



# User`s Manual

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## Auto Tonometer HNT-7000



**Huvitz**  
*Pacing Progress toward People*

## IMPORTANT NOTICE

This product may malfunction due to electromagnetic waves caused by portable personal telephones, transceivers, radio-controlled toys, etc. Be sure to avoid having objects such as, which affect this product, brought near the product.

The information in this publication has been carefully checked and is believed to be entirely accurate at the time of publication. HUVITZ assumes no responsibility, however, for possible errors or omissions, or for any consequences resulting from the use of the information contained herein.

HUVITZ reserves the right to make changes in its products or product specifications at any time and without prior notice, and is not required to update this documentation to reflect such changes..

Ver 1.0

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## Contents

<b>1.</b>	<b>Introduction.....</b>	<b>6</b>
1.1.	Overview .....	6
1.2.	Classificaiton .....	6
<b>2.</b>	<b>Safety Information.....</b>	<b>7</b>
2.1.	Overview .....	7
2.2.	Safety Symbol .....	8
2.3.	Environmental Considerations .....	9
2.4.	Safety Precaution .....	11
<b>3.</b>	<b>Charateristics.....</b>	<b>13</b>
<b>4.</b>	<b>Note for Use .....</b>	<b>14</b>
<b>5.</b>	<b>Names and functions of each part.....</b>	<b>15</b>
5.1.	Main parts .....	15
5.2.	Explanation Switches in Front.....	18
<b>6.</b>	<b>Installation of Equipment &amp; Preparation of Measurement .....</b>	<b>19</b>
<b>7.</b>	<b>Measurement .....</b>	<b>21</b>
7.1.	Tonometry Measurement .....	21
7.2.	Manual Measurement Mode .....	23
7.3.	Auto Measurement Mode .....	30
<b>8.</b>	<b>Other Modes.....</b>	<b>34</b>
8.1.	Compensation mode of Cornea Thickness .....	34

## **4    NonContact Tonometer HNT-7000 -----**

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8.1.1	Composition of Window .....	34
8.1.2	DISPLAY Mode .....	35
8.2.	User SETUP Mode .....	36
8.3.	Power saving Mode .....	41
8.4.	Before calling for serviceman .....	41
8.4.1	Self diagnosis & Maintenance .....	41
8.5.	Replacement .....	44
8.5.1	Printer paper .....	44
8.5.2	Chinrest paper .....	45
8.5.3	Replacing Fuse .....	45
8.6.	Cleaning Equipment .....	46
8.7.	As changing the installation place of the equipment .....	46
<b>9.</b>	<b>Service Information.....</b>	<b>47</b>
<b>10.</b>	<b>EMC Information .....</b>	<b>48</b>
10.1.	Guidance and manufacturer's declaration – electromagnetic emissions.....	48
10.2.	Guidance and manufacturer's declaration – electromagnetic immunity .....	49
10.3.	Guidance and manufacturer's declaration – electromagnetic immunity .....	51
10.4.	Recommended separation distances between portable and mobile RF communications equipment and the EUT .....	53
10.5.	Immunity and Compliance Level .....	54
10.6.	Guidance and manufacturer's declaration – electromagnetic immunity .....	55

11. Main Specifications .....57

12. Accessories .....58

## 1. Introduction

### 1.1 Overview

Auto Non Contact Tonometer HNT-7000 is the equipment to provide. The information of examinee's Intraocular pressure.

Auto Non contact Tonometer HNT-7000 measured intraocular pressure of both eye by Full-Auto button.

In particular, when a lot of lights are sensed the moment that compressed air is separated, prescription about glaucoma is possible by system that convert time to mmHg intraocular pressure after measure microseconds.

Automatic and passivity compensation function of measurement by cornea thickness are possible. It supply optimum intraocular pressure information.

### 1.2 Classification

Classification of product : **2<sup>nd</sup> Grade Medical Instrument**

Resistance against electric shock : Class I (earthed)

Protection class against electric : Type B

## 2. Safety Information

### 2.1 Overview

Safety is everyone's responsibility. The safe use of this equipment is largely dependent upon the installer, user, operator, and maintainer. It is imperative that personnel study and become familiar with this entire manual before attempting to install use, clean, service or adjust this equipment and any associated accessories. It is paramount that the instructions contained in this manual are fully understood and followed to enhance safety to the patient and the user/operator. It is for this reason that the following safety notices have been placed appropriately within the text of this manual to highlight safety related information or information requiring special emphasis. All users, operators, and maintainers must be familiar with and pay particular attention to all Warnings and Cautions incorporated herein.



#### **WARNING**

“Warning” indicates the presence of a hazard that could result in severe personal injury, death or substantial property damage if ignored.

#### **NOTE**

“Note” describes information for the installation, operation, or maintenance of which is important but hazard related if ignored.



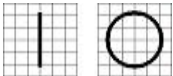

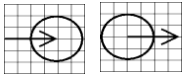




#### **CAUTION**

“Caution” indicates the presence of a hazard that could result in minor injury, or property damaged if ignored.





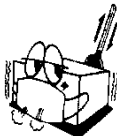
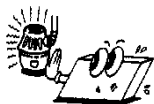
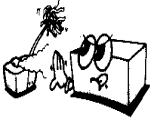
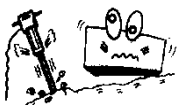
## 2.2 Safety Symbol




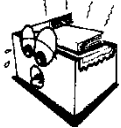


The International Electrotechnical Commission (IEC) has established a set of symbols for medical electronic equipment which classify a connection or warn of any potential hazards. The classifications and symbols are shown below.

	I and O on power switch represent ON and OFF respectively.
	Type B Isolated patient connection.
	It indicates the connection of signal input/output.
	This symbol identifies a safety note. Ensure you understand the function of this control before using it. Control function is described in the appropriate User's or Service Manual.
	It indicates the year of manufacture and the manufacturer.
	Hot surface.
	Identifies the point where the system safety ground is fastened to the chassis. Protective earth connected to conductive parts of Class I equipment for safety purposes.

## 2.3 Environmental Considerations

Please avoid the environment below for the operation and storage of the equipment.

	<p>Where the equipment is exposed to water vapor. Don't operate the equipment with wet hands.</p>
	<p>Where the machine is exposed directly to the sunlight.</p>
	<p>Where the temperature changes frequently (Normal temperature for operation of the machine is at the range of 10°C ~ 35°C, and the humidity is at the range of 30%~70%.</p>
	<p>Where any heaters are at the close distance to the machine.</p>
	<p>Where the humidity is high and there are problems to the heat dissipation and/or ventilation.</p>
	<p>Where the equipment is subject to excessive shocks or Vibrations.</p>

	Where the machine can be exposed to the chemical or flammable substances.
	Please keep the equipment out of dust and do not let inserted any metal parts such as coins, clips, etc.
	Do not disassemble or open the machine. The manufacture shall have no responsibility for any problems caused by these.
	Do not close the thermal ventilation outlet.
	Do not connect the AC power plug into the outlet while not putting the parts of machine together completely. It can harm the equipment.
	Do not pull the plug out of outlet while holding the cord.

For the normal operation of the machine, please keep the ambient temperature is  $10^{\circ}\text{C}$  ~  $35^{\circ}\text{C}$ , humidity is 30% ~ 75% and atmospheric pressure is 800 ~ 1060hpa. For the Transportation of the machine, please keep the ambient temperature is  $-40^{\circ}\text{C}$  ~  $70^{\circ}\text{C}$ , humidity is 10% ~ 95% and atmospheric pressure is 500 ~ 1060hpa. For the Storage of the machine, please keep the ambient temperature is  $-10^{\circ}\text{C}$  ~  $55^{\circ}\text{C}$ , humidity is 30% ~ 75% and and atmospheric pressure is 700 ~ 1060hpa. Avoid environments where the equipment is exposed to excessive shocks or vibrations.

## 2.4 Safety Precaution

This equipment has been developed and tested in conformity with domestic & international safety standards and regulations, which guarantees the high stability of this product. This guarantees a very high degree of safety for this device. The legislator expects us to inform the user expressively about the safety aspects in dealing with the device. The correct handling of this equipment is imperative for its safe operation. Therefore, please read carefully all instructions before switching on this device. For more detailed information, please contact our Customer Service Department or one of our authorized representatives.

1. This equipment must not be used (a) in an area that is in danger of explosions and (b) in the presence of flammable, explosive, or volatile solvent such as alcohol, benzene or similar chemicals.
2. The device should neither be kept nor installed in the place with high humidity. For the optimal operation, the humidity should be at the range of 30%~75%. The machine should not be exposed to the place where water splashes, drips or sprays. Do not place containers containing fluids, liquids, or gases on top of any electrical equipment or devices
3. The equipment must be operated only by, or under direct supervision of properly trained and qualified person/s.
4. Modifications of this equipment may only be carried out by Huvitz's service technicians or other authorized persons.
5. Customer maintenance of this equipment may only be performed as stated in the User's Manual and Service Manual. Any additional maintenance may only be performed by Huvitz's service technicians or other authorized persons.
6. The manufacturer is only responsible for effects on safety, reliability, and performance of this equipment when the following requirements are fulfilled: (1) The electrical installation in the respective room corresponds to the specifications stated in this manual and (2) This equipment is used, operated and maintained according to this manual and Service Manual.

7. The manufacturer is not liable for damage caused by unauthorized tampering with the device(s). Such tampering will forfeit any rights to claim under warranty.
8. The equipment may only be used together with accessories supplied by Huvitz's. If the customer makes use of other accessories, use them only if there are usability under technical safety aspects has been proved and confirmed by Huvitz or the manufacturer of the accessory.
9. Only persons who have undergone proper training and instructions are authorized to install, use, operate, and maintain this equipment.
10. User's manual or service manual should be kept in the place where the persons in charge of operation and maintenance can access easily any time.
11. Do not force cable connections. If a cable does not connect easily, be sure that the connector (plug) is appropriate for the receptacle (socket). If you cause any damage to a cable connector(s) or receptacle(s), let the damage(s) be repaired by an authorized service technician.
12. Please do not pull on any cable. Always hold on to the plug when disconnecting cables.
13. This equipment may be used for the international application related to Tonometry according to this manual.
14. Before every operation, proceed with visual inspection on the equipment exterior to seek any mechanical damage(s) to ensure the proper functioning.
15. Do not obstruct any ventilation outlet for proper heat dissipation.
16. In case of any presence of smoke, spark or abnormal noise/smell from the machine, please power off immediately and pull out the plug.

### 3. Characteristics

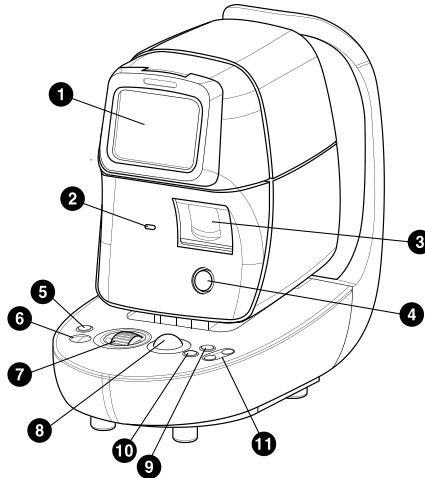
1. Distance between eye and device are established automatically to measurement position. ( Working Distance : 11mm)
2. Patient's intraocular pressure of left/right eye automatically if press button once.
3. The peak of the air pressure is automatically controlled within the range of 0 to 60 mmHg.
4. Air pressure by pressure of patient's eye in controlled suitable.
5. Confirm data amount and detection comparison between reference pressure and data.
6. Reduce error compensating measurement according to patient's cornea thickness.

## 4. Note for Use

1. Do not hit or drop the instrument. The instrument may be damaged by the strong impact. The impact may damage the function of this instrument. Handle it with care.
2. The precision of measurement can be affected when the machine is exposed to the direct sunlight or too bright indoor illumination. It is recommended to perform the measurement in the dark optometry room.
3. If you want to use it as connecting the device to other equipment, please follow the guidance of our local representative.
4. Sudden heating of the room in cold areas will cause condensation of vapor on the protective glass in the measurement window and on nozzle parts inside the instrument. In this case, wait until condensation disappears before performing measurements.
5. Make sure to keep the window in examinee side is clean at all times. In case that it has become dirty by dusts or other substances, it can cause errors in the machine or affect the precision of measurement.
6. In case of any presence of smoke, smell or noise during the use of machine, please contact our local representative after plugging it off from the socket (outlet).
7. If you clean the surface of the equipment with organic solvents such as alcohol, thinner, benzene, etc, it can damage the machine. So, please do not use them.
8. In case of moving HNT-7000, carry it holding the lower part of machine body with both hands as fixing the stage after switching the machine off all the time.
9. In case of no use of the machine for a long time, please put the dust cover on the device after powering and plugging off.

## 5. Names and functions of each part

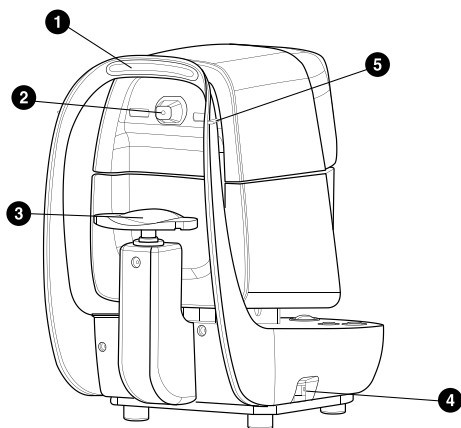
### 5.1 Main parts



[ Figure 1. Front Section ]

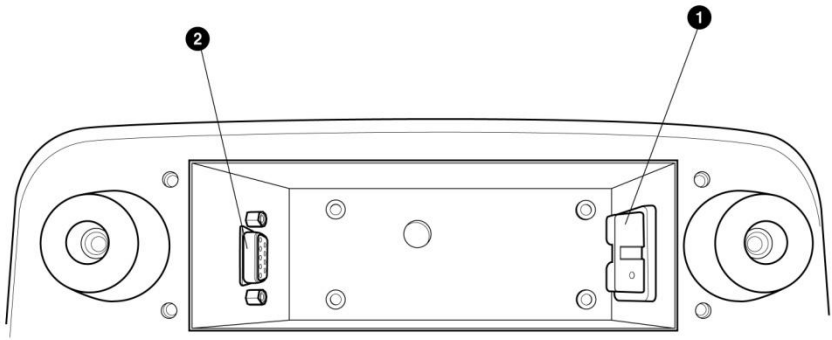
- 
1. **LCD TOUCH SCREEN** : Selectiong for measurement and function parts
  2. **Operatin Lamp** : Indicates whether or not the electric power is on
  3. **Printer** : Printing the measured results
  4. **SAFETY Button** : Safety distance establishment between patient and device
  5. **Printer Button** : A button for printing of measuring results.
  6. **START Button** : Performing the measurement by AT/MT/FT pressing if after focusing.
  7. **Scroll Wheel** : Adjusting the focus by moving the directions of forward/backward.
  8. **Ball Mouse** : Adjusting the focus by moving the directions of left/right, up and down.
  9. **R/L Button**: Adjusting the measured by patient`s eye of left/right
  10. **DEMO 버튼** : Button that discharge wind before measure. (Measurement explanation to patient)
  11. **Chin rest up/down(▲,▼)Button** : Move up or down the chinrest





[ Figure 2. Back Section ]

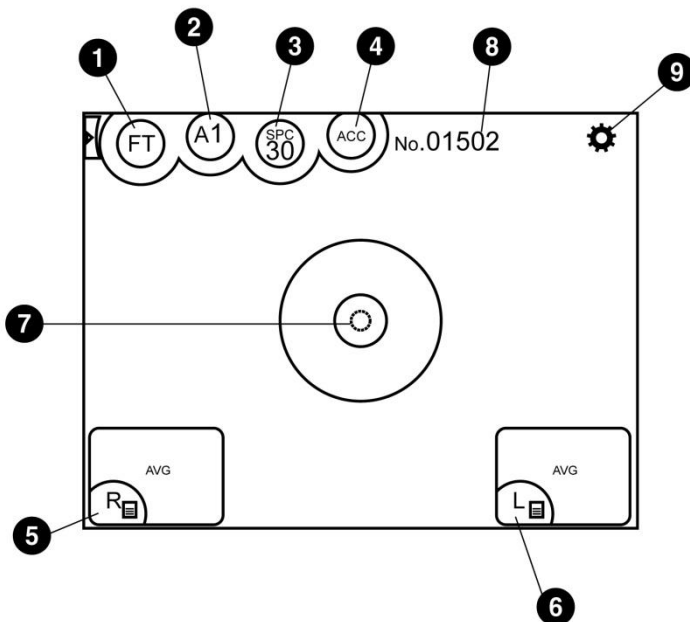
- 
1. **Forehead Rest** : Preventing the vibration by fixing the forehead.
  2. **Air Nozzle** : Measuring the intraocular pressure on eyes.
  3. **Chinrest** : Preventing the vibration by fixing the chin.
  4. **Power Switch** : Switch for power on/off
  5. **High Adjustment Mark** : Adjusts the eyes` height of examinees.



[ Figure 3. Bottom Section ]

- 
1. **Power Supply Socket** : A socket connecting to exterior power plug
  2. **Serial Interface Connector** : A terminal connecting to the exterior equipment.

## 5.2 Explanation Switches in Front



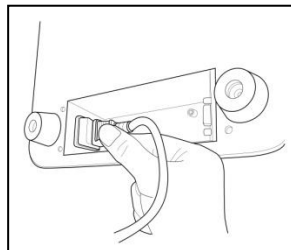
[Figure 4. Front Section Switches]

- Num 1** : A switch to change the mode for measurement (FT/AT/MT)
- Num 2** : A switch to change the Shooting mode for measurement (A1/A3)
- Num 3** : The selected measurement range is displayed (IOP30/IOP60/SPC30/SPC60)
- Num 4** : Thickness compensation function of cornea On/Off
- Num 5** : Right eye's measurement DATA
- Num 6** : Left eye's measurement DATA
- Num 7** : Used as a guide to position the patient's eye in the center of screen.
- Num 8** : Show the patient Measurement number (Counter)
- Num 9** : A switch to change the mode for Environment mode

## 6. Installation of Equipment & Preparation of Measurement

### 1. Connection of Power Cable

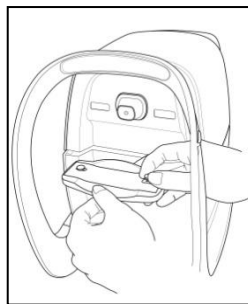
- Put HNT-7000 on the table.
- Insert the power cable into power connector. at the bottom of the main body.
- After checking that the power of the machine is off, insert the power plug into AC outlet (socket)



[ Figure 5. Connection of power cable ]

### 2. Inserting Chin Restpaper

- Pull out the pushing pins at left/right sides.
- Insert the pushing pins into the holes at left/right sides of the chin-rest paper.
- Stick the chin-rest paper inserted with the Pushing pins onto the chin-rest.



[ Figure 6. Inserting chin-rest paper ]

### 3. Installation of Printing Paper

Please refer to section 8.5.1 regarding the sequence of installation of Printing paper.

### 4. Input of Message

Input the contents desirable to be printed such as name or address of hospital, etc. in the memory of message editing monitor in advance at all times.

### 5. Check of Set up

As set up of patient counter, Auto Tracking, Auto Shooting , SPC mode, pressure measurement unit, ACC mode, Cornea thickness input, print mode, data, etc, please check them in SETUP mode. (refer to Section 8.2)

**6.    Transmission to Other Machines.**

In case of transmitting the measured results to other machines, prepare other machines while connecting the cable into the interface connector of this machine. You can select the transmitting speed in the user's SETUP mode. Please contact to the agent where you bought this machine for details..

## 7. Measurement



### WARNING

If the following situations happen, contact to the agents of Huvitz after immediately pushing the power switch off, and pulling the power cord out of AC Power connection part.

- In case that smoke comes, or strange smell or sound is heard from the equipment.
- In case that liquid is poured to the machine, or metallic substance is inputted into the equipment.
- In case that the equipment is fallen down, or the exterior case of it is broken

### NOTE

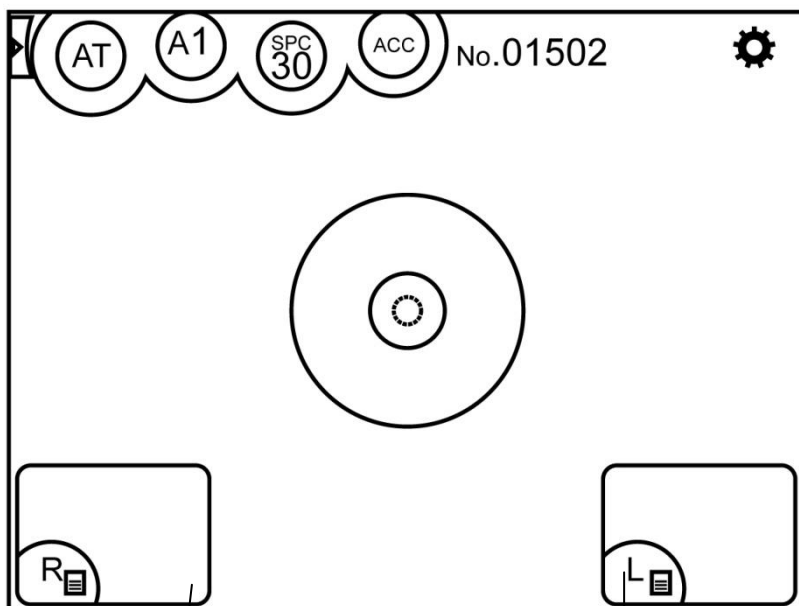
As the equipment does not operate for over 3 minutes while the power switch is at the state of “ON”, the power saving mode is to be performed. If you push any buttons in the power saving mode, it is changed to the mode of measurement preparation.

### 7.1 Tonometry Measurement

It is the mode to measure the intraocular pressure soley.

1. Let the power switch “on”

The measurement window as shown in the picture below appear on the screen of monitor as system check is completed..



Right eye DATA

[ Figure 7. Measure mode Screen ]

Left eye DATA

2. Check the measurement screen appeared on the monitor.

## NOTE

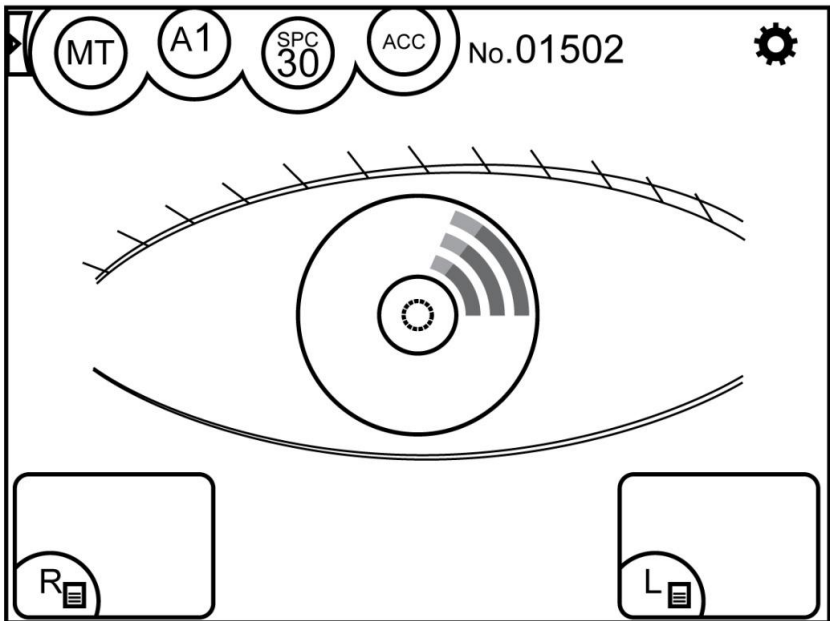
- If the measurement screen as shown in the above picture does not appear on the monitor screen, let the power switch “ON” again in 10 seconds after switching it off. If the measurement screen continues not to appear either, please contact to the agents of Huvitz.

3. Check the user Setup mode. (Refet to Section 8.2)

Check and select the diverse functions relating to measurement including intraocular pressure value or printing condition. Input the message wanted to be printed together with measurement data.

## 7.2 Manual Measurement Mode

As pushing FT button in the AUTO mode, it change to the manual measurement mode (MT). If you change “FT/AT” to “MT”, the auto measurement



[ Figure 8. Manual Mode Screen ]

- ① Adjustment of eye height.
- Let the examinee sit in front of the machine.



### CAUTION

- Make sure that the examinee should not put his or her hands or fingers under chin-rest. The hands or fingers can get injured.
- For the prevention of infection, cleanse the forehead-rest with a solvent such as ethanol for every different examinee.
- To keep it clean, change the chin rest paper for every different examinee.

- Let the patient sit comfortably by adjusting the table or chair or electric machine.
- Let the patient put his or her face on chinrest and his or forehead stick closely to the foreheadrest.
- Adjust the examinee's eye height to the height array indicator by rotating the height adjustment lever as shown in the picture.

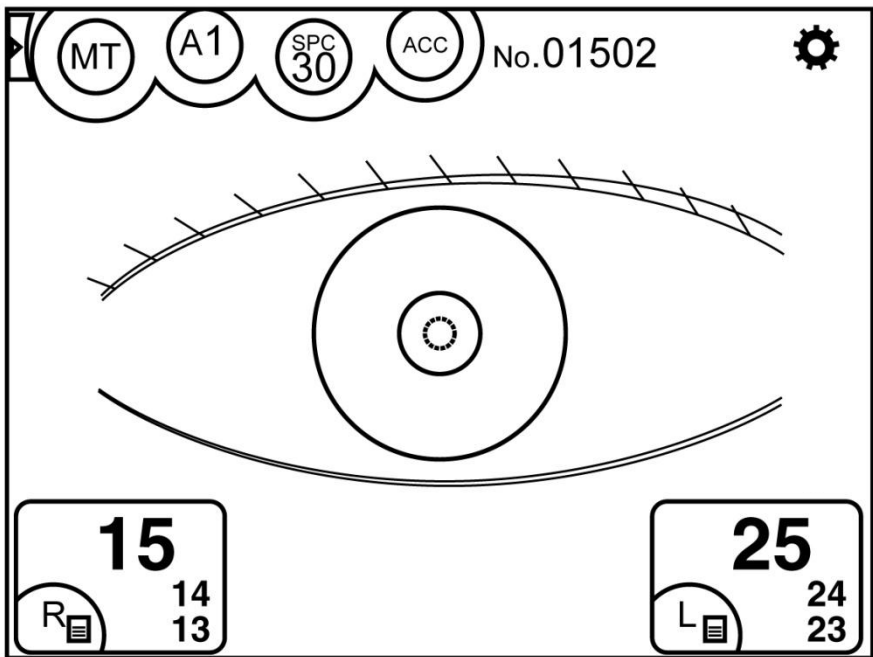
#### ② Adjustment of Measurement Position and Focus.

### CAUTION

Do not insert your hands or fingers between stage and base. Also, make sure that the examinee should not put his or her hands or fingers there. Hands or fingers can get injured.

- Pull body of equipment to the front of user by using scroll wheel.  
(Safety Button)
- Let the right side eye of examinee appear at the center of monitor screen by slowly pushing and rotating scroll wheel and ball mouse.  
At this time, let the glittering bright dot come into the core of internal array ring.
- Ask the examinee to look at internal fixed target (green led).
- Adjust the focus so that the outline of bright dot can be apparent. If the focus is adjusted appropriately, the circle symbol appears on the bright dot.

- Height Adjustment : Adjust it by rotating the operation ball mouse or chinrest button.
- Left/Right Adjustment : Move the operation ball mouse left and right so that outer alignment ring is aligned with the circle ring.
- Focus Adjustment : Adjust it to the bright dot by tilting the operation scroll wheel forward/backward.



[ Figure 9. Manual mode Measurement Screen ]

**NOTE**

- As the bright dot and pupil can not keep the same axis during the consecutive measurement, the error can be caused for measurement.

**③ Measurement**

- Push the START button.
- Used to choose among 1 times and 3 times and manual automatically in “Auto Shooting” mode in user SETUP mode and Measurement screen before measure.
- As the measurement is completed, the measured result is to be indicated on the screen of monitor.
- In case of the consecutive measurement, the result of the previous measurement is indicated.

**④ Repeated Measurement**

- Measure repeatedly if necessary.
- The latest measured value is to be indicated every time new measurement is performed.
- It shall memorize the measured values by 6 times for each left/right eye(except for error). It can be seen on the screen of DISPLAY mode.

**⑤ Measurement of Counter-side eye .**

- Measure the left-side eye by pushing the R/L button to the direction of right (Rotating the ball mouse)
- As measuring the left/right eyes, the value of intraocular pressure is to be indicated on the screen.

- Measurement has been performed 6 times, the number of data sets used for the averaging is displayed of the average data. (Right /Left eye).



[ Figure 10. Manual mode measurement data ]

⑥    **Print**

- Print the measured result by pushing the PRINT button.
- The contents selected in SETUP mode is to be printed.
- Cut the printing paper off from the end of it while lifting it.
- Put the name of examinee in the blank of NAME if necessary.

**NOTE**

- As it is printed, the values measured so far are to be removed.
- As a thermal printing record, the printed characters are easy to be faded away.  
     Please make it copied if you want to keep it for a long time.

Name:  
HUVITZ HNT-7000  
Ver 1.00.00

<R>        IOP  
            15  
-----  
AVG        15.8

<L>        IOP  
            16  
-----  
AVG        16.6

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[ Figure 11. Example of Print ]

### 7.3 Auto Measurement Mode

AS pushing MT button in Manual Measurement mode, it automatically change to the Auto measurement mode.(AT/FT)

AT mode : Auto tracking in the right and left up and down directions is activated.

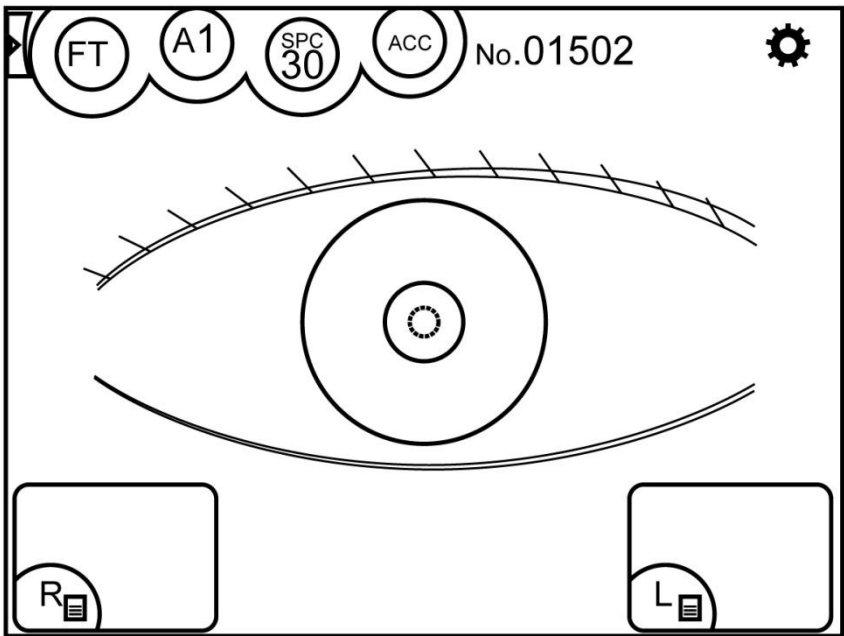
FT mode : Auto tracking in the forward and bawkward, right and left, up and down directions is activated.

As the condition of good array between the machine and the measured eye is reached, the measurement is to be performed automatically without pushing the STOP button.

- ① Perform the ①, ② procedure of manual measurement mode.
- ② Measurement
  - As the array and adjusting the focus is completed, the measurement is to be performed automatically.
  - After the measurement of times (1 times, 3 times or continuous measurement) designated in user Setup mode is performed, the measured result appear on the screen of monitor.
  - For each side of eyes-left and right, maximum of 6 units of data is to be stored, and you can re-check them in DISPLAY mode.



[ Figure 12. Auto Mode (AT/FT) Measurement data ]



[ Figure 13. Auto Mode (FT/AT) Measurement Screen ]

③ Measurement of Another Eye

- Measure the left eye according to the same procedure by moving the stage to the right side.
- As the measurement to both eyes is completed, the value of intraocular pressure is to be indicated automatically on the screen of monitor.

④ Print

- Push the PRINT button in case that the measurement is conducted to the one eye only.
- In case of selecting the condition of Print as "ON" in Setup mode the measured result is to be printed automatically as the measurement of both eyes is completed.



---

- The message selected in Setup mode is to be printed together with the measured data.

```
Name:
HUVITZ HNT-7000
Ver 1.00.00

<R>      IOP
          19
          18
          18
          18
          18
          18
          -----
AVG      18.9

<L>      IOP
          18
          18
          -----
AVG      18.7

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+82-31-442-8868
```

[ Figure 14. Example of Print ]

## 8 Other Modes

### 8.1 Compensation mode of Cornea Thickness

Cornea thickness compensation is mode to input cornea thickness to device and gets correct data to measure exactly patient's intraocular pressure.

#### 8.1.1 Composition of Window



[ Figure 15. Input data of Cornea Thickness ]

## 8.1.2 DISPLAY Mode

You can see the measured results(Max ten(10) units of data) stored in memory in this mode. As pushing R.avr/L.avr button in the measurement mode,it can see measurement data.

### NOTE

- As pushing print button, the measured result stored in memory is to be printed out through the built-in printer, and it is removed completely for the new measurement

#### 1. Measured Result of Intraocular Pressure

- It indicates the latest measured result of max amount of six(6) times(Intraocular Pressure of left/right eyes).



[ Figure 16. Result of Intraocular Pressure Data ]

## 8.2 User SETUP Mode

It is to perform many setups relating to measurement, print-out, etc. As pushing Toothed Wheel button, it entered SETUP mode.



[ Figure 17. Setup mode Information (page 1) ]

### [How to Change Page]

As pushing "PAGE 1/2" side's Arrow button, it is to enter the next page.

### [How to change item and content]

Select the wanted item while Touch Screen.

### [How to finish User SETUP Mode]

As pushing EXIT(Door) button, window as below is to pop up.

Cancel : As intending to return to SETUP Mode again.



[ Figure 18. Setup mode information (Page 2)]

[항목 내용] : 1/2 Page

[Patient Count] Patient measurement count On/Off

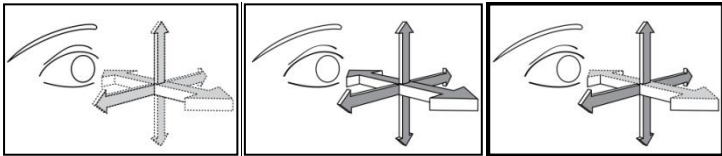
[Patient Number] Measurement patient number

[Auto Tracking]

Full(X,Y,Z) : Forward and backward, right and left, up and down direction

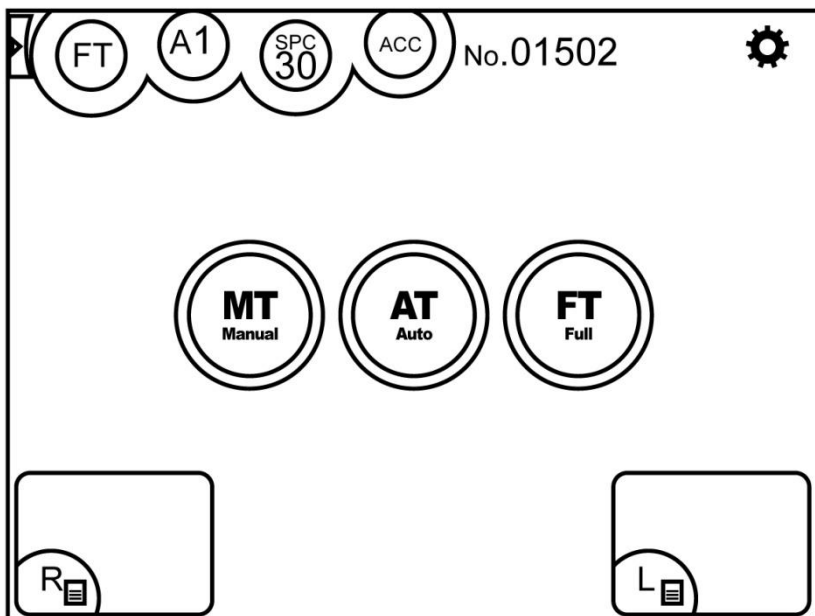
Auto (X,Y) : Right and left, up and down direction (Auto)

MANUAL : Manually align the device and bring the eye into focus.



[ 그림 19 .Auto Tracking Manual, 2D, 3D]

[Auto Shooting] 1 Shot : 1 times auto shot  
3 Shot : 3 times consecutive auto shots



[ Figure 20. Measurement mode Change ]

[SPC MODE]

Air Pressure automatic measurement by patient's intraocular pressure.

**SPC 30** : The peak of the air pressure is automatically controlled within the range of 1 to 30 mmHg

**SPC 60** : 30 mmHg or more of intraocular pressure.

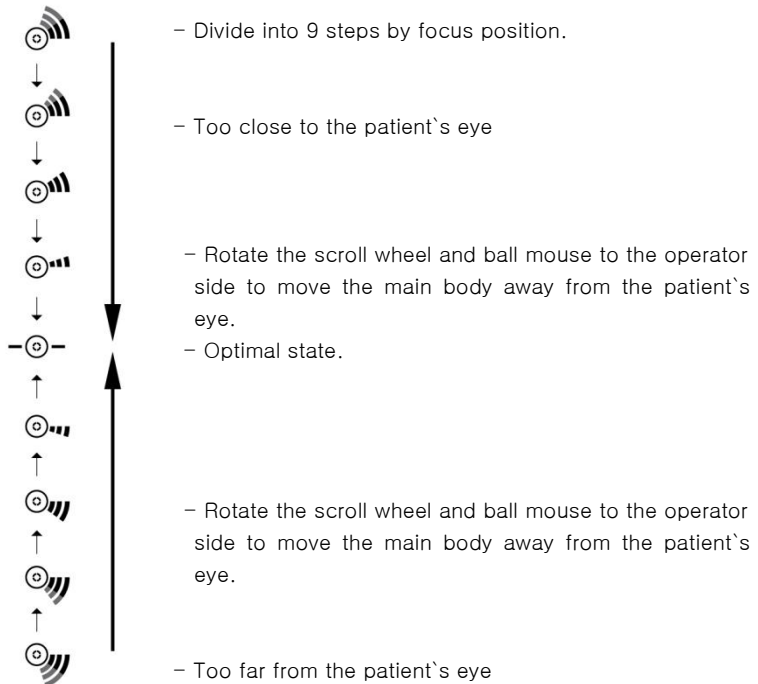
**IOP 30** : The peak of the air pressure is fixed within the range of 1 to 30 mmHg

**IOP 60** : The peak of the air pressure is fixed within the range of 1 to 60 mmHg

[ACC MODE] : Availability of apply Cornea thickness compensation (on/off)

[Pressure Unit] : Selection of pressure unit (mmHg, hpa)

[Cornea Thick] : Input data of Cornea Thickness (Left/Right)



[ Figure 21. Indication of the Focusing indicator ]





[ Figure 22. Input data of Cornea Thickness ]

**[Print Mode]**

- Stand : The measured result & built-in printer of max six(6)times are to Be printed out
- Average : Only average value is to be outputted printed out
- Off : It is not to be printed out

**[Auto print]** : In case of measuring in Auto mode, it is to print out the measured result automatically as the each measurement to left / right eyes is completed one after the other.

**[Date Format]** : Set up of indication sequence of year/month/date

**[Beep Sound]** : Set up Beep sound (on/off)

## 8.3 Power saving Mode

The power saving function begins to operate if you do not operate the machine at all for three(3) minutes or so. It is to return to the measurement mode as pushing any button optionally in saving mode.

## 8.4 Before calling for serviceman

In case that abnormality happens or the machine operates abnormally, a warning sign is to be indicated. In this case, perform the settlements below.

If the machine does not return to the normal condition in spite of the measures below, contact to the agent where you bought the machine after switching the power off.

### 8.4.1 Self diagnosis & Maintenance

Message	Method of Settlement
<b>TRACK CANCELED</b>	Discontinuance by touch input and user`s handling among Auto Tracking measurement.
<b>SWITCH CANCELED</b>	Discontinuance by Track ball and user`s handling among R/L Transfer.
<b>AUTO TRACKING</b>	Auto Tracking measurement start.
<b>FULL TRACKING</b>	Full Tracking measurement start.
<b>SIDE SWITCHING</b>	R (Right), L (Left) Transfer.
<b>HEAD FRONT END</b>	Optical head is position at fore-end of drive extent.  For additional tracking wheel forward

	operating.
<b>HEAD REAR END</b>	Optical head is position at back-end of drive extent. For additional tracking wheel back operating.
<b>HEAD RIGHT END</b>	Optical head is position at right-end of drive extent. For additional tracking Ball mouse right operating.
<b>HEAD LEFT END</b>	Optical head is position at left-end of drive extent. For additional tracking Ball mouse left operating.
<b>HEAD UPPER END.</b>	Optical head is position at up-end of drive extent. Operating ball mouse upward or Chin-rest down transfer.
<b>HEAD LOWER END</b>	Optical head is position at down-end of drive extent. Operating ball mouse down or Chin-rest upward transfer.
<b>SAFETY LOCKED</b>	There is optical head in position that Safety lock established.
<b>NO TARGET</b>	There is no target.

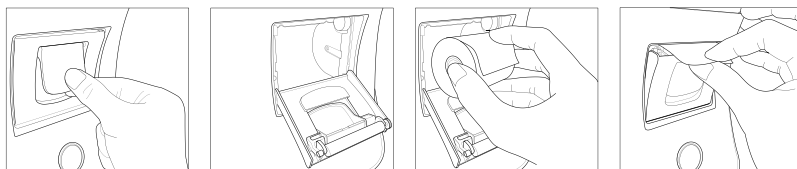
<b>EYELID COVERED</b>	As measured, eyelid was shield.
<b>WEK APPL</b>	Applanation signal is feeble.
<b>IOP OVER</b>	The intraocular pressure exceeds the preset measurement range.(IOP) Touch the measurement range to “spc 60” or “IOP 60” and perform the measurement again.
<b>WEAK PRESSURE</b>	Pressure of solenoid is weak.
<b>SETUP INVALID</b>	Do not setup for IOP measurement.
<b>IOP INVALID</b>	IOP is not measured normally.

## 8.5 Replacement

### 8.5.1 Printer paper

As red line appears on the paper, immediately change the print paper with new one.

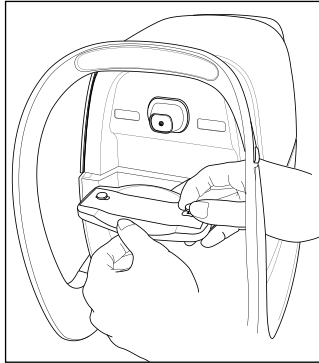
- ① Open the printer cover
- ② Cut the paper inserted in the printer, and take it away from it. Take paper roll together with shaft out of the printer, and pull the rotating shaft away from paper roll.
- ③ Put the rotating shaft in to the new roll.
- ④ Put the paper inserted with the rotating shaft into the printer case.
- ⑤ Fix the paper onto the printer. At this time, adjust the length of paper so that it can come out from the paper outlet of the printer cover.
- ⑥ Close the cover after inserting the end of paper into the hole of cover.



[ Figure 23. Replacement Paper ]

### 8.5.2 Chinrest paper

- ① Pull two(2) pins out of the chinrest.
- ② Push the pins into the holes of chinrest paper. You can put 50 sheets of it on.
- ③ Insert the pins into each one of two(2) holes in the chinrest.



[ Figure 24. Replacement Chinrest paper ]

### 8.5.3 Replacing Fuse

- ① Turn off and raise the HNT-7000 with two arm carefully.
- ② Remove the Power cord
- ③ Pick the fuse holder out from the Power inlet
- ④ Exchange the fuses
- ⑤ Insert the fuse folder

## 8.6 Cleaning Equipment

- ① The Equipment should be kept as clean basically. Do not use the solvents such as strongly volatile substance, thinner, benzene, etc.
- ② Put some soapy water to the soft cloth, and twist the water out of the cloth. Then, polish each part of the equipment.
- ③ As polishing the parts of lens or glass, get rid of dusts on the surface of lens with air tube and use a dry cloth.

## 8.7 As changing the installation place of the equipment

- ① Off the power switch of main body.
- ② Take the power connection cable apart.
- ③ Move it while maintain the horizontality of it by holding the bottom of the main body.

## 9 Service Information

Repair: If the problem is not solved in spite of the settlement according to the contents of chapter 8, please contact to Huvitz's agent with the information on the following items.

- Name of Equipment Type : HNT-7000
- Typical No.of Equipment : Typical number consisted of 8 digits and characters written on its name plate.
- Explanation on its symptom : Description in detail.

Supply of parts required for repair :

- The preservation period of parts required for repair of this machine is by eight(8) years after stopping to produce the product.

Parts to be repaired by qualified service manpower :

- Parts below aer consumable in their characteristics, or the quality of them shall degraded after the long time use. User should not replace them by him or herself. Please contact to Huvitz's agent for the replacement if these parts are consumed enough or degraded by the longtime use.
- Back up battery for clerk and data.



### CAUTION

As this machine use lithium battery, the reckless abandon of the machine itself or the lithium battery can cause the environmental pollution. Please contact to the professional waste disposal company.



10 EMC Information

10.1Guidance and manufacturer’s declaration – electromagnetic emissions

The EUT is intended for use in the electromagnetic environment specified below. The customer or the user of the EUT should assure that it is used in such an environment.		
Immunity test	Compliance	Electromagnetic environment - guidance
RF Emissions CISPR 11	Group 1	The EUT uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment
RF Emissions CISPR 11	Class B	The EUT is suitable for use in ail establishments, including domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes
Harmonic emissions IEC 61000-3-2	Class A	
Voltage fluctuations/ Flicker emissions  IEC 61000-3-3	Complies	

## 10.2 Guidance and manufacturer's declaration – electromagnetic immunity

The EUT is intended for use in the electromagnetic environment specified below. The customer or the user of the EUT should assure that it is used in such an environment.			
Immunity test	IEC 60601 Test level	Compliance level	Electromagnetic environment -guidance
Electrostatic discharge (ESD) IEC 61000-4-2	±6kV Contact ±8kV air	±6kV Contact ±8kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transient/burst IEC 61000-4-4	±2kV for power supply lines ± 1kV for input/output lines	±2kV for power supply lines ± 1kV for input/output lines	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	±1kV differential mode ±2kV common mode	±1kV differential mode ±2kV common mode	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	<5% $U_T$ (>95% dip in $U_T$ ) for 0.5cycle 40% $U_T$ (60% dip in $U_T$ ) for 5 cycle 70% $U_T$ (30% dip in $U_T$ ) for 25 cycle <5% $U_T$	<5% $U_T$ (>95% dip in $U_T$ ) for 0.5cycle 40% $U_T$ (60% dip in $U_T$ ) for 5 cycle 70% $U_T$ (30% dip in $U_T$ ) for 25 cycle <5% $U_T$ (<95% dip in $U_T$ ) for 5 s	Mains power quality should be that of a typical commercial or hospital environment. If the user of the EUT image intensifier require continued operation during power mains interruptions, it is recommended that the EUT image intensifier be Powered from an


	(<95% dip in U <sub>T</sub> ) for 5 s		uninterruptible power supply or a battery.
Power frequency (50/60Hz) magnetic field IEC 61000-4-8	3 A/m	3 A/m	Power frequency magnetic fields should be at levels character istic of a typical location in a typical commercial or hospital environment.
NOTE U <sub>T</sub> is the a.c. mains voltage prior to application of the test level.			

### 10.3 Guidance and manufacturer's declaration – electromagnetic immunity

The EUT is intended for use in the electromagnetic environment specified below.

The customer or the user of the EUT should assure that it is used in such an environment.

Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment - guidance
Conducted RF IEC 61000-4-6	3 Vrms 150 kHz to 80MHz	3 Vrms 150 kHz to 80MHz	Portable and mobile RF communications equipment should be used no closer to any part of the EUT, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter.
Radiated RF IEC 61000-4-3	3 V/m 80 MHz to 2.5GHz	3 V/m 80MHz to 2.5GHz	<p><b>Recommended separation distance</b></p> $d = \left[ \frac{3,5}{V_1} \right] \sqrt{P}$ $d = \left[ \frac{3,5}{E_1} \right] \sqrt{P} \quad 80 \text{ MHz to } 800 \text{ MHz}$ $d = \left[ \frac{7}{E_1} \right] \sqrt{P} \quad 800 \text{ MHz to } 2,5 \text{ GHz}$ <p>where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in meters (m).</p>

			<p>Field strengths from fixed RF transmitters, as deter-mined by an electromagnetic site survey,<sup>a</sup> should be less than the compliance level in each frequency range.<sup>b</sup></p> <p>Interference may occur in the vicinity of equipment marked with the following symbol :</p> 
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<p>NOTE 1) At 80MHz and 800MHz, the higher frequency range applies.</p> <p>NOTE 2) These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.</p>
<p><sup>a</sup> Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the EUT is used exceeds the applicable RF compliance level above, the EUT should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as re-orienting or relocating the EUT.</p> <p><sup>b</sup> Over the frequency range 150kHz to 80MHz, field strengths should be less than [V<sub>1</sub>] V/m.</p>

## 10.4 Recommended separation distances between portable and mobile RF communications equipment and the EUT

This is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the EUT can help Prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the EUT as recommended below, according to the maximum output power of the communications equipment.

Rated maximum output power of transmitter [W]	Separation distance according to frequency of transmitter [m]		
	150kHz to 80MHz $d = \left[ \frac{3,5}{V_1} \right] \sqrt{P}$	80MHz to 800MHz $d = \left[ \frac{3,5}{E_1} \right] \sqrt{P}$	800MHz to 2.5GHz $d = \left[ \frac{7}{E_1} \right] \sqrt{P}$
	$V_1=3V_{rms}$	$E_1=3V/m$	$E_1=3V/m$
0.01	0.116	0.1166	0.2333
0.1	0.368	0.3687	0.7378
1	1.166	1.1660	2.3333
10	3.687	3.6872	7.3785
100	11.660	11.6600	23.333
<p>For transmitters rated at a maximum output power not listed above, the recommended separation distance d in metres (m) can be estimated using the equation applicable to the frequency of the transmitter, where p is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.</p> <p>NOTE 1) At 80MHz and 800MHz, the separation distance for the higher frequency range applies.</p> <p>NOTE 2) These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.</p>			


10.5 Immunity and Compliance Level

Immunity test	IEC 60601 Test Level	Actual Immunity Level	Compliance Level
Conducted RF IEC 61000-4-6	3Vrms 150kHz to 80MHz	3Vrms	3Vrms
Radiated RF IEC 61000-4-3	3Vrms 80MHz to 2.5GHz	3V/m	3V/m

## 10.6 Guidance and manufacturer's declaration – electromagnetic immunity

The EUT is intended for use in the electromagnetic environment specified below.

The customer or the user of the EUT should assure that it is used in such an electromagnetic environment.

Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment - guidance
Conducted RF IEC 61000-4-6	3 Vrms 150 kHz to 80MHz	3 Vrms 150 kHz to 80MHz	The EUT must be used only in a shielded location with a minimum RF shielding effectiveness and, for each cable that enters the shielded location with a minimum RF shielding effectiveness and, for each cable that enters the shielded location
Radiated RF IEC 61000-4-3	3 V/m 80 MHz to 2.5GHz	3 V/m 80MHz to 2.5GHz	<p>Field strengths outside the shielded location from fixed RF transmitters, as determined by an electromagnetic site survey<sup>a</sup>, should be less than 3V/m.</p> <p>Interference may occur in the vicinity of equipment marked with the following symbol:</p> 



NOTE 1) These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

NOTE 2) It is essential that the actual shielding effectiveness and filter attenuation of the shielded location be verified to assure that they meet the minimum specification.

<sup>a</sup> Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength outside the shielded location in which the EUT is used exceeds 3V/m, the EUT should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as relocating the EUT or using a shielded location with a higher RF shielding effectiveness and filter attenuation.

## 11 Main Specifications

Measurement Mode
Intraocular Pressure Measurement (FT (X,Y,Z), AT(X,Y), MT(Manual))

Data Memory	
Measured value of six(6) times amount for each left/right eye.	
Hardware specification	
Built-in printer	Line printer of heat printing type.
Power saving function	As stopping to measure for about 3minutes, the main power is shut, it returns as pushing button.
Monitor	TFT LCD Color Monitor of 5.7"
Electrical Power	AC100 ~ 240V, 50/60Hz
Current	1A

12   Accessories

1. Power cable(AC 220V / 60Hz Power plug or other).....1unit
2. Chin Rest Paper(100 sheets)..... 1 unit
3. Printer Paper.....2 rolls
4. Dust Cloth.....1Piece
5. Fuse(250V / 3.15A).....2units