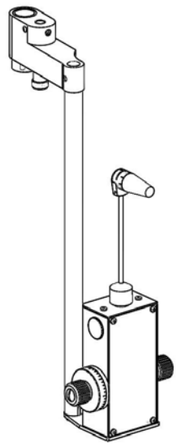
T170R Applanation Tonometer

User Manual



version： 1.0

20140210

serial number：2013-08-007

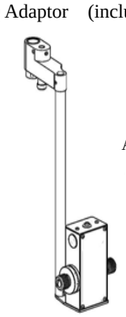
Acknowledgment

Many thanks you for making the decision of purchasing our products known as the best price-performance and almost trouble-free products in the global market of Ophthalmic Instrument and Vision Machinery!

For having the smooth and pleasant experience in using our products, it is recommended to read the User Manual first after unpacking.

Packing list

1, Applanation Tonometer (including Mounting Rod)
2, User Manual
3, Accessory Box (including Prism Arm x1, Prism x 3, Weight Seat x 1, Counterweight x 3)
4, Mounting Adaptor (including Mounting Screw x 1)



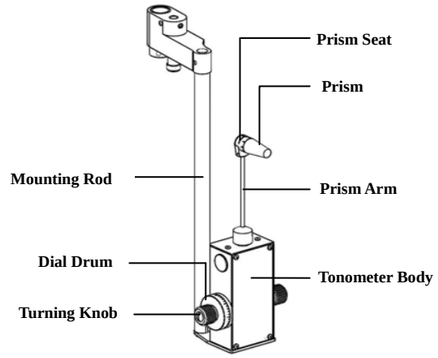
Applanation Tonometer

Accessory Box

User Manual

Mounting Adapter

Structure and Specification

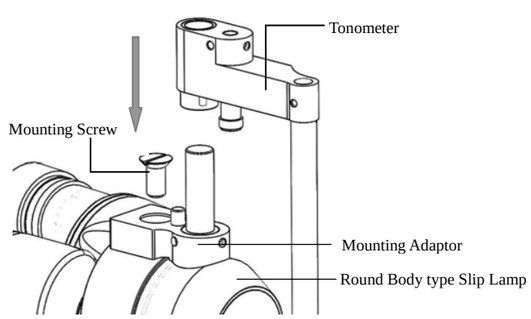


Range of Measurement:	0 mmHg ~ 80mmHg (0 kPa ~ 10.64kPa)
Moving Range of the Rings：	1.53×2＝3.06mm。
Prism Diameter：	7mm。
Moving Range of Prism：	0 ~ 3mm。
Dimension：	190mm×80mm×80mm。
Net Weight：	480g。
Working Temperature：	0℃～40℃ / 32℉～104℉。
Working Relative Humidity：	10%～85%。
Storage Temperature：	0℃～55℃ / 32℉～131℉。
Storage Relative Humidity:	10%～95%。

Installation

Mounting the Tonometer onto the Slit lamp

Shown as below:



The Mounting Adapter provided in the packing is for the Slit Lamp with the round body only. (shown as above).

When coming across any problem with the Mounting Adapter, please contact your service or supplier.

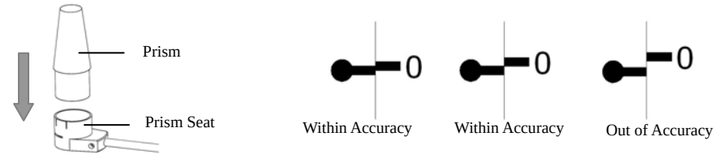
The Tonometer can also stay mounted on the Slit Lamp when not in use.

Accuracy Test

To ensure the reliability of the measurement, the test on the accuracy of the Tonometer is necessary at the first time when the Tonometer is to be used. The Accuracy Test should also be carried out regularly after that.

Test on position “ 0 ” with the Prism on

1, Lay the Tonometer on a flat and firm surface with the Prism pointing upwards.
2, Set the Dial Drum at the number “0”.
3, Turn the Knob till the Prism Arm stays freely between the two extreme positions.
4, If the scale line "0" is out of contact with the Basic Line, the tonometer is out of accuracy, shown as below:



Test on position “ 2 ” with the Counterweight Seat on

1, Replace the Prism with the Counterweight Seat.
2, Set the Dial Drum at the number “ 2 ”.
3, Turn the Knob till the Prism Arm stays freely between the two extreme positions.
4, If the scale line "2" is out of contact with the Basic Line, the tonometer is out of accuracy, shown as below:

Test on position “ 4 ” with 1 Counterweight on

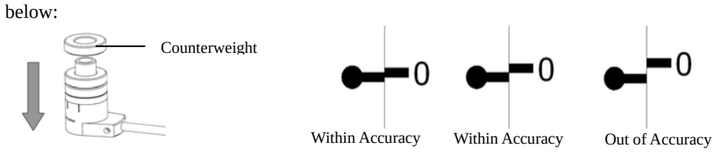
1, Put one Counterweight in the Seat of the Counterweight.
2, Set the Dial Drum at the number “ 4 ”.
3, Turn the Knob till the Prism Arm stays freely between the two extreme positions.
4, If the scale line "4" is out of contact with the Basic Line, the tonometer is out of accuracy, shown as below:

Test on position “ 6 ” with 2 Counterweights on

1, Keep 2 Counterweights in the Seat of the Counterweight.
2, Set the Dial Drum at the number “ 6 ”.
3, Turn the Knob till the Prism Arm stays freely between the two extreme positions.
4, If the scale line "6" is out of contact with the Basic Line, the tonometer is out of accuracy, shown as below:

Test on position “ 0” with 3 Counterweights on

1, Keep 3 Counterweights in the Seat of the Counterweight.
2, Set the Dial Drum at the number “ 0 ”.
3, Turn the Knob till the Prism Arm stays freely between the two extreme positions.
4, If the scale line "0" is out of contact with the Basic Line, the tonometer is out of accuracy, shown as below:



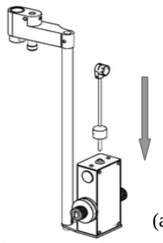
The Tonometer out of accuracy should be sent back to MediWorks for calibration.

Caution: Any unauthorized attempt of calibration may cause the permanent damage to the Tonometer.

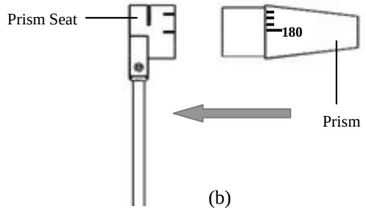
Measurement

Preparation of the equipment

1, Install the Prism Arm onto the Tonometer, shown as (a);
2, Insert the Prism gently into the Prism Seat, shown as (b);



(a)



(b)

3, Clean the prism with 1:32000 solution of Phenylmercuric Borate or other organic glass friendly cleaning solution. Dry it up with cotton ball afterward;

4, Mount the Tonometer onto the Slit Lamp. For the patient who has Astigmatism, it is necessary to adjust the axis of the prism accordingly. For the detail please read the chapter " Astigmatism ";

5, Set the number of the Dial Drum at " **1** ";

6, Adjust the the eyepieces of the Slit Lamp Microscope to get it focused;

7, Position the illumination of the Slit Lamp and the Microscope in 40~60° angle to properly light up the Prism;

8, Open the slit light to the maximum into a round spot.;

9, Switch the filter to the Cobalt Blue;

10, Set the magnification at 10 x.

Caution: The direct contact to the surface of the Prism with the finger or any kind of hard material may cause the scratch on it.

Preparation of the patient

1, Both eyes must always be anesthetized to stop the movement of the eye lids during the measurement. For example 2-3 drops of 0.2% novesin or other anesthetic into each of the patient eyes. Repeat it every 1 - 2 minutes for 2 - 3 times.

2, Place a fluorescein paper strip near the external canthus in the lower conjunctival sac for 2 - 3 seconds till the lacrimal fluid is properly colored.

3, Or using eye drop solution of sodium fluorescein 0.25 % to 0.5 % .

4, Position the head of the patient on the chin rest.

5, When the patient has problem of keeping the eyes open during the measurement, the fingers could be used to assist, on the condition of without extra pressure on the eyeball.

Procedure of Measurement

1, Right before the start of the measurement instruct the patient to blink the eyes for a couple of times to moisten the cornea with the lacrimal fluid and the fluorescein.

2, Move the Slit Lamp gently forward till the surface of the prism contact the center part of the cornea of the patient.

3, Observe the cornea through the left side eyepiece of the microscope (for R type of MediWorks Tonometer).
Adjust the microscope till the two bluish Half-Rings are focused.
(The Dial Drum is set at " **1** ") (Figure 1).

Figure 1

Figure 2

4, Turn the Dial Drum slowly to add the pressure onto the cornea till the inner edges of the two Half-Rings meet. (Figure 2).

5, Read the number on the Dial Drum.
For the mmHg value or kPa value of the Intraocular Pressure please check the Conversion Table below against the read out from the measurement.

mmHg/kPa Value Conversion Table

Read out	mmHg value	kPa value
1	10	1.33
2	20	2.66
3	30	3.99
4	40	5.32
5	50	6.65
6	60	7.98
7	70	9.31
0	80	10.64

6, Reset the Dial Drum at " **1** " for the next measurement.

7, Repeat the measuring process above for 3 times on each patient. If the results are similar, the measurement is reliable.

8, Clean the Prism with 3% Hydrogen Peroxide or 1:5000 Chlorhexidine solution and dry it up with cotton ball after the measurement.

How to solve the Problems in Measurement

Problem : The fluorescein rings are too fat (Figure 3)
Cause: The prism was not properly dried up after cleaning, or the eyelids touched the prism while measuring.
Solution: Pull the Slit Lamp back to withdraw the prism. Dry up the prism properly with a cotton ball and try again.

Figure 3

**P: The fluorescein rings are too thin (** Figure 4)
C: The cornea was in lack of lacrimal fluid.
S: Pull the Slit Lamp back to withdraw the prism. Let the patient blink the eyes for a couple of times before trying again.

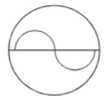


Figure 4

P: The fluorescein rings are too large(Figure 5)
C: The Slit Lamp and the Tonometer were too close to the cornea.
S: Pull the Slit Lamp and the Tonometer back into the correct position.

Figure 5

P: The lower Half-Ring looks larger than the upper one(Figure 6)
C: The cornea is too low in position.
S: Raise the position of the cornea or lower the the position of the Prism.

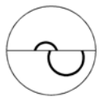


Figure 6

P: The fluorescein ring appears on the left side(Figure 7)
S: Move the Slit Lamp and the Tonometer leftwards.

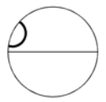


Figure 7

P:The rings are completely in the upper half(Figure 8)
S: Move the Slit Lamp and the Tonometer upwards.

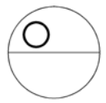


Figure 8

P: The rings are on the right side (Figure 9)
S: Move the Slit Lamp and the Tonometer rightwards.

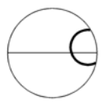


Figure 9

P: The outer edges of the rings touch each other(Figure 10)
S: Increase the pressure till the inner edges of the rings meet.

Figure 10

P: The ends of the rings coincide to form a continued line (Figure 11)
S: Increase the pressure till the inner edges of the rings meet.

Figure 11

P: The inner edges of the rings miss each other (Figure 12)
S: Decrease the pressure till the inner edges of the rings meet.

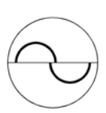


Figure 12

Astigmatism

If the cornea is spherical, measurements can be made on any meridian. It is most convenient to do it on the 0° meridian.
This is not so when eyes with higher corneal astigmatism than 3 dioptres are examined, as the flattened areas are not circular but elliptic.
It has been calculated that, in cases of larger corneal astigmatisms, a surface of 7.354 mm2 (ø 3.06 mm) is to be applanated, when the measuring prism is at an angle of 43° to the meridian of the greatest radius.
For example, if the corneal astigmatism amounts to
6.5 mm / 30° = 52.0 D / 30° and
8.5 mm / 120° = 40.0 D / 120°
the graduation value 120° of the prism is set at the red 43° mark of the prism holder.
If there is a corneal astigmatism of
8.5 mm / 30° = 40.0 D / 30° and
6.5 mm / 120° = 52.0 D / 120°
the graduation value 30° is set at the red 43° mark.
In other words, set the axial position of the greatest radius, that is the axis of a minus cylinder, on the prism graduation at the **red mark** on the prism holder.

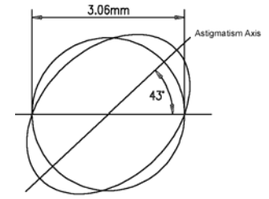


Figure 13

Tips for the Measurement

The result of the measurement could be affected if the patient drinks coffee, alcohol or too much water before the measurement. Body tension, holding breath or a tight collar of the patient could also affect the measurement result.
Different anaesthetics may also affect the result of the measurement. It is recommended to use 0.2% Novesine or 0.5%-1% teracainum or 0.2% Dorsacaine
The value of first time measurement could be higher than the second time because of the tension of the patient.
When measuring procedure is correctly carried out, the differences of the results in a run of measurement on a patient should be within ± 0.5 mm Hg.
When the differences are within 1 mmHg value, take the average one.
During the measuring process, keep the eyelids and eyelashes of the patient out of contact with the Prism.
A measurement should be completed within 30 seconds to avoid coloration of the cornea.
Too frequent measurement in one run on one eye may result with the lower measurement value. It is recommended to measure both eyes alternately.
During the measurement the patient should focus on an object 5 meter away.
The head of the patient should be kept still during the measurement.
3-5 minutes interval is necessary when switching among the different Tonometers during a measurement on a patient.

Maintenance

Before the measurement
Clean the prism with 1:32000 solution of Phenylmercuric Borate or other organic glass friendly cleaning solution. Dry it up with the cotton ball afterward.
After the measurement
Clean the prism with 3% Hydrogen Peroxide or 1:5000 Chlorhexidine solution after the measurement. Dry it up with cotton ball before putting it back into the accessory box.