose piece, the measurement result could give wrong value.**

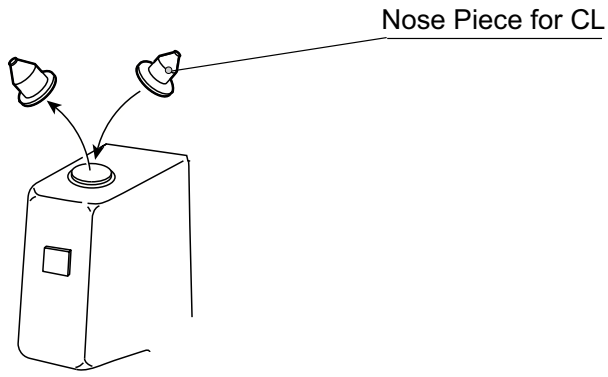
1) Automatic change to the contact lens mode:
   If AUTO CL in the AUTO Setup Screen is set at ON (CL) or "ON (CL Holder) and if the Nose Piece is changed with that for contact lens measurement, the mode will automatically be changed to the contact lens mode (CL Mode).
   If the Nose Piece is returned to that for spectacles the mode will automatically be changed to the spectacles mode
2) CL Mode
   If the CL Mode button in the Function Setting-up Screen is set up at "ON (CL)" or "ON (CL Mode)", the selection of lens will be limited to CL or CL Holder only. (See the figure below.)

Note **When "CL MODE" is "ON(CL)" / "ON(CL Holder)" and using standard Nose Piece, the error message "NOSEPIESE ERR!" will appear on the screen. Be sure to exchange CL Nose Piece.**



Note **When "CL MODE" is "ON", the Default button will not be able to function. To reset the setting, enter "Function Setting Screen" and select "CL MODE OFF" before press the Default button. When you turn on the power to re-start, makes sure the nosepiece have been replaced to the standard nosepiece.**

a) Replacing of the Nose Piece



1) Replace the Nose Piece with that for contact lens measurement.

Notes

- **If the Nose Piece for CL is replaced when the Normal Mode is used and the "AUTO CL" is OFF, "NOSEPIECE ERROR!" (Nose Piece error) is displayed.**
  Change the mode to the CL mode.
- **When "CL Mode" is set ON, measurement can be made only in the CL mode. Therefore, first place the Nose Piece for contact lens and next turn the power on.**
- **When the CL MOde is activate and the normal nose piece have been used, there is no error message appear on the screen so please make sure to check the nose piece type and the measurement mode is match.**
- **When the contact lens measurement taken by the normal nose piece, the measurement result could give wrong value.**

b) Measurement of the Hard Contact Lens (using of the hard CL holder)

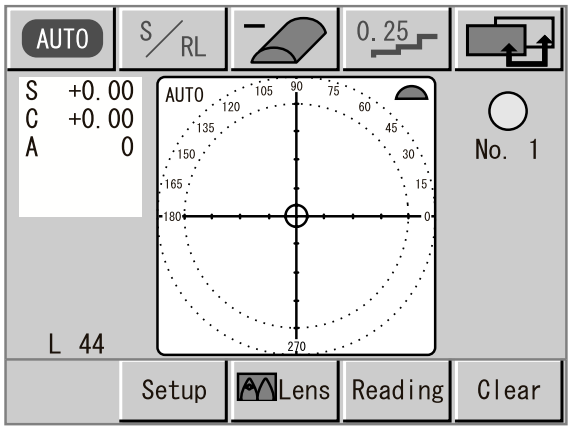
Notes

- **Excessive pressing of the Lens against the Nose Piece or abruptly rubbing of the lens over the Nose Piece may damage the lens.**
- **No measurement of the bifocal lens can be made. Strained lens also does not allow correct measurement.**

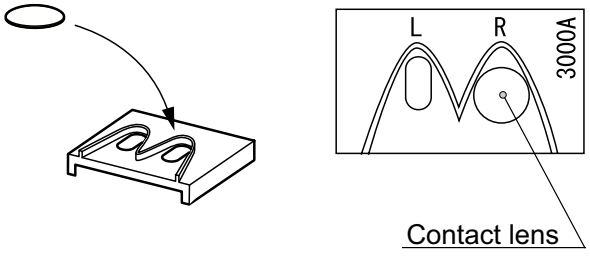
- **The contact lenses which correspond to the specifications listed in the following table may have large errors; therefore, place the lens directly on the Nose Piece for measurement without using the holder. Set the lens mode at "CL".**

P	B.C	DIA
Lower than -15D	Lower than 7.35mm	Lower than 8.0mm
Higher than +15D	Higher than 8.25mm	Higher than 9.6mm

1) In case of using the hard contact lens with the use of the hard CL Holder, press the Lens button and select the CL Holder.
2) Change the Nose Piece with that for contact lens measurement.
3) Be sure to change the mode to the CL measurement mode.



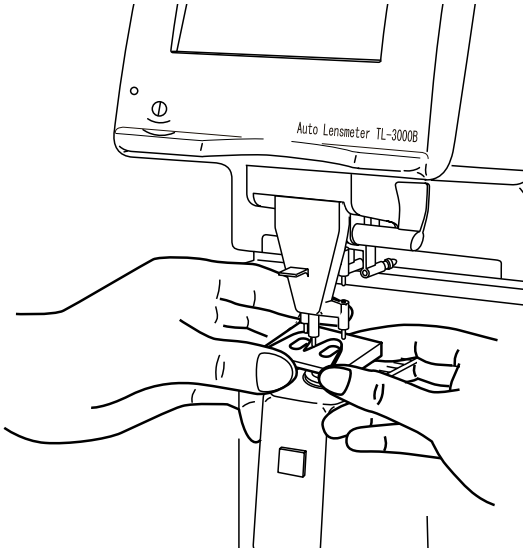
4) Place the contact lens on the Hard CL Holder. (In case the left and right lenses are measured, place the right eye lens on the R side and the left eye lens on the side of L.



5) Place the Holder with the lens as mounted on the Nose Piece and fix the Holder with the Lens Holder.

6) Center the Holder by moving to the front rear, left and right.

Note **When "AUTO HOLD" is "ON", the instrument will take a measurement of lens automatically when the target have been found. When "AUTO HOLD" is "OFF", find the target and press "HOLD" to take a measurement of lens.**

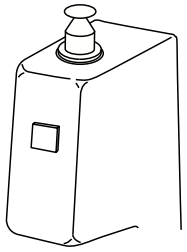


c) Measuring of the Hard Contact Lens (The Hard CL Holder is not used.)

Note **Measurement cannot be made if the lens has a small diameter or is a bifocal lens. Accurate measurement may not be made if the lens has an excessive strain.**

1) In case of measurement without using the Hard CL Holder, press the Lens button to select the CL mode.
2) Change the Nose Piece with that exclusively used for the contact lens.
3) Make sure that the CL Measurement Mode has been setup.
4) Place the contact lens to the Nose Piece by turning the outer side of the lens as turned up.
5) Center the contact lens by moving to the front, rear, left and right.

Note **When "AUTO HOLD" is "ON", the instrument will take a measurement of lens automatically when the target have been found. When "AUTO HOLD" is "OFF", find the target and press "HOLD" to take a measurement of lens.**



d) Measuring of the Soft Contact Lens

Note **Accurate measurement is difficult due to the nature of the lens. No measurement can also be made for a bifocal lens.**

1) In case of measurement of the soft contact lens, press the Lens button to select the CL mode.
2) Change the Nose Piece to that for contact lens measurement.
3) Make sure that the measurement mode has been changed to the CL Measurement mode.
4) Remove water from the lens and adjust the form of the lens.
5) Place the contact lens on the Nose Piece by turning the outer of the lens as turned up.
6) Center the contact lens by moving to the front, rear, left and right.

Note **When "AUTO HOLD" is "ON", the instrument will take a measurement of lens automatically when the target have been found. When "AUTO HOLD" is "OFF", find the target and press "HOLD" to take a measurement of lens.**

3.3.8 Prism Lens

Measure the prism in the Mode Setup Screen or press the PRISM button in the Second Menu. The power of the prism will be displayed under the white-frame data display (S, C, A, ADD).

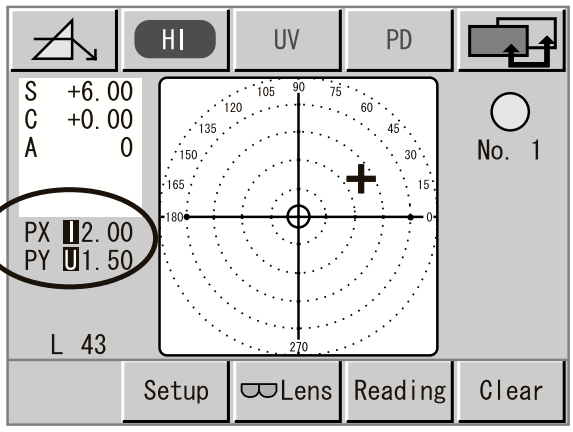
Three display modes are used. Set up the Prism mode in the Mode Setup Screen or with the PRISM button in the Second Menu. As for setting up the mode in the Mode Setup Screen (see 3.2.1 Setting up of the Setup Screen / page 3-2 for more details).

- Rectangular coordinates: PX, PY (△)
- Polar coordinates: PSM, BAS (△, deg.)
- Eccentricity: DCX, DCY (mm)

● **Rectangular coordinates** (PX, PY)

The symbols for Prism denotes the following directions.

O (base out):	Outer
I (base in):	Inner
U (base):	Upper
D (base down):	Lower



● **Polar coordinates**

PSM: Absolute value of prism (△)

BAS: Base direction (angle, deg.)

● **Eccentricity** (DCX, DCY)

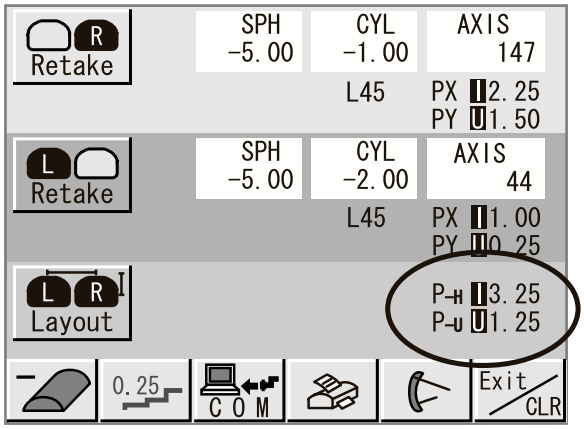
The distance from the measuring position of the lens to the optical center is displayed in the horizontal and vertical directions.

DCX: Eccentricity in horizontal (mm)

DCY: Eccentricity in vertical (mm)

● Both eye prism

If "Total PRISM" is turned ON in the Function Setup Screen, the measured values of both eye prism will be displayed in the Measurement Results View Screen.



P-H: Prism amount in the horizontal direction

P-V: Prism amount in the vertical direction
The prism amount in the vertical direction is displayed on the base of right eye.

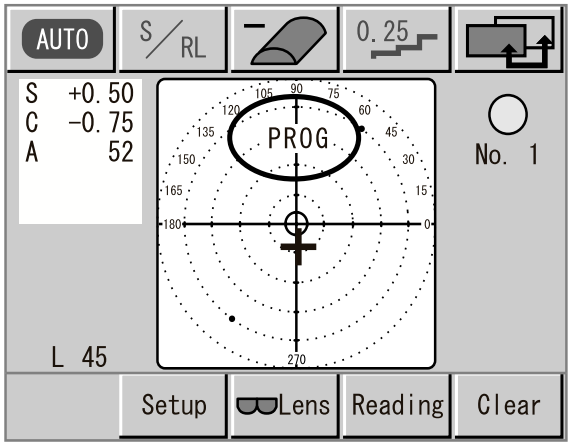
3.3.9 Automatic Detection of Progressive Lens

If a progressive refractive power lens is placed on the Nose Piece, the instrument will automatically detects it as a progressive refractive power lens so that "PROG" will be displayed.
In case "AUTO PROG" has been set "ON" in the AUTO Setup Screen, the screen will automatically be changed to that for mode for PROG.

Notes

- **For detecting the progressive corridor, place the lens center portion on the Nose Piece. There is some cases that detection cannot be successively made in the periphery of the lens, even if it is a progressive lens.**
- **There is also some cases that no automatic detection can be made for a progressive refractive lens, if its addition power (ADD value) is less than 1D.**
- **The instrument detect the near-distance progressive lens as far-distance progressive lens once a while. When the instrument detect wrong, press Lens button and select "PROG (near)" to take a near-distance progressive lens.**
- **An erroneous detection may be caused even with the single focal lens, if it is tilted on the Nose Piece. If the mode is unexpectedly changed, press the LENS button to return the mode.**

1) Set up the Normal Mode.
2) Place the progressive lens on the Nose Piece with its far area facing your side and the lens is centered to the Nose Piece.
3) "PROG" is displayed in the target area.



4) If "AUTO PROG" has been set "ON" in the AUTO Setup Screen, the mode will change to the PROG Mode.
5) Measure the progressive corridor → far area → near area in order. (see 3.3.3 Progressive Lens / page 3-32 for more details)

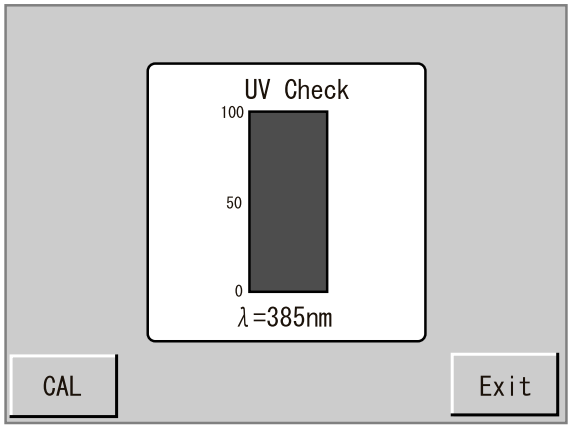
3.3.10 UV Checker

The UV permeability of the lens is displayed in a bar graph, through which the lens can be checked if it cut with UV.

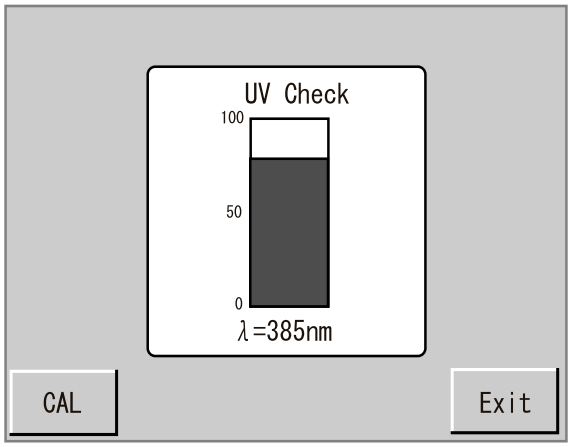
Notes

- **The permeability of the lens is not displayed in the entire range of UV.**
- **Give measurement in the center area of the lens, since no accurate measurement can be taken in the periphery area of the lens.**

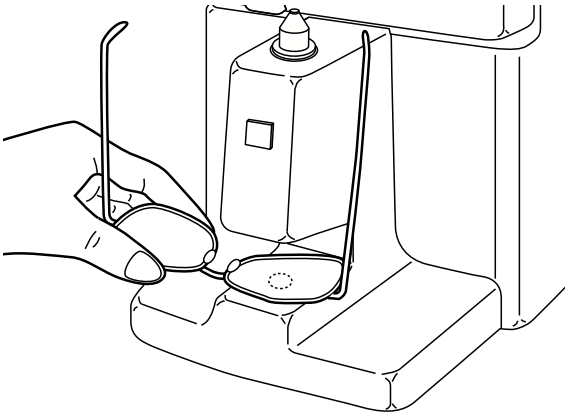
1) Pressing of the Second Menu changes the mode to that for UV check and displays the bar graph in the target area.

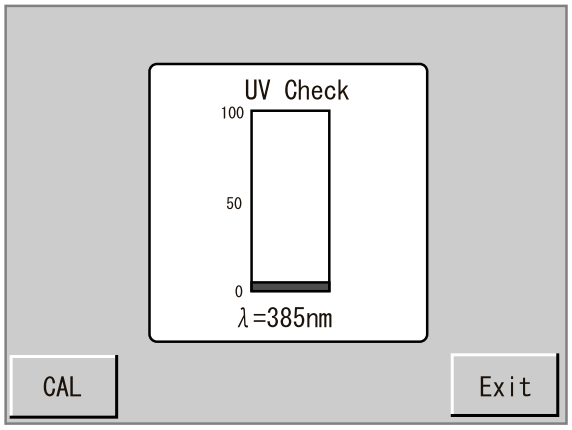


2) If the bar graph is not 100% with the condition that the lens is not inserted into the UV checker, press the CAL button for calibration.



3) Inserting the lens into the UV checker displays the UV permeability in the bar graph.

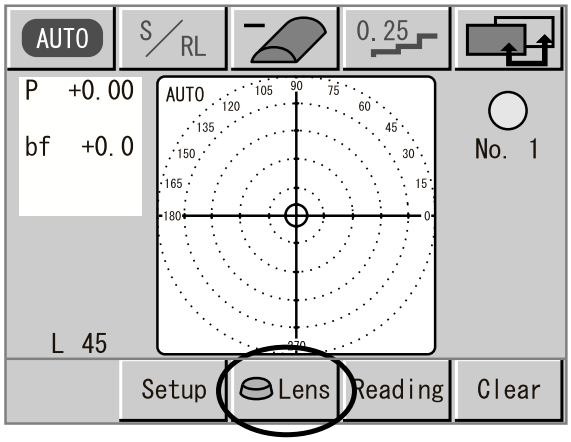




3.3.11 High Power Lens

If measuring a lens having a refractive power exceeding ±25D, take measurement in the High Power Mode (HP Mode). Measurement can be given for lenses of up to ±80D.

1) Change the Measurement Screen to the single mode (S-mode). To enter the "S Mode", press S/RL button on the First Menu of measurement screen or press "Setup" button to enter "Mode Setup Screen" and select "Single" lens.
2) Press the Lens button and select the HP button, so the mode will be changed to the High Power Mode.



The value "P" in display represents a refractive power (unit: D), which is equivalent to related spherical degree.
The value "bf" in display is a rear side focal distance (unit: mm) and calculated from the P-value.

Notes

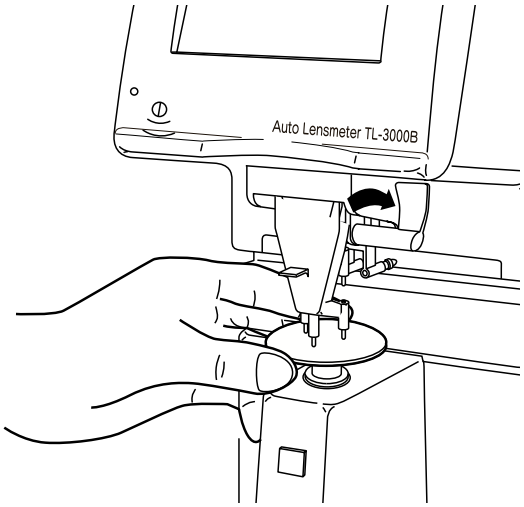
- **The CYL value is not displayed.**
- **Measurement can be given in the single mode (S-Mode) only.**

3.3.12 Refractive Power

The anterior (D1) and the posterior (D2) refractive powers of the lens to be examined, which is necessary for calculation of refractive index is obtained.

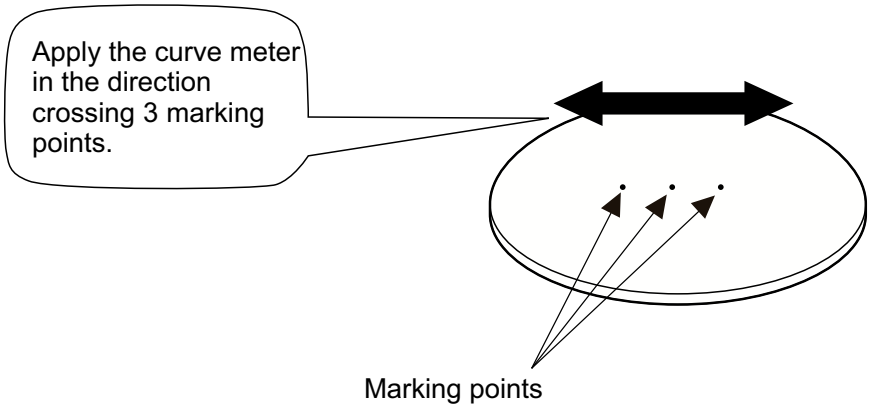
Note **For calculating the refractive power of a lens to be examined, prepare a curve meter.**

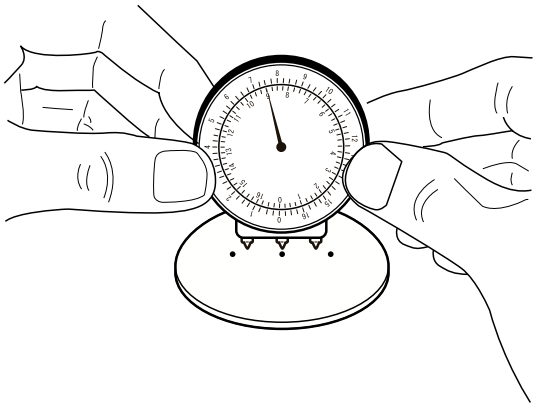
1) Press the AUTO button in the First Menu to turn "AUTO HOLD" OFF.
2) For centering of the lens (see 3.3.2 Single Vision Lens / page 3-17 for more details)
3) Fix the lens in a place where the target is located, with the use of the lens holder, and next press the HOLD button to retain measured data. Then, place the marking for the lens position. (see 3.4.2 Marking Device / page 3-65 for more detials).



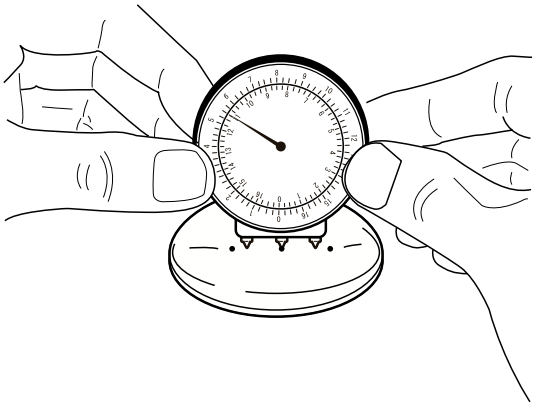
4) Remove the lens from the Nose Piece and next measure the refractive power of the lens which has been marked, with the use of the curve meter.

Place the lens on the horizontal table as illustrated in the below figures and next align the curve meter in the marking direction. (Point the pin located to the center of the curve meter.) At the same time, read the value shown in the curve meter (D1: anterior refractive power). In a similar manner, measure the refractive power (D2: posterior refractive power) of the face on the opposite side.





Measuring of anterior refractive power (D1)

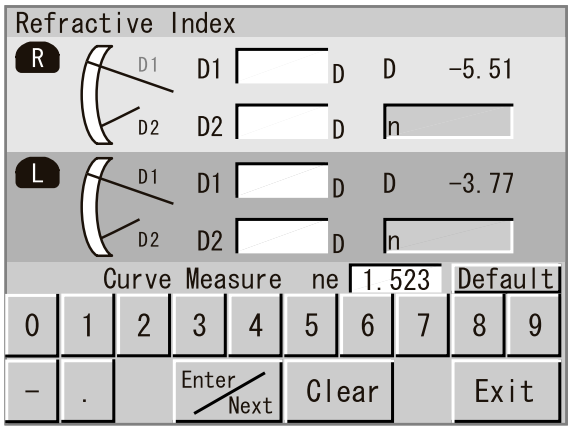


Measurement of posterior refractive power (D2)

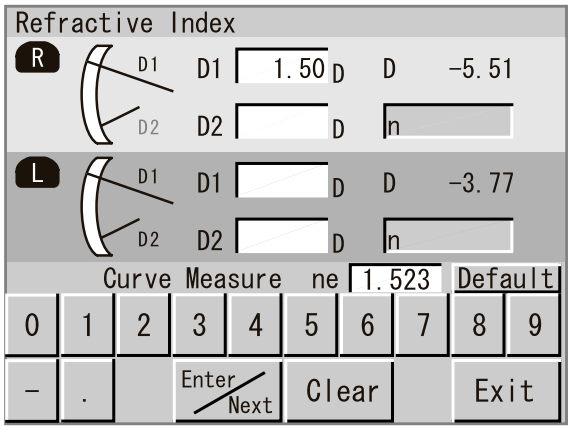
3.3.13 Calculation of Refractive Index

Note **Obtain the refractive index of the lens measured by using the refractive powers (D1, D2), which are obtained according to 3.3.12 Refractive Power / page 3-59.**

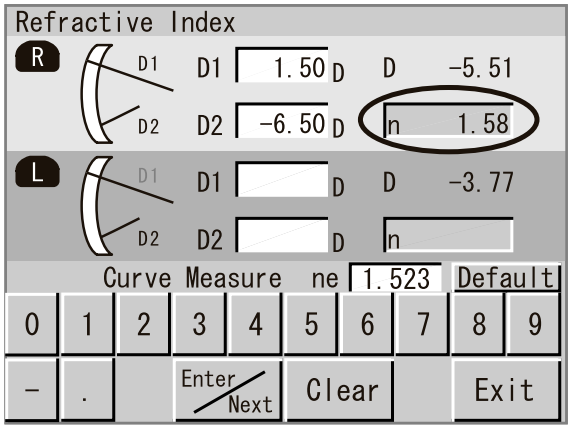
1) Take measurement according to 3.3.2 Single Vision Lens / page 3-17, and next display measured data of the lens for which refractive index is calculated in the Measurement Results View Screen.
   Press the Refractive Index Calculation button to change the screen to the Refractive Index Calculation Screen.



2) Input the refractive power D1 which has been obtained in the procedure of 3.3.12 Refractive Power / page 3-59 by using the ten-keys and next press the Enter/Next button to proceed in inputting the refractive power D2.
   In case of the RL mode, input the refractive power D1 for the R side first. In case of desiring to calculate the refractive index for L only, use the Enter/Next button for inputting the refractive power D1 for L side.



3) Input the refractive power D2 in a similar manner and press the Enter/Next button, so the refractive index will be displayed.



Notes

- **The refractive index of the curve meter uses 1.523 as "Default". If different from this figure, change it with that for the curve meter to be used.**
  If the refractive index for the curve meter is changed, the values obtained after such change is made will be saved. No setup is renewed even the power is turned OFF.
- **When D1 and D2 are inputted and D1 + D2 = 0, the calculation of the index becomes erroneous, displaying "ERROR" in the screen.**
- **Input the refractive powers of D1 and D2 within the range of +25D~-25D. If the sum of these powers is not excluded in this range, "ERROR" will be displayed.**

- **The refractive index of the curve meter is changeable in the range of 1.400<ne<1.900.**
- **In case the lens is not spherical, calculated refractive index may arise an error of 0.03~0.05.**
- **To calculate the refractive index for the progressive lenses (far/near), take curve measurement for the point the instrument measure. The calculation result might be little different than the actual index value due to the structure of the progressive lens.**

3.4 Lens Holder / Marking Device / Table Stopper / Nose Block

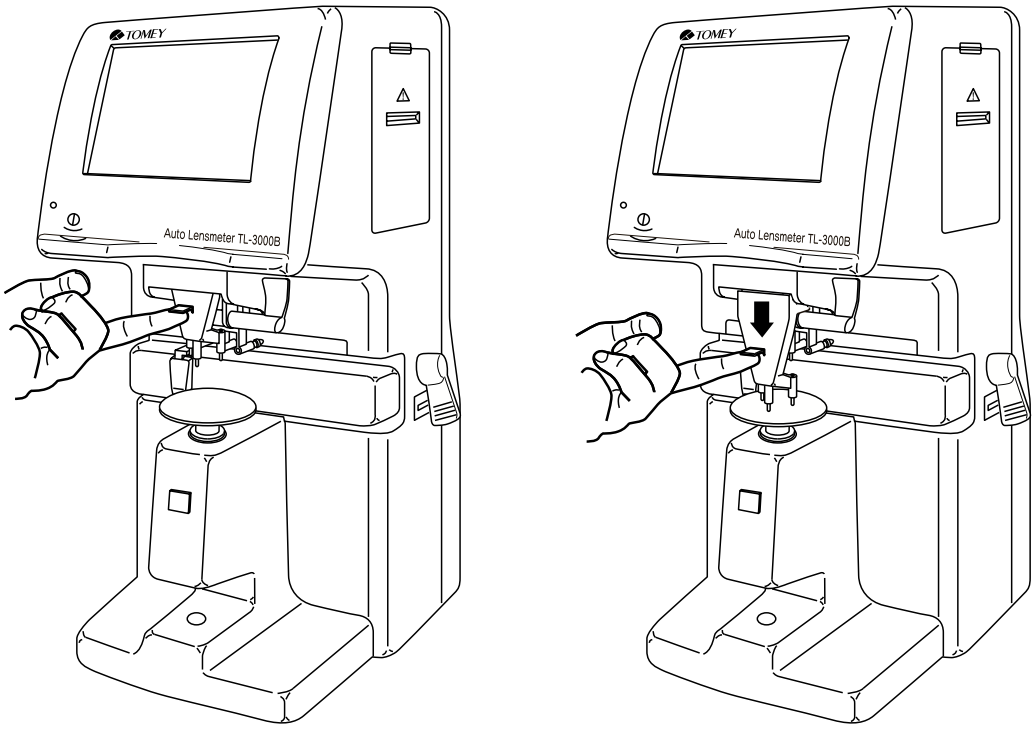
3.4.1 Lens Holder

The Lens Holder is used to secure the position of the lens when the lens is marked with the marking device.

Caution

Carefully remove the Lens Holder, since its abrupt lowering may damage the lens.

1) Slightly raise the Lens Holding Lever to release the lock.
2) Then carefully lower the Lens Holder onto the lens to fix securely.

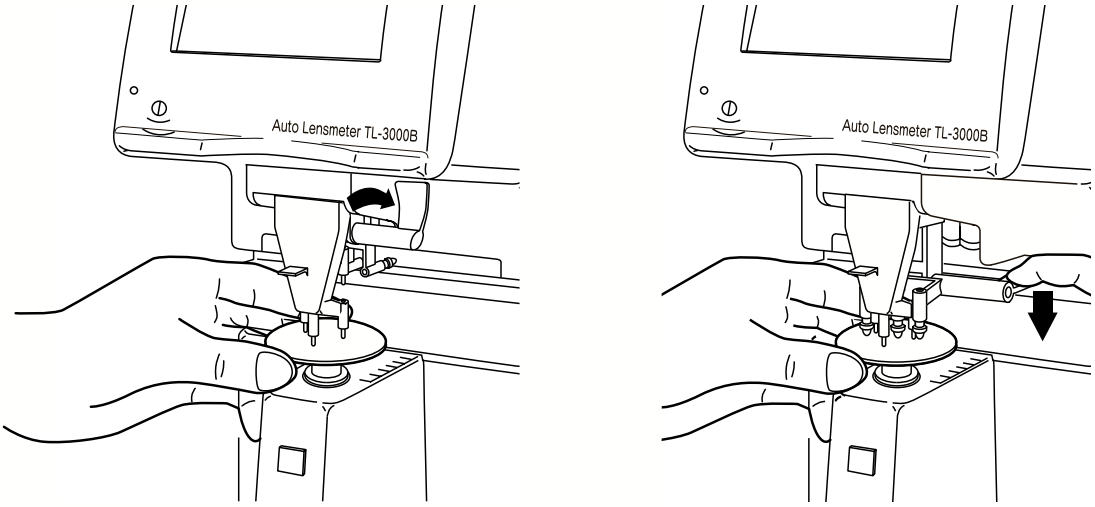


3.4.2 Marking Device

The Marking Device marks three points with the ink pen, including "center" and "axial direction" (in case of astigmatism).

Note **The ink pen is of the cartridge type. If the ink does not properly make clear marks, change the ink cartridge with the new part (see 4.2.2 Replacing of the Ink Cartridge / page 4-3).**

1) Push and turn the marking lever, so the pen point will be lowered to place a mark in the lens surface.
2) After marking, slowly leave your finger from the marking lever, so the ink pen will be returned to its beginning position with the spring force.

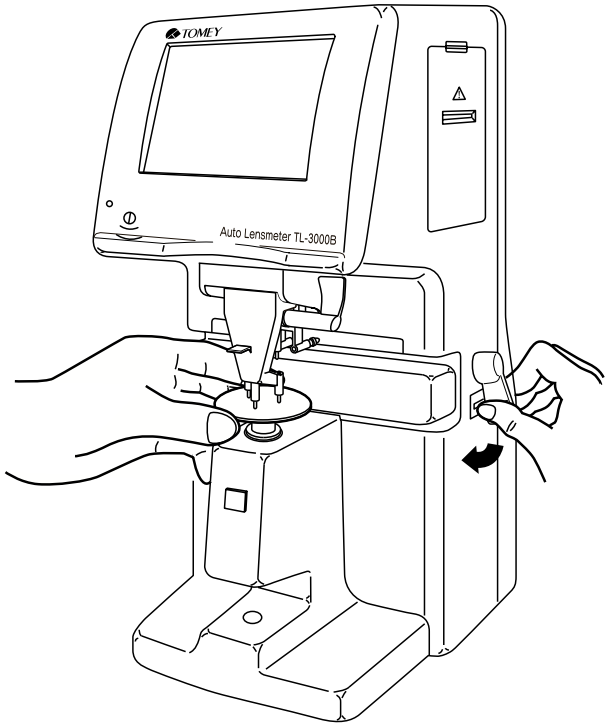


3.4.3 Lens Table Stopper

The Lens Table is used as the reference of the astigmatism axis of the spectacles.

Move the Lens Table by hand so that it touch the lens end in case of measurement of a single lens and the lower end of the left and right lens frames in case of the spectacles.
In case of using the Lens Stopper thereafter, pull the Stopper in the ON-direction to fix itself, or pull it in the OFF-direction to release.

Note **The Lens Stopper is used for marking purposes by fixing the astigmatism axis.**



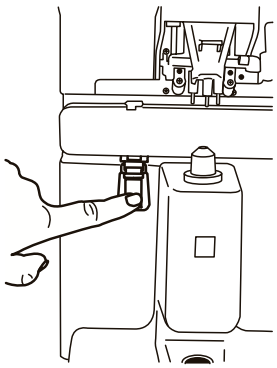
3.4.4 Nose Block

When the Nose Block is not used, it can be avoided as shown in the following figure.

Note **Carry out avoiding of the Nose Block by pressing the PD button in the second menu to turn the PD Measure "OFF" or after setting up the PD Measure of the Function Setup Screen.**

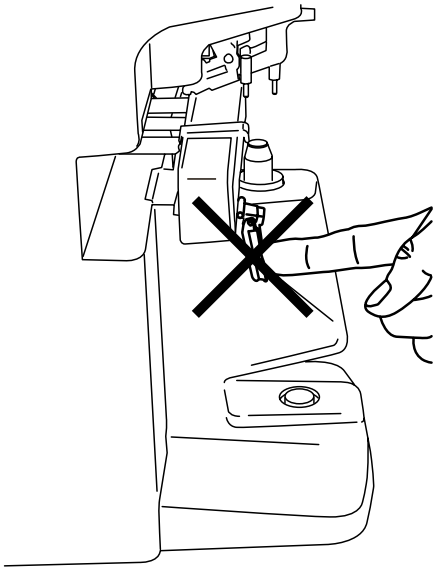
1) Return the Lens Table to the specified position where is the deepest specified position.

2) As for the Nose Block disengage by releasing the lock and next slowly lower until it reaches the bottom as illustrated in the drawing below.



3) After measurement is finished, return the Lens Table to the deepest position and then lock the Nose Block after returning the Lens Table to its specified position.

Note **Do not move the Lens Table with the Nose Block as not being avoided completely.**
Do not also move or apply force to the Nose Block while the Lens Table is being moved, which may otherwise cause to breakage.



3.5 Print Out

Note **No printing can be made if "Print" "OFF" has been setup in the Print Setup Screen. If making printing out, change "Print" to "ON" in the Print Setup Screen (see 3.2.1 Setting-up of the Setup Screen / page 3-2).**

If pressing the Print button after lens measurement is finished, stored measurement data will be printed out.

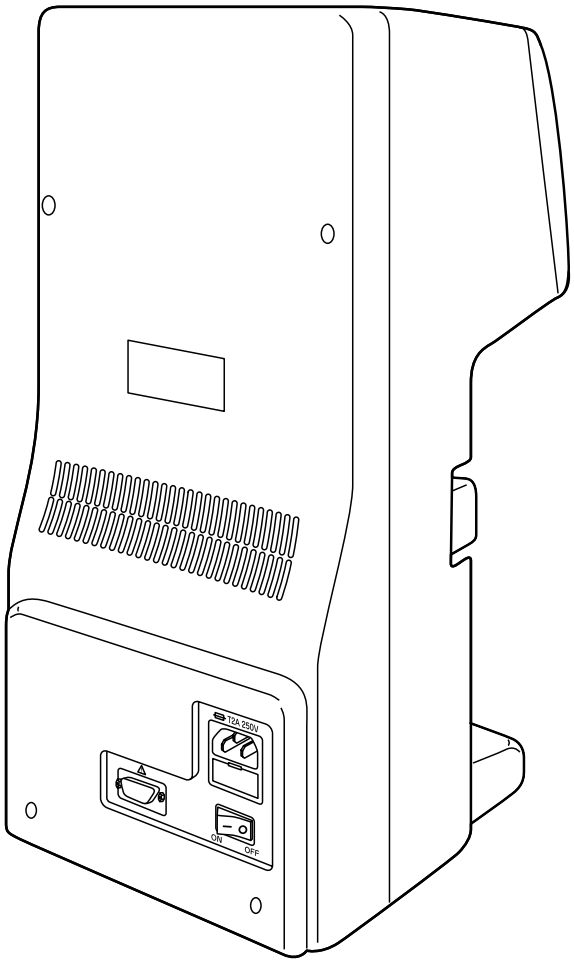
Notes

- **If pressing the Print button while no measurement is in process (where measured data is not saved in the internal memory), only the print paper will be fed.**
- **Measurement data, as long as being displayed in the Measurement Screen, will continuously be printed out every time the Print button is pressed even if such data have been printed out once, unless the Exit/CLR button is pressed to change the screen to the Measurement Screen.**

3.6 External Output (RS-232C Output)

Caution

The external output terminals have not been isolated from the internal electric circuits. Connecting inappropriate device (s) with the TL-3000B which do not follow RS-232C protocols, may damage the instrument.

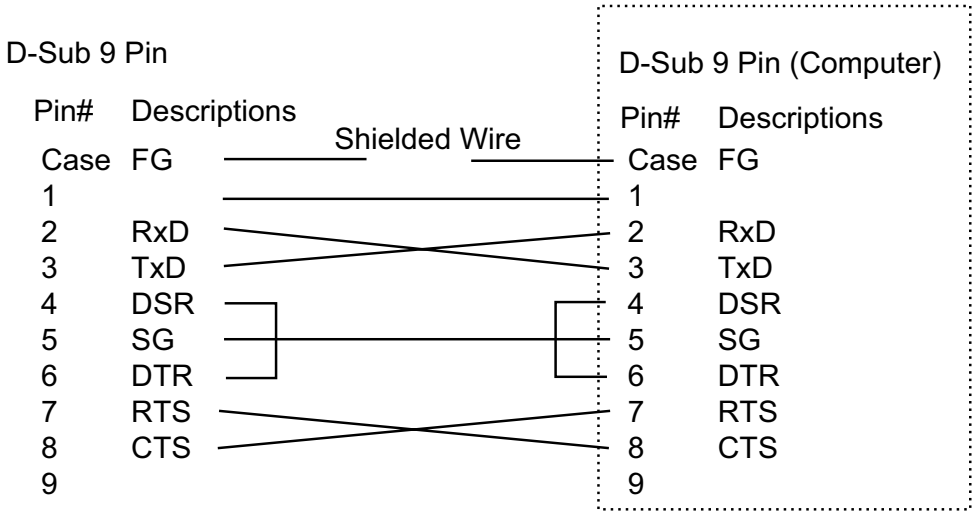


INFORMATION FOR DATA COMMUNICATION

This is an instruction to do data communication between PC and TL-3000B.

Required Tools:

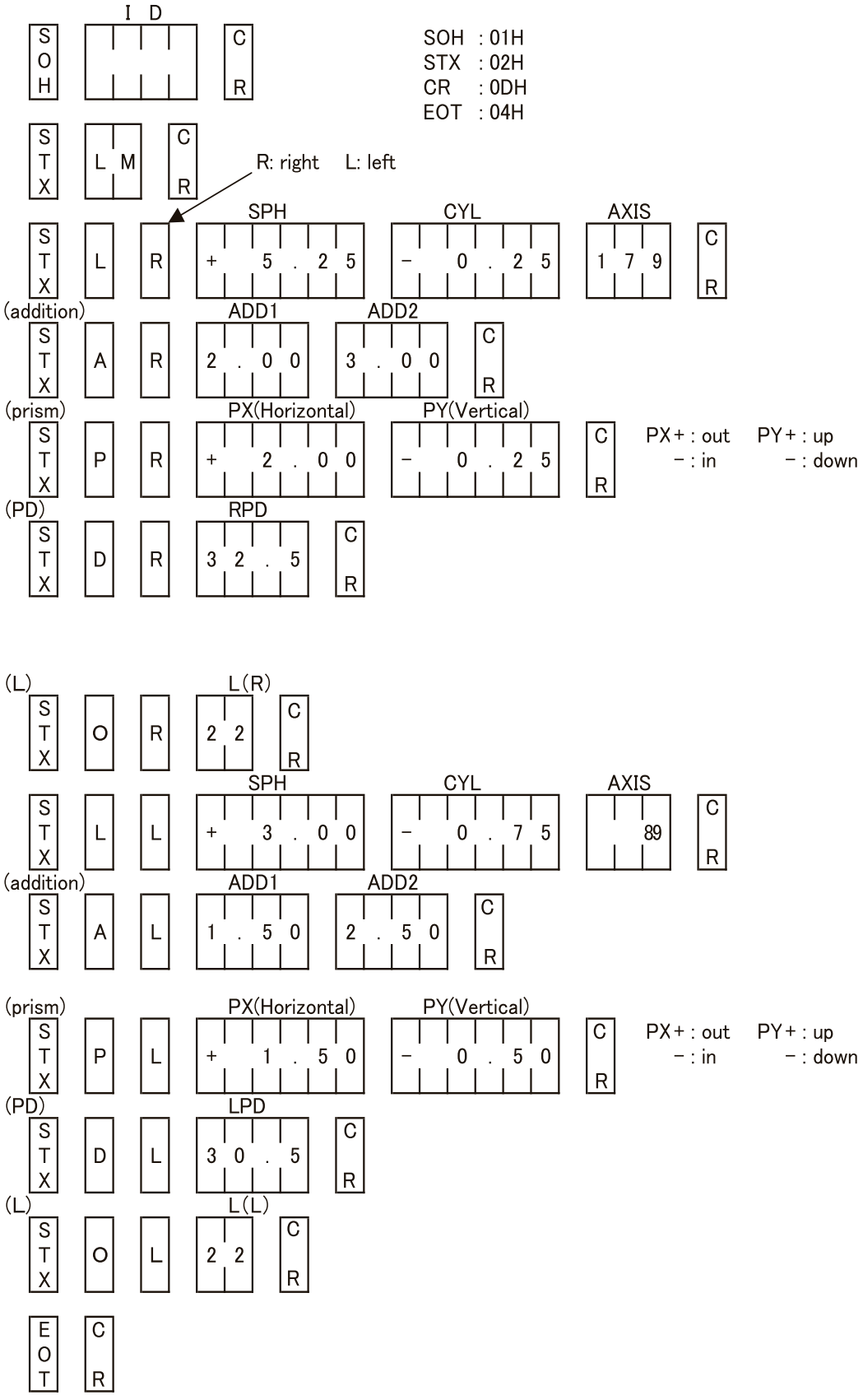
- RS-232C Cable (cross)
- Gender Changer (depend on the type of RS-232C cable)
- Software (for example Hyper Terminal)



Note **For connecting to external computers and other peripherals, above cable is necessary.**
For data export to external computers, please use Hyperterminal for communicating and Microsoft Excel to edit the data.

Connecting Instruction:

1. Connect PC and TL-3000B by RS-232C cable (if necessary, use the gender changer)
2. Open the software, which is able to read binary code (for example, Hyper Terminal)
3. Change connecting condition on TL-3000B from the "Output Setting" screen (see 3.2.1 Setting-up of the Setup Screen / page 3-2 for more details to change the setting).
4. Take some measurement and send out the measurement data to the PC.
   (Carriage return should be active by setting of software)


I D
SOH
CR
SOH : 01H
STX : 02H
CR : 0DH
EOT : 04H
STX
L M
CR
R: right L: left
SPH
CYL
AXIS
STX
L
R
+ 5.25
− 0.25
179
CR
(addition)
ADD1
ADD2
STX
A
R
2.00
3.00
CR
(prism)
PX(Horizontal)
PY(Vertical)
STX
P
R
+ 2.00
− 0.25
CR
PX+ : out PY+ : up
− : in − : down
(PD)
RPD
STX
D
R
32.5
CR
(L)
L(R)
STX
O
R
22
CR
SPH
CYL
AXIS
STX
L
L
+ 3.00
− 0.75
89
CR
(addition)
ADD1
ADD2
STX
A
L
1.50
2.50
CR
(prism)
PX(Horizontal)
PY(Vertical)
STX
P
L
+ 1.50
− 0.50
CR
PX+ : out PY+ : up
− : in − : down
(PD)
LPD
STX
D
L
30.5
CR
(L)
L(L)
STX
O
L
22
CR
EOT
CR

4. INSPECTION AND MAINTENANCE

4.1 Warranty

One-Year Limited Warranty

The seller warrants this product to be free from defects in material and workmanship under the normal use of this product for one year or other term complying with local regulation from the date of invoice issued by Seller to 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 (here in after called "Tomey"). Neither seller nor Tomey shall be liable for any damages caused by purchaser's failure to follow instruction for paper 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 duty 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 GENERALLY 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.

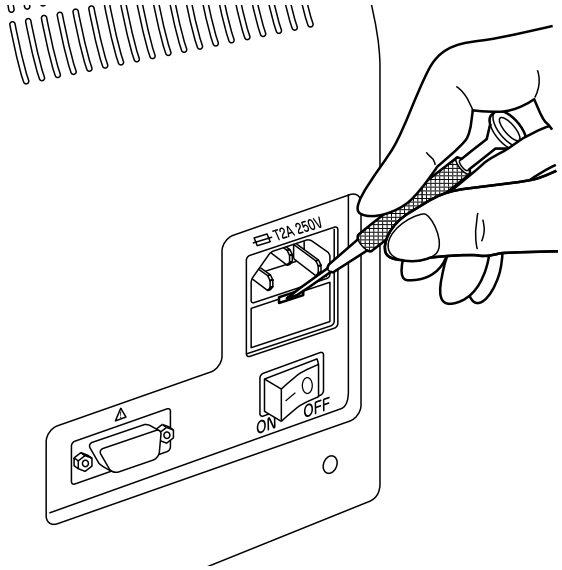
4.2 Replacing of Spare Parts

4.2.1 Replacing of Fuse

Caution **Be sure to disconnect the power plug from the receptacle for replacing the fuse, which, if unheeded, may cause you an electric shock.**

Note **In case any disordered operation is caused after the fuse is replaced with the new part, other causes are assumed. If so, turn the power source off immediately and report to your local distributor for appropriate remedy.**

1) Turn the power off and disconnect the power plug from the receptacle.
2) Disconnect the power cord from the power terminal of the instrument.
3) Put the end of the minus screw driver in the slot located at the upper part of the fuse holder provided under the power terminal to unlock the fuse holder to remove the holder case.



4) Take the broken fuse out of the holder case and replace the new fuse.
5) Return the holder case to the fuse holder in the opposite procedure to that used for removing the broken fuse.

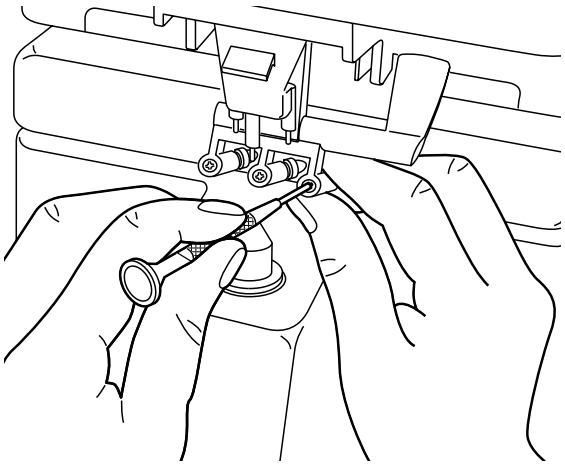
4.2.2 Replacing of the Ink Cartridge

If the marking ink becomes thin or unclear, it is time to replace the ink cartridge with the new part.

Notes

- **Be sure to use Tomey supplied ink cartridge.**
- **To replace the ink cartridge, do not touch the pen point, which may deform the pen point, making use of the ink cartridge unable.**
- **Do not apply an excessive force to the stop screw for ink cartridge, which may otherwise break the cartridge.**
- **Do not lose the stop screw and the spring, which are exclusively supplied with the instrument.**

1) Lift up the lens clamp and keep it as being lifted.
2) Pull the Marking Device down, without rotating the marking lever.
3) Fix the ink cartridge with one hand and unscrew the stop screw for ink cartridge with the plus screw driver.



4) Remove the ink cartridge from the Marking Device together with the spring as attached.
5) Place the spring to the new ink cartridge and next assemble the cartridge to the Marking Device with the stop screw.

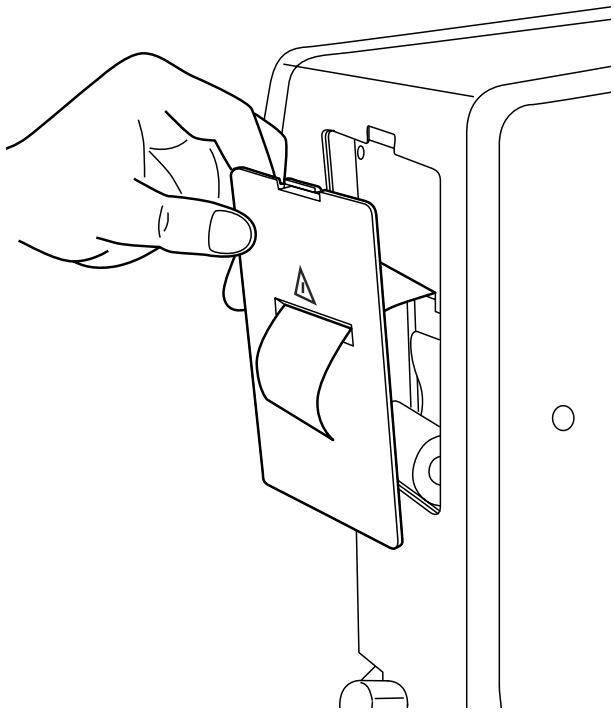
4.2.3 Replacing of Printer Paper

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

Caution **The printer cover is provided with the metal blade for cutting the printer paper. Sufficient care should be taken not to cut yourself when you replace the printer paper.**

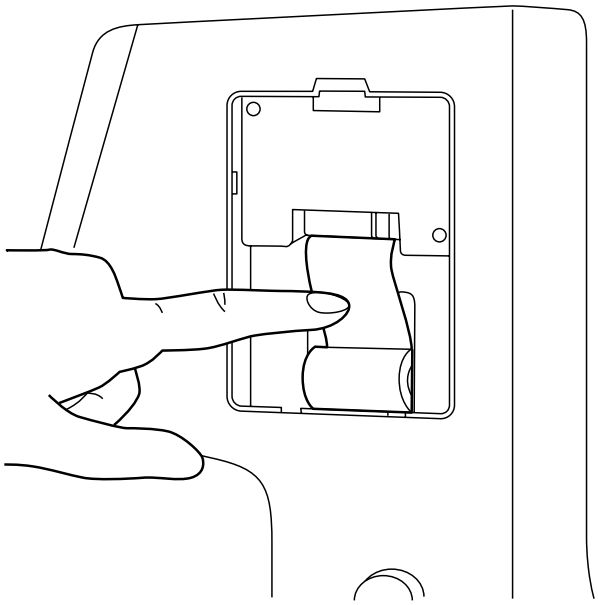
Note **Be sure to use the genuine printer paper. A printer paper other than specified in this Manual may cause to disorder the operation of the Printer of this instrument.**

1) Open the Printer Cover.

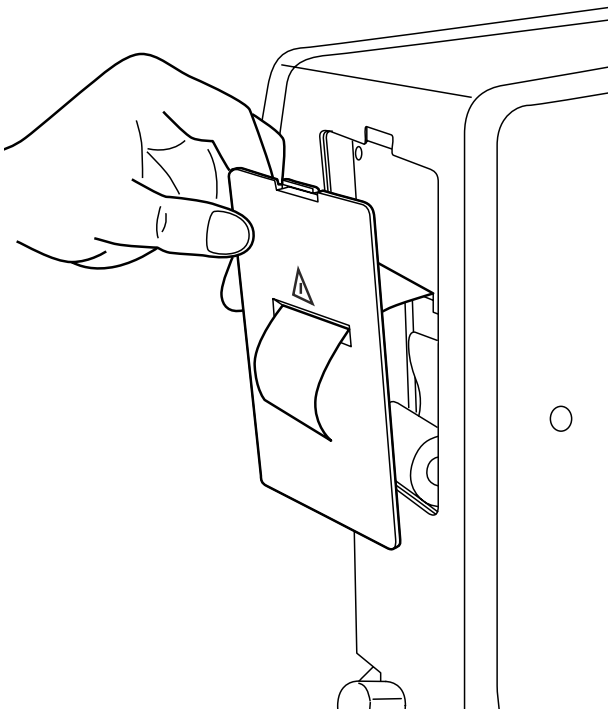


2) Remove the printer paper left remaining. The paper left in the Printer is fed out of the system by pressing the Print button.
3) Cut the leading end of the new printer paper off with the scissors in such a manner that the leading end can easily be inserted into the Printer.

4) Insert the leading end of the new printer paper into the paper insertion inlet of the Printer and press the Print button to feed the paper through the Printer.



5) Close the Printer cover.



4.3 Routine Maintenance

Notes

- **No such organic solvents as thinner shall be used for cleaning the instrument, which may otherwise harm the surface of the instrument.**
- **Do not touch the optical elements, such as the cover glass, with your fingers. Also, keep the instrument away from dust, dirt, and finger prints, which may otherwise influence on accurate measurement of the instrument.**

4.3.1 Maintenance of the Main Unit of the Instrument

- Cleaning of the Main Unit and the liquid crystal display with dry cloth. For heavy stains, use a diluted neutral cleanser.
- Place the dust cover on the instrument when its operation is in recession.
- While the instrument ceases operation, keep the power plug of the instrument as being disconnected from the receptacle, covering the instrument with the dust cover.

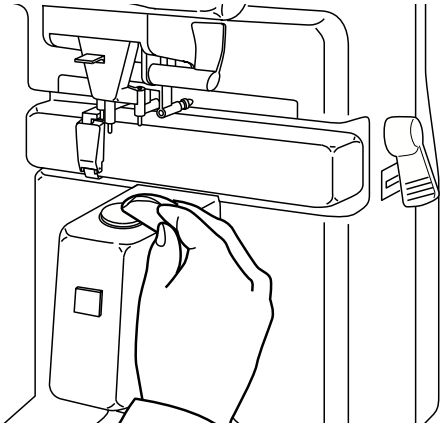
4.3.2 Cleaning of the Protective Glass

Dismount the Nose Piece periodically, to clean the protective glass by removing dust and dirt.

Note

Care must be taken not to damage the protective glass. The damaged protective glass extremely lowers the reliability of measurement data.

Remove the Nose Piece and blow off the dirt from the protective glass by using the blower. If any stains adhere to the glass, wipe such dirt away by lightly rubbing the glass surface with the lens cleaning paper.



4.4 Storing

- **Store the instrument in a place where it is free from water and chemicals.**
- **Store the instrument in a place where it is not subjected to adverse conditions, such as direct sunbeams, high temperature, high moisture, dust, dirt, salts, and/or sulfur contained air.**
- **Ascertain that factors such as excessive slope, vibration, and impact will not endanger the instrument (including during transportation).**
- **Do not store the instrument near chemical substances or in a location where any gas may be generated.**

4.5 Packing Materials

Notes

- **Keep the containers and packing materials for future movement or transportation which may occur.**
- **Keep the cushion materials together with the packing materials.**
- **If you discard the packing materials, be sure to comply with local ordinances and regulations.**

5. TROUBLESHOOTING

Before assuming your operation as a trouble of the equipment, check the following. If the following does not solve your problem, consult your local representative or distributor for inspection or service.

Note **Do not attempt measures other than those described below.**

5.1 General Troubleshooting

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

Cause 1: Failure in power cord connection.

▶ **Action: Securely connect the power cord to the power terminal of the instrument. Also securely connect the power plug to the power source receptacle.**

Cause 2: Broken fuse.

▶ **Action: Replace with a new fuse (250VA, 2.0A).**
(See 4.2.1 Replacing of Fuse / page 4-2 for more details)

Cause 3: Improper adjustment of the screen contrast.

▶ **Action: Adjust the contrast of the screden properly by using the contrast adjuster at the lower right of the operation panel.**
(See 3.2.3 Adjusting of the LCD Contrast / page 3-15 for more details).

Cause 4: The maintenance switch on the rear side of the instrument sits in a position other than the middle position.

▶ **Action: Turn power off, next return the switch to the center, and then turn power on.**

2) Freezes at the initial screen.

Cause 1: There is an object on the Nose Piece when the instrument is turned on.

▶ Action: Remove the object from the Nose Piece.

Cause 2: The Nose Piece is not seated properly.

▶ Action: Seat the Nose Piece properly.

Cause 3: The protective glass below the Nose Piece is stained.

▶ Action: Remove the Nose Piece and clean the protective glass.

3) "INITIAL ERROR!" is displayed when the instrument operation is stopped.

Cause 1: The lens is on the Nose Piece when the power is turned on.

▶ Action: Remove the lens and press the Retry button.

Cause 2: The Nose Piece is not seated properly.

▶ Action: Correct the position of the Nose Piece and press Retry button.

Cause 3: The protective glass under the Nose Piece is not clean.

▶ Action: Turn the power off and remove the Nose Piece to clean the protective glass. Replace the Nose Piece and turn the power on again.

Cause 4: The CL Nose Piece measurement is placed.

▶ Action: Use the Nose Piece for spectacles and press the Retry button.

4) The S, C or A value is not "0", when the lens is not on the Nose Piece. Measurement is in process, but showing abnormal data.

Cause 1: The Nose Piece has been set as tilted.

▶ Action: Correct the Nose Piece position and press the power switch.

Cause 2: The protective glass is stained.

▶ Action: Remove the Nose Piece and clean the protective glass. Then turn the power on.

Cause 3: Nose Piece measurement is placed.

▶ Action: Use the Nose Piece for spectacles and press the Retry button.

5) No printout is made by pressing the Print button.

Cause 1: "Print" Setup is set at "OFF" in the Print Setup Screen.

▶ Action: Set up "Print" Setup in the Print Setup Screen "ON".
See "3.2.1 Setting-up of the Setup Screen".

Cause 2: The printer paper has been installed face side rear.

▶ Action: Set the printer paper properly.
See "4.2.3 Replacing of the printer paper".

6) The printing ink is abnormally thin or thick.

Cause 1: The Printer paper is old.

▶ Action: Change with the new Printer paper.

Cause 2: The Printer paper is not the one specified.

▶ Action: Change with the specified Printer paper.

7) No PD value is displayed by moving the Nose block for PD measurement.

Cause 1: The Nose block has not been reset.

▶ Action: Reset by moving the Nose block to the left end once (Stopper position).

Cause 2: The PD measurement mode has not been set.

▶ Action: Press the PD button in the Second Menu to display "PD: ON" or "PD: OFF" in the left lower of the screen.

8) No AUTO R/L (automatic change-over for left vs right) can be made.

Cause 1: "PD: ON" is displayed in the left lower of the screen.

▶ Action: Change the PD measurement mode to the "OFF" mode. Fix the Nose block to the left end.

Cause 2: The left/right movement is too fast.

▶ Action: Make the left/right movement slower.

9) The button different from that pressed in the touch panel was reacted.

Cause 1: The touch panel calibration was disordered out of position.

▶ Action: First, check to see if the calibration of the touch panel was disordered out of position. Turning the power switch by pressing the right upper of the touch panel with the finger changes the screen display to the touch panel check screen.
The screen will display the letters of A though I at the right upper part, so press the E-button until the (E) Switch in the center of the screen is turned to OK. After (E) switch is turned to OK, the screen shows the letters of J through R aligning at the left lower part of the screen. Then press the N-button in the middle with your finger.
Then, repeatedly press the N-button until (N) Switch in the center of the screen becomes OK. If repeatedly pressing of the E or N button does not display OK, press the HOLD button to change the screen for touch panel calibration. Thus, the target will appear in the screen. Press the center of the target with the fine point (in such a manner that does not damage the display). Since, after this, the target will be displayed in the right upper part, press the center of the target in a similar manner to done previously.
When the touch panel check screen is returned, make sure that the (E) and (N) are turned to OK.
If the touch panel is out of calibration even if the above action is repeatedly given, consult your representative.

5.2 Progressive Lens

1) Centering of the target cannot be made when detecting the progressive corridor.

Cause 1: For the progressive lenses having an ADD of lower than 1D, those having the near area as important area, and those having the middle/near area, which have small progressive addition, the target may sometimes not align to the center when detecting their progressive corridor.

▶ Action: These lenses have their progressive corridor in the center area of the lens (the center of the lens frame in case the framed lens). Therefore, center the target in the vicinity of such area and press the HOLD button.

2) Centering of the target cannot be made when measuring the far area.

Cause 1: In the progressive lenses for near area and for middle near area which have a wide range of progressive addition to the far area, it is difficult to take accurate measurements.

Cause 2: In case of 0D far lenses and cylinder lens

▶ Action: Measure the far area in a position which is slightly upper than the ordinary level (approximately 15mm above the eye point for far). If measurement cannot still be made, move the lens to the front, rear, left and right in a position which is approximately 10 to 15mm upper than the eye point for far (the center of the lens in case of the framed lens), and press the HOLD button to use the position having a small fluctuation of SPH value for the far area.

3) The near point cannot be detected. The target does not change to "○" or "◉".

Cause 1: This instrument cannot automatically detect the near point, if the ADD value is less than 1D.
(The lens of which addition power (ADD value) is less than 1D has lesser progression and, thereby, the near point is easily erroneously detected.)

▶ Action: Measurement of the near area is carried out in the position where the addition power (ADD value) becomes of the largest.

Cause 2: In case the lens having a long progressive corridor is prescribed for the spectacle frame, the near area may be positioned by limiting the lens frame or possibly override the lens frame, making it unable to detect the near point.

▶ Action: Measurement of the near area is taken in the position that maximizes the ADD value in the condition that the target is in the progressive corridor.

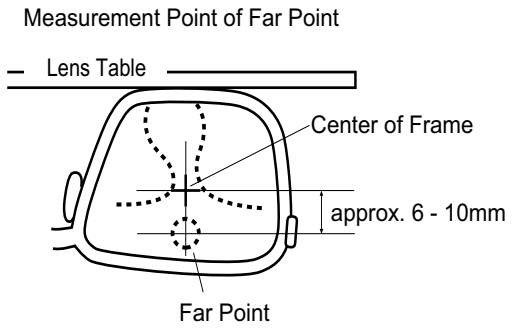
Cause 3: In case prescription is given for a small spectacle frame, the near area may be positioned close to the lens frame or away from the lens frame, making unable to detect the near point.

▶ Action: Measurement is taken in the position that makes the addition power (ADD value) the largest in the conditions that the target is included in the progressive corridor.

4) The measurement data of addition power (ADD value) fluctuate more than 0.5D or will be 0.5D lower than the prescribed value.

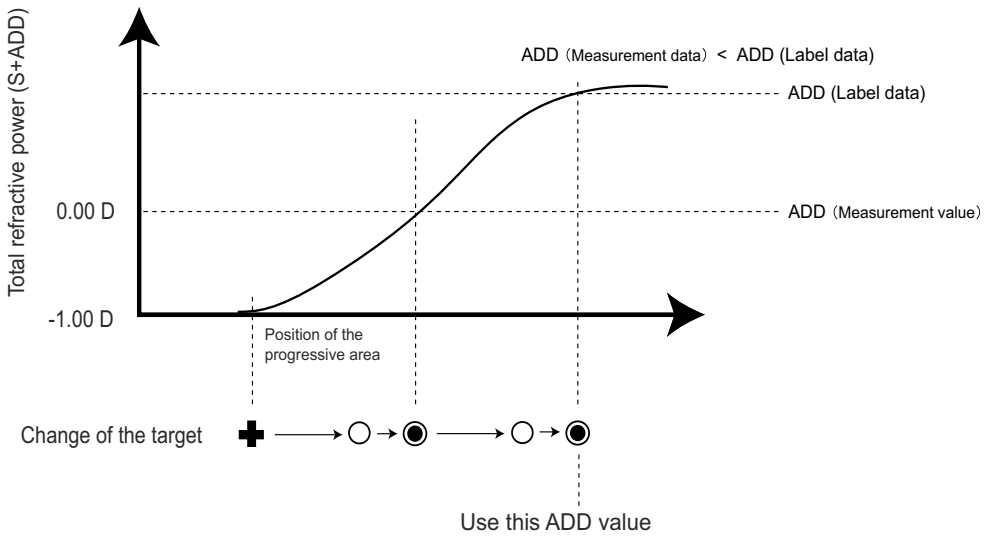
Cause 1: Measurement of the far area is not carried out correctly.

▶ Action: The far area in the Auto Hold Mode may not be measured, which depends on the lens. In such case, set up the "AUTO HOLD" in the AUTO Setup Screen at "OFF" so measurement of the far area in the Manual Hold Mode is performed. In this case above, "AUTO HOLD" in the AUTO Setup Screen is set up at "OFF" and the far area is measured in the Manual Hold Mode. Measurement of the far area, in this case, is measured in the position shown in the below figure of "measurement point in the far use area". It is also noted that the value, even if the target is centered, may be fluctuated depending on the lens. In such case, move the lens to the front, rear, left, and right to take measurement of the far area in the position which ensures the least fluctuation of the SPH values and then press the HOLD button.



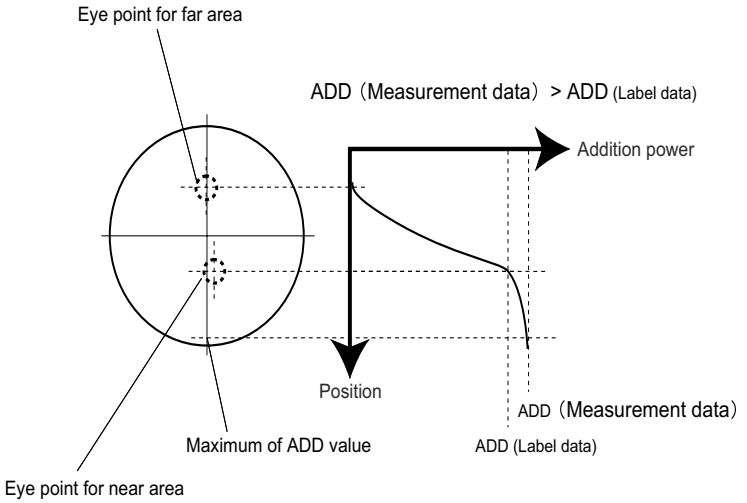
Cause 2: **In case the power in the far area is minus or slightly weak (for example, approximately -1 to -2D), the total refractive power may be 0D on the way of the progressive corridor due to the ADD value. Since, in this case, the near area is easily detected on the way of the progressive corridor, the ADD values may be fluctuated or smaller. For instance, if the lens has its power of the far area of SPH-2.00D and an ADD value of 3.00D, the total power becomes 0D when the ADD value is 2.0D; therefore, the near area may be detected at an ADD value is 2.00 to 2.50D. Especial care is to be taken for the lens having the CYL which can easily be caused with such detection.**

▶ **Action:** **Give measurement of the progressive lens manually. If the target changes in "+" to "○" (or ◉) twice in the measurement of the near area, the larger ADD value is taken as the progressive power. If it is once, the value which becomes the largest ADD value in the condition of "○" (or "◉").is used as the progressive power.**

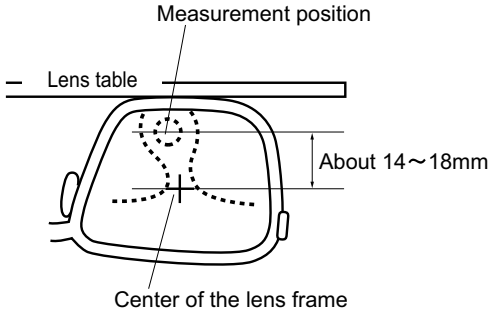


5) A higher value of progression is obtained if compared with the prescribed value.

Cause 1: There is a progressive lens which has a peak point of ADD in the lower part of the eye point of the near area. In case of measuring such lens, the addition power obtained by this instrument may be measured higher the value written on the leas or the prescribed value for the lens.

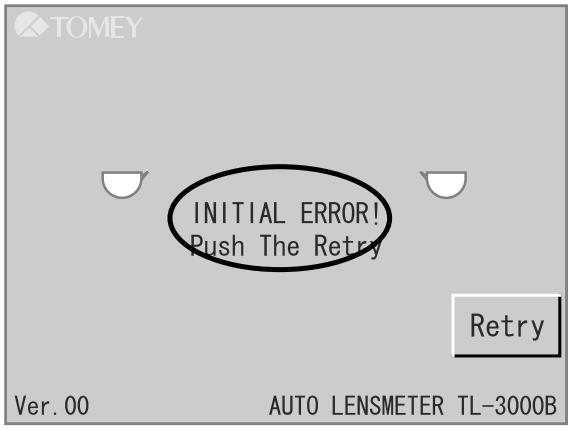


▶ Action: In case the eye point for near area was printed in the lens before being processed: the addition power is measured in such position (There may be such a case that does not change the target to "○".)
Since, in case of a framed lens, there is no mark, the eye point for near area is assumed to be positioned in approximately 20mm lower than the center of the lens frame, of which value in such position is used as the addition power. In either of these cases, its addition power is measured with the target is in the progressive corridor.



5.3 Error Messages

- **Initial Error**



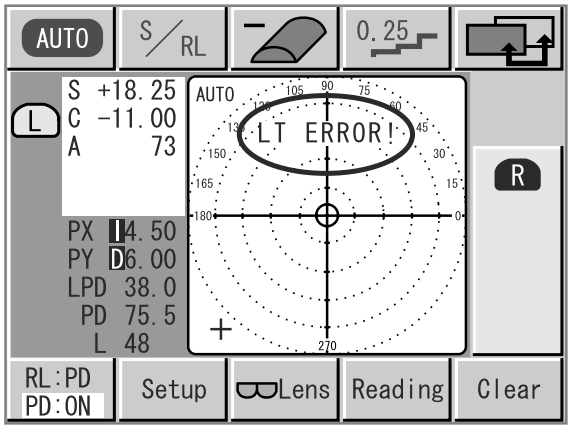
1) "INITIAL ERROR!"

Cause: Initial error

▶ Action:

- **If the power has been turned ON with the lens as being placed on the Nose Piece, dismount the lens and press the Retry button.**
- **If the Nose Piece is set tilting, correct the position of the Nose Piece and press the Retry button.**
- **If the protective glass provided under the Nose Piece is stained, remove the Nose Piece, clean the protective glass and then press the Retry button.**
- **If the Nose Piece for contact lens is set, replace it with that for spectacle lens and press the Retry button.**

- **Measurement Screen**



1) "LT ERROR!"

Cause: Light amount not sufficient.

▶ Action: Clean the lens or the protective glass provided under the Nose Piece. No measurement can be made of heavily tinted lenses. Make sure that the spectacle frame does not override the Nose Piece.

2) "NOSEPIECE ERR!"

Cause: Wrong Nose Piece for the measurement mode

▶ Action: Change the Nose Piece with that which suits the measurement mode. (When changing to the CL mode, replace the Nose Piece with that for contact lens measurement.)

3) "OVER FLOW!"

Cause: Over/under flow

▶ Action: The lens to be measured is outside the scope of the measurement range; therefore, no measurement can be made.

4) "DATA OVER FLOW" (for the S Mode only)

Cause: No capacity left open for saving data

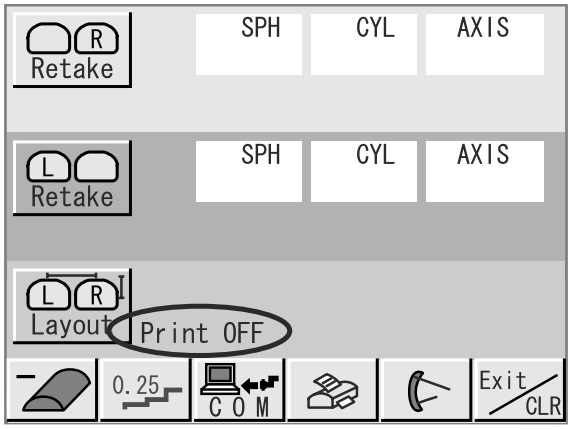
▶ Action: Print out saved data and then delete the data.

5) "MT ERROR!"

Cause: Failure of the DC-motor.

▶ Action: Report to your local representative or distributor.

- **Measurement Results View Screen**



1) "Print OFF"

Cause: "Print" in the Print Setup Screen is "OFF".

▶ Action: Click "Print" at "ON" in the Print Setup Screen.

2) "PRT ERROR!"

Cause: The Printer is plugged with paper.

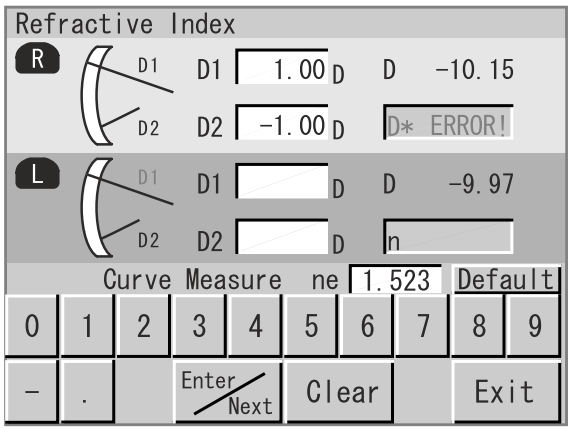
▶ Action: Remove plugged paper out of the Printer.

3) "RS ERROR!"

Cause: No communication being connected with an external equipment.

▶ Action: Set up the external output terminal.

- **The Refractive Index Measurement Screen**



1) "D* ERROR"

Cause 1: D1 plus D2 become "0".

▶ Action: Input D1 and D2 of which addition does not make "0".

Cause 2: D1 or D2 is not within the scope of +25D ~ -25D.

▶ Action: A value other than +25D ~ -25D cannot be inputted.

2) "ne ERROR"

Cause: The curve refractive index is not in the scope of curve refractive index.

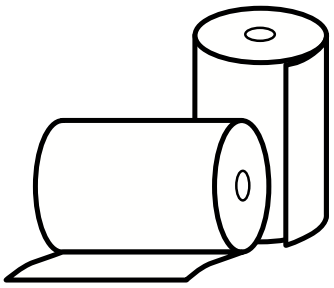
▶ Action: Input the value in the range of 1,400<ne<1,900, which is the range of the refractive indexes of the curve meter.

6. SPARE PARTS

The following spare parts for TL-3000B are available by ordering to your Tomey representative or local distributor.

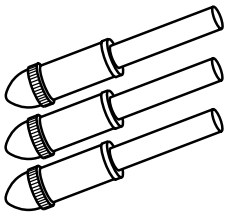
- Printer Paper

  When you place an order for Printer paper, specify the commodity name as "Printer paper for TL-3000B".



- Ink Cartridge for Marking

  When you place an order for ink cartridge, specify the commodity name as "Ink cartridge for TL-3000B".



7. SPECIFICATIONS

7.1 Measurement

- Range
  - Sphere Power (SPH): - 25D to +25D
  - Cylinder Power (CYL): - 10D to +10D
  - AXIS: 0° to 180°
  - ADD: 0D to 10D
  - Prism: 0 to 10△
  - High Power: - 80D to +80D
- Increment
  - Diopter: 0.01/0.12/0.25D
  - Prism: 0.01/0.12/0.25 △
- Mode
  - Cylinder: +/±/−
  - Prism: Rectangular Coordinates / Polar Coordinates / Displacement
- Measurement Time: 0.035 seconds (sampling time)
- Wavelength: 660nm
- Light Velocity: 2.5mm /5.0 mm
- Diameter: 20mm to 100mm (5mm for Contact Lens)
- Pupilary Distance: 50mm to 86mm (Step: 0.5mm)
- Measurement Object: Single Vision / Bi-Focal / Tri-Focal / Progressive (Far/Mid/Near)
- Abbe Numbers: 30 to 65 (5-unit increment)

7.2 Data Control

- Display: 5.7 inches Color Touch Panel Operation LCD (320 × 240 dot)
- Alignment: Cross Cursor
- Printer: Thermal Printer (MTP type)
- External Communication Port: RS-232C

7.3 Dimensions and Electric Requirements

- Dimensions: 220 (W) × 260 (D) × 438 (H) mm
- Weight: Approx. 7.0kg (15.4lbs.)
- Power supply: AC100 ~ 240V(adjusts automatically)
- Frequency: 50 / 60 Hz
- Consumption Power: 35 to 50VA

7.4 Environmental Conditions

- Installing Site: Indoor
- Operating Temperature: +10°C ~ +40°C
  (80% maximum relative humidity for up to 31°C
  decreasing linearly to 50% RH at 40°C)
- Power Fluctuation: To be less than ± 10% nominal Voltage
- Installation Category: II
- Pollution Degree: 2 (as per IEC 664)
- Storage Temperature Range: -20 to +60°C
  Humidity Range: 10 to 95%

7.5 Applicable Standards

- Electrical Safety: EN-61010-1: 2001
- Electromagnetic Compatibility:
  EN61326: 1997+A: 1998+A2: 2001
  FCC Part 15 Class B

Index

R

S

T

U

W

Symbol

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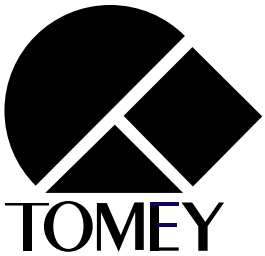

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