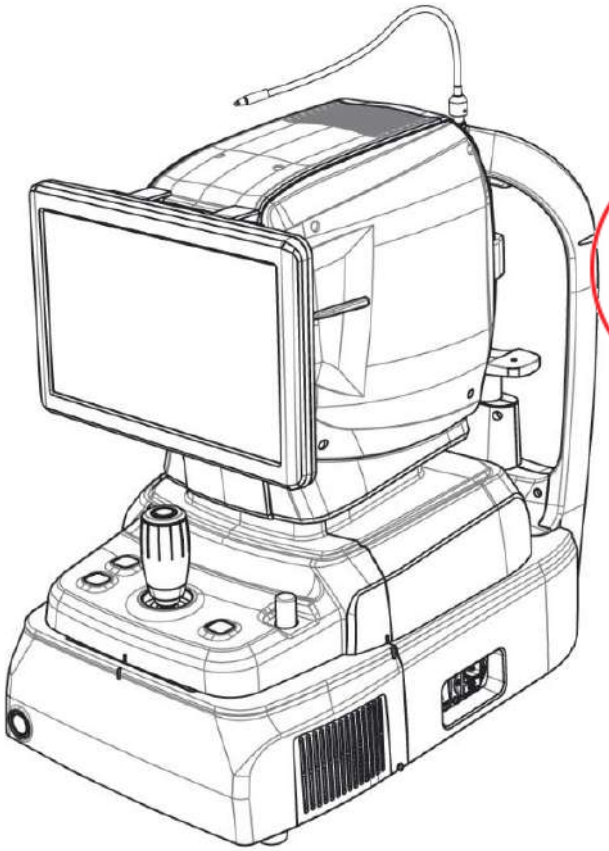
Huvitz

FUNDUS CAMERA

HFC-1

SERVICE MANUAL



■ 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.

■ Revision History

Revision	Date	Approval	Description
A	2019.04.01		First issued
B	2020.06.25		Added stereo function

XXVSSM-19-00001, Rev.B
(2020/06/25)

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Huvitz

CONTENT

1. SAFETY PRECAUTIONS

1.1 Overview

Safety is everyone's responsibility. The safe use of this instrument is largely dependent upon the installers, users, operators, and managers. It is prerequisite to read and understand these specifications before installing, using, cleaning, fixing or revising. Fully understanding the whole instructions must be the first priority. For this reason, 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 signs of Warnings and Cautions.

⚠ WARNING

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

"Warning" indique la présence d'un danger pouvant entraîner des blessures graves, la mort ou des dommages matériels importants s'il est ignoré.

⚠ CAUTION

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

"Caution" indique la présence d'un danger pouvant entraîner des blessures légères ou des dommages matériels en cas d'ignorance.

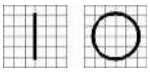
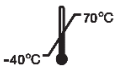
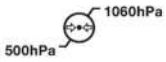
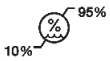
⚠ NOTE

This is used to emphasize essential information.

Be sure to read this information to avoid operating the device incorrectly.

2. Symbol Information

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.

Symbol	Indication
	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. (Ce symbole identifie une note de sécurité. Assurez-vous de comprendre la fonction de ce contrôle avant de l'utiliser. La fonction de contrôle est décrite dans le manuel d'utilisation ou d'entretien approprié.)
	I and O on power switch represent ON and OFF respectively. (O sur l'interrupteur d'alimentation représentent respectivement ON et OFF.)
	Temperature Limitation (Limitation de température)
	Atmospheric pressure limitation (Limitation de pression atmosphérique)
	Humidity limitation (Limite d'humidité)
	Stack direction (Direction de la pile)
	Keep DRY (Garder au sec)
	Fragile , handle with care (Fragile, manipuler avec soin)
	Keep away from sunlight (Tenir à l'écart de la lumière du soleil)
	Stack layer limit (Limiter la couche de pile)
CE 0197	CE Mark (Marque CE)
	Use no hook (N'utilisez aucun crochet)
	WEEE Symbol – EU only Disposal of your old appliance When this crossed-out wheeled bin symbol is attached to a product it means the product is covered by the European Directive 2002/96/EC. All electrical and electronic products should be disposed of separately from the municipal waste stream via designated

	collection facilities appointed by the government or the local authorities. The correct disposal of your old appliance will help prevent potential negative consequences for the environment and human health. For more detailed information about disposal of your old appliance, please contact your city office, waste disposal service or the shop where you purchased the product. (Symbole WEEE- EU seulement Mise au rebut de votre ancien appareil Lorsque ce symbole de poubelle barrée est joint à un produit, cela signifie que le produit est couvert par la directive européenne 2002/96 / CE. Tous les produits électriques et électroniques doivent être éliminés séparément du flux des déchets municipaux via des installations de collecte désignées par le gouvernement oules autorités locales. L'élimination correcte de votre ancient appareil aidera à prévenir les conséquences negatives potentielles sur l'environnement et la santé humaine. Pour plus d'informations sur l'élimination de votre ancient appareil, veuillez contacter votre mairie, le service d'élimination des déchets ou le magasin où vous avez acheté le produit.)
EC REP	Authorized representative in the European Community – EU ONLY (Représentant autorisé dans la Communauté européenne- EU seulement)
	Manufacturer (Fabricant)
	Date of manufacture (Il indique l'année de fabrication et le fabricant.)
	Refer to instruction manual/booklet (Se reporter au manuel d'instructions / brochure)
	Type B Isolated patient connection (Type B Connexion patient isolée.)
	Warning: Crushing or insert of hand (Attention: écrasement ou insertion de la main)
	QR code (QR code)
	Alternating Current (Courant alternative)
	Consult instructions for use (Consulter les instructions d'utilisation)

	The United States and Canada have mutual-recognition agreements. Therefore, if certified using a Canadian specification (CSA) for UL, the certification mark for the product will be a C-UL certification mark which means CSA specification compliance as follows. (Les États-Unis et le Canada ont conclu des accords de libre-échange. Par conséquent, si l'on obtient une certification au moyen d'une spécification canadienne (CSA) pour l'AMT, la marque de certification pour le produit sera une marque de certification C-UL, ce qui signifie la conformité de la spécification CSA comme suit.)
CE RoHS	CE for RoHS RoHS Directive Compliance 2011/65/EU (CE pour les RoHS Respect de la directive en matière de conformité 2011 / 65 / CE)

2.1 Usage Precautions

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.

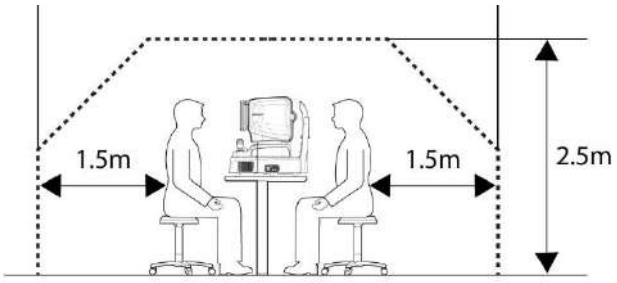
⚠ WARNING

For use of equipment in rated voltage less than 125Vac, minimum 6A, Type SJT or SVT, 18/3AWG, 10A, max 3.0m long: One end with Hospital Grade Type, NEMA 5-15P Other end with appliance coupler.
For use of equipment in rated voltage less than 250Vac, minimum 6A, Type SJT or SVT, 18/3AWG, 10A, max 3.0m long: One end terminated with blade attachment plug(HAR) Type, NEMA 6-15P.

Pour l'utilisation d'équipements à une tension nominale inférieure à 125 Vca, minimum 6 A, type SJT ou SVT, 18 / 3AWG, 10 A, max 3,0 m de long: une extrémité avec type hospitalier, NEMA 5-15P Autre extrémité avec coupleur d'appareil.
Pour l'utilisation d'équipement à une tension nominale inférieure à 250 Vca, minimum 6 A, type SJT ou SVT, 18 / 3AWG, 10 A, max 3,0 m de long: une extrémité se termine par un bouchon de fixation de lame (HAR) de type NEMA 6-15P.

⚠ WARNING

Use instrument that comply with IEC60601-1 in the patient environment. [The figure below show]
Utilisez un instrument conforme à la norme IEC60601-1 dans l'environnement du patient. [La figure ci-dessous montre]



If and instrument that does not comply with IEC 60601-1 is to be used, use an isolation transformer.
If a person handling a conductive part of the system comes into contact with a patient at the same time, hazard may occur due to leakage current exceeding the value specified in the applicable standard. Be careful not to touch patients when connecting or removing the power plug or cable connectors.

Si un instrument non conforme à la CEI 60601-1 doit être utilisé, utilisez un transformateur d'isolement.

Si une personne manipulant une partie conductrice du système entre en contact avec un patient en même temps, un danger peut se produire en raison d'un courant de fuite dépassant la valeur spécifiée dans la norme applicable. Veillez à ne pas toucher les patients lors de la connexion ou du retrait de la fiche d'alimentation ou des connecteurs de câble.

⚠ CAUTION

This instrument includes lithium battery. This hazardous material needs to be disposed of properly to limit environmental pollution. Please contact to the professional waste disposal company.

Cet instrument comprend une pile au lithium. Cette matière dangereuse doit être éliminée correctement pour limiter la pollution de l'environnement. Veuillez contacter la société professionnelle d'élimination des déchets.

⚠ CAUTION

Do not install any software on equipment without our consent.

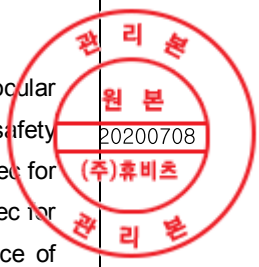
The manufacturer is not responsible for any failure due to random installation.

N'installez aucun logiciel sur l'équipement sans notre accord.

Le fabricant n'est pas responsable de toute défaillance due à une installation aléatoire.

⚠ CAUTION

This equipment is a meets ISO 15004-2 Group1 specifications.
Cet équipement est conforme aux spécifications ISO 15004-2 Group1.



- The longer the duration of exposure and the greater the number of pulses, the greater the risk of ocular damage. Exposure to light from this instrument when operated at maximum output will exceed the safety guideline after 9.9 x 10^7 sec for Retina IR, 5.3 x 10^7 sec for Working dot(Manual Focusing), 4.1 x 10^7 sec for Kerato ring(Auto / Manual Tracking), 9.5 x 10^7 sec for Kerato focus(Auto/Manual Tracking), 1.0 x 10^8 sec for Split focus(Optimizing), 9.1 x 10^5 sec for external fixation lamp, 1,936,114 pulses for the light source of fundus image capture.

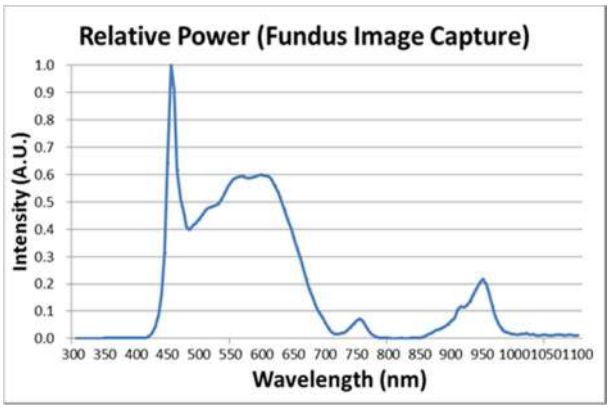
  Note 1: The exposure time and number of pulses from all light sources is cumulative and additive.
  Note 2: If the intensity of any of the light sources is reduced to 50% of the maximum intensity, the exposure time or number of pulses for that light source to reach the exposure guideline is doubled. This linear relationship can be used to determine the time to reach the exposure guideline for the combination of light sources at various intensity settings.
  Note 3: The weighted retinal radiant exposure guideline is 10 J/cm2

- Plus la durée d'exposition est longue et plus le nombre d'impulsions est élevé, plus le risque de lésions oculaires est grand. L'exposition à la lumière de cet instrument lorsqu'il est utilisé à la sortie maximale dépassera les directives de sécurité après 9,9 x 107 s pour la rétine IR, 5,3 x 107 s pour le point de travail (mise au point manuelle), 4,1 x 107 s pour l'anneau Kerato (suivi automatique / manuel) , 9,5 x 107 s pour la mise au point Kerato (suivi automatique / manuel), 1,0 x 108 s pour la mise au point divisée (optimisation), 9,1 x 105 s pour la lampe de fixation externe, 1 936 114 impulsions pour la source lumineuse de capture d'image du fond d'œil.

Remarque 1: Le temps d'exposition et le nombre d'impulsions de toutes les sources lumineuses sont cumulatifs et additifs.

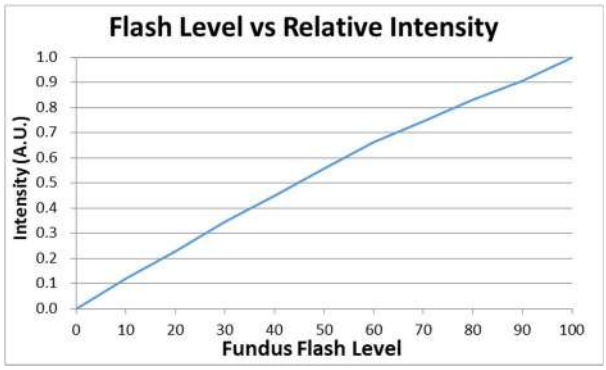
Remarque 2: Si l'intensité de l'une des sources de lumière est réduite à 50% de l'intensité maximale, le temps d'exposition ou le nombre d'impulsions pour que cette source de lumière atteigne la ligne directrice d'exposition est doublé. Cette relation linéaire peut être utilisée pour déterminer le temps nécessaire pour atteindre la ligne directrice d'exposition pour la combinaison de sources lumineuses à divers réglages d'intensité.

Remarque 3: La ligne directrice pondérée d'exposition au rayonnement rétinien est de 10 J/cm2



<Spectrum output of all light source during measurement (maximum light intensity)>

<Sortie spectrale de toutes les sources lumineuses pendant la mesure (intensité lumineuse maximale)>

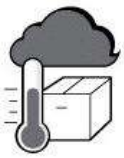
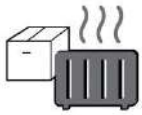
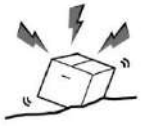
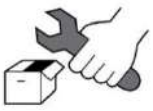


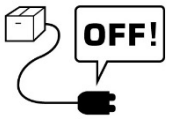
<Relationship between fundus flash level and maximum light intensity>

<Relation entre le niveau de flash du fond d'œil et l'intensité lumineuse maximale>

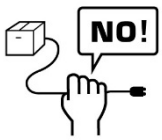
2.2 Environmental Considerations

Avoid the following environments for operation or storage:

	Where the instrument is exposed to water vapor. Don't operate the instrument with wet hands Indoor use only.
	Where the instrument is exposed to direct sunlight.
	A place where the equipment can be exposed to direct ultraviolet.
	Where there are big changes in temperature. Optimal temperature range for normal operation is from 10°C to 35°C (Humidity : 30 ~ 90%).
	Where there is hot equipment nearby.
	Where the humidity is extremely high or there is a ventilation problem.
	Where the instrument is exposed to excessive shocks or vibrations.
	Where the instrument is exposed to chemical material or explosive gas.
	Be cautious so that things like dust and metal do not fall inside the instrument.
	Don't disassemble or open the product. HUVITZ does not take responsibility for the possible problems
	Be careful not to block the fan of the instrument.



Don’t plug the AC power cable into the outlet unless all parts of the instrument are completely connected. Otherwise, it will cause severe damage on the instrument.



Pull out the power cable with holding the plug, not the cord.
To avoid risk of electric shock, this equipment must only be connected to a supply mains with protective earth.

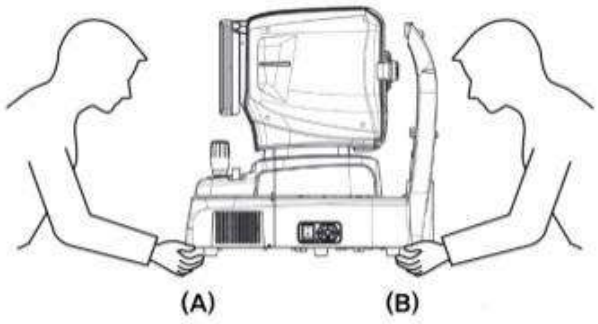
For the normal operation of the instrument, please keep the ambient temperature is 10℃ ~ 35℃, humidity is 30% ~ 90% (with non-condensing) and atmospheric pressure is 800 ~ 1060hpa. For the Transportation of the instrument, please keep the ambient temperature is -40℃ ~ 70℃, humidity is 10% ~ 95% and atmospheric pressure is 500 ~ 1060hpa. For the Storage of the instrument, please keep the ambient temperature is -10℃ ~ 55℃, humidity is 10% ~ 95% (with non-condensing) and atmospheric pressure is 700 ~ 1060hpa. Avoid environments where the equipment is exposed to excessive shocks or vibrations.

2.3 Safety Precautions

1. This is an electric medical device. Use is limited to doctors or persons qualified by the law of each country.
2. Do not make a diagnosis base on a single captured image. Doctors are responsible for making the final diagnosis based on the present and past medical records of the patient such as captured images. Without sufficient information, proper diagnosis may not be made.
3. This equipment must not be used in an area that is in danger of explosions and in the presence of flammable, explosive, or volatile solvent such as alcohol, benzene or similar chemicals.
4. Do not place or store this instrument in humid area. Do not expose the device to water splashes, dripping water, or sprayed water. Do not place containers with fluids, liquids, or gases on top of this instrument.
5. The device must be operated by a trained and qualified person or under his or her supervision.
6. Repair of this instrument must be conducted by HUVITZ's service technicians or other authorized persons.
7. Maintenance by users must observe the User's Manual and Service Manual. Any additional maintenance may only be performed by HUVITZ's service technicians or other authorized persons.
8. Manufacturers are not responsible for the damages caused by unauthorized alterations. Such tampering will forfeit any rights to receive services during the term of guarantee.
9. This instrument must be connected with the accessories supplied by HUVITZ. If you are to use other accessories, their safety or usability must be checked and proved by their manufacturers or HUVITZ.
10. Only those who have undergone proper training and instructions are authorized to install, use, operate, and maintain this instrument.
11. Do not apply excessive force to cable connections. If the cable does not connect easily, make sure that the connector (plug) is appropriate for the receptacle (socket). If you caused 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 grab the plug when disconnecting cables.
13. Do not block any ventilation outlet necessary for proper heat dissipation.
14. If smoke, sparks or any abnormal noise or smell is noticed coming from the instrument, please switch the power off immediately and pull out the plug.
15. To avoid the risk of electric shock, this instrument must only be connected to protective earth.
16. Do not place the instrument where it is difficult to operate the disconnecting device. (disconnecting device: power cable)

17. External equipment intended for connection to signal input, signal output or other connectors of this instrument, shall comply with relevant IEC Standard (e.g., IEC60950 for IT equipment and IEC60601-1 series for medical electrical equipment). In addition, all such combination-system-shall comply with the standard IEC60601-1 harmonized national standard or the combination. If, in doubt, contact qualified technician or your local representative. The operator should not touch the patient and accessible male parts of the SIP/SOP connectors simultaneously.

18. When you carry this product, please hold on left(A) and right(B) bottom of the product.



19. Do not touch directley if an operator has a hand injury or a significant allergic reaction to the material used in the operaton contact part.

Part Name	Material
LCD Touch pannel	Glass
Joystick / button	ABS + Silicon, Aluminum(A6061 T6) + Anodizing
Power switch	PC + PA66
Cover	ABS
Chin Rest	ABS

20. Do not measure to patients who are sensitive to light. (ex> photophobia)

21. When instrument is send back to A/S center for repair or maintenance, or before authorized service man is arrived at the place for repair or maintenance, wipe the surfaces of the instrument (especially, the parts that come into contact with the patient) with a clean cloth dampened with rubbing alcohol.

22. In the event of a serious incident involving the device, the user shall report it to the manufacturer and the competent authority of the Member State in which the user and/or patient are established.

23. If a user uses power save supported by Windows 10 except for the power save in User setting, it causes some trouble in HFC-1. The manufacturer isn't responsible for the problem.

24. User must not change the setting supported by the manufacturer, This change might make some trouble in HFC-1. The manufacturer isn't responsible for the problem.

3. INTRODUCTION

3.1 System Outline

The Huvitz Fundus camera HFC-1 is a non-contact, high-resolution bio-microscopic imaging device. It is indicated for in-vivo viewing, color fundus imaging.

3.2 Intended Use

A device that illuminates the fundus by entering light into the pupil and photographs the fundus state according to the reflected light.

3.3 Classification

- Classification of product : Class II according to Annex IX (Rule 10) of the Medical Device Directive 93/42/EEC as amended by 2007/47/EC
- Resistance against electric shock : Class I (earthed)
- Protection class against electric : Type B(Head rest, chinrest paper)
- Classification Light hazard : Group I (EN/ISO15004-2 Standard)

3.4 Contraindications

This device should not be used for:

- Patients who are hypersensitive to light.
- Patients who recently underwent photodynamic therapy
- Patients taking medication that causes photosensitivity

3.5 Patient requirements

The patient who undergoes and examination by this instrument must maintain concentration for a few minutes and adhere to the following instructions;

- After his/her face to the chinrest, forehead rest.
- Keep the eye open
- Understand and follow instructions when undergoing an examination.

If the patient does not conform to these conditions, it is not possible to take a picture correctly

3.6 Operating Principles

The anterior of an eye is illuminated by IR light, the retina of an eye is illuminated by a white LED, of which lightings are emitted by the fundus illumination optical system. The fundus observation/photography optical system forms and makes an image with image sensors, which images are observed and manipulated with the display panel.

3.7 Applied Standard List

IEC/EN 60601-1: MEDICAL ELECTRICAL EQUIPMENT

- Part 1: General requirements for safety

IEC/EN 60601-1-2: Medical electrical equipment Part1: General requirements for safety

- Collateral Standard: Electromagnetic Compatibility-Requirements and tests

ISO15004-1: Ophthalmic instruments

- Fundamental requirements and test methods

  General Requirements applicable to all Ophthalmic instrument

ISO15004-2: Ophthalmic instruments -Fundamental requirements and test methods

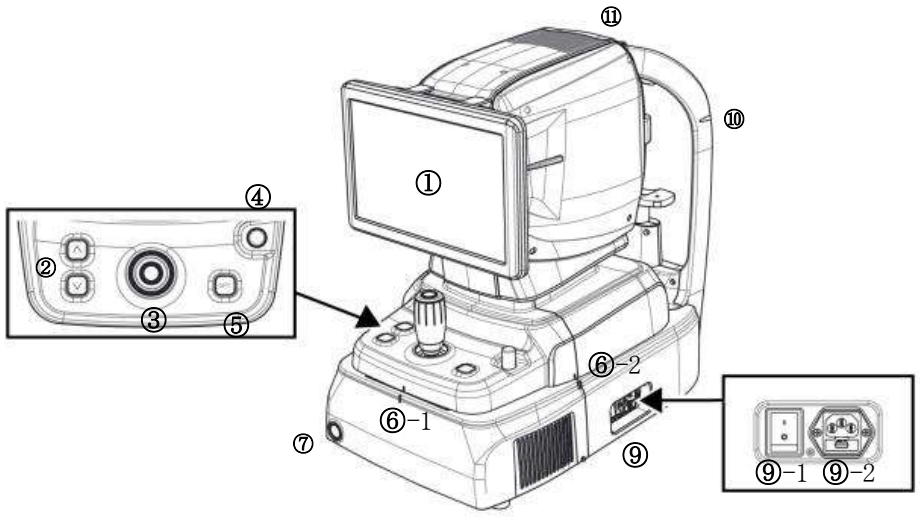
- Part 2: Light hazard protection

ISO 10940: 2009 Ophthalmic instruments - Fundus Cameras

4. System Overview

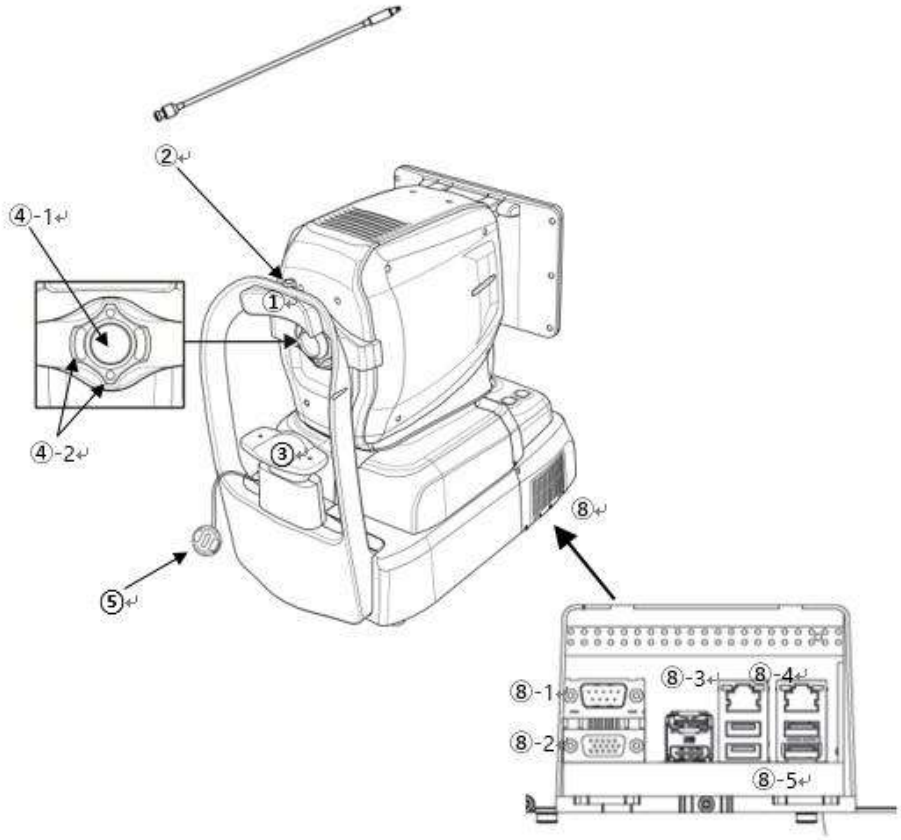
4.1 Configuration and Functions

■ Front View



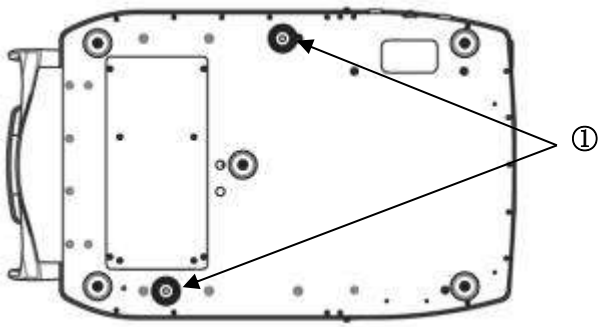
No	Part	Name	Description
1	Display	LCD	Monitor for displaying captured image and user interface icon.
2	Body	Chinrest button	Button for moving chinrest up and down.
3		Joystick	Joystick for aligning body to patient's eye. Button for capturing image.
4		User Lock	Lock for fixing body to base frame.
5		OPT button	Button for optimizing signal
6-1 6-2		Align index mark	Mark for indicating center of body and base.
7	Base	Power button	Button for turning power of internal PC on/off. When the power is on, white light is lit.
9-1		Power switch	Switch for power on/off.
9-2		Power inlet	Inlet for connecting power cable.
10	Headrest	Eye level mark	Mark for indicating base height of patient's eye.
11	Body	Heat vent	Window for emitting internal heat.

■ **Rear View**



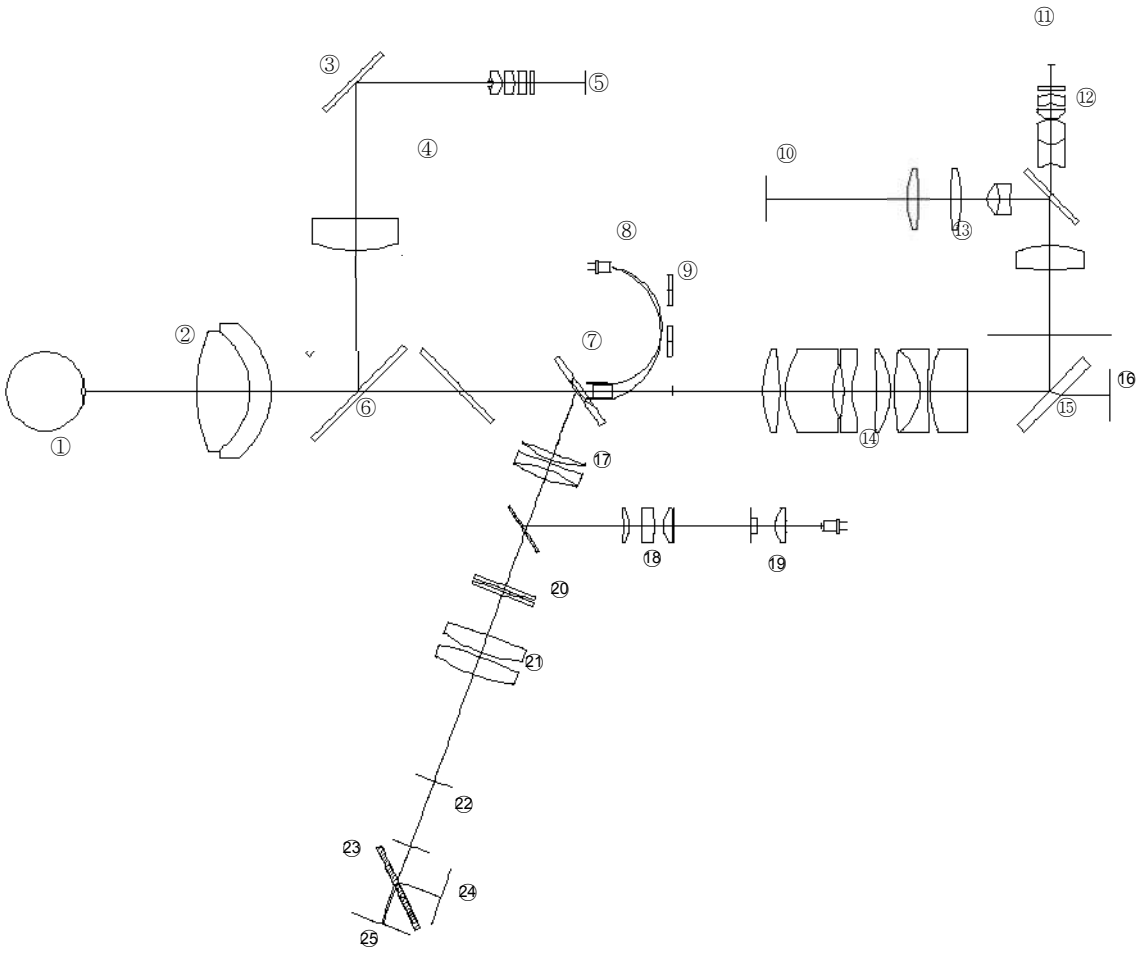
No	Part	Name	Description
1	Headrest	Headrest	Rubber for fix patient's head.
2		External LED	External LED for fixing patient's eyes.
3		Chinrest	For fixing patient's chin.
4-1	Body	Objective lens	Lens for passing illumination light from body and reflected light from patient's eye.
4-2		Mirering Focus LED	LEDs for checking working distance.
5	Headrest	Objective lens cap	Cap for protecting objective lens.
8	Base	External port	Port for communicating internal or external device.
8-1		RS-232 port	Port for communicating internal PC board and main board.
8-2		RGB port	Port for external display device.
8-3		DP port	Port for communicating external DP device.
8-4		LAN port	Port for external network (2 ports)
8-5		USB port	Port for internal or external USB device (4 ports)

■ **Bottom View**



No	Part	Name	Description
1	Base	Packing lock	Lock for fixing body and base during transportation. (2 points)

4.2 Optical System



4-2-1. List of Optical Components

No.	Name and critical feature part(*)
1	Patient's Eye
2	Objective Lens
3	Cornea Mirror
4	Cornea Lens
5	Cornea Camera
6	Return Mirror
7	Hole Mirror
8	W.D LED
9	Fundus Diopter Lens
10	Color Fundus Camera
11	IR Fundus Camera
12	IR Fundus Lens
13	Color Fundus Lens
14	Fundus Zoom Lens
15	Fixation Mirror
16	Fixation LCD
17	Fundus Ill. Lens
18	Split Focus Lens
19	Split Focus Illumination
20	Block Dot
21	Fundus Ill. Lens 2
22	Illumination Mask
23	Half Mirror
24	Color LED
25	IR LED

4-2-2. Light Paths of the System

A: Color Fundus Observation channel

(① → ② → ⑥ → ⑦ → ⑭ → ⑮ → ⑬ → ⑩)

B: IR Fundus Observation channel

(① → ② → ⑥ → ⑦ → ⑭ → ⑮ → ⑫ → ⑪)

C: Working Dot Imaging channel

(⑧ → ⑥ → ② → ① → ② → ⑥ → ⑦ → ⑭ → ⑮ → ⑫ → ⑪)

D: Cornea Observation channel

(① → ② → ⑥ → ③ → ④ → ⑤)

E: Color Illumination channel

(㉔ → ㉓ → ㉒ → ㉑ → ⑳ → ⑰ → ⑦ → ⑥ → ② → ①)

F: IR Illumination channel

(㉕ → ㉓ → ㉒ → ㉑ → ⑳ → ⑰ → ⑦ → ⑥ → ② → ①)

G: Split Focus System

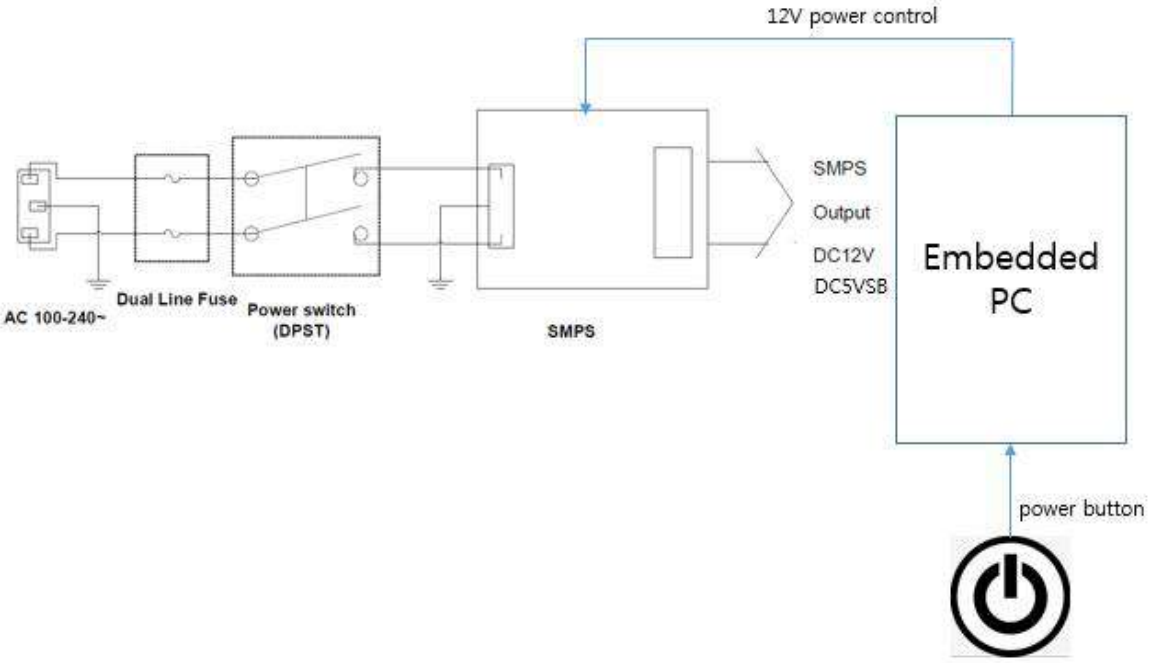
(⑲ → ⑱ → ⑰ → ⑦ → ⑥ → ② → ① → ② → ⑥ → ⑦ → ⑭ → ⑮ → ⑫ → ⑪)

H: Fixation target

(⑯ → ⑮ → ⑭ → ⑦ → ⑥ → ② → ①)

4.3 Electrical construction diagram

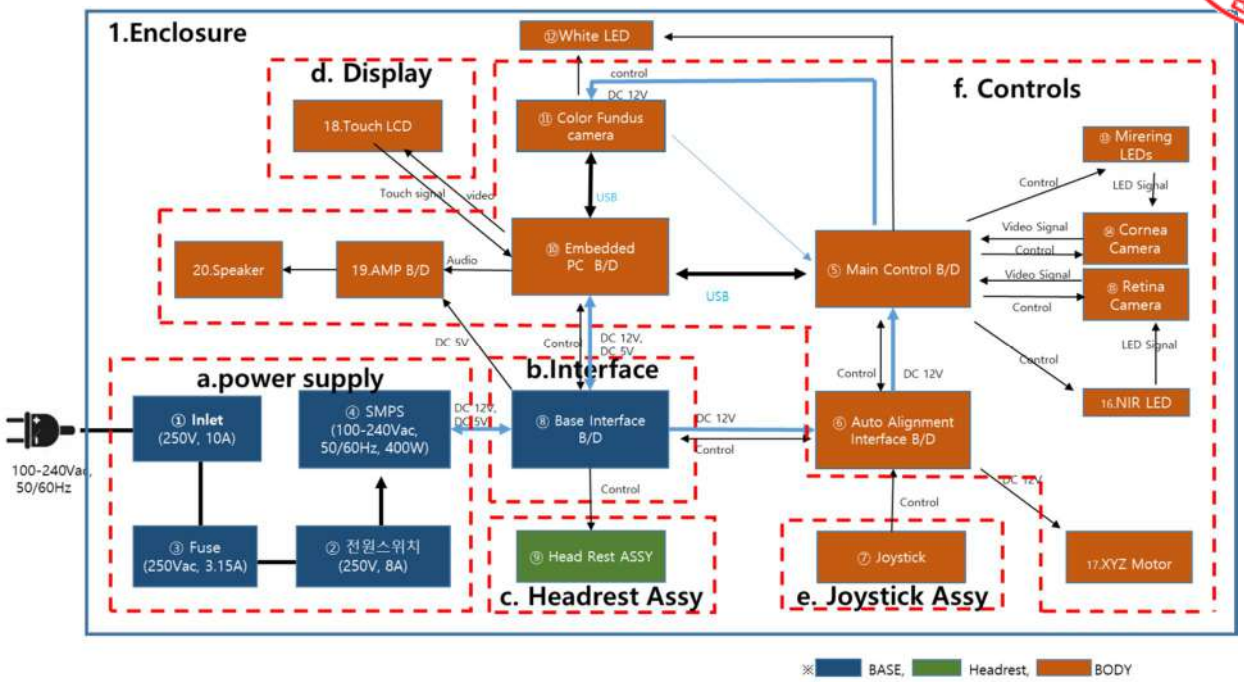
4-3-1. Power input electrical block diagram



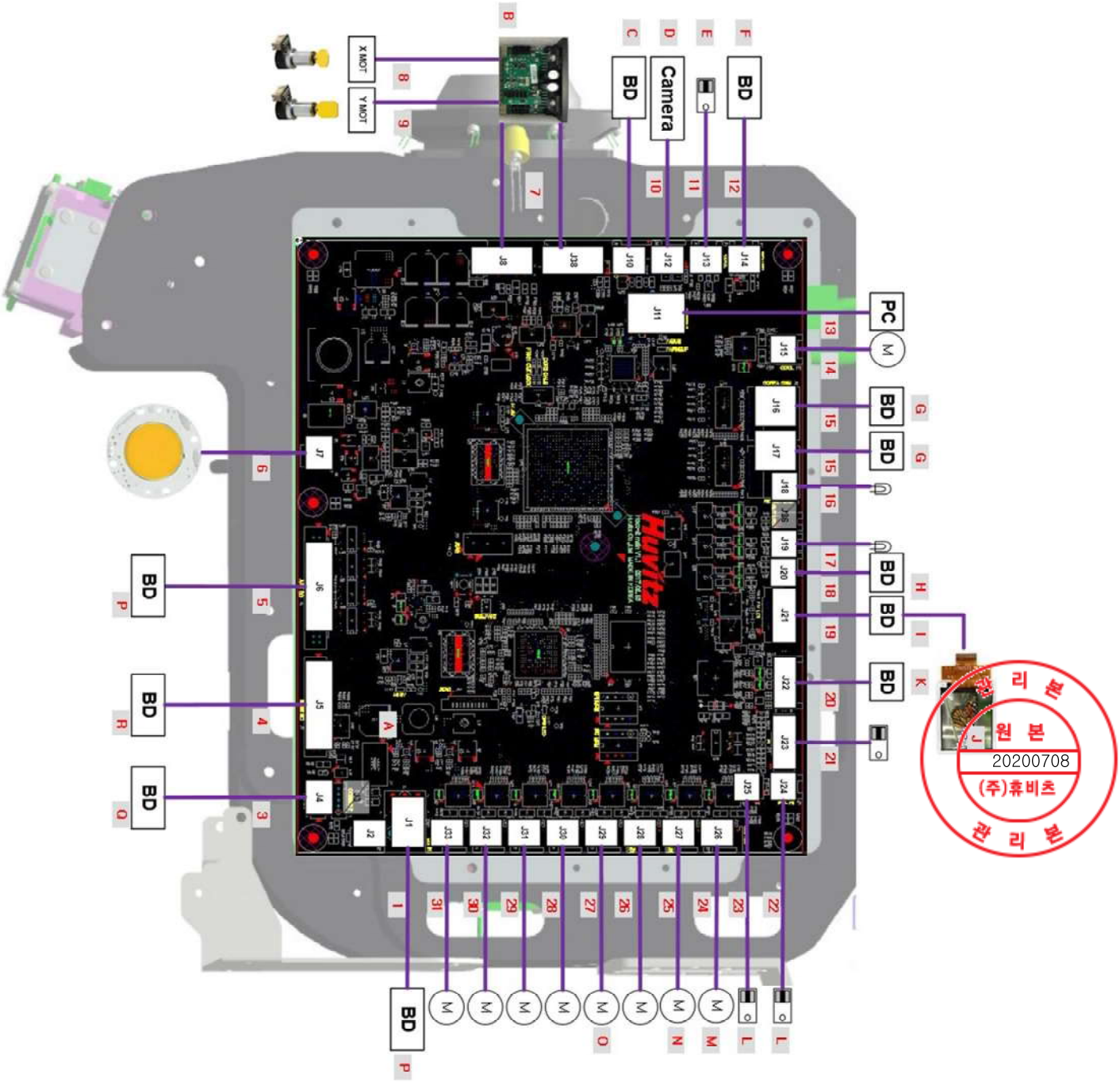
① Power switch ON: DC5VSB(5V standby power) on

② Power button on → DC12V on: system power up

4-3-2. System functional block diagram

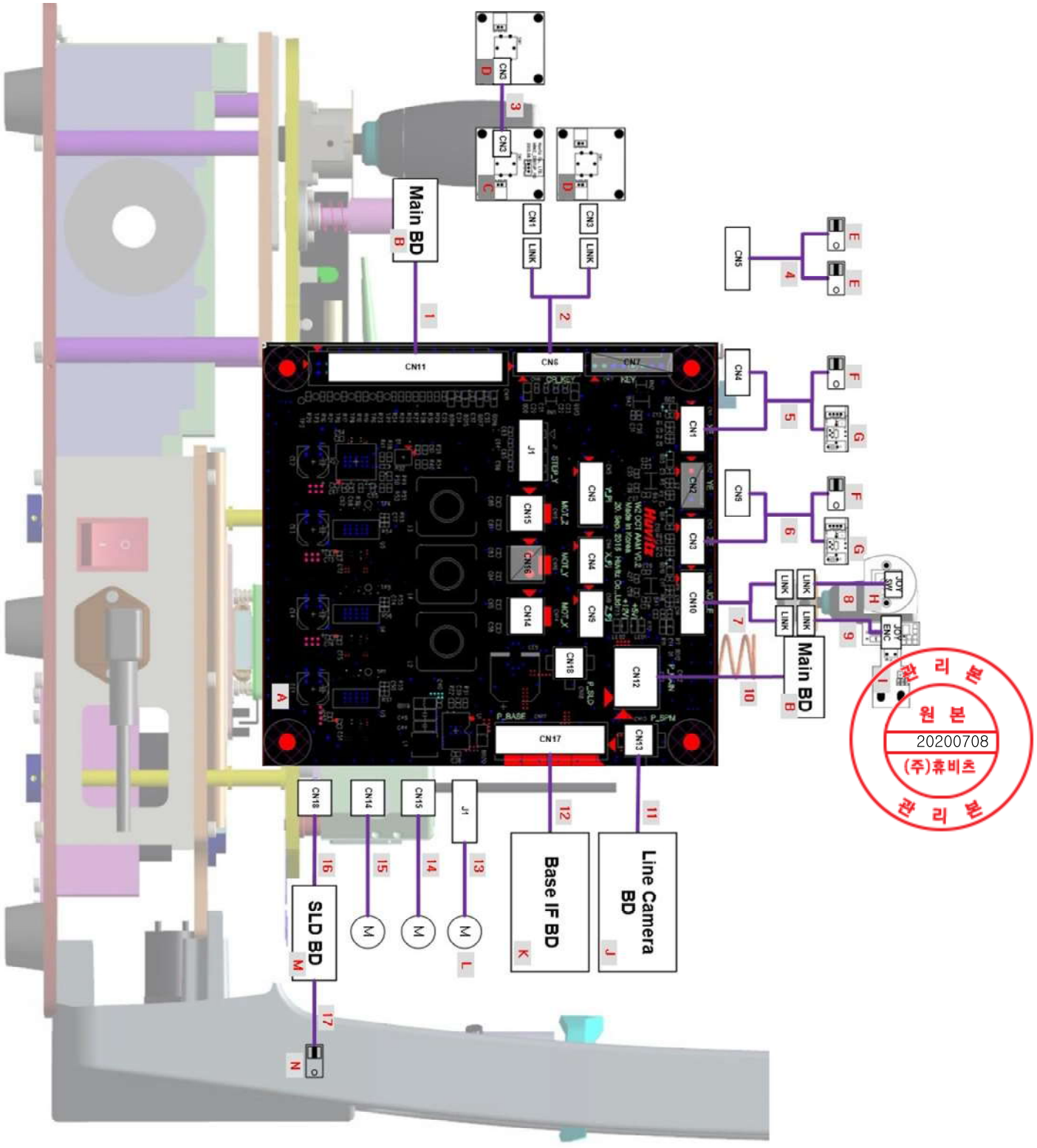


4-3-3. Description of wire harness connection of Main Board/head optics



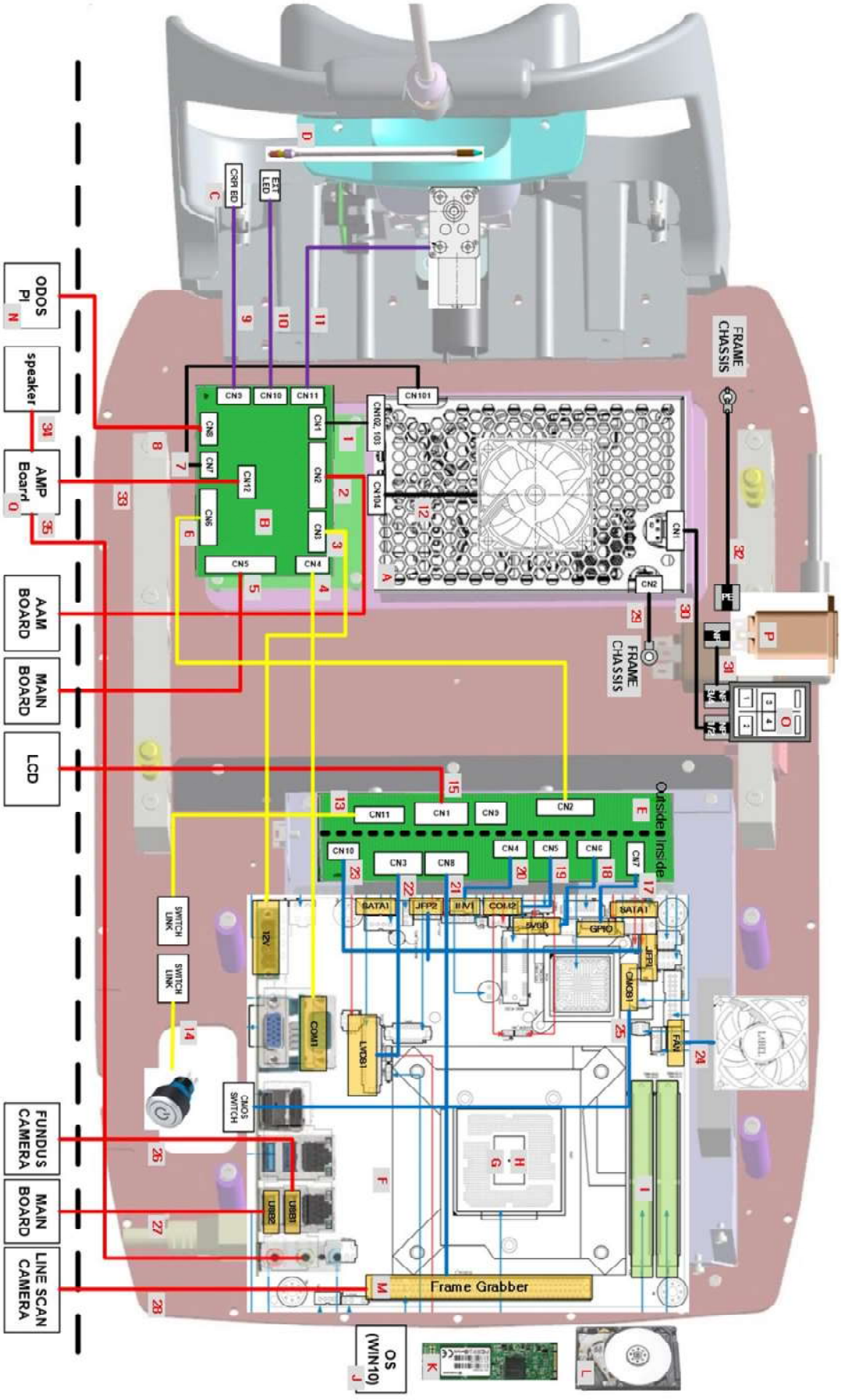
Connect No.	Description (Connector number)	Target connector
J1	HARNESS(MB(J1) TO AAM POWER(CN12))	AAM CN12
J4	HARNESS(MB(J4) TO TOUCH IF)	Touch interface B/D
J5	HARNESS(MB(J5) TO BIF DATA)	Base interface B/D CN5
J6	HARNESS(MB(J6) TO AAM DATA)	AAM B/D J4
J7	HARNESS(MB(J7) TO FLASH LED)	Flash LED
J10	MIRE RING FPCB	Miring LED FPCB
J11	USB 3.0 CABLE(AM-BM)	PC USB 3.0 port
J12	HARNESS(MB(J12) TO FUN CAM)	Color camera J12
J14	HARNESS(MB(J14) TO WD LED)	Working dot led
J16	HARNESS(A9_MB TO REF CAMERA)	Cornea IR camera
J17	HARNESS(A9_MB TO REF CAMERA)	Retina IR camera
J18	HARNESS(MB(J18) TO SPLIT LED)	Split focus led
J19	ARNESS(MB(J19) TO FOCUS LED)	Mire ring Focus led
J20	HARNESS(MB(J20) TO NIR LED)	Retina IR LED B/D
J21	HARNESS(MB(J21) TO FIX LCD IF)	Fixation LCD B/D
J23	HARNESS(MB(J23) TO PI)	PIs
J28	HARNESS(MB(J28) TO FUN FOCUS MOT)	Fundus zoom motor
J30	HARNESS(MB(J30) TO QRM MOT)	Quick return mirror motor
J31	HARNESS(MB(J31) TO SFM MOT)	Split focus motor
J32	HARNESS(MB(J32) TO FDCL MOT)	Fundus diopter compensation lens motor
J33	HARNESS(MB(J33) TO PUPIL MOT)	Fundus pupil mask select motor

4-3-4. Description of wire harness connection of AAM board



Connect No.	Description (Connector number)	Target connector
CN1	HARNESS(BIF TO X ENC)	X encoder
CN4	HARNESS(BIF TO X PI)	X PI
CN3	HARNESS(BIF TO Z ENC)	Z encoder
CN9	HARNESS(BIF TO Z PI)	Z PI
CN10	HARNESS(AAM(CN10) TO JOYSTICK)	Joystick
CN12	HARNESS(MB(J1) TO AAM POWER(CN12))	Mainboard J1
CN17	HARNESS(AAM(CN17) TO BIF POWER)	Base interface BD CN2
CN11	HARNESS(MB(J6) TO AAM DATA)	Main board J6
CN6	HARNESS(AAM(CN6) TO FRONT COVER)	Front cover buttons
CN5	HARNESS(AAM(CN5) TO Y PI)	Y PIs
J1	HARNESS(AAM(J1) TO Y MOT)	Y motor
CN15	HARNESS(CN15 TO Z MOTOR)	Z motor
CN14	HARNESS(CN14 TO X MOTOR)	X motor

4-3-5. Description of wire harness connection of Base interface B/D(**B**)



Connect No.	Description (Connector number)	Target connector
CN1	HARNESS(BIF(CN1) TO SMPS 12V)	SMPS 12V
CN2	HARNESS(AAM(CN17) TO BIF POWER)	AAM CN17
CN3	HARNESS(BIF(CN3) TO PC POWER)	PC 12V
CN4	HARNESS(BIF(CN4) TO PC COM1)	PC COM1
CN5	HARNESS(MB(J5) TO BIF DATA)	Mainboard J5
CN6	HARNESS(BIF(CN6) TO PC IF DATA)	PC IF B/D CN2
CN7	HARNESS(BIF(CN7) TO SMPS 5V)	SMPS 5VSB
CN8	HARNESS(BIF(CN8) TO ODOS PI)	ODOS PI
CN9	HARNESS(BIF TO HR LINK)	Headrest cable link
CN10	HARNESS(BIF(CN11) TO CR MOT LINK)	Chinrest motor link
CN11	HARNESS(CR MOT LINK TO CR MOT)	Chinrest motor

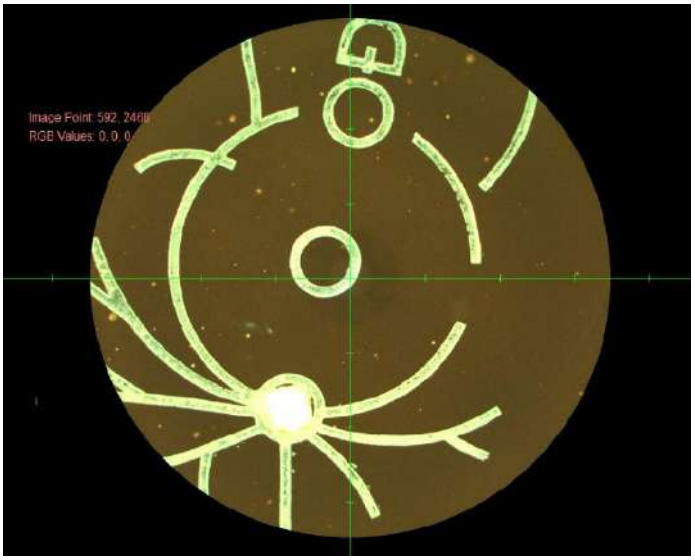
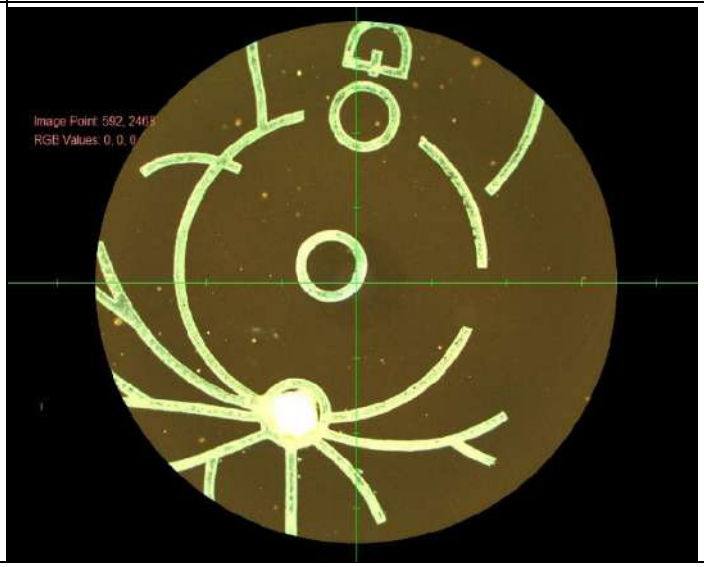
4-3-6. Description of wire harness connection of PC interface B/D(**E**)

Connect No.	Description (Connector number)	Target connector
CN1	HARNESS(AUO LCD TO PC IF LVDS)	LCD module
CN2	HARNESS(BIF(CN6) TO PC IF DATA)	Base interface B/D CN6
CN3	HARNESS(PC IF(CN3) TO PC LVDS)	PC motherboard
CN4	HARNESS(PC IF(CN4) TO PC BACKLIGHT)	PC motherboard
CN5	HARNESS(PC IF(CN5) TO PC COM2)	PC motherboard
CN6	HARNESS(PC IF(CN6) TO PC 5VSB)	PC motherboard
CN7	HARNESS(PC IF(CN7) TO PC GPIO)	PC motherboard
CN10	HARNESS(PC IF(CN10) TO PC PIN HEADER)	PC motherboard
CN11	HARNESS(PC IF(CN11) TO SOFT SWITCH LINK)	PC power soft switch

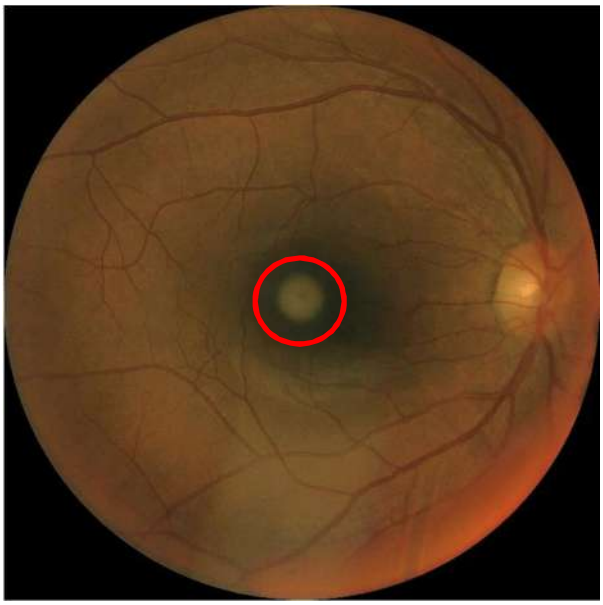
5. Check and Testing

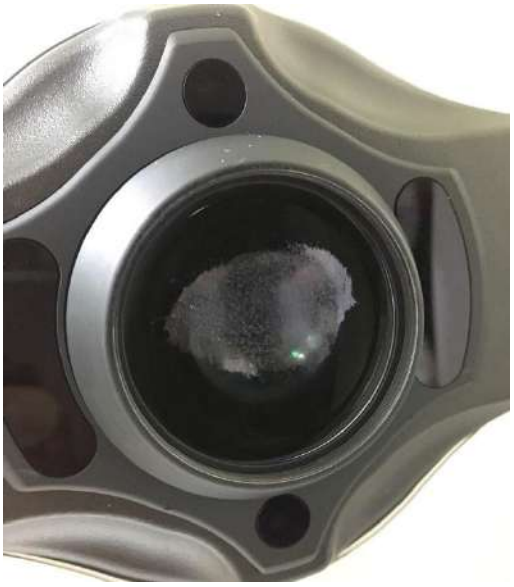
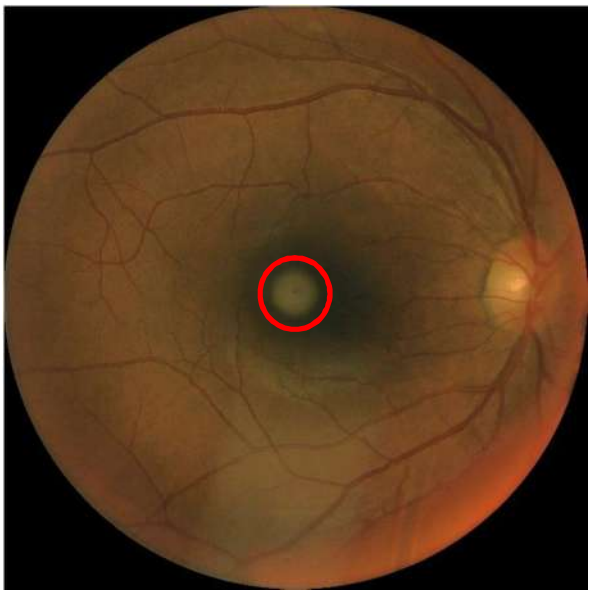
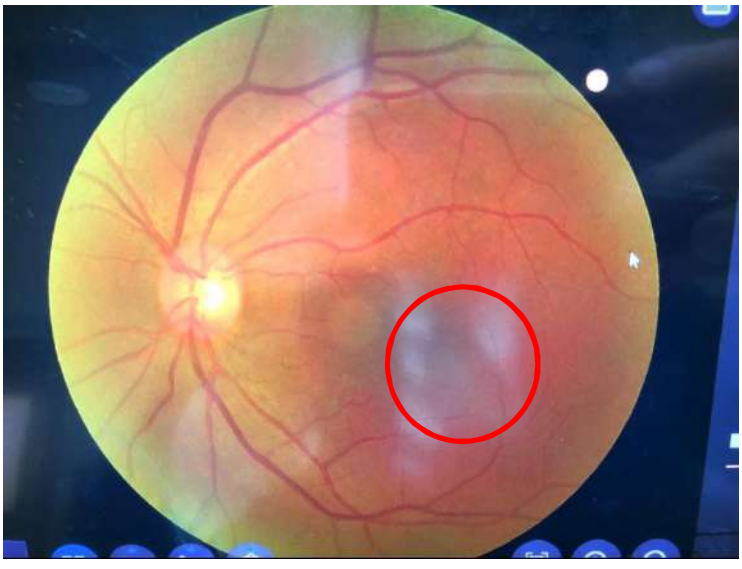
5.1 Fundus checking

Focus check

Patterns	Settings
Procedures to test	- Assemble the **'0D model eye JIG'** on Chinrest. - Run the main program 'HFC'. - Choice the 'patient' (It does not matter what patient.) and click the 'measure'. - Click the 'Fundus'. - Adjust the '0D model eye JIG' to working distance using working dots. - Take a Fundus image of 0D.  - You will see below Fundus image. - Check the focus of image
Criteria	- Check the focus of target.
Tested Example	 0D Model Eye (example sample)

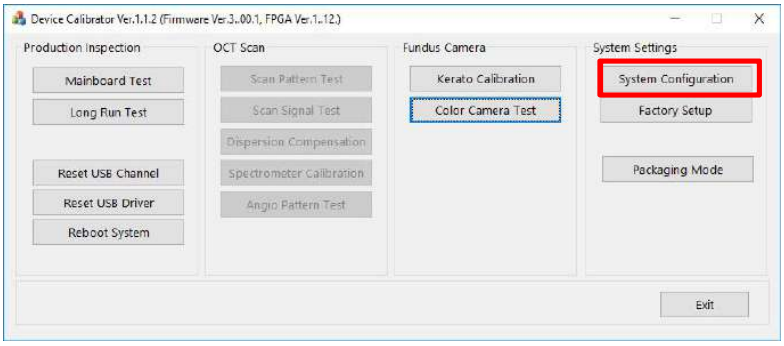
Fundus Image check (Check a dust)

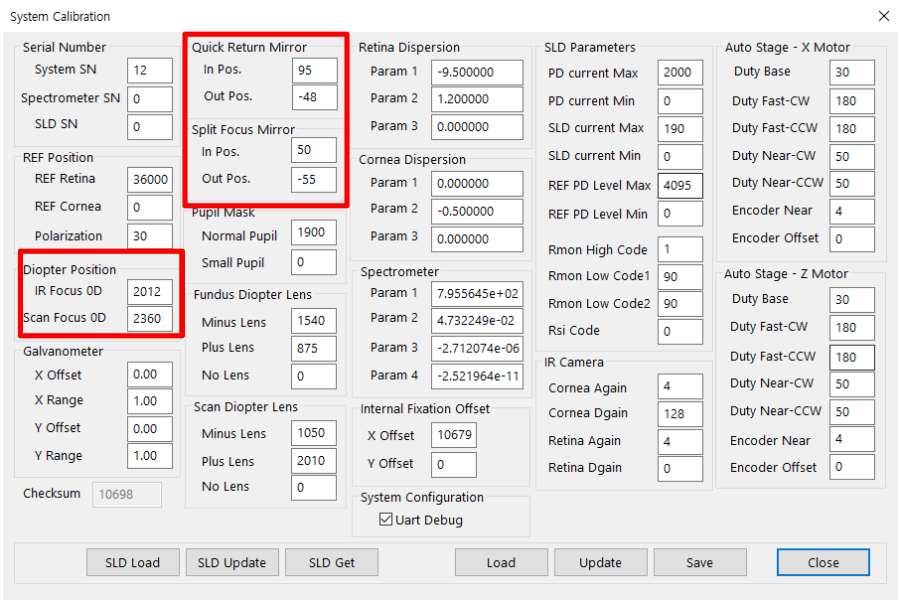
Patterns	Settings
Procedures to test	- Run the main program 'HFC'. - Choice the 'patient' (It does not matter what patient.) and click the 'measure'. - Click the 'Fundus'. - Adjust the **'0D model eye JIG'** to working distance using working dots. - Take a Fundus image of eye. - Check the Fundus image. - If the center of the fundus image appears white (as below image) and If the white part of the Fundus image is found, you must clean the objective lens or illumination lens.  - And Check the dust on Objective lens as below image.

	
Criteria	- Check the Fundus image. - Check the Objective lens.
Tested Example	 

5.2 Setup data checking

Set up data

Patterns	Settings
Procedures to test	- Run the 'Device Calibrator.exe', you will see 'Device Calibrator' dialog. - Click the 'System Configuration'  - You will see 'System Configuration' dialog.

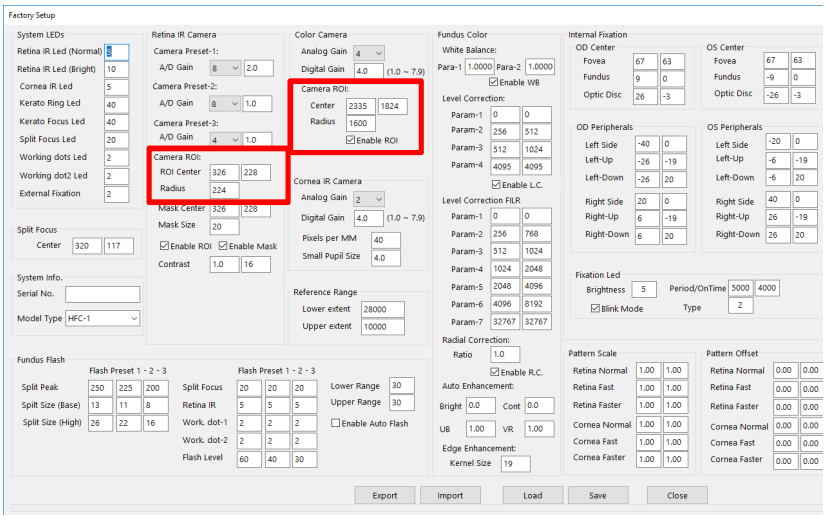


- Check the values 'Diopter Position', 'Quick Return Mirror', 'Split Focus Mirror'.

- Compare with previous values. (You can check previous values on capture image in the folder (C:₩HFC-1₩(version)₩backup))

- If the values are different, change the values to previous values.

- And If you changed the value again, capture and save the dialog window.



- Click the 'Factory setup'

- You will see above 'Factory setup' dialog.

- Compare with 'Camera ROI' on the Retina IR Camera tap, 'Camera ROI' on the Color Camera in the same way as above.

- If the values are different, change the values to previous values.

- And If you changed the value again, capture and save the dialog window.

GACriteria	- FOV : Deg 45, 12.5mm cf) The outer line is 45 °, the second line is 43.5 °
Tested Example	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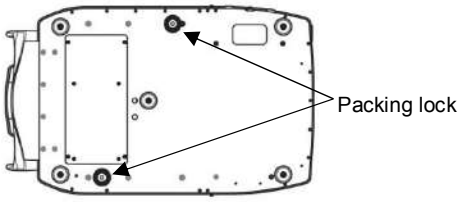
20200708
(주)휴비츠
관 리 본

6. Installation Procedure

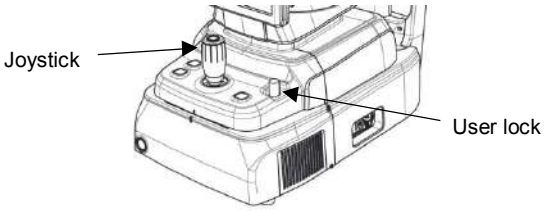
6.1 System installation

① Place the main body unit on a stable table.

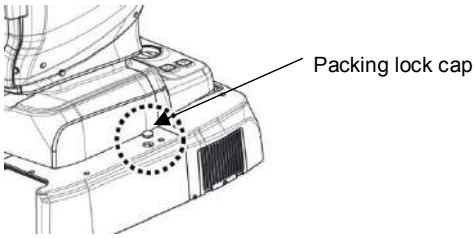
② Loosen the two packing lock screw under the main body.



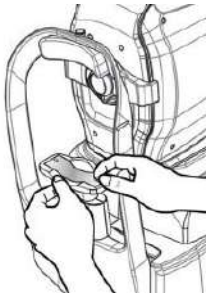
③ Unscrew the user lock lever on the body.



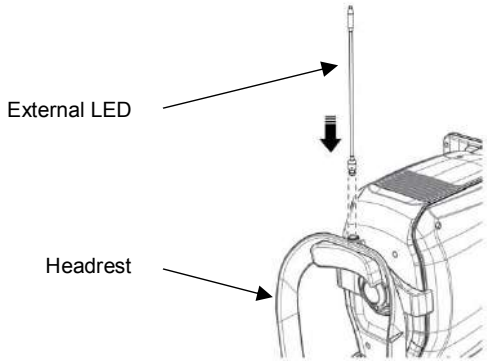
④ Attach two base packing lock cap while moving body left and right with joystick.



⑤ Attach the chinrest paper to the chinrest.

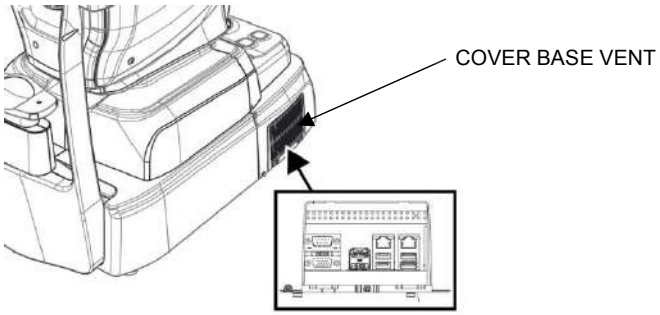


⑥ Attach external LED to the headrest



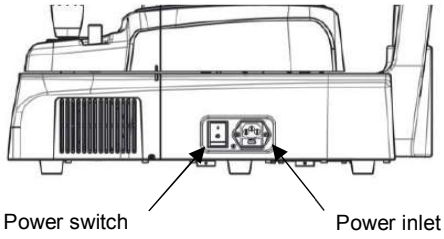
⑦ If needed, connect external devices.

- Open ‘COVER BASE VENT’ on the left bottom of base with screw driver.
- If needed, connect mouse or keyboard
- Connect communication cable of external device.
- Close ‘COVER BASE VENT’ with screw driver.

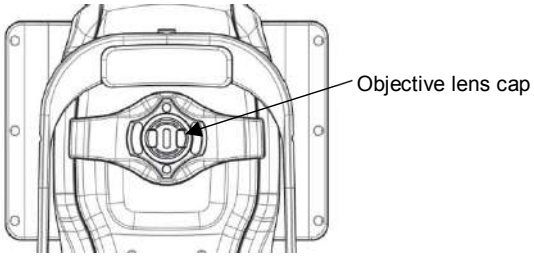


⑧ Check the power switch on the bottom right of base is off. (O position).

⑨ Connect power cable to power inlet. Also, connect the other side of power cable to electric outlet.



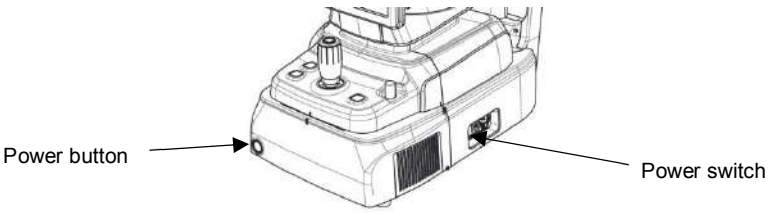
⑩ Remove objective lens cap, and check objective lens is clean,



⑪ If external devices are connected, turn on external devices first.

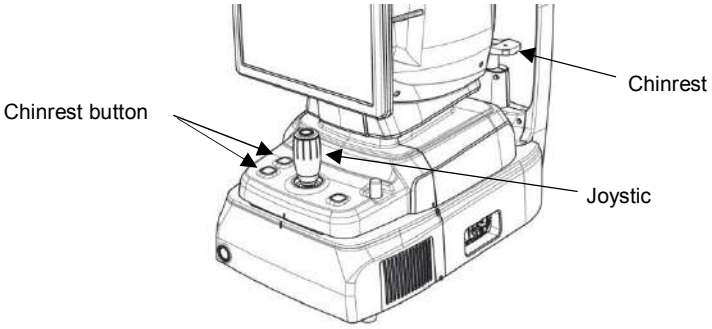
⑫ Turn on the main body by pressing power switch (I position)

⑬ Turn on the internal PC by pressing power button.



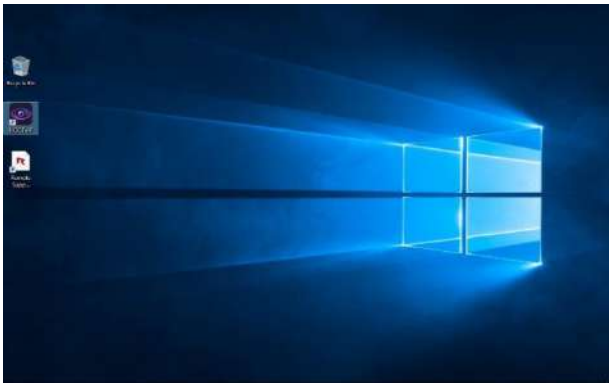
⑭ Check there is no error during initialize process.
Wait for until the initialization is complete.

⑮ Check the movement of body with joystick. Also, check the movement of motorized chinrest with chinrest button.

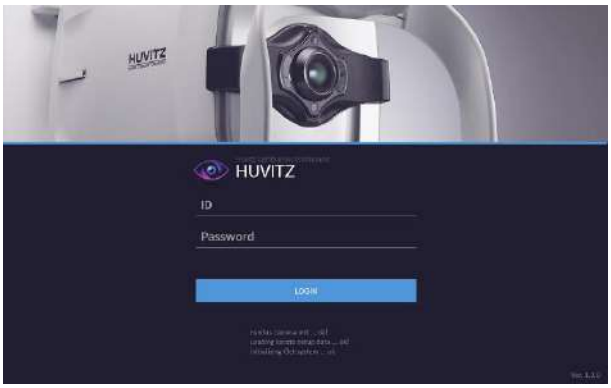


6.2 Operation Software

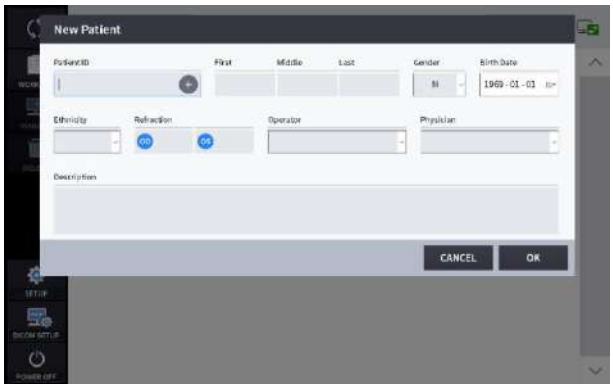
① Double-click the program icon on the LCD screen.



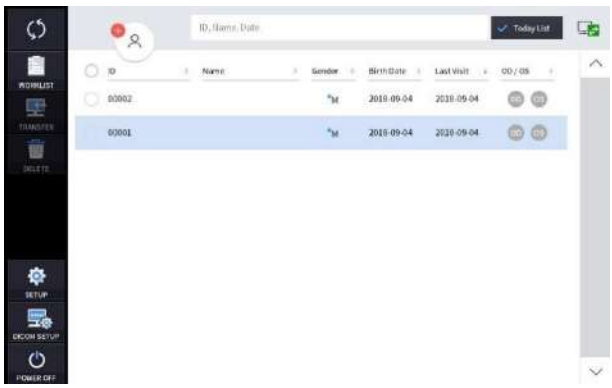
② When the initialization is complete, "Initializing Oct system...ok" will appear at the bottom of the screen.
After initialization, log in by entering the ID and password.



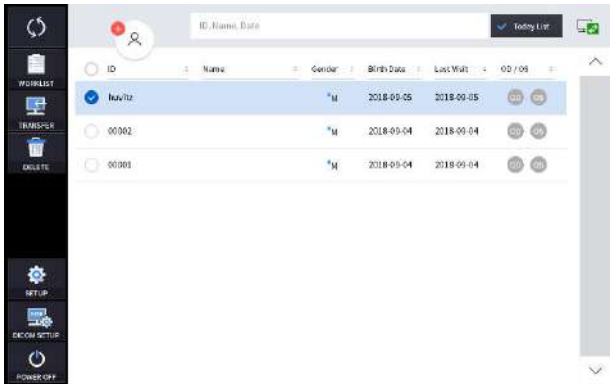
③ Press register patient icon ( ) and input patient information. If patient is resisted already, skip this step.



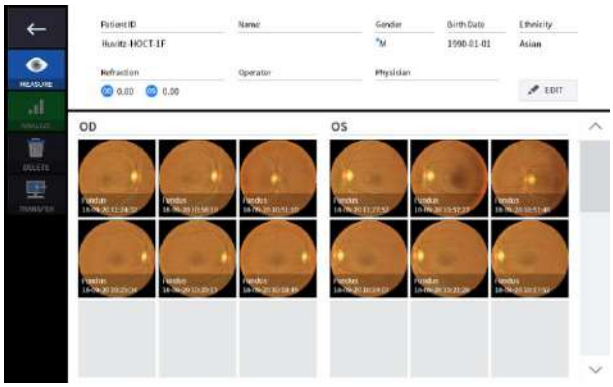
④ Select patient and check patient information is correct.



⑤ If you want to send patient information to a web viewer or delete patient information, select the circle next to the ID and press the TRANSFER icon or DELETE icon.



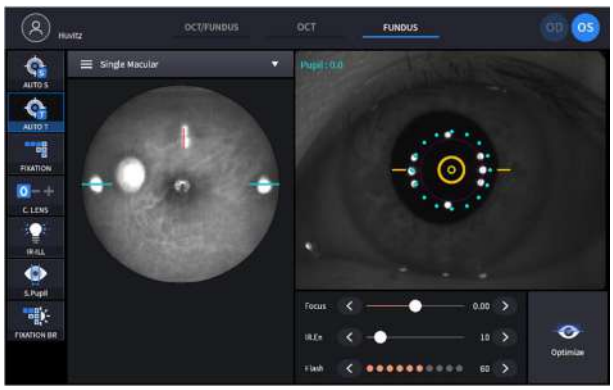
⑥ When you select a patient, the screen changes.



⑦ Enter observation mode by pressing measure icon (

).

The screen of observation mode is as follow.



6.3 SETUP Mode

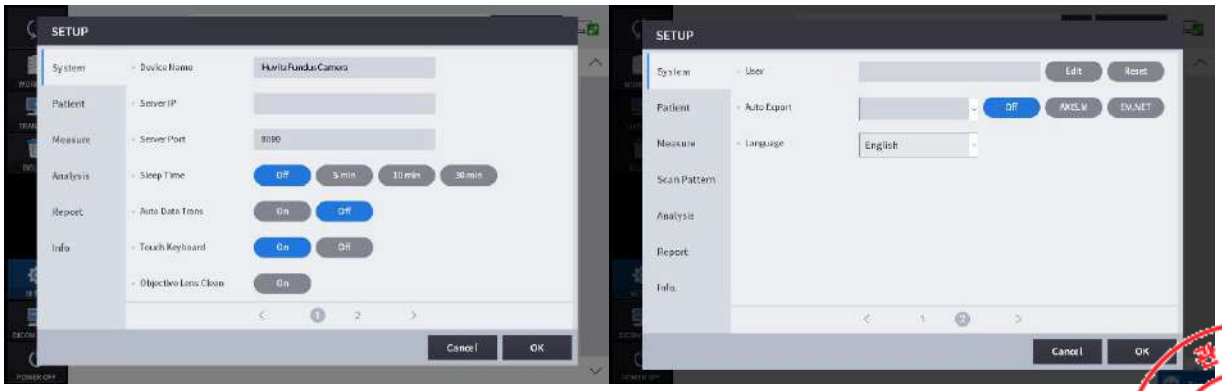
[To choose the section to setup]

- Setup mode consists of seven sections: System, Patient, Measure, Analysis, Report and info. You can select the section to setup from the left side.
- You can navigate the setup items with the page move buttons [< , >] or the page numbers [1 , 2] at the bottom.

[To change settings]

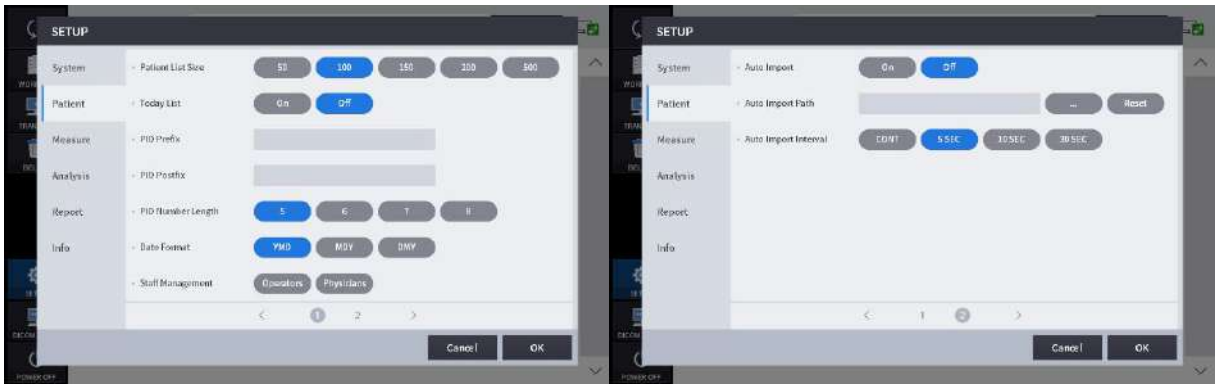
- Select the item to change.
- To press OK button [OK] will save all the changes made and exit the setup screen.
- To press CANCEL button [Cancel] will discard the changes and exit the setup screen.

1. System Settings



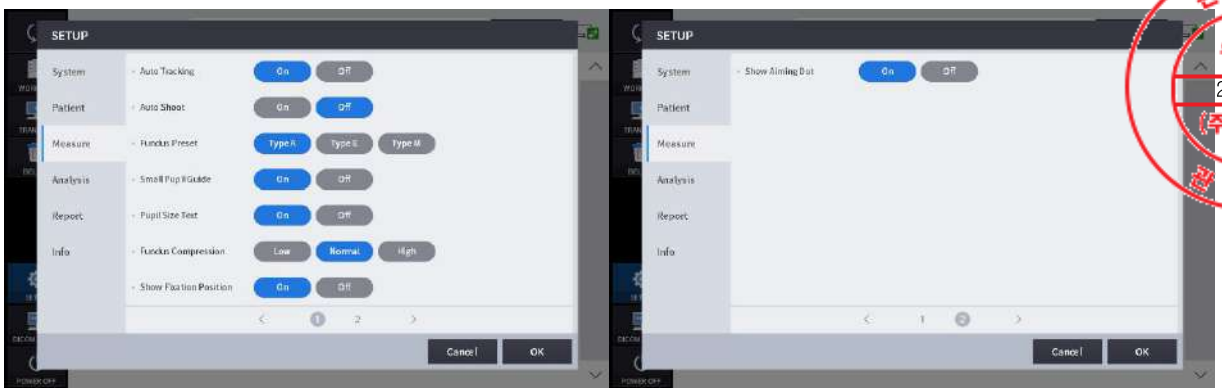
Device Name	Set Device Name.
Server IP	Web Viewer Server IP address setting.
Sever Port	Web Viewer Server port setting.
Sleep Time	Sleep mode setting.
Auto Data Trans	Set the function to transfer the measured data to Web Viewer automatically.
Touch Keyboard	Touch Keyboard ON/OFF setting.
Objective Lens Clean	When this option is turned on, the Light is turned on for convenient cleaning of the Objective Lens.
User	Set User ID and Password for Login.
Auto Export	Auto export setting
Language	Language setting.

2. Patient Settings



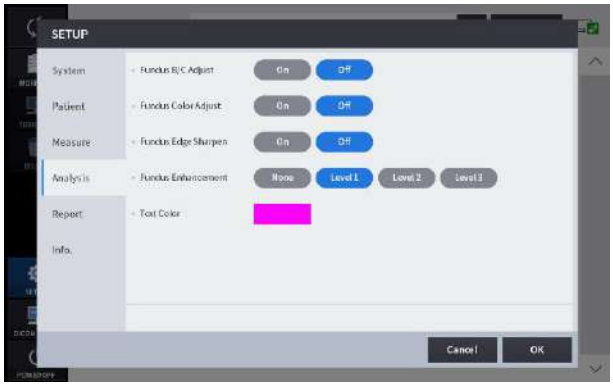
Patient List Size	Number of patients to be displayed per pages.
Today List	Today List (List of patients visited today) settings.
PID Prefix	The function to set the prefix of the patient ID.
PID Postfix	The function to set the postfix of the patient ID.
PID Number Length	The function to set the length of patient ID.
Date Format	Format of the date (Year, Month, Day).
Staff Management	Register staffs
Auto Import	Auto import setting
Auto Import Path	Assign the import path
Auto Import Interval	Set the interval of auto import

3. Measure Settings.



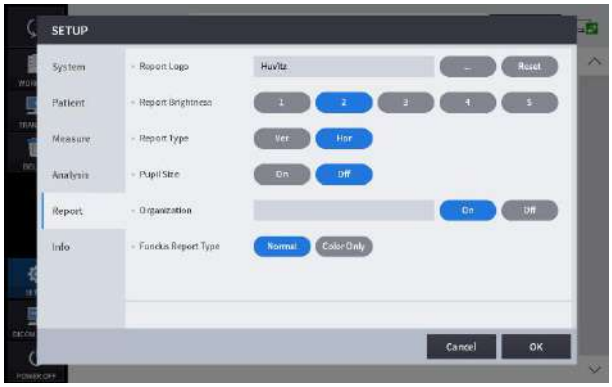
Auto Tracking	Auto Tracking ON/OFF setting.
Auto Shoot	Auto Shoot ON/OFF setting.
Fundus Preset	Set fundus Preset.
Small Pupil Guide	Small Pupil Guide ON/OFF setting.
Pupil Size Text	Pupil Size Text ON/OFF setting.
Fundus Compression	Set the Fundus image compression ratio.
Show Fixation Position	Show Fixation Position ON/OFF setting.
Show Aiming Dot	Show Aiming Dot ON/OFF setting.

4. Analysis Settings



Fundus B/C Adjust	Apply the standard values of brightness and contrast to the measured fundus image automatically.
Fundus Color Adjust	Apply the standard values of UB and VR to the measured fundus image automatically.
Fundus Edge Sharpen	Apply edge sharpening function to the measured fundus image automatically.
Fundus Enhancement	Set the enhancement level of Fundus image
Text Color	Set the measurement value text(ruler value) color.

5. Report Settings



Report Logo	Set the report logo image.
Report Brightness	Set the report print brightness.
Report Type	Set the orientation of report print.
Pupil Size	Set the pupil size information.
Organization	Assign the organization.
Fundus Report Type	Decide the type of fundus image.

6.3 DICOM SETUP Mode

1. Worklist Setting

Server IP	IP Address of the PC where the server program is installed.
Server Port	Set Port Number.
Server AE	Set Server AE.
Client AE	Set Client AE.

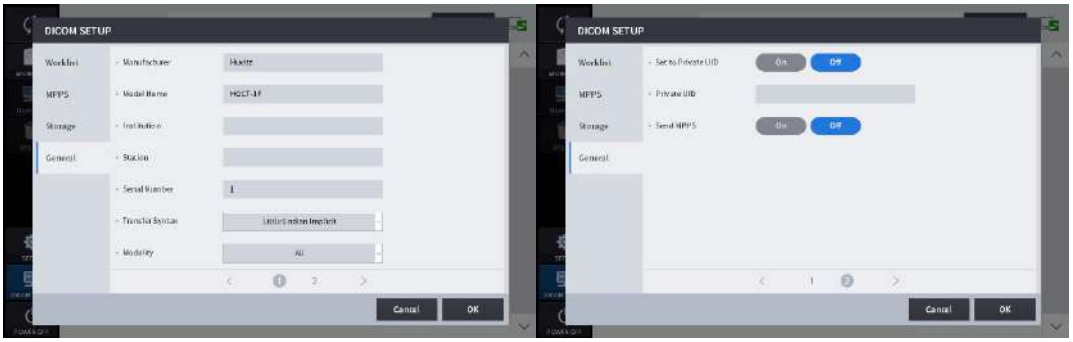
2. MPPS Setting

Server IP	IP Address of the PC where the server program is installed.
Server Port	Set Port Number.
Server AE	Set Server AE.
Client AE	Set Client AE.

3. Storage Setting

Server IP	IP Address of the PC where the server program is installed.
Server Port	Set Port Number.
Server AE	Set Server AE.
Client AE	Set Client AE.

4. General Setting



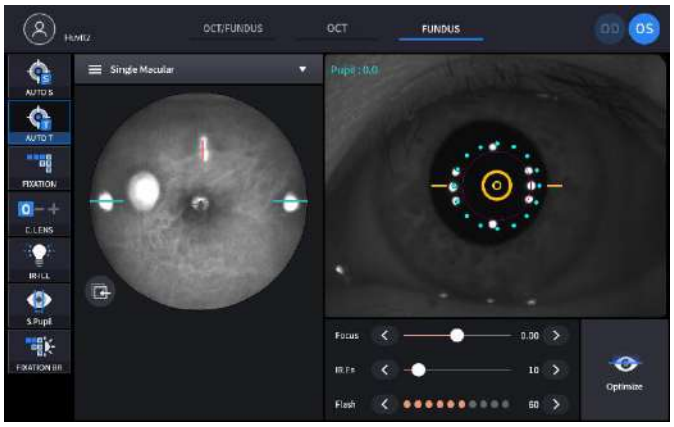
Manufacturer	Set the name of the manufacturer.
Model Name	Set the Model Name.
Institution	Set the name of the institution.
Station	Set the name of the Station.
Serial Number	Set the Serial Number.
Transfer Syntax	Set the Transfer Syntax.
Modality	Set the Modality.
Set to Private UID	Set Private UID ON/OFF setting.
Private UID	Set the Private UID.
Send MPPS	Set Send MPPS ON/OFF setting

7. Maintenance

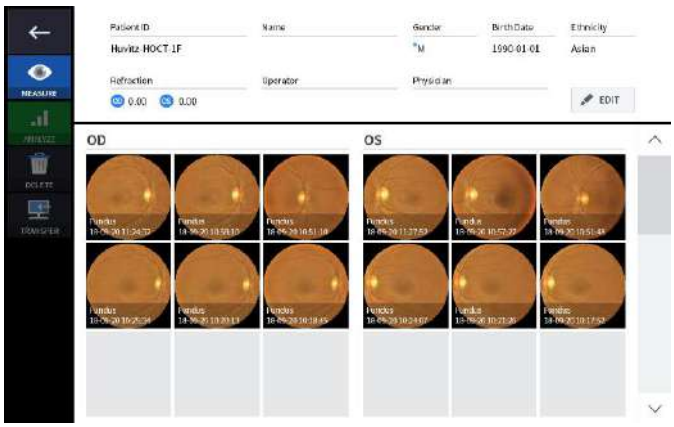
7.1 After operation

1. Exit HFC software and Power off.

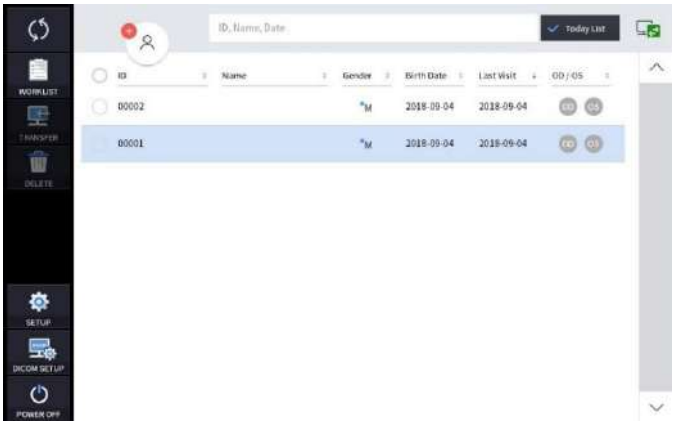
(1) Select the Patient information icon ( ) in the upper left corner of the screen.



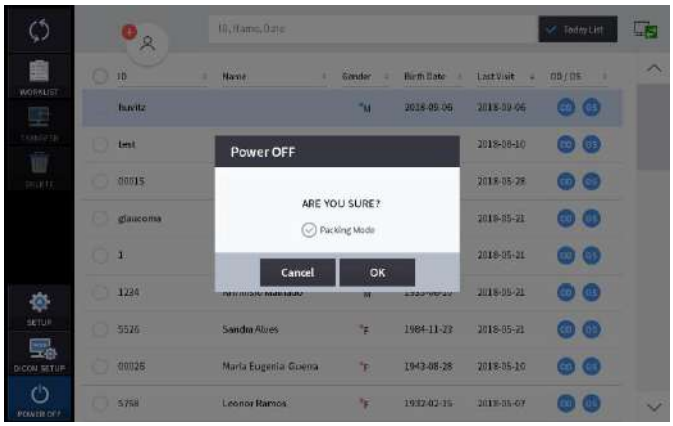
(2) Select the Previous screen icon ( ) in the upper left corner of the screen.



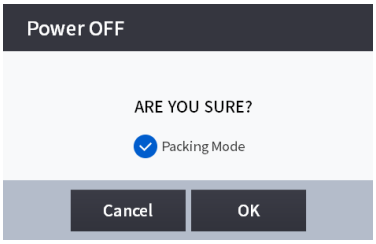
(3) Select the Power Off icon (POWER OFF) from the bottom left corner of the screen.



(4) Selecting POWER OFF icon (POWER OFF) shows a pop-up window show below.



(5) Checking the Packing Mode will move chinrest and the body of HFC to the lowest position before Power off (This is for packaging).

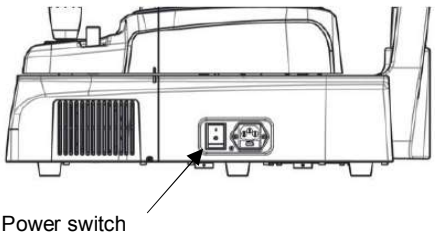


NOTE

To put the equipment in the packing box, select Packing Mode and then press OK to finish.

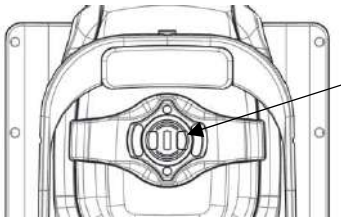
2. Turn off external devices (monitor, etc.) if any external device is connected.

3. Turn the power switch off(O) on the base plate.



7.2 Cleaning

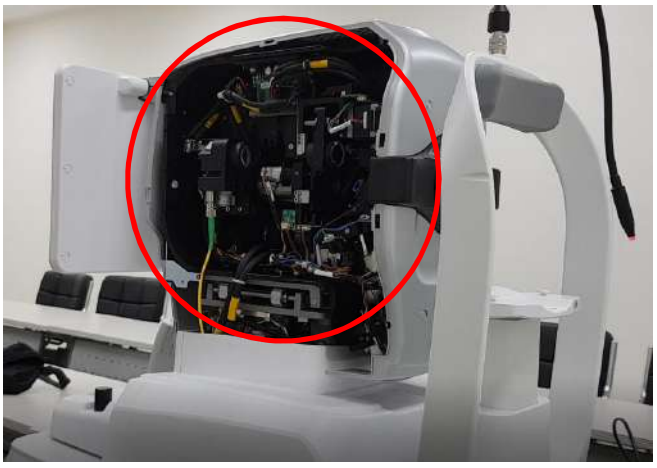
1. Cleaning objective lens
   ① Cover the objective lens with lens cap to protect the lens from external pollution.
   ② Use blower for removing dust on the surface of lens.



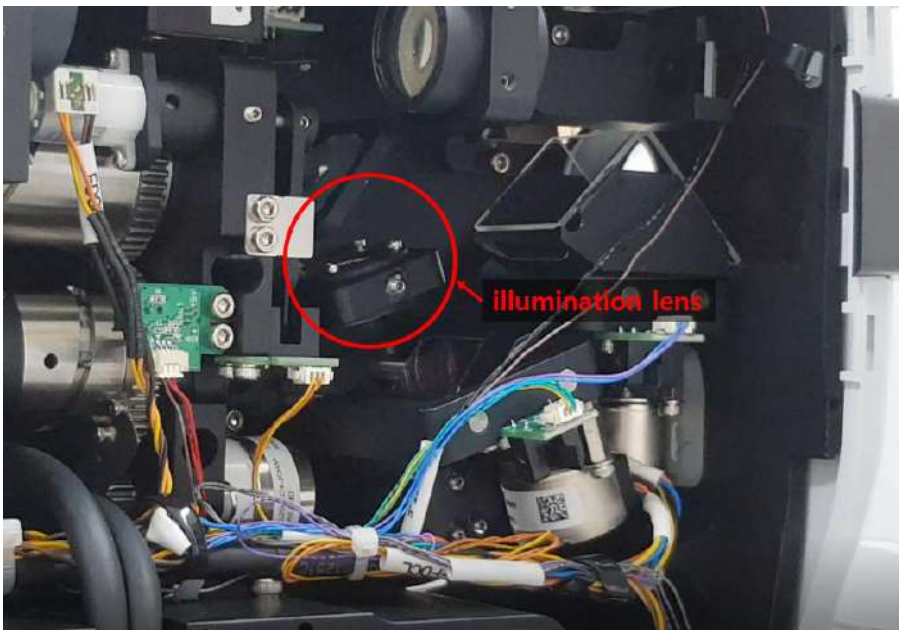
Blower

   ③ Any contaminants on the objective lens will affect the measurement.
   Wipe them using soft cotton swab or lens cleaning paper moistened with alcohol.
   ④ Be careful not to use the wrong tools, so as not to damage the surface of the lens.
   ⑤ When the Objective Lens Clean option in Setup mode is ON, the light is turned on to facilitate cleaning of the Objective Lens.

2. Cleaning illumination lens
   ① Remove the cover as shown below.

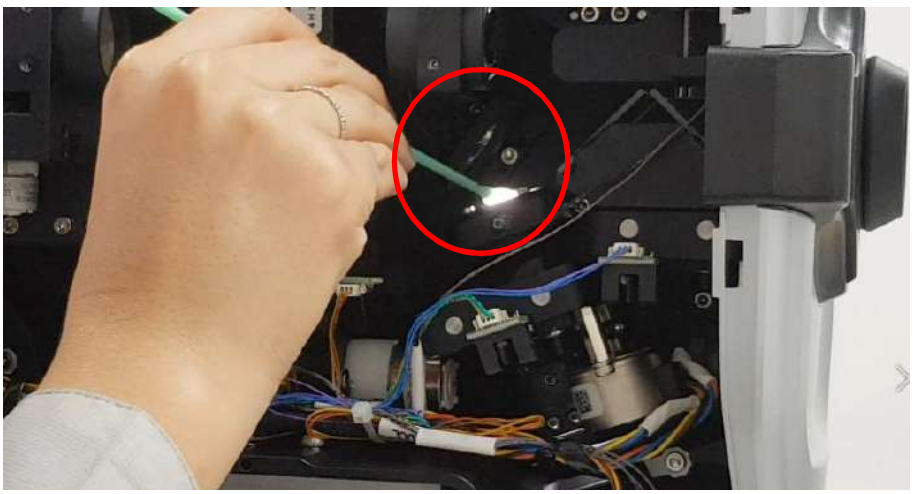


   ② Run the 'Device Calibrator.exe' and click the 'Color Camera Test.'
   ③ Click the ' LEDs' and check the 'continuous mode'. The LED will then turn on.
   ④ Use blower for removing dust on the illumination lens surface



⑤ Cleaning illumination lens as shown below.

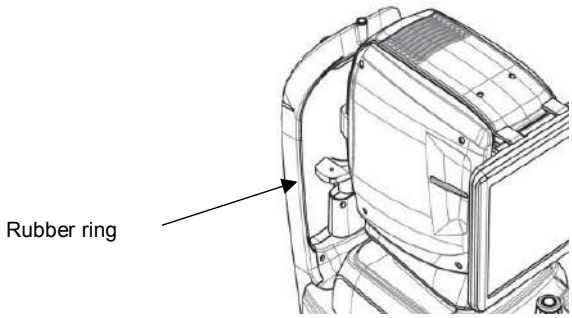
Wipe them using soft cotton swab moistened with alcohol.



3. System exterior
   ① Keep system exterior clean with a soft close. For severe stains, wipe with a soft cloth with neutral detergent diluted with water. Do not use organic solutions such as thinner or benzene.
   ② Wipe the touch screen with dry soft cloth. Do not use sponge or cloth soaked with large amount of liquid.
   ③ Do not press hard or place magnetic objects near the touch screen.

4. Part of patient contact
   ① Wipe the headrest and the chinrest with a clean cotton swab or gauze. For severe stains, use a soft cloth with alcohol.
   ② Remove a single sheet of chinrest paper if the chinrest paper is used.

5. Others
   ① Cover device with dustcover for unused storage for a long time.
   ② Clean headrest and chinrest with alcohol before sending device to authorized agent or Huvitz for maintenance.
   ③ The rubber ring inserted to conceal the wires may be out during use. It can be used either by inserting it again or by removing it.



⚠ CAUTION

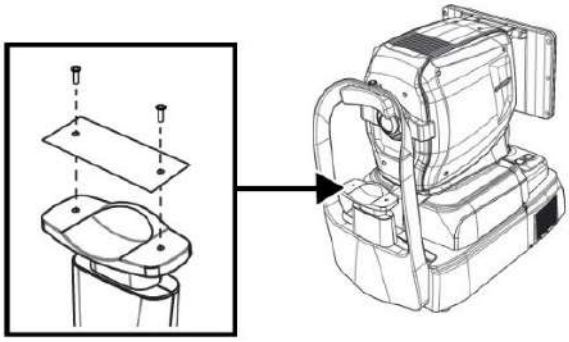
Do not use the solvents such as strongly volatile substance, thinner, benzene, etc
Do not use a sponge or cloth soaked in water because the water might leak into the equipment.
Clean headrest rubber and chinrest with an alcohol before sending device to authorized agent or Huvitz for maintenance.

N'utilisez pas de solvants tels que des substances fortement volatiles, des diluants, du benzène, etc.
N'utilisez pas d'éponge ou de chiffon imbibé d'eau car l'eau pourrait s'infiltrer dans l'équipement.

Nettoyez le caoutchouc de l'appuie-tête et la mentonnière avec de l'alcool avant d'envoyer l'appareil à un agent autorisé ou à Huvitz pour l'entretien.

7.3 Replacement of consumables and fuse

1. Replacing chinrest paper
   - ① Pull out two fixing pins from chinrest.
   - ② Put a new chinrest paper on the chinrest.
   - ③ Insert two fixing pins into the chinrest paper hole.
   - ④ Attach the chinrest paper to the chinrest.



2. Replacing fuse
   - ① Ensure the power switch of device off (O).
   - ② Remove power cable from inlet.
   - ③ Pull out fuse holder in the inlet with a tweezers.
   - ④ Replace two new fuses in the fuse holder. Be sure to check the fuse specification for the replacement (250V T 3.15AL).
   - ⑤ Insert fuse holder into the inlet.

7.4 How to pack the device

1. Make sure to shut down the device with ‘Packing Mode’.
   Refer to “7.1. After operation”

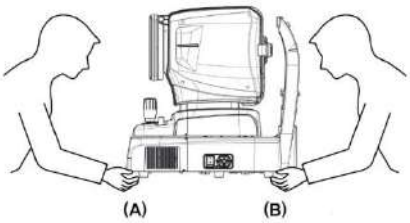
2. Tidy the device up in reverse order of system setup.
   Refer to “6.1. System installation”
   Make sure to fasten two ‘Packing lock’ under the device bottom.
   Screw the user lock lever on the body

3. Have the packing box and bottom foam ready.

4. Open the vinyl envelop wide.

5. Insert ‘Headrest Foam’ as shown below.

6. Put down the device while checking the device direction.



7. Insert the foams while checking front and back side.

8. Close the top foam and put accessories to the right position.

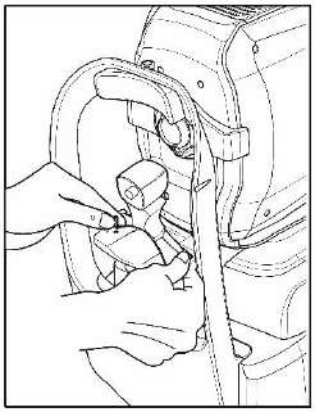
9. Close the box and seal with plastic tape.

7.5 Self-diagnosis using Model eye

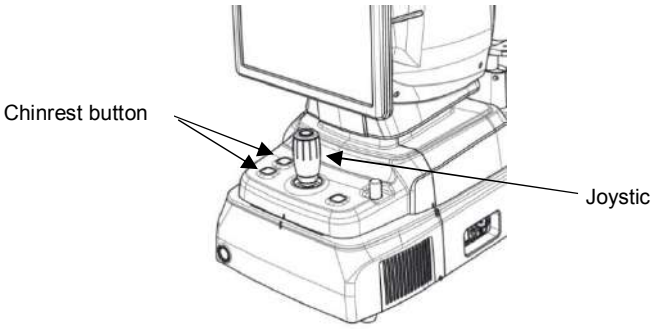
1. How to mount Model eye

① Remove chinrest paper.

② Mount Model eye as shown below and then fix it using two paper pins.

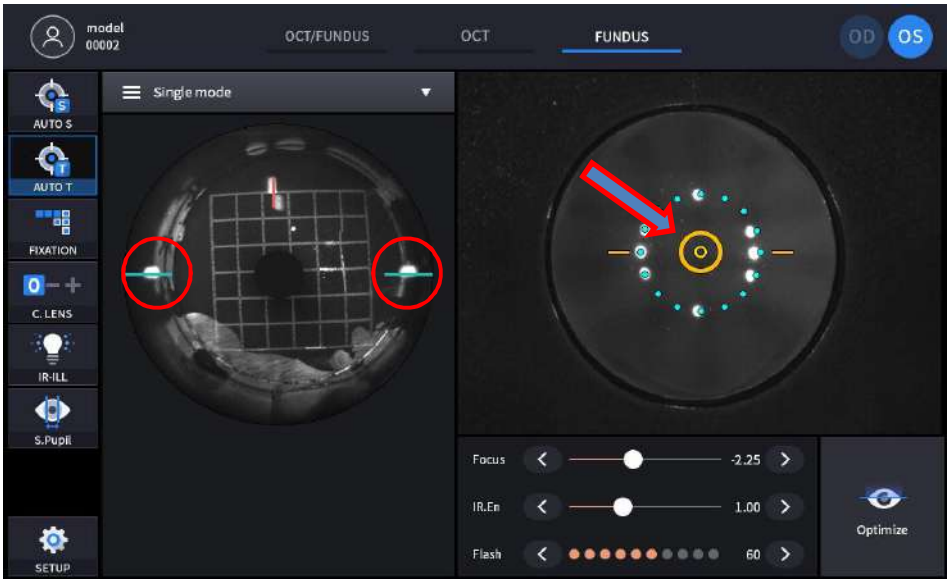


③ Align the center of the Model eye with the objective lens using joystick and chinrest button.



2. Checking working distance

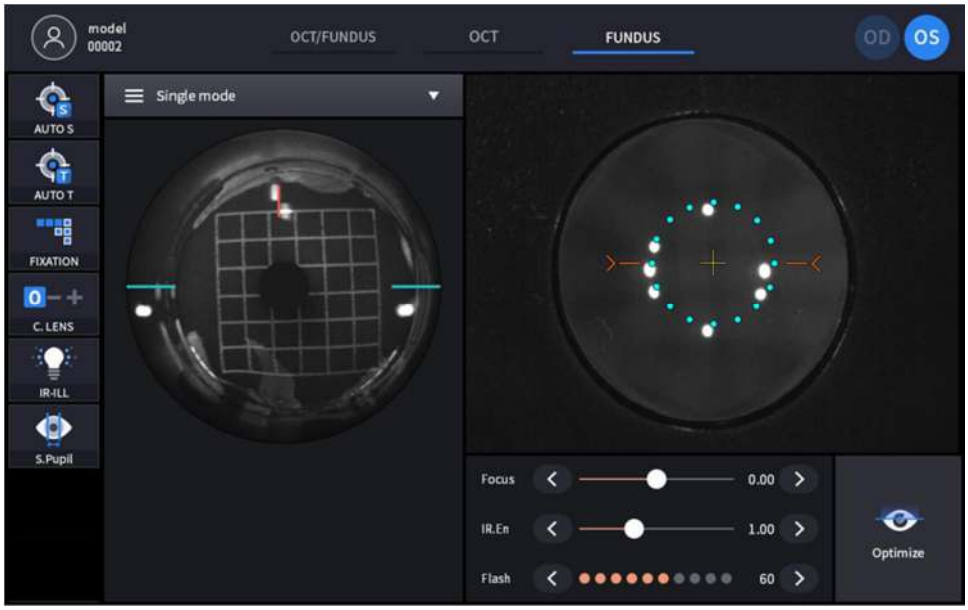
① Select FUNDUS measurement in MEASURE mode.



- At anterior screen, align the device till the target mark (circular orange) appears which indicated the Model eye and the device's alignment and focusing is correct.
- Align the device till the working dot marked red on the left IR screen to be positioned on the blue guide line and also the size to be smallest while maintaining the target mark (circular orange) to be displayed.
- KERATO SETUP shall be performed when the Working dot is extremely distorted while the target mark (circular orange) displayed.

3. Checking anterior lightning LED

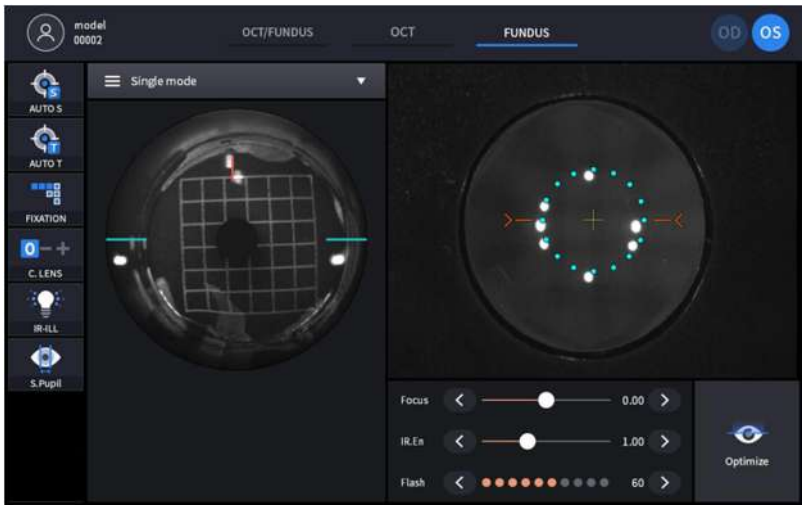
① Select FUNDUS measurement in MEASURE MODE.



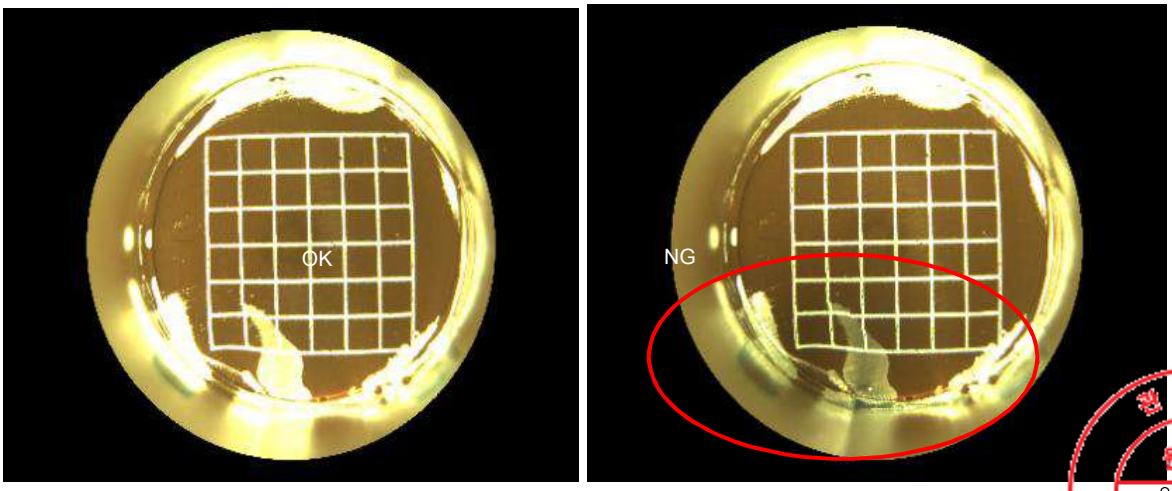
- Check anterior lighting LED. They consist of six dots except two center dots out of eight dots at anterior screen.
- KERATO SETUP shall be performed after changing LED when there is a problem with the LED and the LED shows OFF as number six shown in the picture.

4. Check Fundus Camera

① Select FUNDUS Mode and measure Fundus.

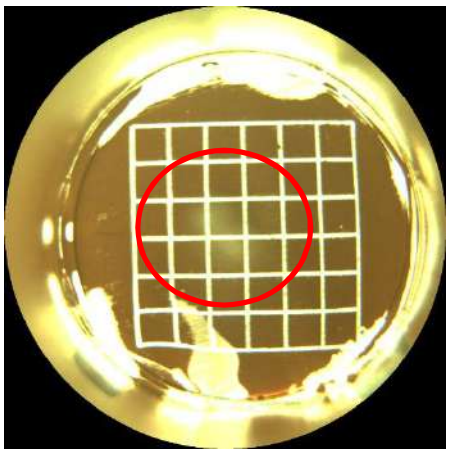


② Check if there are asymmetric areas as right picture from the measured images.



- If there are some, re-boot the device and measure again.

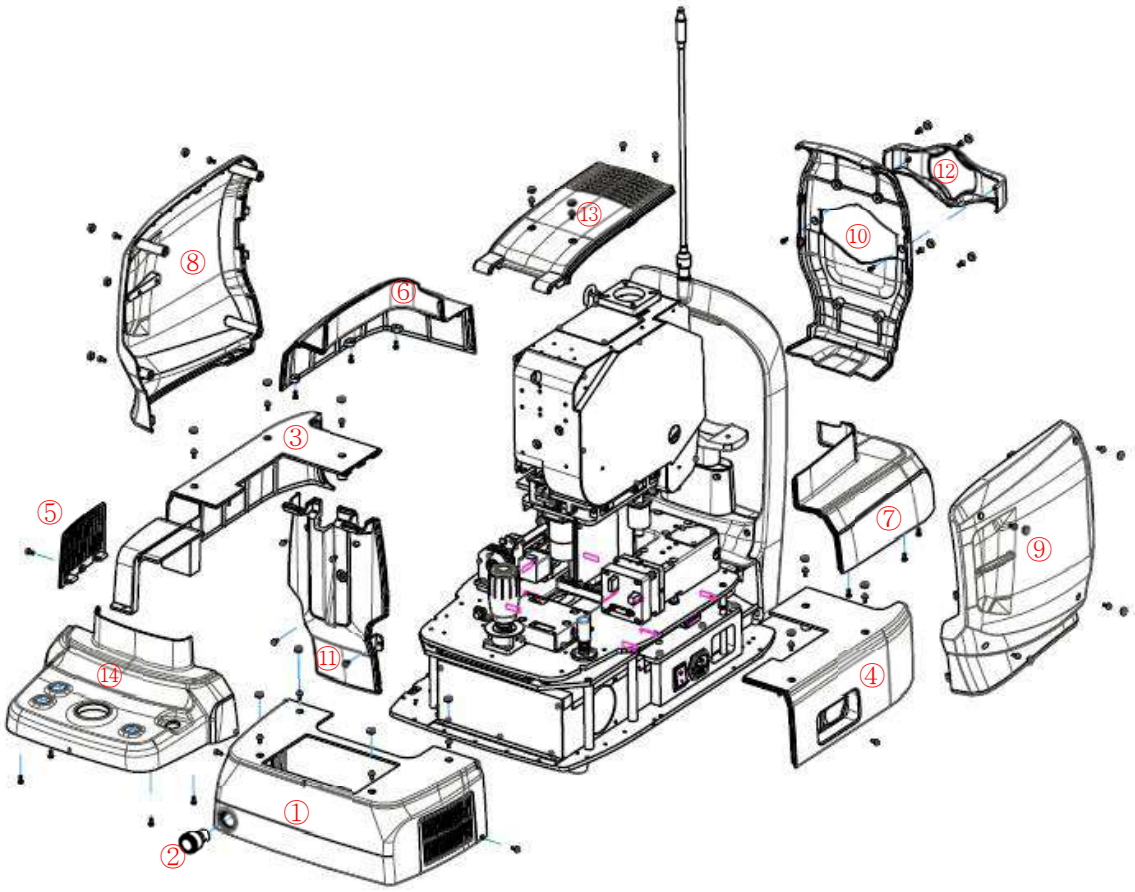
③ Check if there are any blurriness or smear as below picture from the scanned images.



- If blurriness or smear appears, clean the finger prints or stain on the objective lens.

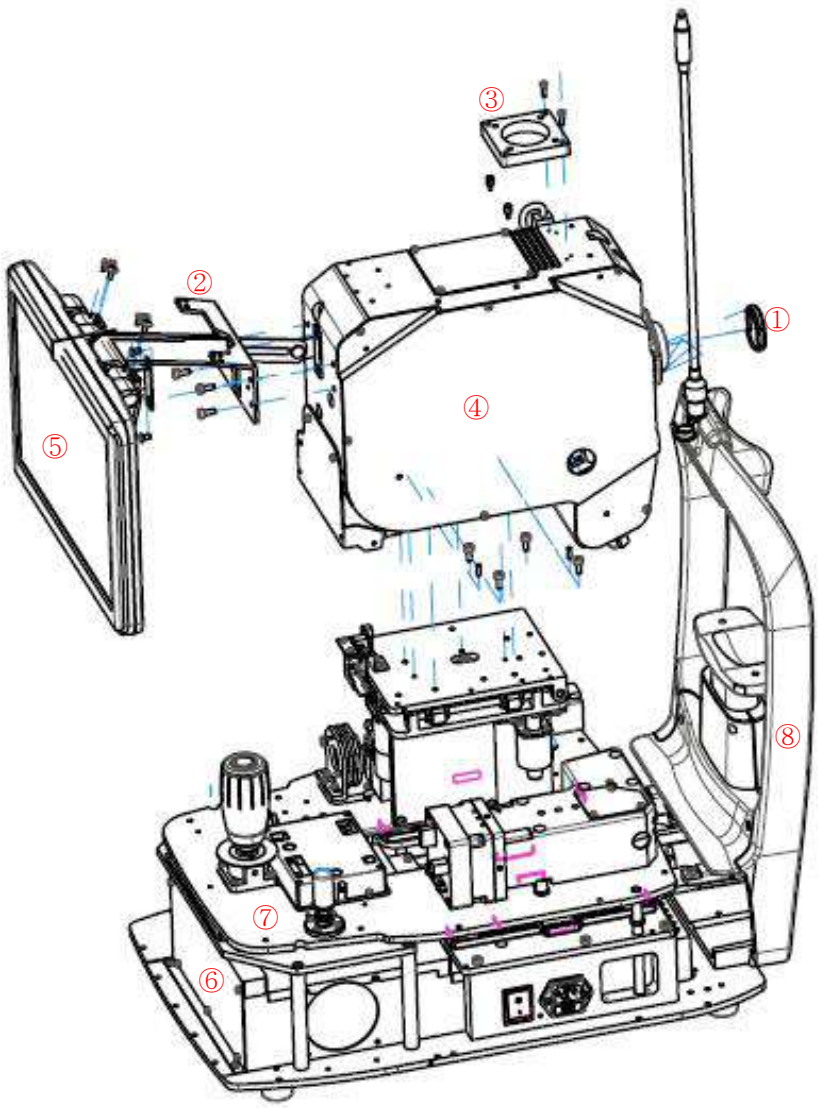
8. Exploded Diagram

8.1 COVER ASSY



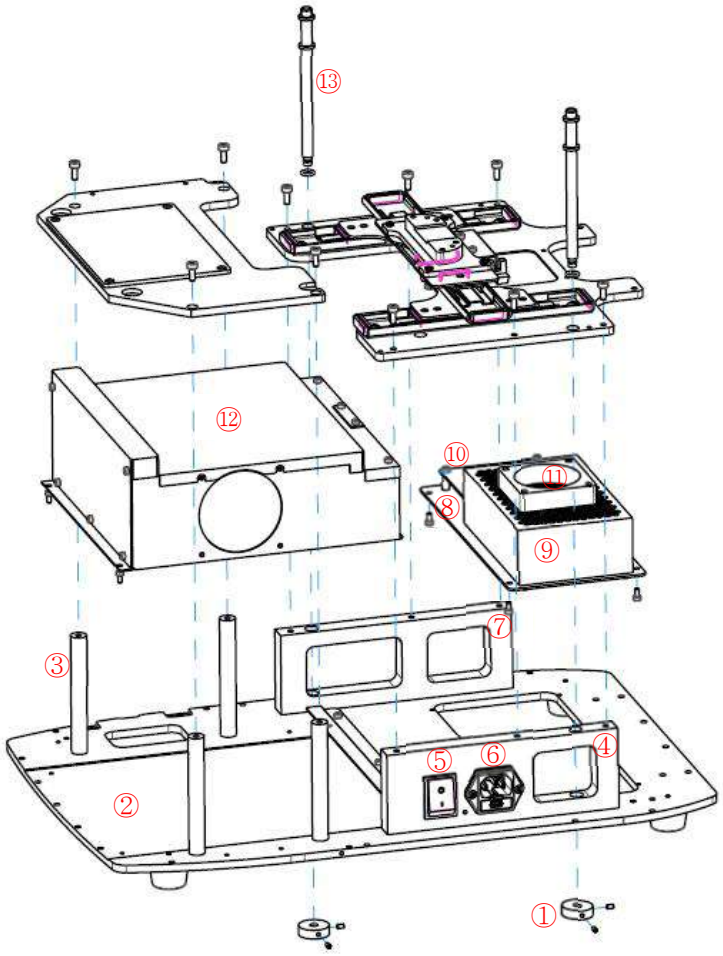
NO	CODE	PART NAME	Quantity	REMARK
1	2000A001287	W2_COVER-BASE-FRONT	1	
2	W2EHAR0059	HARNESS(SOFT SWITCH LINK TO SOFT SWITCH)	1	
3	2000A001288	W2_COVER-BASE-LEFT	1	
4	2000A001289	W2_COVER-BASE-RIGHT	1	
5	2000A001290	W2_COVER-BASE-VENT	1	
6	2000A001294	W2_COVER-MOVING-LEFT	1	
7	2000A001295	W2_COVER- MOVING-RIGHT	1	
8	2000A001296	W2_COVER-OT-LEFT	1	
9	2000A001297	W2_COVER-OT-RIGHT	1	
10	2000MS00118	W2_COVER-OT-BACK	1	
11	2000MS00119	W2_COVER-OT-FRONT	1	
12	2000MS00120	W2_COVER-OT-MIRE-RING	1	
13	2000MS00121	W2_COVER-OT-TOP	1	
14	2000A001293	W2_COVER-MOVING-FRONT	1	

8.2 UNCOVER ASSY



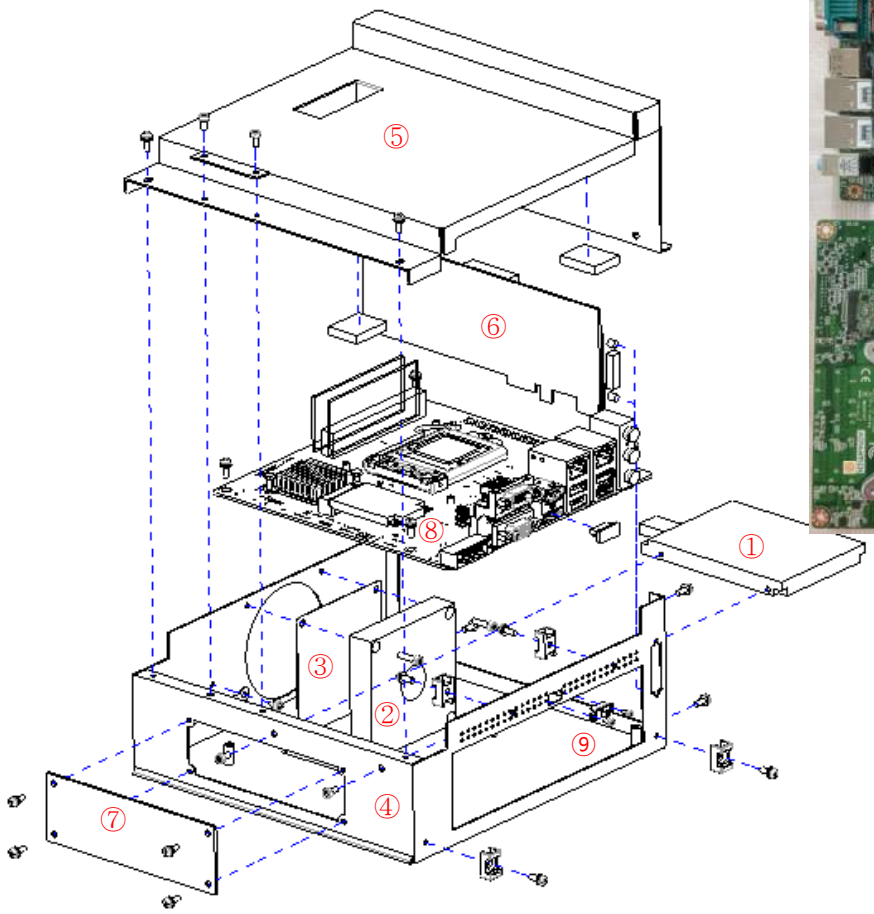
NO	CODE	PART NAME	Quantity	REMARK
1	3099A000094	LENS-CAP-37MM	1	
2	1330A000038	W2_OT-LCD-SUPPORT	1	
3	W2EHAR0072	HARNESS(MB TO OPTICAL FAN)	1	
4	W2MASSY002	W2_OPTICAL-ASSY	1	
5	W2MASSY054	W2_LCD-ASSY	1	
6	W2MASSY004	W2_BA-BASE-ASSY	1	
7	W2MASSY005	W2_MO-BASE-ASSY	1	
8	W2MASSY006	W2_HR-HEAD-REST-ASSY	1	

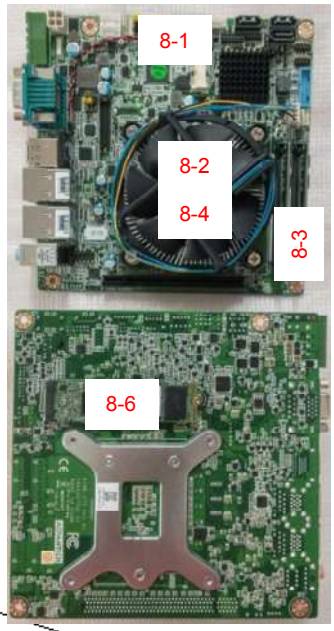
8.3 BASE ASSY



NO	CODE	PART NAME	Quantity	REMARK
1	1200A00A201	PACKING_LOCK_KNOB	1	
2	1200A000364	W2_BA-BASE-PLATE	1	
3	1210A000870	W2_BA-HEXA-SUPPORT	4	
4	1200A000366	W2_BA-BASE-PLATE-SUPPORT-R	1	
5	76010010002	SWITCH(ON-OFF)	1	
6	79050010004	AC INLET FILTER	1	
7	1200A000365	W2_BA-BASE-PLATE-SUPPORT-L	1	
8	1330A000025	W2_BA-SMPS-PLATE	1	
9	75010010008	SMPS	1	
10	W2EPCB0016	PCB ASSY(BASE IF-110)	1	
11	W2EHAR0064	HARNESS(SMPS TO SMPS FAN)	1	
12	W2MASSY011	W2_BA-PC-BOX-ASSY	1	
13	1200A000368	W2_PACKING-LOCK-SHAFT	2	

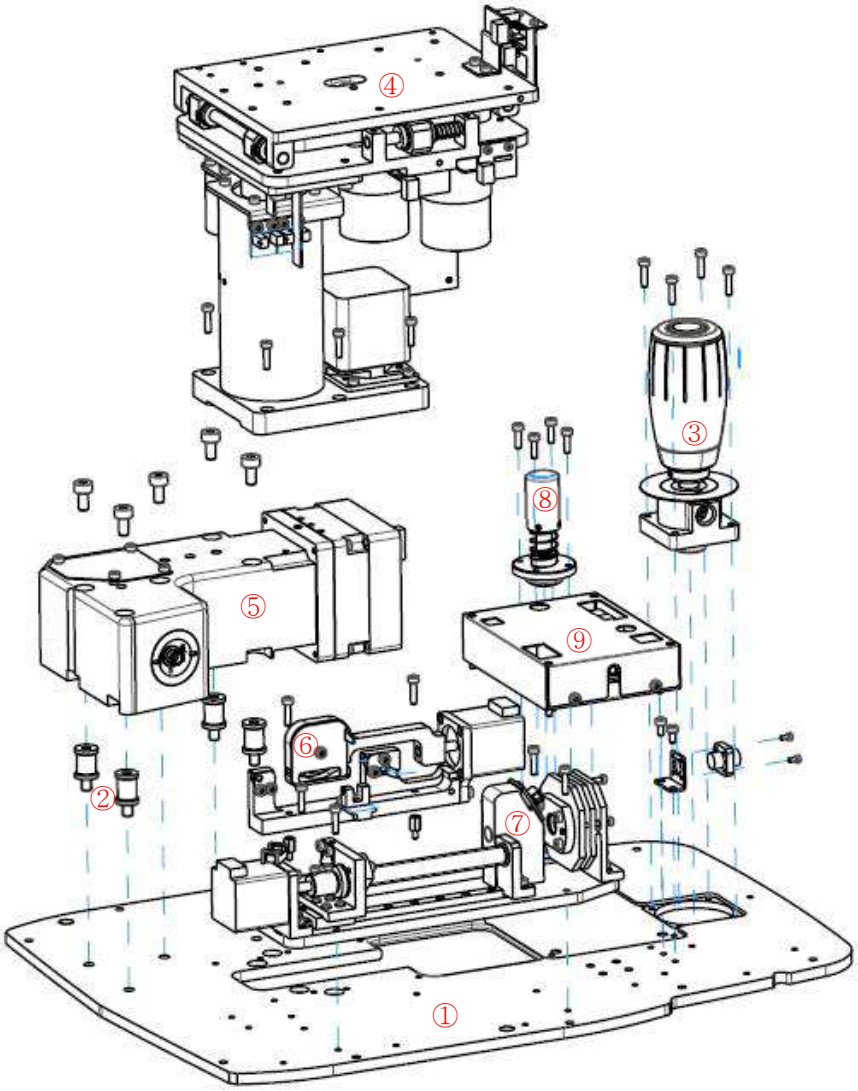
8.4 PC BOX ASSY





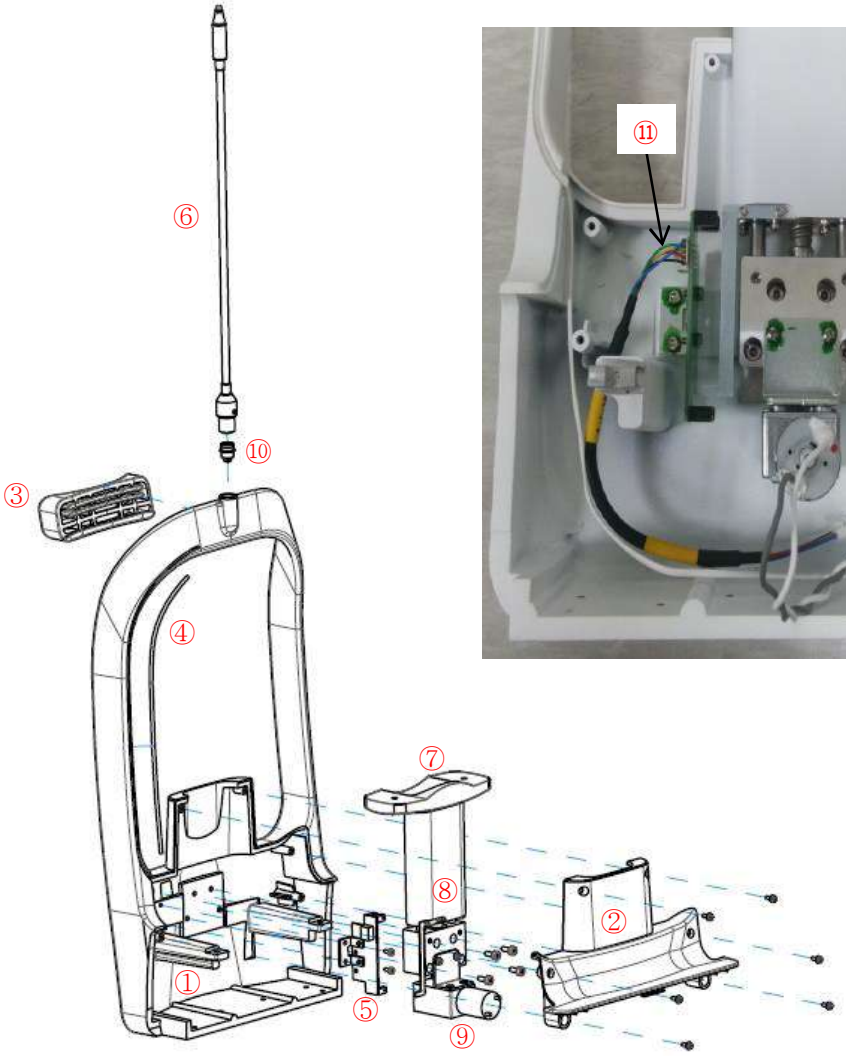
NO	CODE	PART NAME	Quantity	REMARK
1	79990010011	HDD(2.5Inch 1TB)	1	
2	79990010014	HARNESS(PC TO SYSTEM FAN)	1	
3	1310A000183	W2_BA-COOLING-FAN-GRILL	1	
4	3024A000089	W2_BA-PC-BOX-1	1	
5	3024A000090	W2_BA-PC-BOX-2	1	
6	76SOL6M0001	FRAME GRABBER	1	
7	W2EPCB0017	PCB ASSY(PC IF-100)	1	
8-1	79990010022	PC MOTHER BOARD	1	PC SET
8-2	62080010010	IC(CPU)	1	
8-3	62020010008	RAM(DDR4 4GB SODIMM)	1	
8-4	79990010023	FAN(CPU)	1	
8-5	79990010024	OS(WINDOWS)	1	
8-6	79990010012	SSD(M.2 128GB)	1	
9	W2EHAR0073	HARNESS(PC TO CMOS RESET SWITCH	1	

8.5 MOVING BASE ASSY



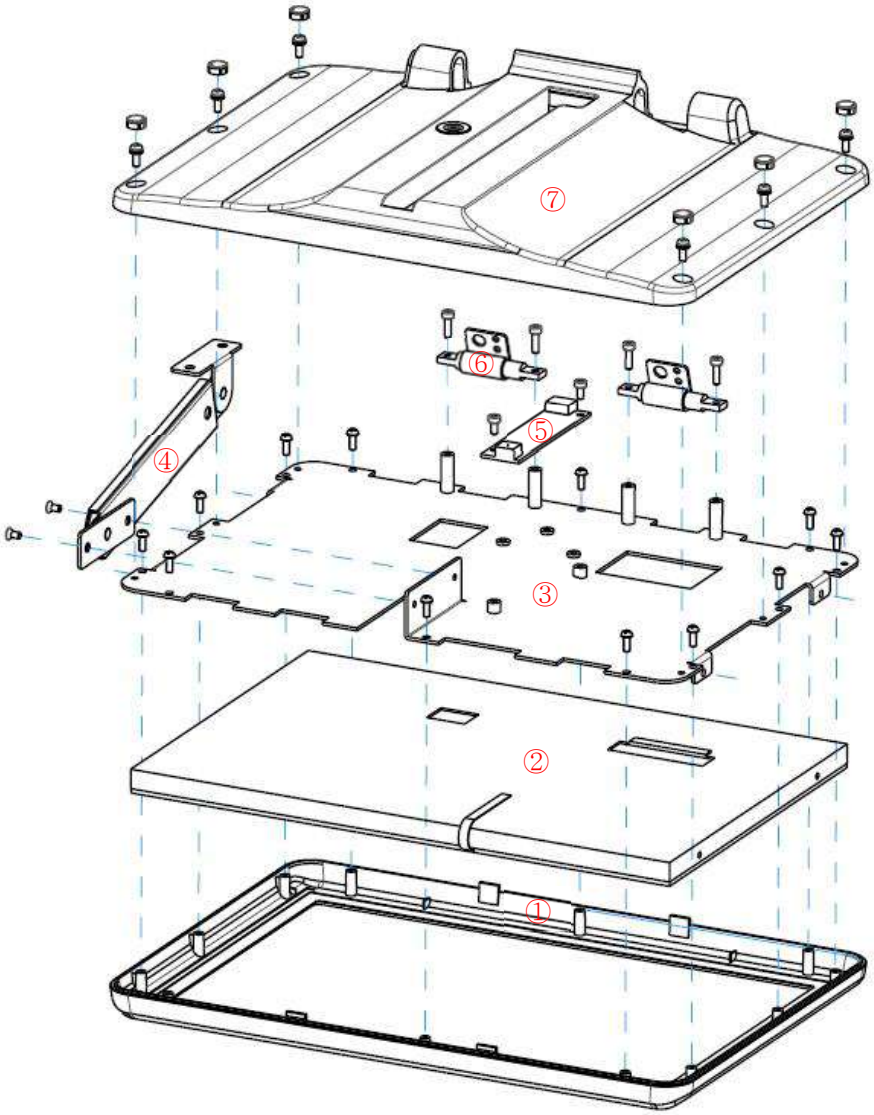
NO	CODE	PART NAME	Quantity	REMARK
1	1200A000372	W2_MO-BASE-PLATE	1	
2	1250A000063	W2_SPECTRO-RUBBER	4	
3	A8MASSY005	A8_JOYSTICK-ASSY	1	
4	W2MASSY014	W2_XYZ-MOVING-ASSY	1	
5	W2MASSY015	W2_SPECTRO-ASSY	1	
6	W2MASSY016	W2_POLA-ASSY	1	
7	W2MASSY017	W2_REFFERENCE-ASSY	1	
8	W2MASSY018	W2_MO-LOCK-A-ASSY	1	
9	W2MASSY019	W2_SLD-ASSY	1	

8.6 HEAD REST ASSY



NO	CODE	PART NAME	Quantity	REMARK
1	1110MS00004	W2_HR-HEAD-REST	1	
2	2000A001298	W2_HR-HEAD-REST-COVER	1	
3	2040A000123	W2_HEAD-REST-RUBBER	1	
4	3004A000266	W2_HEAD-REST-SILICON-COVER	1	
5	W2EPCB0018	PCB ASSY(W2_CRPI-010)	1	
6	W2MASSY035	W2_HR-LED-BASE-ASSY	1	
7	2000A00M004	M0_CHINREST	1	
8	1130A000007	W2_HR-NECK	1	
9	W2EHAR0061	HARNESS(BIF(CN11) TO CR MOT)	1	CHIN REST MOTOR
10	W2EHAR0070	HARNESS(BIF(CN10) TO EXT LED LINK)	1	
11	W2EHAR0062	HARNESS(BIF(CN9) TO CR PI)	1	

8.7 LCD ASSY



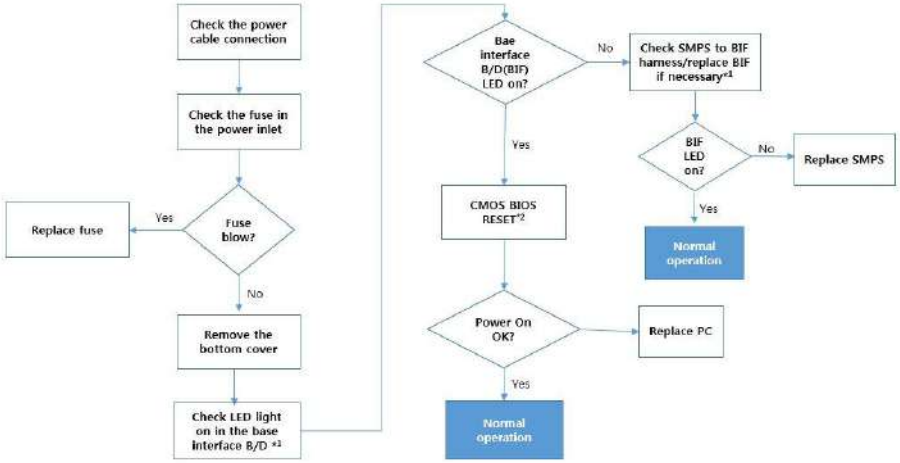
NO	CODE	PART NAME	Quantity	REMARK
1	2000A001292	W2_COVER-LCD-FRONT	1	
2	72050010004	LCD(GRAPHIC)	1	LCD SET
	72990010001	TOUCH SCREEN	1	
3	1330A000030	W2_LCD-BASE-PLATE	1	
4	3022A000044	B-1479(Multi-stage hinge)	1	
5	79990010021	TOUCH IF BOARD	1	
6	3022A000028	OP BOX HINGE	2	
7	2000A001291	W2_COVER-LCD-BACK	1	

9. Troubleshooting

System power up sequence performed as follows

Power switch on→ Power control button on → system boot → Measurement software initialization

(1) Power on failure



*1 refer 4-3-5 , marked B

*2 refer following description

[How to reset CMOS Bios]

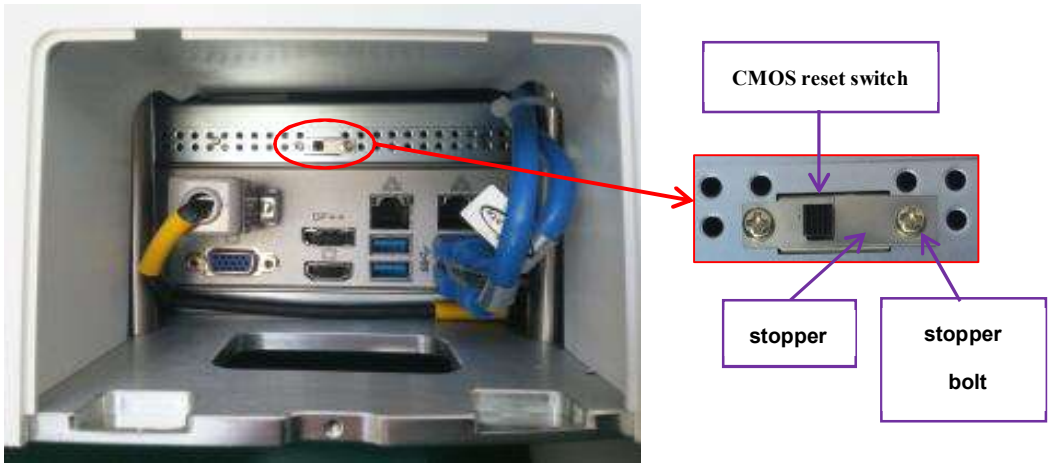
① Unlock screw shown in the circle.

② Press two hooks and pull forward to open 'W2_COVER-BASE-VENT'.

③ Unlock the screw to remove stopper.

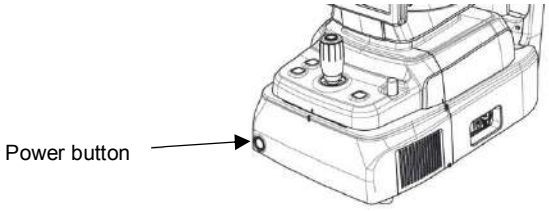
④ Slide CMOS reset switch to right side and wait at least 10 seconds.

⑤ Slide CMOS reset switch to left side and lock the stopper as original.



⑥ Assemble 'W2_COVER-BASE-VENT' as original.

⑦ Turn up the power and check if the initialization is normal.



⑧ Setup the time at main 'Window'.

(2) PC system boot error.

- Windows boot fail
  - check PC box SSD connection
  - backup user data if possible
  - replace SSD if the error persists.

(3) Measurement software initialization fail

- Initialization error messages are displayed
  a. Identify the error message(installation directory\log\system.log)

Error Message	Description	possible defect point
Check init status fail	mainboard initialization status check error	PC COM1 UART harness connection
		mainboard to base interface board harness
		Mainboard boot status check
		base interface to COM1 harness
usb channel open failed	Mainboard to PC USB connection error	Mainboard to PC USB cable check
		Mainboard status check
device init failed	Mainboard device initialization sequence fail	identify the separate error code for the source of the error
Color camera sensor init failed	Color camera to PC USB connection error	Color camera to PC USB cable
		check color camera power

(4) IR camera /Color Camera image is not displayed.

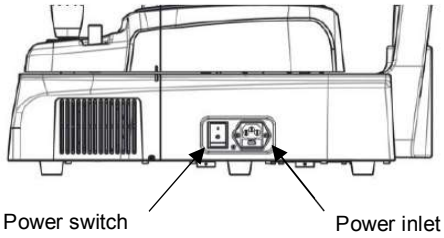
- Retina, Cornea observation cameras is not displayed
- Color camera is not displayed
  ➔ try power cycle(power off,wait 10 seconds, power on)

10. Replacement

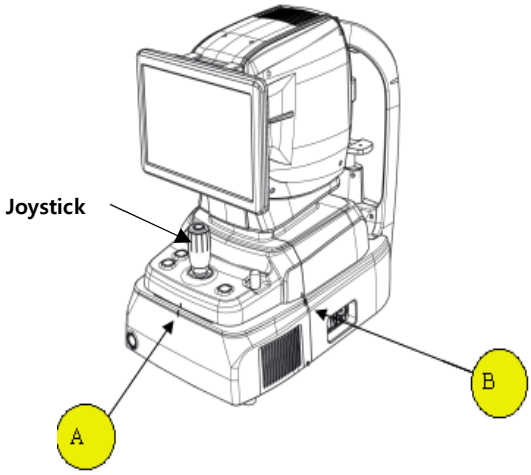
10.1 SMPS

1) Check the power switch on the bottom right of base is off. (O position)

2) Disconnect the power cable from the power inlet.



3) Align left/right index mark (B) and front index mark (A) of body and base with joystick.

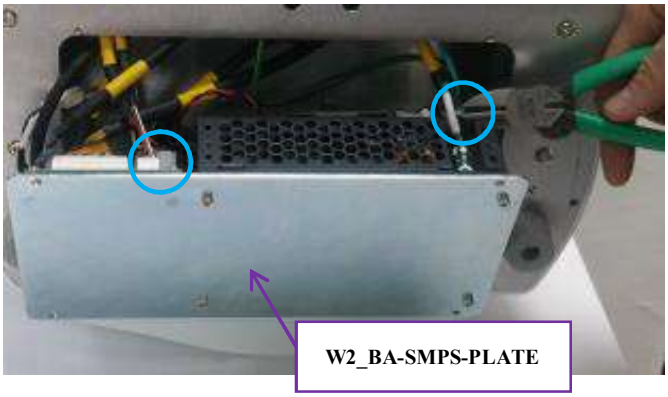


4) Lift two Packing locks under the bottom and turn them counterclockwise to lock the device (Important).
Move the joystick to check if the device is locked firmly. Device is locked correctly if the device doesn't move.

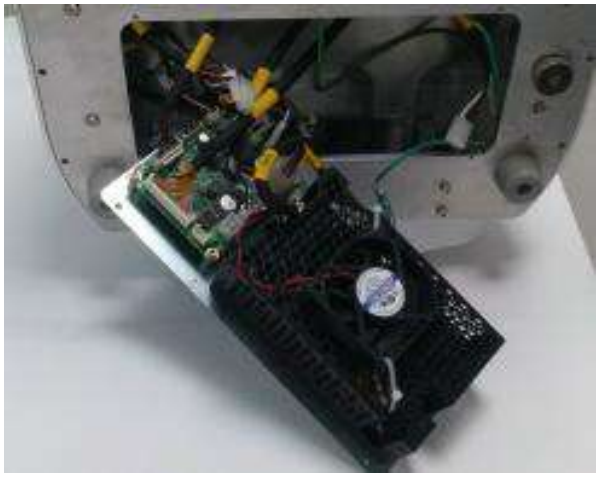
5) Lean the device as shown below with caution.

6) Unscrew four bolts in the circle as shown below.

7) Pull 'W2_BA-SMPS-PLATE' out with caution.
When, cut off the cable tie at the right side as shown below and uncouple the connector.

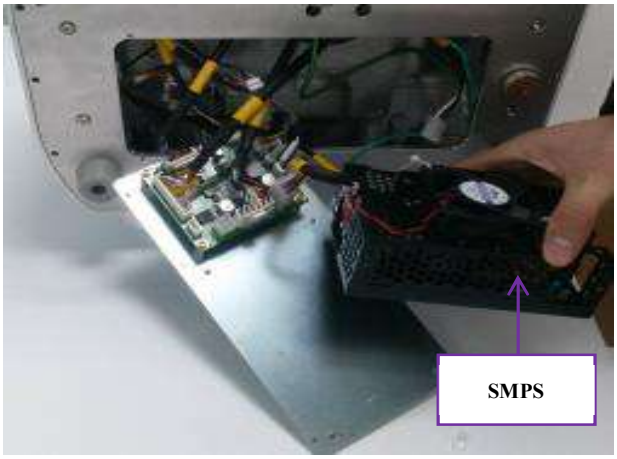


8) Pull out with caution.



9) Unlock four bolts in the circle as shown below.

10) Uncouple harness connector to separate SMPS.



11) Change the SMPS with new one.

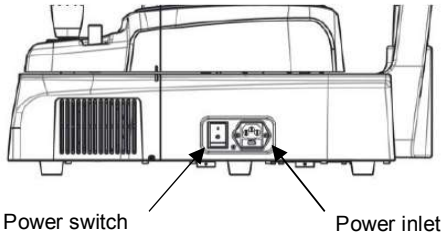
12) Reassemble in reverse order.

Be careful when insert the SMPS ASSY into the main body.

10.2 PC MOTHER BOARD

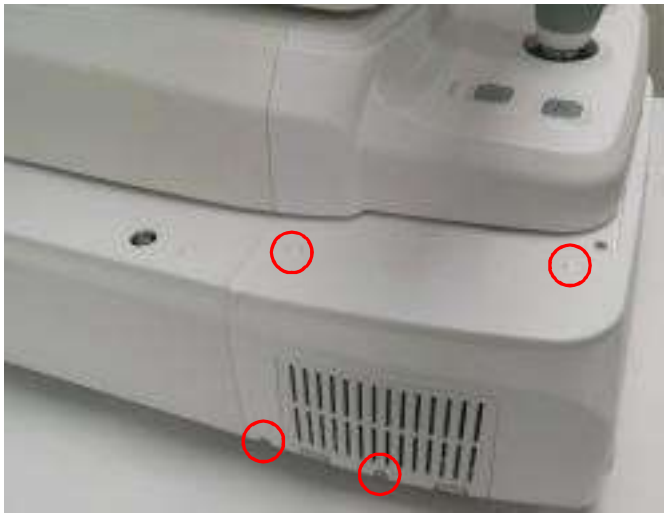
1) Check the power switch on the bottom right of base is off. (O position)

2) Disconnect the power cable from the power inlet.



3) Remove Bolt caps and unscrew as shown below.

4) Remove Bolt caps and unscrew as shown below.



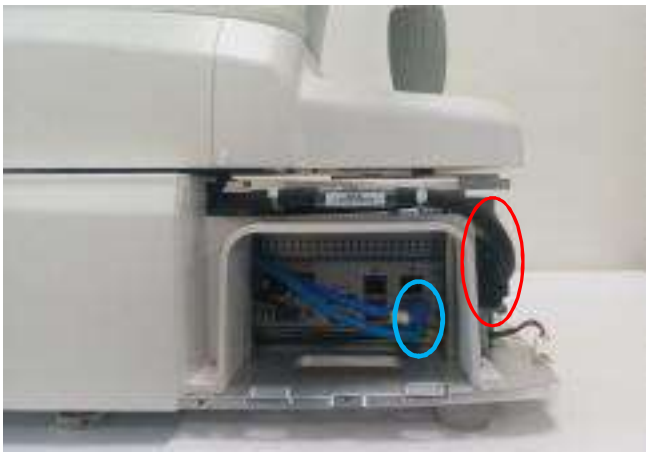
5) Press two hooks and pull forward to open ‘W2_COVER-BASE-VENT'.

6) Lift slightly and pull 'W2_COVER-BASE-FRONT' forward while lifting Joystick slightly.

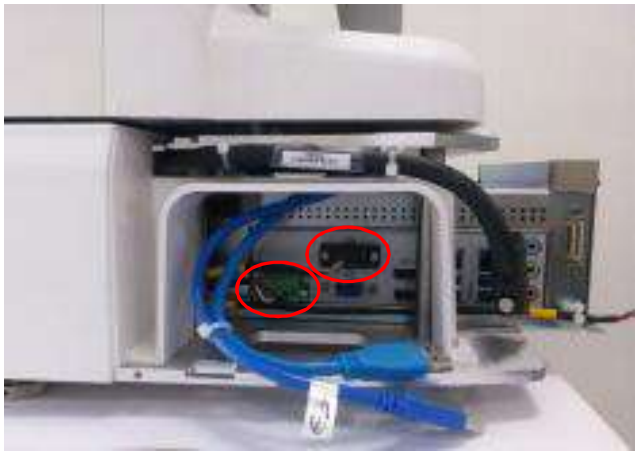
7) Uncouple harness connector of the power button as shown below.

8) Unscrew two bolts as shown below.

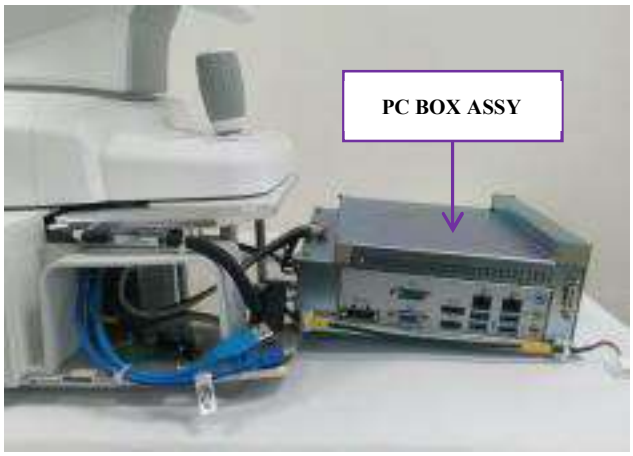
9) Disconnect main cable (use screw driver) and two USB cables.



10) Pull 'PC BOX ASSY' out slightly as shown below. Unscrew four bolts with screw driver and disconnect the cables.



11) Pull ‘PC BOX ASSY’ out of the main body.

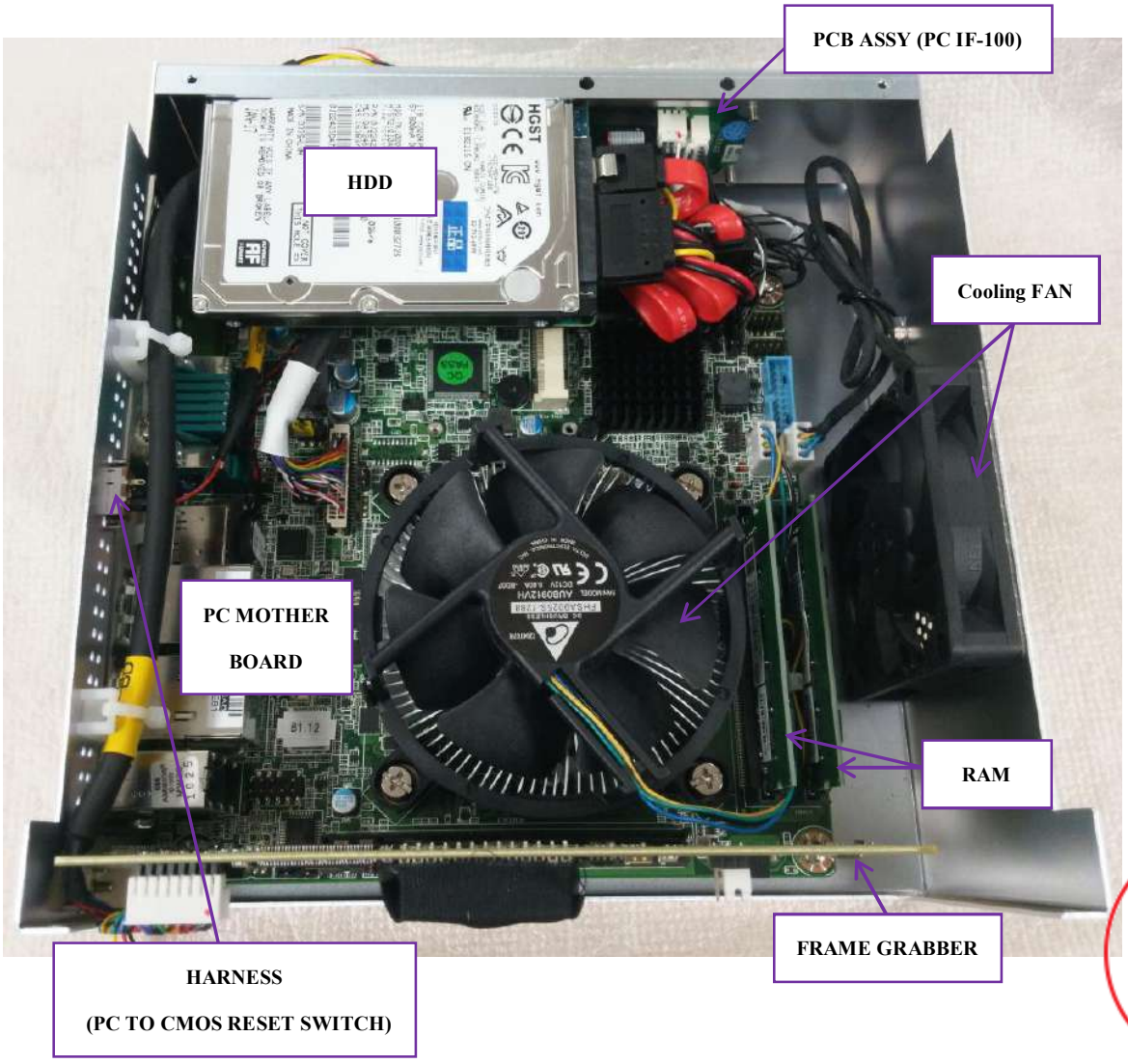


12) Unscrew nine bolts as shown below.

13) Lift ‘PC BOX ASSY COVER’ up to open.

14) Change ‘PC MOTOR BOARD’ with new one.

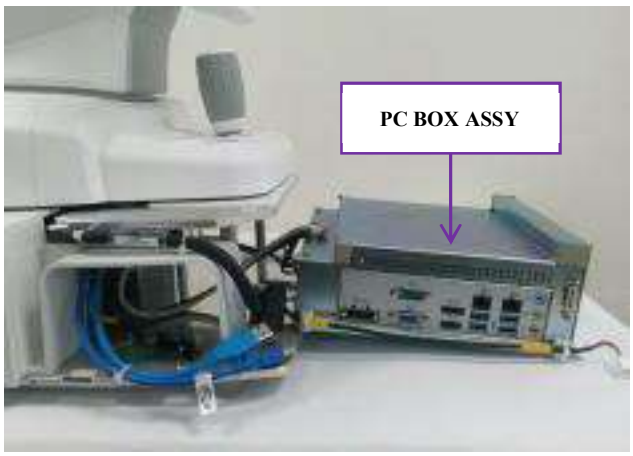
15) Reassemble in reverse order. Make sure that the cables not to touch the cooling fans. Refer to picture shown below to tidy up the cables.



*SSD is located on the back of the PC BOX ASSY.

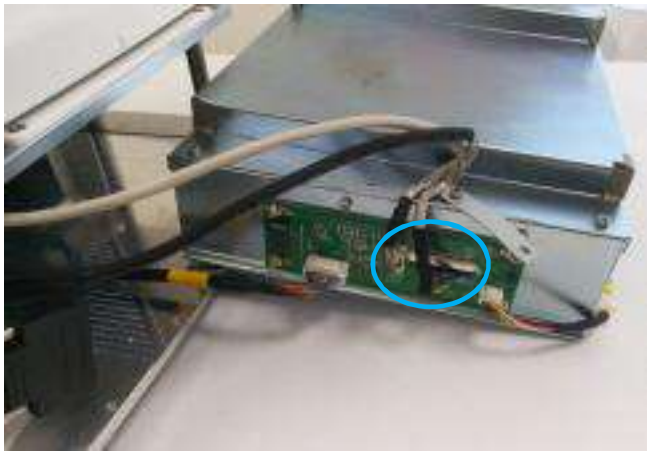
10.3 LCD PANEL

1) Refer to “10.2 PC MOTHER BOARD change” to disassemble bottom part.



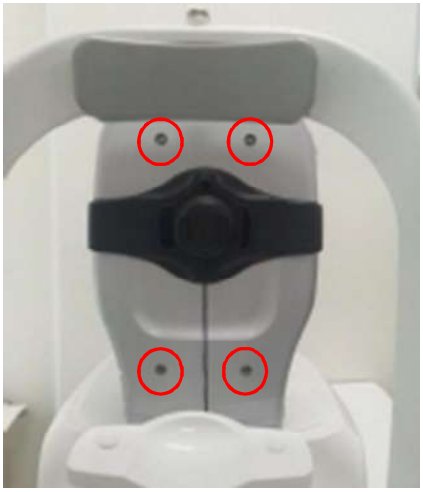
2) Unscrew two bolts as shown below.

3) Disconnect two connectors as shown below.

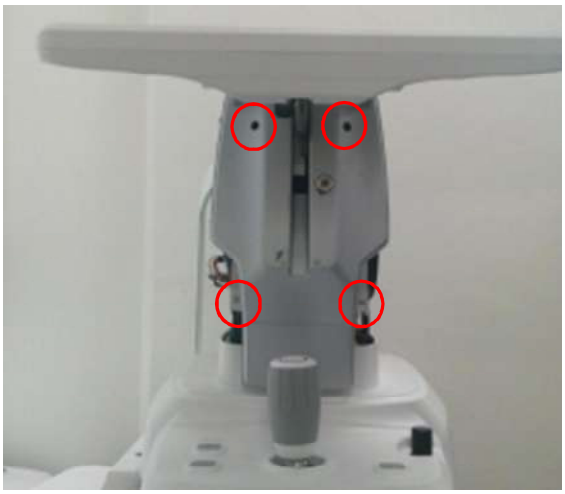


4) Remove four ‘Bolt caps’ and unscrew bolts as shown below. Then separate covers (left and rights).

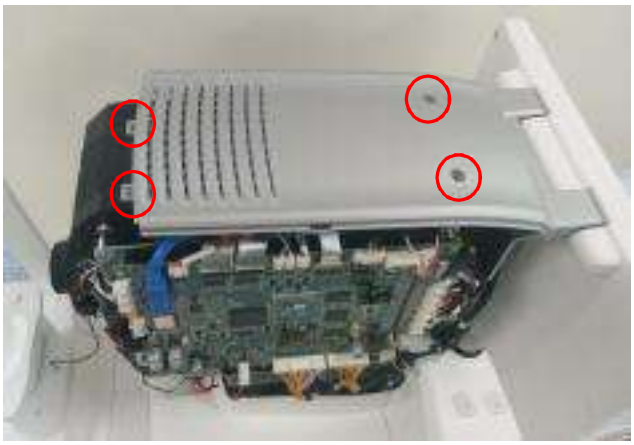
5) Remove four ‘Bolt caps’ and unscrew bolts as shown below. Then separate cover.



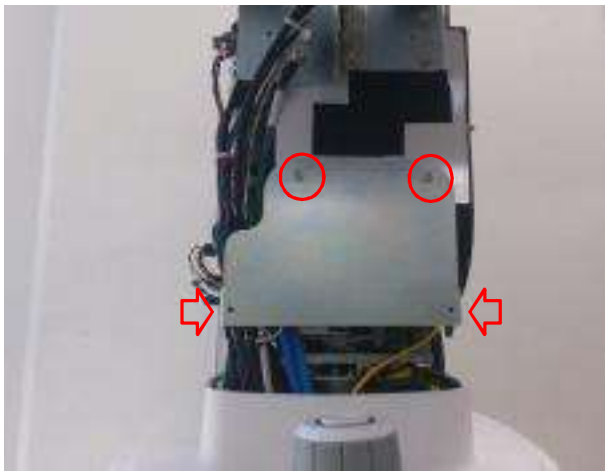
6) Remove four ‘Bolt caps’ and unscrew bolts as shown below. Then separate cover.



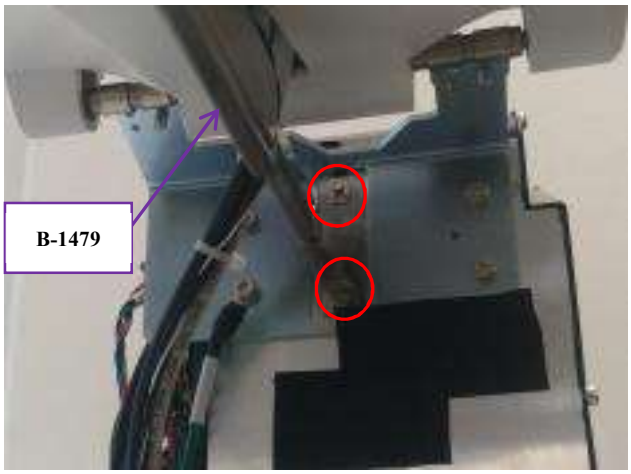
7) Remove four ‘Bolt caps’ and unscrew bolts as shown below. Then separate cover.



8) Unscrew four bolts and separate the plate as shown below.

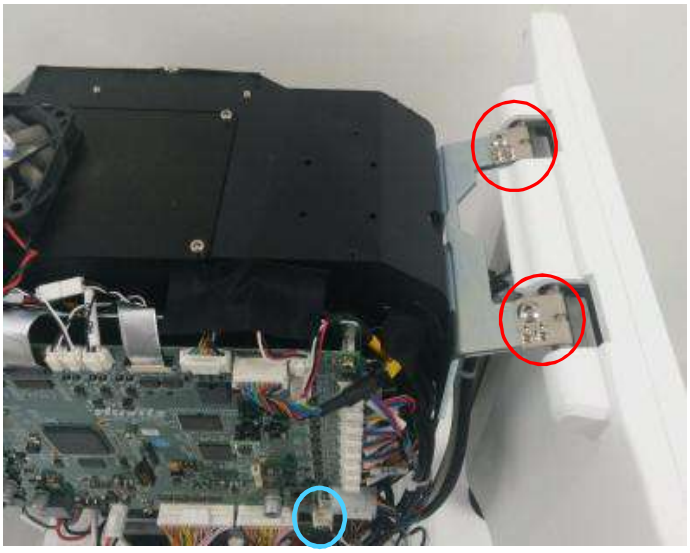


9) Remove two bolts and then separate B-1479 as shown below.



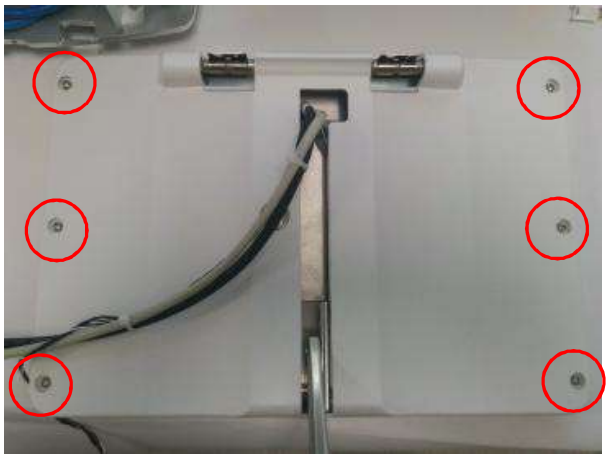
10) Disconnect lower side harness as shown below.

11) Unscrew six bolts as shown below.

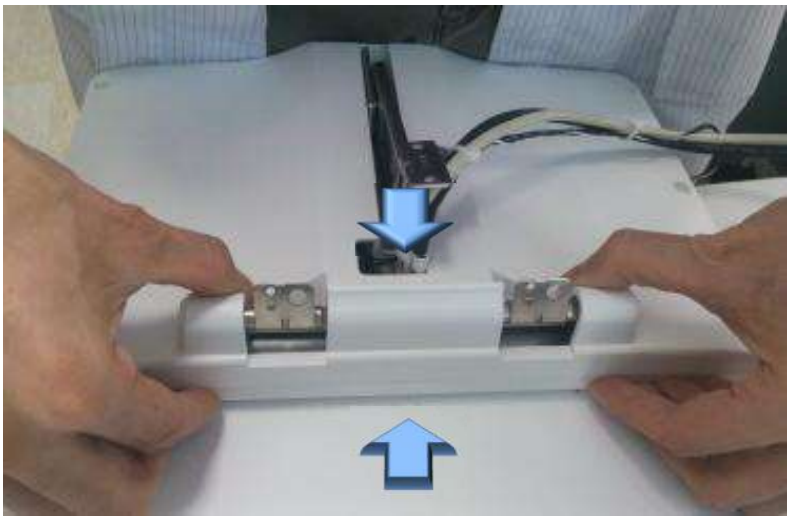


12) Disconnect ‘LCD ASSY’ from the main body. Be sure to be cautious with the cables.

13) Remove six ‘Bolt caps’ and remove bolts as shown below. Then separate the cover.

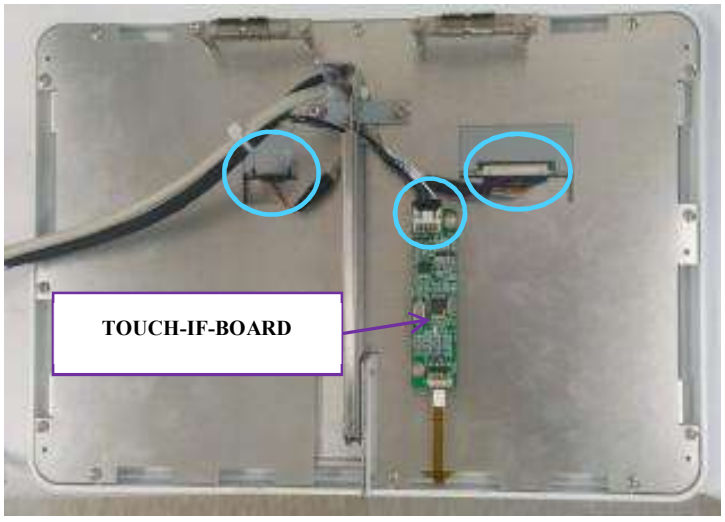


14) Separate ‘LCD cover’ forcing the thumbs to outside and the other fingers to inside. Be cautious the hooks not to be damaged.



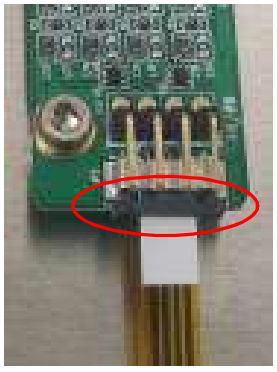
15) Disconnect three connectors as shown below.

.



16) Be sure to disconnect the cable while the harness locker locked screw as shown below.

Locked

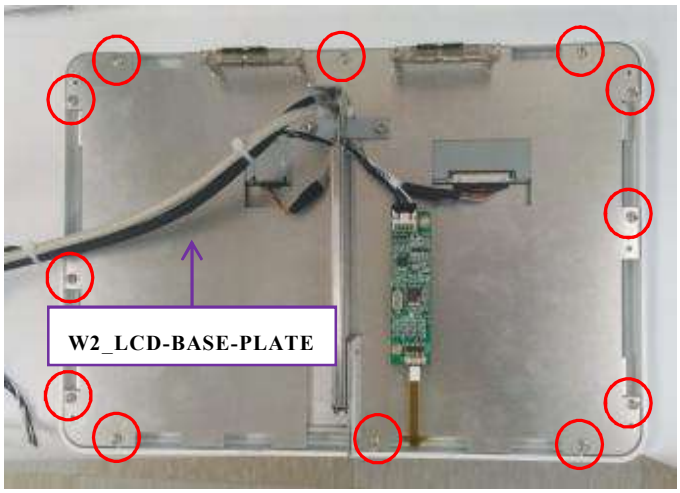


Unlocked

Harness can be connected or disconnected

17) Unscrew twelve bots and separate the plate.

These screws are different type from others and be cautious not to be mixed with others.

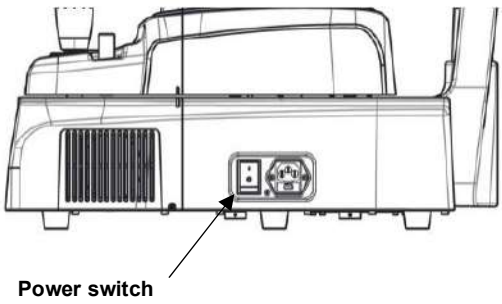


18) Change LCD Panel with new one.

19) Reassemble in reverse order.

10.4 Headrest

1) Check the power switch on the bottom right of base is off. (O position)



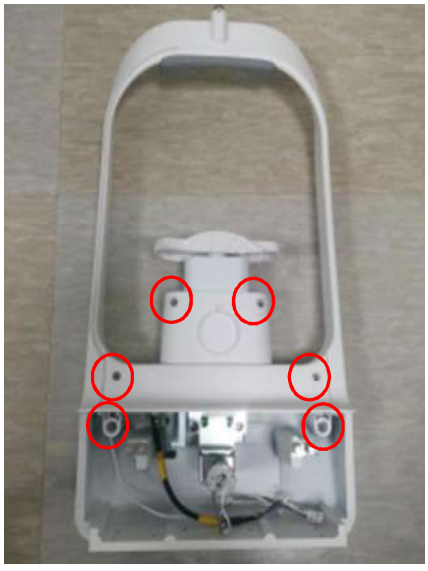
2) Remove the bolt covers and unscrew the bolts.

3) Unscrew 6 bolts screw from the bottom of the chinrest assembly.

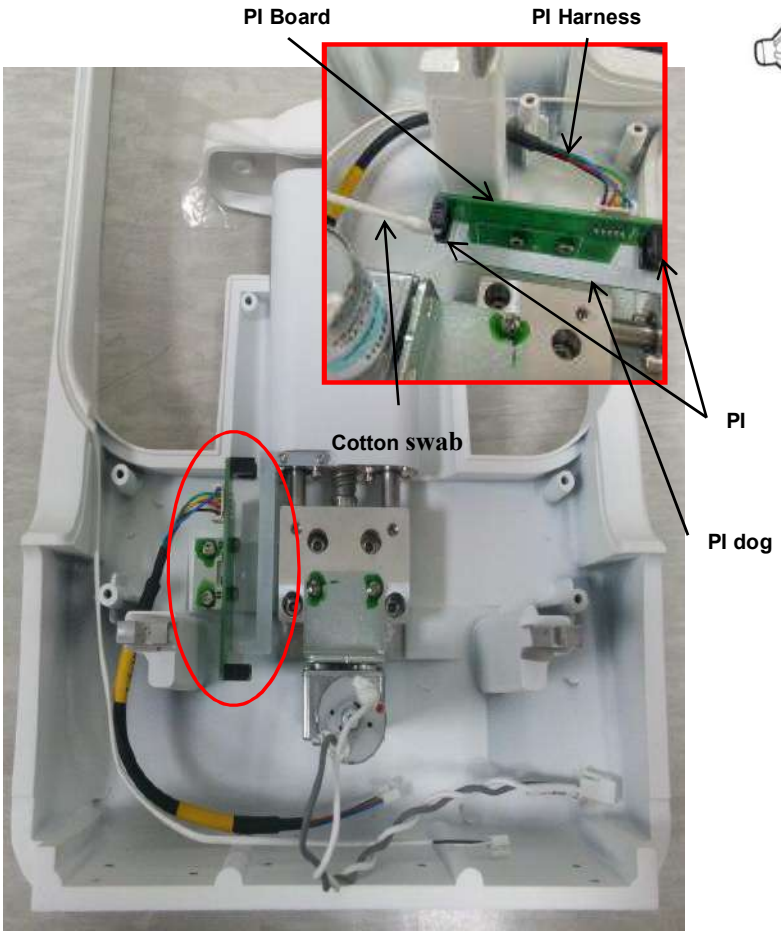
4) Disconnect the 3 connectors between the chinrest assembly and the equipment body.

5) Replace the Headrest assembly.

6) If no replacement chinrest assembly available, you can try check and repair the chinrest assembly.
In that case, unscrew 6 bolt screws to remove the cover..

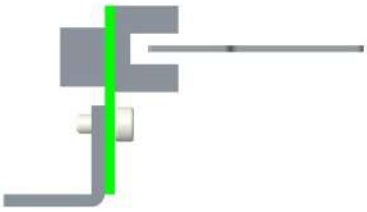


7) Check the PI Board and harness status. Clean the PI sensor gently with an air blower or cotton swab.



Blower

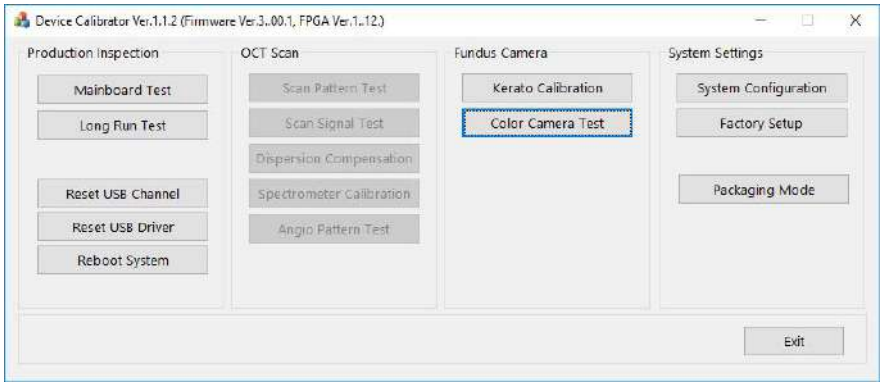
8) Check the PI dog in the center of the censor. If the PI dog is not in the center of the sensor, align the PI dog by a little bending.



11. Calibration

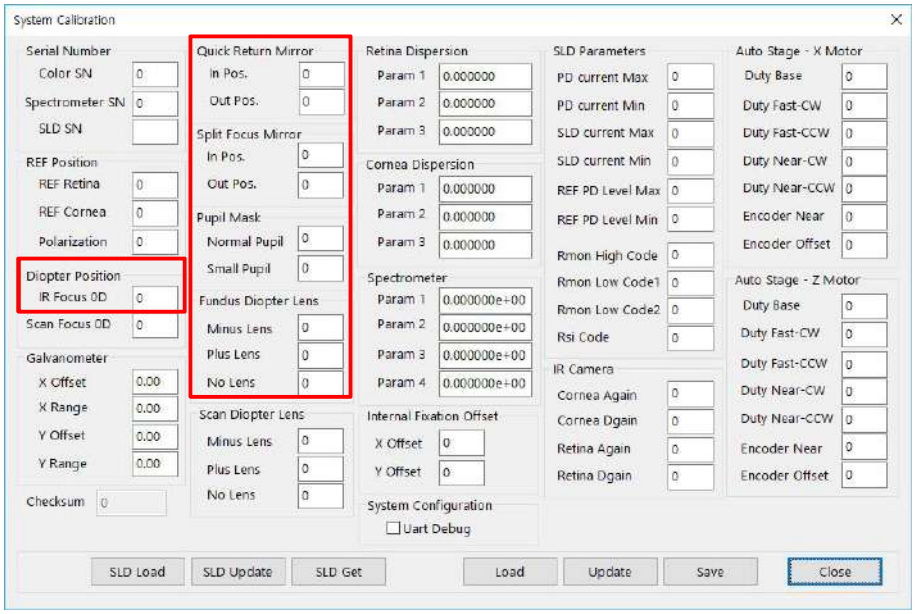
11.1 Device Calibrator

1) Fundus Device Calibrator

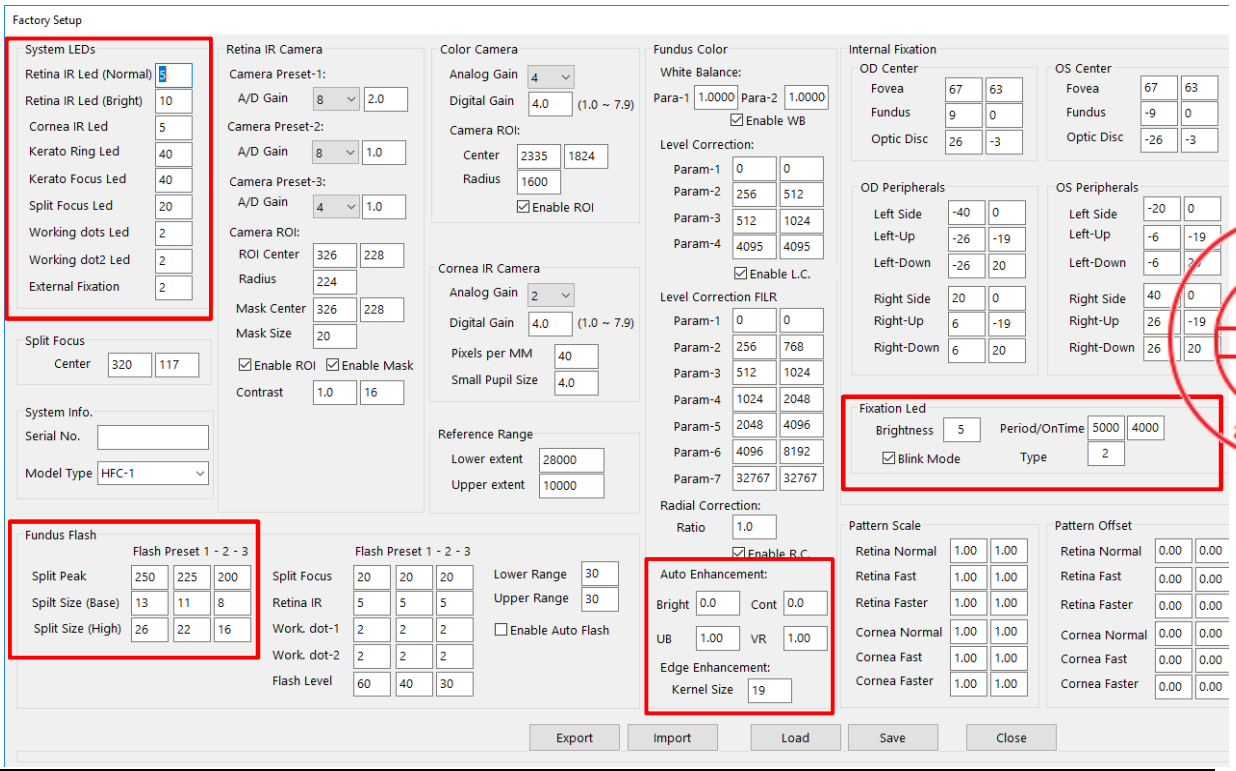


Categories	Contents
Mainboard Test	Mode for testing the USB communication channels between PC and HFC main board, and testing the devices connected to HFC main board such as motors, fixation, LED lights, and etc..
Long Run Test	Mode for long-running tests of major operations such as Auto Tracking, Fundus photography, and etc..
Reset USB Channel	Initialize the USB communication channel between PC and HFC main board and reconnect
Reboot System	Reset HFC main board, reconnect the USB communications channel after initialization is completed
Kerato Calibration	Mode for acquiring Kerato focus parameters from the mire ring image on anterior IR camera, and checking the quality and optimization of split focus signal on retinal IR camera.
Color Camera Test	Mode for checking the static image and live images from fundus camera.
System Configuration	Mode for checking and storing the parameters for system initialization, such as the serial number of the device, the location of the motor, the spectrometer setting, and the duty of the auto tracking motor
Factory Setup	Mode for checking and storing the parameters for operation, such as the initial value of system LED, IR camera settings, parameter of fundus image and the fixation's position
Packing Mode	Move Chinrest and the body of HFC the lowest position
Exit	Exit the Device Calibrator menu.

2) System Configuration



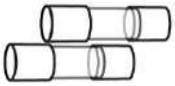
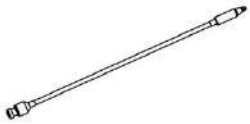
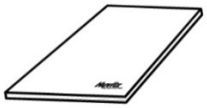
3) Factory Setup



Categories	Contents
System LEDs	Set the System LED's parameters
Fundus Flash	Set the Fundus Flash Level and Auto flash
Auto Enhancement	Set the parameters for Fundus Auto Enhancement and Kernal Size(Edge Sharpen)
Fixation Led	Set the parameters for Fixation Led, such as Brightness, Period.

12. Specifications and Accessories

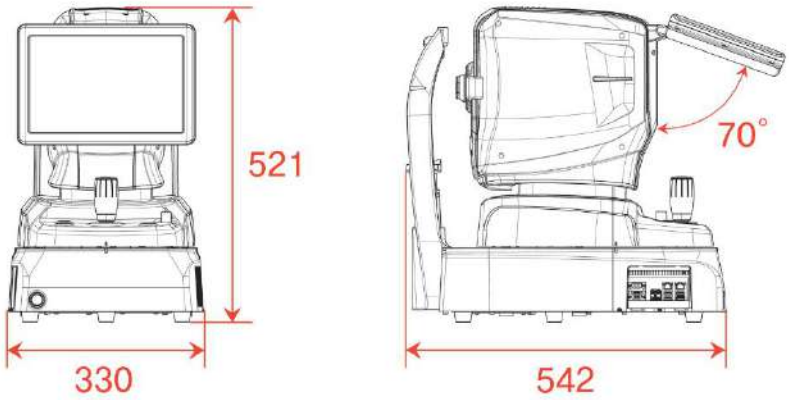
12.1 Standard Accessories

		
Chinrest paper	Touch pen	Power cable
		
Fuse (250V T 3.15A)	Dust cover	External LED
		
Blower	User manual	Packing lock cap
		
Model Eye		

12.2 Specifications

Device specifications	
Type	Non-mydriatic fundus camera
Resolution	Center :60 lines/mm or more Middle(r/2) :40 lines/mm or more Periphery(r) :25 lines/mm or more
Angle of view	45˚
Camera	Color Image Sensor
Minimum pupil diameter	4.0 mm (Normal mode), 3.3 mm (Small pupil mode)
Flash light	White light
Working distance	33 mm
Display	12.1 inch, 1280x800 pixel, Touch panel color LCD
Dioptric compensation for patient's eye	-33D ~ +33D total -33D ~ -7D with minus compensation lens -13D ~ +13D with no compensation lens +7D ~ +33D with plus compensation lens
Fixation target	LCD (internal), White LED (external)
Horizontal movement	70 mm (back and forth), 100 mm (left and right)
Vertical movement	30 mm
Chinrest movement	62 mm (up and down), motorized
Auto tracking	X,Y for positioning, Z for working distance
Power supply	AC 100 - 240 V, 50/60 Hz, 1.6 - 0.7 A
PC	Built in computer
Dimensions	330(W) x 542(D) x 521(H) mm
Mass	28 kg

12.3 Drawings of System



13. EMC Information

Manufacturer announcement – electromagnetic waves trouble

- **Electromagnetic waves trouble**

HFC-1 should be used in the below mentioned electromagnetic wave environment. HFC-1 purchaser or user needs to confirm whether HFC-1 is used in this type of environment.

Trouble test	Question of appropriateness
RF emissions CISPR 11	Group 1
RF emissions CISPR 11	Class B
Harmonic emissions IEC 61000-3-2	Class A
Voltage fluctuations/flicker IEC 61000-3-3	Complies

- **Electromagnetic waves tolerance**

HFC-1 is to be used in the below designated electromagnetic wave environment. HFC-1 customer and user need to guarantee that the HFC-1 will be used in this type of environment.

Tolerance test	IEC 60601 test level	Appropriateness level
Electrostatic discharge(ESD) IEC 61000－4－2	contact ±8 kV in the air ±15 kV	contact ±8 kV in the air ±15 kV
Electric rapid transients/bust IEC 61000－4－4	power supplying line ±2 kV input/output line ±1 kV	power supplying line ±2 kV input/output line ±1 kV
Surge IEC 61000－4－5	between lines ±1 kV between line and grounding ±2 kV	differential mode ±1 kV common mode ±2 kV
Voltage dip, instantaneous interruption, voltage fluctuation at the power input line IEC 61000－4－11	For 0.5 cycle < 5 %UT(UT's > 95 % decrease) For 5 cycle, 40 % UT(UT's 60 % decrease) For 25 cycle, 70 %UT(UT's 30 % decrease) For 5 seconds < 5 % UT(UT's > 95 % decrease)	For 0.5 cycle < 5 %UT(UT's > 95 % decrease) For 5 cycle, 40 % UT(UT's 60 % decrease) For 25 cycle, 70 %UT(UT's 30 % decrease) For 5 seconds, < 5 %UT(UT's > 95 % decrease)
Power frequency magnetic field (50/60 Hz) IEC 61000－4－8	30 A/m	30 A/m
Other UT is the a.c. power voltage for before approving the test level.		

- **Electromagnetic waves tolerance**

HFC-1 is to be used in the below mentioned electromagnetic wave environment. HFC-1 purchaser or user needs to confirm whether HFC-1 is sued at this environment.

Tolerance test	IEC 60601 test conditions	Appropriateness level
Conductivity RF electromagnetic field IEC 61000－4－6	3 Vrms 150 kHz～80 MHz	3 Vrms
Radioactivity RF electromagnetic field tolerance IEC 61000－4－3	10 V/m 80 MHz～2.7 GHz scope	10 V/m

14. Service Information

Repair: If the problem is not solved in spite of the settlement according to the contents of chapter 7, please contact to Huvitz's agent with the information on the following items.

1.1 Name of Equipment Type: Fundus Camera HFC-1
1.2 Typical No.of Equipment: Typical number consisted of 8 digits and characters written on its name plate.
1.3 Explanation on its symptom: Description in detail.

Supply of parts required for repair:

1.4 The preservation period of parts required for repair of this machine is by seven(7) years after stopping to produce the product.

Parts to be repaired by qualified service manpower:

1.5 Parts below are 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.

1.6 Back up battery for clock and data.

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