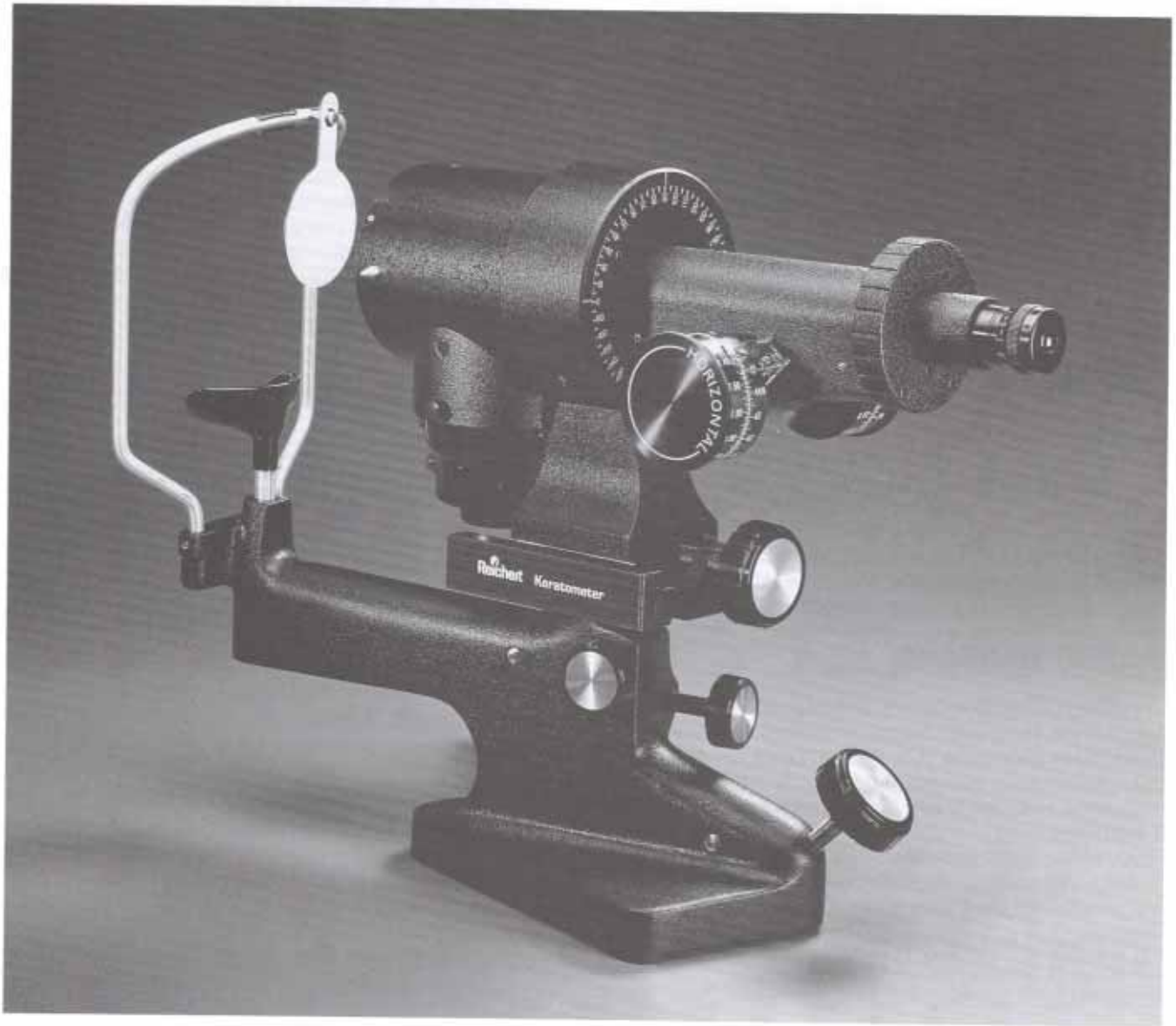
Reichert
Ophthalmic Instruments

INSTRUCTION MANUAL

12515
KERATOMETER



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We recognize the value of your contribution to health care and want to provide the instruments to support the best possible patient care. So, please take a few moments to complete this form. We'd like to know what you think about our products, what new products you'd like to see and what improvements could be made, if any. Your thoughts and plans are important to us and help us prepare for the future.

When you have completed the form, please fold on the dotted lines on the back, seal and mail it to us . . . we'll even pay the postage!

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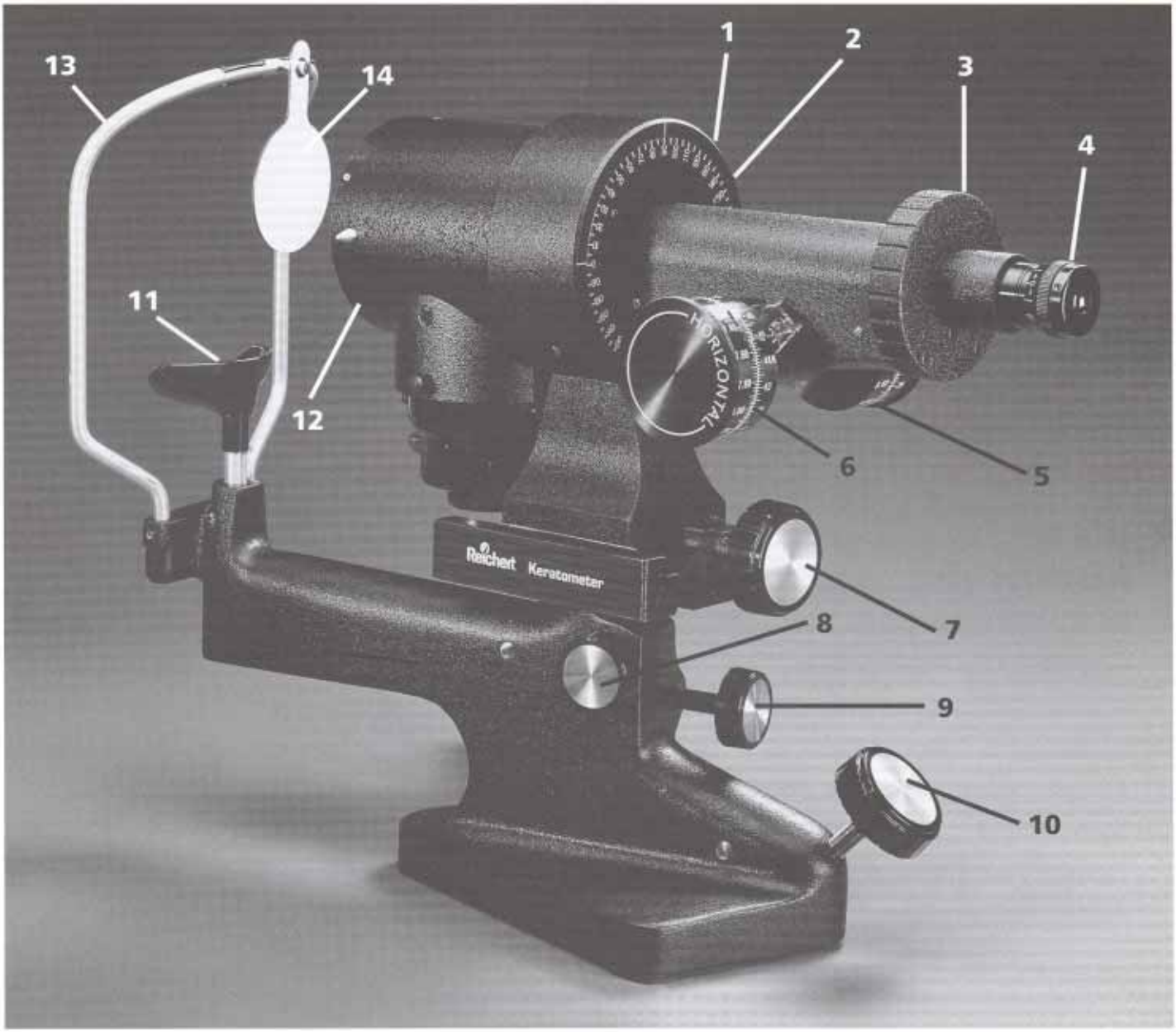

PRODUCT

This manual should be used in reference to the Reichert Keratometer Model No. 12515.

PACKAGE CONTENTS

Contents of the shipping container should include the following:

1 Keratometer
1 Dust Cover
1 Instruction Manual
1 Bulb

INSTRUMENT COMPONENTS

1. Vertical meridian marker
2. Axis scale
3. Rotating grip for locating the axis
4. Eyepiece
5. Vertical measuring drum
6. Horizontal measuring drum
7. Focusing knob
8. Locking knob
9. Chin rest elevation knob
10. Elevating knob
11. Chin rest
12. Leveling sight
13. Head rest
14. Occluder

INTRODUCTION

The Keratometer is designed to provide swift, easy, and accurate corneal measurement.

INSTALLATION

INSTRUMENT STAND

1. Check to see that the power switch is in the "OFF" position and carefully lay the Keratometer on its side.
2. Attach the optional tray adaptor (714009) to the Keratometer base plate with the three screws provided.
3. Insert the adaptor post into the mounting hole in the arm of the stand.
4. Secure instrument by turning the knob on the instrument arm while still allowing free swivel.
5. Plug the power cord into the receptacle.

OPERATION

PRELIMINARY ADJUSTMENTS

To adjust the instrument's eyepiece for the operator's eye:

1. Position the white backed occluder (14) so it is vertical in front of the instrument.
2. Turn the eyepiece cap (4) counterclockwise as far as possible.
3. Turn the instrument on and look through the eyepiece; a blurred cross will be seen (See Figure 2).
4. While looking through the eyepiece, slowly turn the eyecap in a clockwise direction until the cross is in the sharpest focus (Figure 3). Do not turn the eyecap back and forth to focus the cross. This tends to stimulate accommodation and may result in erroneous readings.
5. When the cross is at its sharpest focus, note the reading on the outer edge of the eyecap.
6. Repeat Steps 3, 4 and 5 several times. If the results are approximately the same each time, the eyepiece is adjusted for your eye.

The calibrated scale on the outer edge of the eyecap is for the operator's convenience. After the eyepiece is correctly adjusted for the operator, the setting should be recorded for future reference. The next time he uses the instrument, the eyecap should be reset.

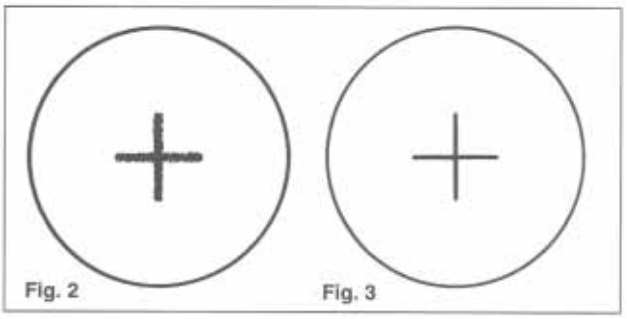

Fig. 2 Fig. 3

PATIENT ORIENTATION

1. Seat the patient comfortably before the instrument. The chin should fit snugly into the chin rest (11). It is important that the patient hold his head firmly against the head rest during the examination.
2. Instruct the patient to grasp the horizontal arm of the instrument, thereby providing a better support while proper fixation is being maintained.

For the patient with an extremely receding forehead or with deep set eyes and a protruding forehead, it may be necessary to adjust the patient's forehead or chin. The adjustment on the Keratometer body is sufficient to take care of most types of patients.

INSTRUMENT ORIENTATION

1. Grasp the rotating grip (3), and rotate the instrument body to allow the axial scale to read exactly 90° and 180° at the axis marks.
2. Release locking knob (8) and swing the tube of the instrument to one side.
3. Raise or lower the instrument with the elevating knob (10) until the leveling sight pin (12) on the side of the lamphouse and the white axis marker are aligned with the patient's pupil, or with his outer canthus.

   For greater accuracy in axis specification, turn the instrument in the direction of the other eye, and make the same adjustment. If the patient's head is not held in the proper vertical position, it will not be possible to line up both pupils or canthi at the same level. When the correct position has been established, be sure the patient's head remains in position while the readings are being made. The corneal axis measurement is based on the 0-180° imaginary line connecting the outer canthi or pupil centers of the two eyes.

Another method of adjustment is to elevate the instrument until the small, black, circular shadow, caused by the aperture in the target, falls on the bridge of the nose at the level of the inner canthi, then swing the instrument to the right or left, depending upon which eye is to be examined first.

4. Cover the eye not under examination with the occluder (14).

PATIENT FIXATION

After the patient has been properly oriented:

1. Turn the instrument to point directly at the eye to be examined.
2. Looking from the side, you will see a tiny, bright ring in the center of the cornea (the corneal image of the circular mire).

With the correct position established, the patient sees a green fixation target in the tube of the instrument. Instruct the patient to fixate on the green light.

FOCUSING THE INSTRUMENT

1. Looking through the eyepiece, the operator will see the images of the target mire, perhaps very blurred.
2. To clear these images, use focusing knob (7).
3. Place the black cross near the center of the double circle (Fig. 4) by swiveling the instrument slightly and making fine adjustments of the elevating knob. (This doubled circle is called the focusing circle).
4. Lock the instrument with the locking knob, and the corneal surfaces are ready to be measured.

It is important that the cross in the eyepiece be near the center of the focusing circle. At this point, the optic axis of the instrument will coincide with the visual axis of the patient's eye. At the same time, the image of the patient's eye will be directly before him. These conditions constitute the "triple alignment." In the Reichert Keratometer, the focusing does not depend solely upon the apparent sharpness of the target image, but is accomplished more precisely by coincidence of overlapped focusing circles, appearing single. When the instrument is out of focus, the central focusing circle and the plus and minus signs are doubled, as shown in Fig. 4. But when the exact focus is located, (by turning the focusing knob) the focusing circle will appear single and sharp, as illustrated in Fig. 5 or 6.

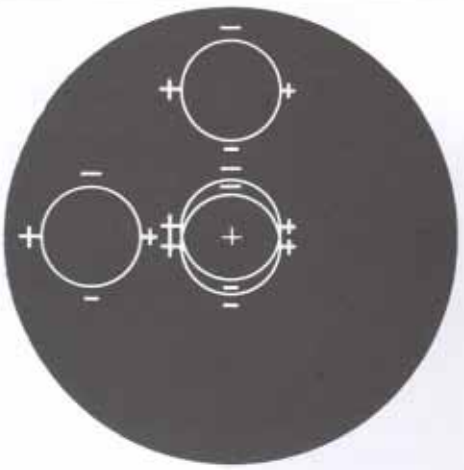

Figure 4

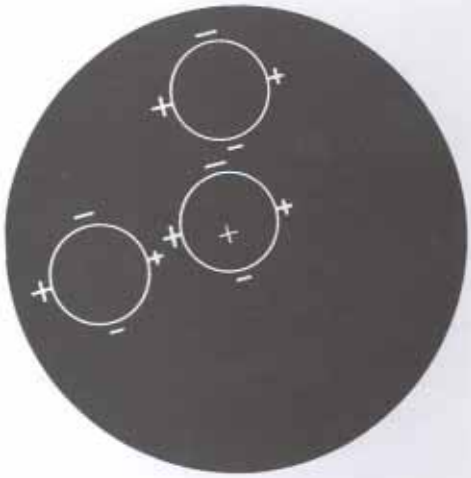

Figure 5

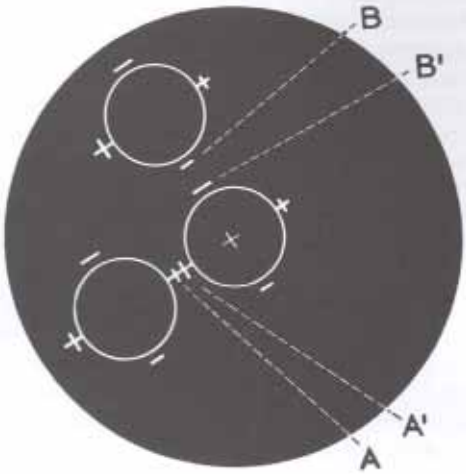

Figure 6

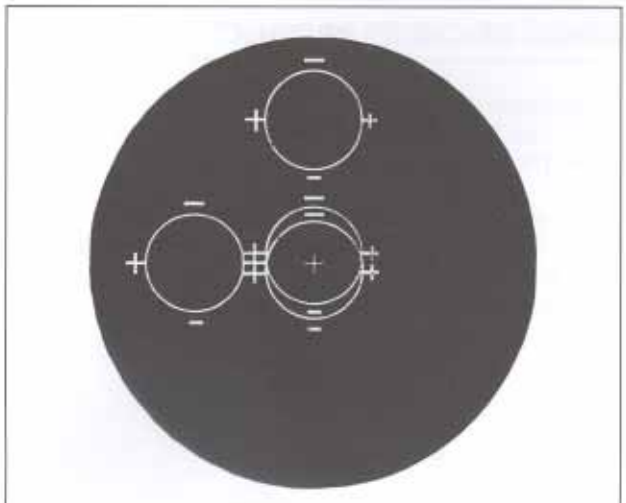

Figure 7

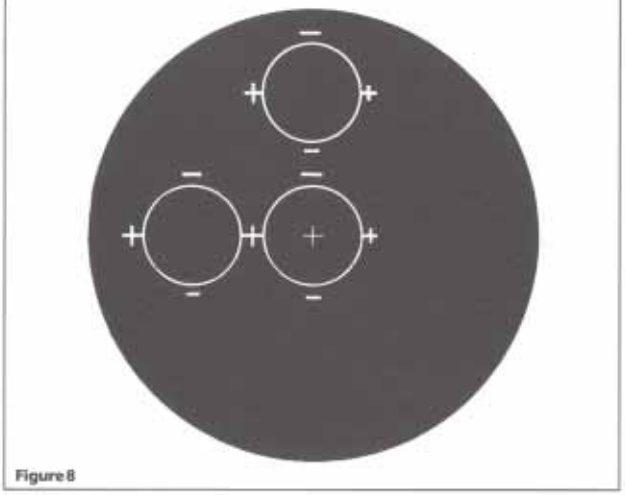

Figure 8

It should be noted that with an astigmatic eye, all of the central focusing circle will not appear exactly in focus at the same time. Therefore, for greater accuracy, direct attention to the doubled plus sign and focus it sharply. The focus of the minus sign is disregarded until later.

LOCATING THE CYLINDER AXIS

Two plus signs, A and A', (Fig. 6), will be seen between the left-hand and central focusing circles in the instrument. The axis of the cylinder can be found easily when the tips of these plus signs just touch, as shown in this figure.

1. Turn the horizontal measuring drum until the plus signs are barely separated, as in Fig. 5 or 6. If the horizontal lines of the plus sign appear to be continuous and unbroken, as in Fig. 6, the instrument is set at the position of the axis of the astigmatism. If the horizontal lines appear discontinuous, as shown in Fig. 5, the Keratometer is not at the cylinder axis.
2. Grasp the Keratometer at the rotating grip (3), and rotate the entire tube while looking into the eyepiece. Using a somewhat trial and error approach, a position is reached at which the horizontal lines of the plus signs will appear continuous and unbroken, as shown in Fig. 6.

A further check on the accurate location of the axis may be obtained by throwing the instrument slightly out of focus with the focusing knob (7). Then the plus sign of the central focusing circle will be doubled (Fig. 7). If the axis is correct, the horizontal line in the plus sign of the left circle will be exactly midway between the double horizontal line of the other plus sign as shown.

If it is not at the midpoint, a slight rotation of the instrument one way or the other using the rotating grip (3) will move the line to the midpoint. The double plus should next be focused, becoming single. The two horizontal lines then become continuous. This extra check on the corneal axis is particularly valuable in low astigmatic errors. When these horizontal white lines of the plus signs appear tip to tip and continuous, as shown in Fig. 6, the Keratometer is set to indicate the axis of astigmatism.

MEASURING THE HORIZONTAL PRINCIPAL MERIDIAN

After the axis has been established:

1. Turn the horizontal measuring drum (6), and the left-hand plus sign will move to the right or left.
2. Move this plus sign until it is exactly superimposed on the plus sign of the central focusing circle, as shown in Fig. 8. This completes the setting for the near horizontal meridian.

The scale of the left-hand or horizontal measuring drum indicates the actual dioptric power of the cornea in the horizontal or near-horizontal meridian. The drum may be left at this position during the rest of the procedure.

MEASURING THE VERTICAL MERIDIAN

When the horizontal meridian is found with an astigmatic cornea, the minus signs above and below the center circle will be doubled. They must now be made single by rotating the

instrument's focusing knob (7). This brings the vertical meridian into proper focus.

To measure the curvature in the vertical meridian:

1. Turn the right-hand vertical measuring drum (5) until the short minus sign B and the longer minus sign B^1 (Fig. 6) are superimposed. The scale on the right-hand drum then indicates the actual dioptric power of the corneal curvature in the vertical or near-vertical meridian.

Remember that if the cornea is astigmatic, it is impossible to get both principal meridians in focus at one time.

Note: While measuring with either drum, the other hand should constantly be on the focusing knob to keep the meridian being measured in sharp focus. This permits the operator to keep the mire being viewed a constant distance from the cornea, in spite of the small movements which every eye constantly makes. Unless the object distance is a fixed one, the measurements of the image size may be erroneous. The operator should continually take advantage of the critical focus capabilities provided by the Keratometer.

CORNEAL ASTIGMATISM

On the left or horizontal measuring drum (6), the power is established for the cornea in the meridians nearest to 0-180°. On the right, or vertical measuring drum (5), the power is established for the cornea in the meridian nearest to 90°. The difference between these two readings is the amount of corneal astigmatism in the eye under examination. If they are the same, there is no measurable corneal astigmatism.

AXIS OF ASTIGMATISM

The meridian indicators of the Keratometer tube are white lines (1) on the instrument body facing the operator. The horizontal marks on each side indicate the meridian measured on the horizontal drum. The vertical mark on top indicates the meridian measured on the vertical drum. If the astigmatism is to be corrected in a minus cylinder form, take for its axis the mark representing the drum having the lower dioptric reading. If the astigmatism is to be corrected in a plus cylinder form, use the axis mark representing the drum having the higher dioptric reading. The Keratometer axis will usually corroborate that found with a retinoscope.

OTHER REICHERT PRODUCTS

To complement your Reichert Keratometer, we invite you to take a look at the other products* made by Reichert Ophthalmic Instruments:

CTEST Contrast Sensitivity Test
EYECHEK KM Integrated Logic Keratometer
LENSCHEK Advanced Logic Lensometer
LongLife Project-O-Chart
Non-Contact II Tonometer (NCT II)
Selectra Project-O-Chart
Ultramatic RxMaster Phoroptor Refracting Instrument
XCEL Slit Lamps
XPERT NCT *PLUS* Advanced Logic Tonometer

*See Reichert Brand Names/Trademarks/Tradenames for a list of trademarked names.

NOTES

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