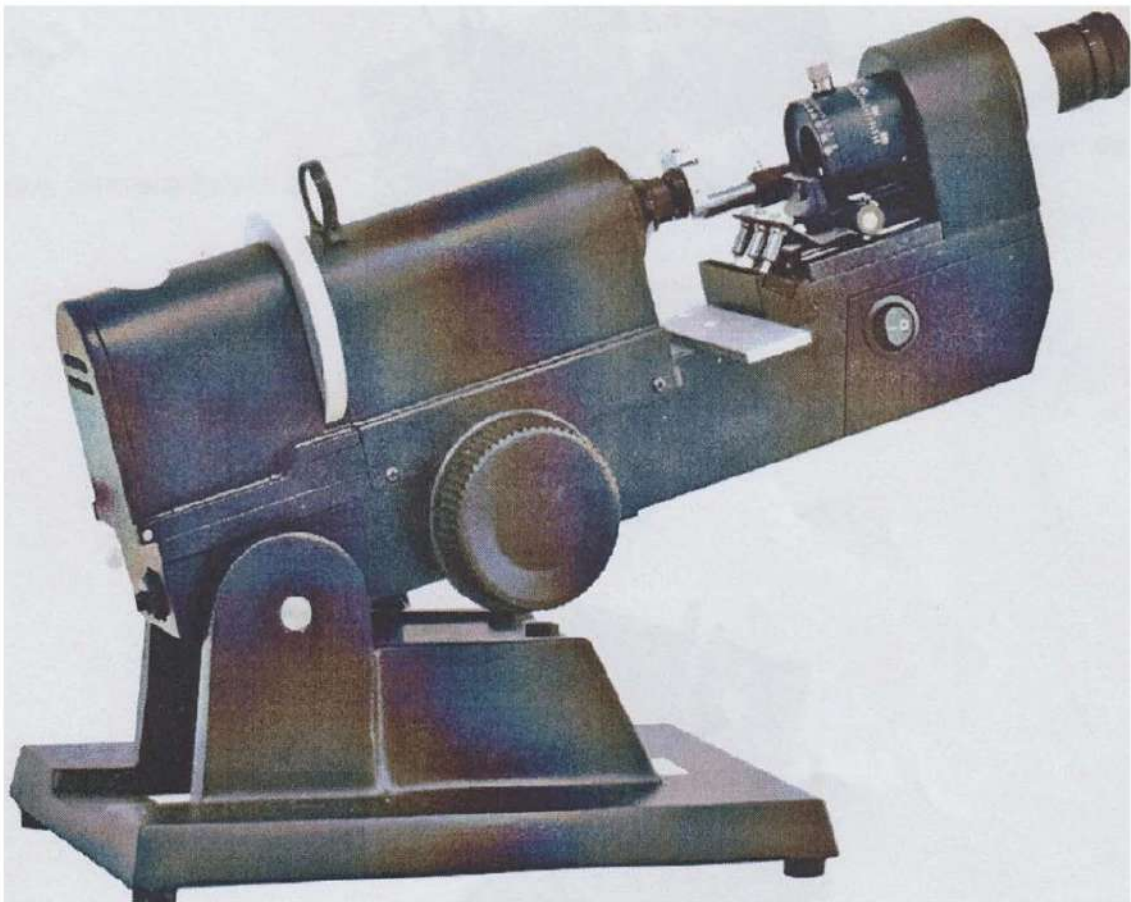


User's Manual



LENSMETER. INSTRUCTION MANUAL

1. purpose:

Lensometer can be used in optical spectacles, spectacles shops and ophthalmological department of hospital to determine the optical parameters such as apex diopter, cylindrical astigmatic diopter, cylindrical astigmatic axial angle and the the prismatic power .It is an essential optical measuring instrument for correcting defects of vision and inspecting the lens during production.

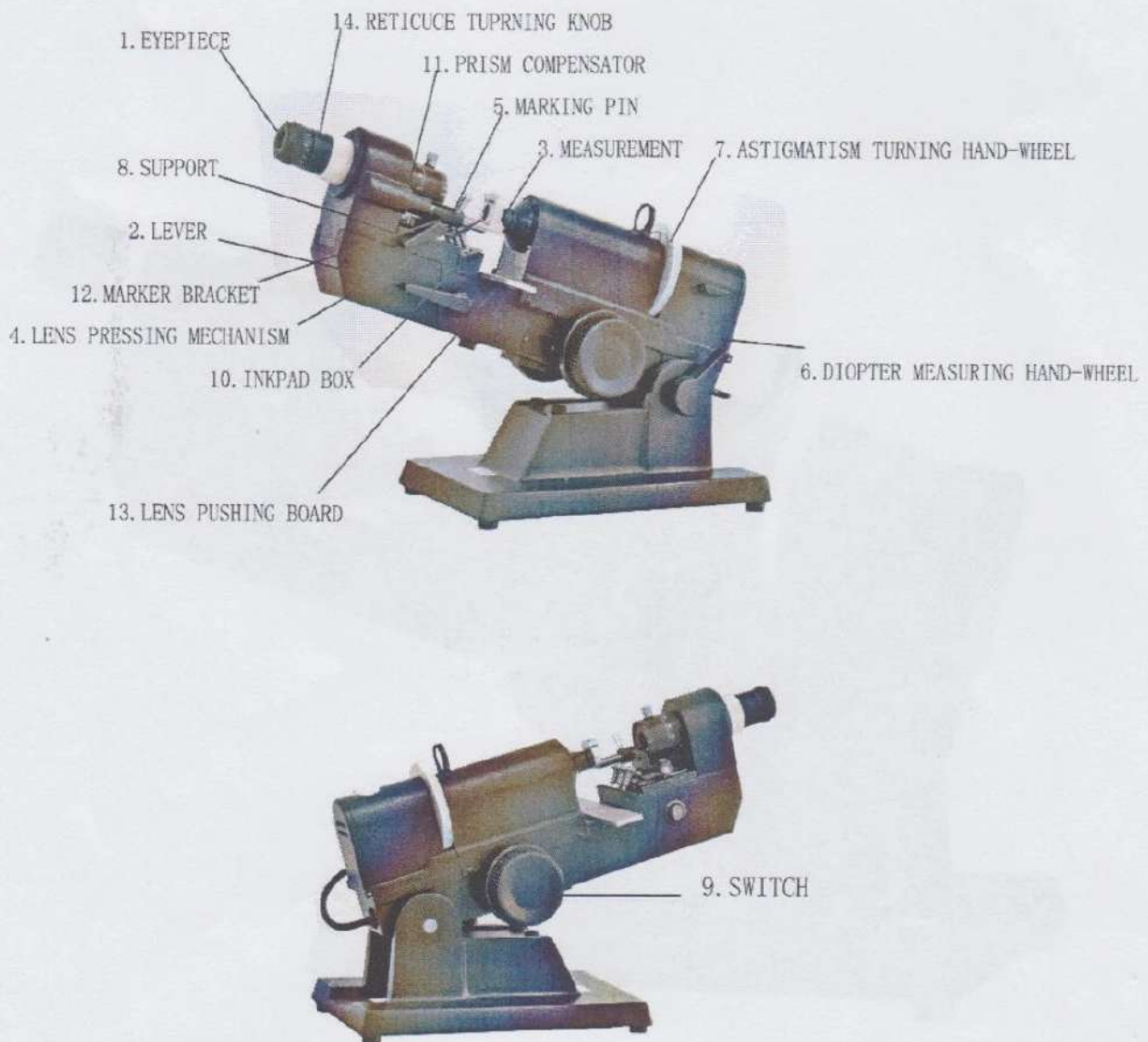


Fig 1

II. Specifications:

Focusing range of eyepiece	-5D $\pm$ 5D
Measuring range of lens	-20D $\pm$ +20D
Scale value of spherical diopter (External reading)	0.125D (-5D $\pm$ 5D)
(Inner reading)	0.125D (-5D $\pm$ 5D)
Scale value of cylindrical diopter	0.125 (-5D $\pm$ 5D)
	0.25D (Exceed $\pm$ 5D)
Readout of cylindrical astigmatism axial angle	
Measuring range	0-180°
Scale value	1°
Prism deviation	
Measuring range	0-5 Δ (0-20 Δ with prism compensator)
Scale value	1 Δ
Readout of prism axial angle	
Measuring range	0-360°
Scale value	1° (on the reticule)
suitable range for lens	Φ 30mm - Φ 90mm
Adjustable range of tilt angle	0° - 90°
Voltage/Power	220V/25W or 110V/25W
Weight/Dimension	7.35kg/460mm $\times$ 170mm $\times$ 240mm

III. Main parts and function

1. Eyepiece diopter adjustable ring: Adjustable range $\pm$ 5D
2. LEVER: Put lens to be tested, up and down adjustable.
3. MEASUREMENT BEARING SEAT: To hold lens to be tested. (surface of the lens near hold ring)
4. LENS PRESSING MECHANISM: Move and relax lever to fix lens to be tested.
5. MARKING PIN
6. DIOPTER MEASURING HAND-WHEEL: Measure and display diopter reading at the range of $\pm$ 20D
7. ASTIGMATISM TURNING HAND-WHEEL: Turn to measure astigmatism lens axial angle and prism
8. Support: Adjust instrument tilt angle to working position.
9. Power switch
10. INKPAD BOX
11. PRISM COMPENSATOR
12. MARKER BRACKET
13. LENS PUSHING BOARD
14. Reticule turning knob: Turn eyepiece reticule and measure astigmatism axial angle.

IV.Procedures and notes.

1. put the instrument on the working table. Move support⑧ to adjust the inclined angle of the instrument body to comfortable position for observation. (Note:While adjusting the inclined angle of the instrument be sure prevent the eyepiece tube① from being affected)
2. Insert the power cable into the socket. Make sure power supply conform to the instrument voltage and switch on power⑨.
3. put on suitable glasses if the observer is astigmatical
4. Adjust eyepiece diopter① and observe until sharp image on reticule appears.
5. Adjust the⑥ until green mark line is clear. "0" indicate zero reading.
6. Put lens to be tested or surface against③, move and relax the④. Then press the lens
7. Adjust the② until the working table hold the lens.
8. Adjust the diopter reading knob until green mark line is clear. The graduation value indicated on the graduation wheel is the diopter value of the lens to be tested. (Simple spherical lens)

V.Special lens to be tested and center location

1. Cylindrical astigmatical lens diopter measurement. The cylindrical lens has different diopter on cross-sections vertical to each other, when the cross reticule is partly clear the image is cylindrical, the lens have cylindrica astigmatical diopter. As see Fig. 2.

To measure cylindrical astigmatical diopter, first turn diopter measuring hand-wheel to adjust the brightnessline of cross reticule to be clearly show. then turn the support to adjust (spherical mark line) the thicker line of cross reticule to the same direction thicker line of cross reticule of the prolonged mark. At the same further adjust the focus to be clear. As see in Fig. 3 The first diopterreading is recorded. Turn the top diopter measuring knob again to focusing the thinner line(spherical mark line) to be clear and turn the axial line wheel at the same time as Fig. 4. The reading line cover the longer line. Record the next diopter and the angle degree of the axial line direction. The difference between the two recorded reading is the cylindrical lens diopter(astigmatical degree). The axial line direction of the cylindrical lens can be read directly on the reticule of the eyepiece. Illustration tables are as follow:

Measurement reading records

First reading	-2.75D	+3.00D	+0.75D
second reading	-4.75D	+1.50D	-0.75D
top diopter measuring knob moving direction	-	-	-
Difference between two reading	2.00D	-1.50D	-1.50D
Axial line direction reading	145°	180°	75°
Group of lens to be tested	1	2	3

Final results

Spherical diopter	-2.75D	+3.00D	+0.75
Cylindrical astigmatism diopter	-2.00D	-1.50D	-1.50D
Cylindrical astigmatism axial degree	145°	180°	75°

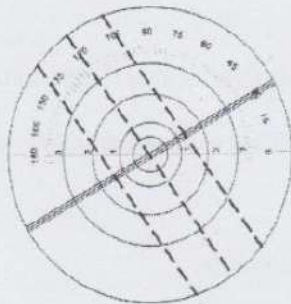


Fig 2

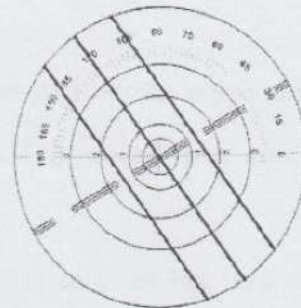


Fig 3

2. Prism diopter and basic point measurement

- (1). Make a small round point mark on optical center of the prism as measurement zone
- (2). Hold the prism on the instrument. Point the the center to the center of the lens hold ring and adjust the 180 line in the eyepiece field to cover the point of the three print needles (this position can be found with central printer of the lens)
- (3). focus the mark image to be clear. As the prism diopter exists in the lens, the mark image will go away from the center. As in Fig. 5, the mark image will go away along the prism basic point direction, that is, mark image above the prism basic point will move to the upper, the mark image under the prism basic point will move down. To the right eye prism basic point inside left eye prism basic point outside prism, the mark image will move to the right. To both the right eye prism basic point and left eye prism basic point inside prism the image will move to the left.
- (4). Turn axial line ring, to part of the line reading half the center of the mark image.
- (5). The prism diopter of the lens can be read through position moving of the mark center to the same circle of the reticule. 1-4 prism diopter are numbers shown on reading line .0.25 prism diopter is estimated.

- (6). Position of the prism basic point can be on the reticule. If the mark image move down to horizontal line the reading value is the upper value add 180, as shown in Fig. 6.

3. Measurement of the prism diopter of the assembled lens

- (1) Put the glasses on the lens hold ring and move up down the lens stage above the glasses.

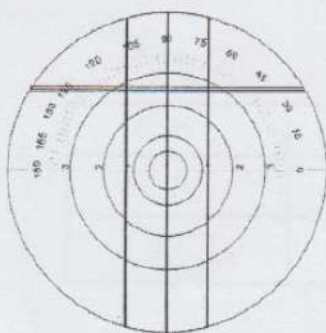


Fig 4

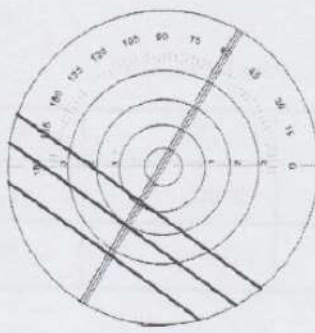


Fig 5

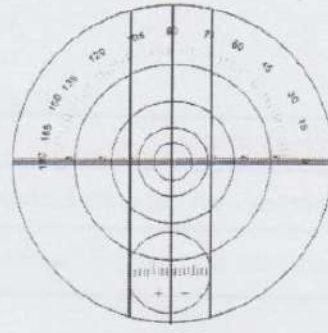


Fig 6

(2).Point the center of the lens to be tested to the lens hold center(Light axial of the instrument).The mark image center will always from the center retivule which shows the prism diopter.

(3).Prism diopter and basic point can be read from the reticule.

4.Location of the ground edge lens

The instrument can not only check the accuracy of the lens according to the instruction bur print mark on unground edge lens according to the following steps.

(1).Make point on the center of small piece(for a double focusing lens)and hold the lens on the instrument.

(2).Adjust diopter measuring lever to the stipulated spherical diopter value and the astigmatical axial angle measuring knob on the stipulated astigmatical axial angle value(if stipulated to be cylindrical lens).

(3).Turn lens until the thicker cross reticule lines to be clear without intermittance.

(4).Move the len to point the center of the thicker cross reticule mark line to the center of the reticule. If prism dioPter is needed, make the thicker cross reticule line go away from the center as stipulated.

(5).Turn diopter measuring ring to the thinner reticule mark line clear.If necessary, move the lens to point the center of the mark line to the center of the eyepiece reticule. To check cylindrical diopter. refocus the thicker mark line to be clear so that the diopter and the center to be correct without error.

(6).Make 180° dot line with lens center printer.

(7).To single focusing eyesight lens, the three point can be take as reference point to draw the ground edge line.

(8).If it is necessary to meet the requirement of the stipulated deviation, correspondently change the "ground edge certen"

(9).For double focusing lens, put the three points on the line to check the position of the small piece and then draw ground edge line according to procedure(7).

VI.Unpack and installation of the instrument

The instrument is insequent packed in dry plastic bag, styroform plastic box hard carton box.

Carefully and slowly open the packing cartons and box when unpacking and installation. keep the instrument clean and prevent the instrument form collision and damaging. put the instrument on the special working table and insert the power socket according to theinstru-
tion manual.

VII.Care of the lensmeter

To make sure the accursacy and prolong lifetime of the instrument, the operator shoud pay attention to maintenance instrution. Suggestion is as follow:

(1).Put the instrument in dry and air - circulated room to prevent optical parts from being mouldy and foggy.

(2).After using the instrument, put on plastic cover ...

(3).Keep the instrument clean . Oily or wetted hand is forbidden to touch the optical parts. If there' s dust oil on the eyepiece,gently wipe with piece of gauze with a little xylene.

(5).Send the instrument to the factory for repairment when the instrument is ineffec-
tive or low accurate.

(6).Use 220V 25W or 110V 25W bulb as the light source. When replacing,unload. the lamp cover and replace with new bulb.

VIII.Complete set of the instrument

Spare parts and accessories

1. Lensmeter	1 piece
2. Instruction manual	1 piece
3. Bulb(220V 25W or 110V 25W)	1 piece

IX.Sale - after service and quality assurance

Excellent sales-after service is supplied. We are responsible for solving quality problems occurred if the insrument was not used improperly. Free maintenance period is one year. Please don' t disassemble instrument at will so as to avoid the instrument being damaged.

Prism Compensator Application Instruction

Note: Be sure to keep the prism compensator at "0" when not used so as to avoid any center deviation.

1. Put lens on the lens hold ring and aim the reference point on the lens to the center of the hold ring (center of the instrument). Overlap 180° line of axial line ring and the three printing needles (central printing point is the reference point).
2. Turn the diopter reading knob to the spherical diopter degree of the lens. If the prism derection deviation on the reference point is more than 5Δ prism compensator must be used to allow signal image pass into the view field. turn prism compensator lever to overlap the signal image on the center of the reticule. turn the operation lever can change the prism direction deviation. Turn the operation lever of the instrument light axial will change the basic point direction of the prism.
3. When used in spherical lens. adjust diopter reading knob to focus the signal image. Turn the prism compensator operation lever so that the signal image point accurately to the center of the reticule. the prism direction and basic point direction can be read on the graduated disc.
4. If the lens to be tested is between $15 - 20\Delta$, turn the prism compensator operation lever to 15Δ first so that the signal image pass into the view field, then keep on turning until the signal image is closed to the center reticule (turn the operation lever of the instrument light axial at the same time). the accurate prism direction deviation is the reading on the reticule plus 15Δ , the basic point direction should be on graduated disc of the prism axial line.

LM-700

LENSMETER