WIKI OPTICS

nun+

USER MANUAL(WMD-FM01 Rev. 1.0)
Warranty Card

Fundus camera
Portable Medical Device

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SYMBOLS

	Caution : This symbol identifies a safety note. Ensure you understand the function of this control before using it. Control function is described in the appropriate service manual.
I	"ON" (power) To indicate connection to the mains, at least for mains switches, or their positions, and all those cases where safety is involved.
○	"OFF" (power) To indicate disconnection from the mains, at least for mains switches or their positions, and all those cases where safety is involved.
	This symbol indicates to follow instructions for use.
CE	Meets essential requirements of the European Medical Device Directive 93/42/EC
	This indicates the year of manufacture/production
	This indicates the manufacturer.
EC REP	Authorized Representative in the European Community.
SN	Serial number
	Type B applied part
	Class II equipment
	Battery Charging
	USB
IPXØ	Degree of protection provided by enclosure(IP code)
	This symbol indicates to handle the fragile device with care

	This symbol indicates to keep the device away from sunlight
	This symbol indicates to keep the device dry
	This symbol indicates the humidity limitation for operation, transport and storage.
	Temperature limitation.
	Conforms with the Waste Electrical and Electronic Equipment Directive(2002/96/EC). At the end of useful life, dispose of all waste according to local requirements, or contact agent for device. The product is designated for separate collection at an appropriate collection point. Do not dispose of in normal waste stream.

INTRODUCTION

Intended use

The nun+ WFC-01 using user's android smartphone is a portable fundus camera that records images and videos of the patient's retina.

Target population and diseases.

- From infants to old age
- Glaucoma, diabetic retinopathy, macular degeneration and retinal detachment

Warnings and Cautions

Warnings and Cautions can be seen on the nun+ device, the packaging, the shipping container, or in this guidance for use. The device is safe for patients when used in accordance with the instructions, warnings, and cautions stated in this guidance for use;

Before using the device, the user must familiarize with all the warnings and cautions, the steps to power up the device, and the sections of this guidance for use. Specific warnings and cautions are also found throughout this manual.

- ■ Failure to understand and observe any warning stated in this manual could lead to patient injury.
- ■ Failure to understand and observe any caution stated in this manual could lead to damage of the equipment or other property or loss of patient data.

CAUTIONS FOR SAFETY

This device is classified as Group 1 based on standard ISO 15004-2:2007.

⚠ WARNING!

No acute optical radiation hazards have been identified with the device. The intended use of this device is for routine ophthalmic examinations of typically less than 60 seconds per eye. While any medical procedure has its benefit versus risk factor, more complicated examinations should not exceed three minutes within 24 hours.

Since a long time intense light exposure can cause ocular damage, the use of the device for ocular examination should not be unnecessarily prolonged, and the brightness setting should not exceed what is enough to provide a clear visualization of the target structures. Infants, persons with aphakia or diseased eyes will be at greater risk of ocular damage. The risk may also be increased if the person being examined has had any exposure with the same instrument or any other ophthalmic instrument using a visible light source during the past 24 hours.

⚠ CAUTIONS

Unless the instructions for operating are followed carefully, this product is possible to fail or be broken.

SAFETY & CAUTIONS REGARDING THE USE OF THE PRODUCT, RECHARGEABLE BATTERY AND DC POWER SUPPLY

- It is not appropriate to use this product at a place where a flammable anesthetic mixture exists since it is dangerous to be exploded.
- Please do not give the impact by dropping the product or put a heavy object on the product.
- Please do not keep the product together with an object having a strong magnetism, such as, a magnet, etc. Otherwise, it may cause a failure.
- Please do not disassemble or remodel the battery pack since it is risky of being exploded.
- Please use only the original battery pack having the protective circuit that is provided or certified by WIKIOPTICS and a battery charger certified as a medical device.
- Please do not charge a battery pack under an environment where the temperature is not lower than 45℃ or not higher than 0℃.

- If the battery is fully charged, please unplug the DC power supply out of the socket.
- Please do not expose the battery pack to a temperature which is not lower than 55℃ or not higher than -20℃.
- Please do not discharge the battery pack if the surrounding temperature is not lower than 55℃ or not higher than -20℃.

STARTING

Thank you for purchasing our portable fundus camera, 'nun+'.

Please read this user manual (this document) carefully before using the product.

If you have any doubts about operating this product properly, please read this user manual and follow the instructions.

⚠ CAUTIONS

(1) It is strictly prohibited to copy all or some part of the contents of the user manual without permission.

(2) Some contents of this document might be changed without notice.

(3) Although the contents of this document are prepared with paying full attention, if there are any doubts, errors or omissions, etc., please contact WikiOptics, Inc.

(4) Since it is hard for this company to be responsible for any damages or a claim for business profits, etc., for the reason of using the product regardless of the provision of the paragraph (3), we ask your understanding beforehand.

TERMS OF USE

This portable fundus camera, 'nun+', is made to be used in a general office environment.

The terms of use are as follows.

■Operating temperature: 0℃~45℃

■Storage temperature (non-operating): -20℃~ 55℃

■Operating humidity: 30%~ 90%

■Storage humidity: 10%~ 95%

■ Operating & Storage Atmospheric pressure: 800hPa~ 1060hPa

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CHAPTER 1- HOW TO USE

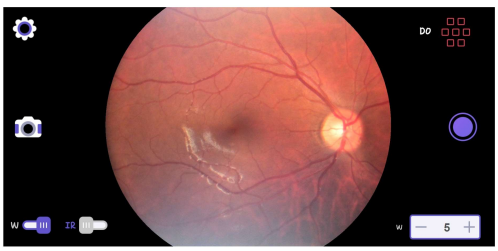
CHAPTER 2- ELECTROMAGNETIC COMPATIBILITY

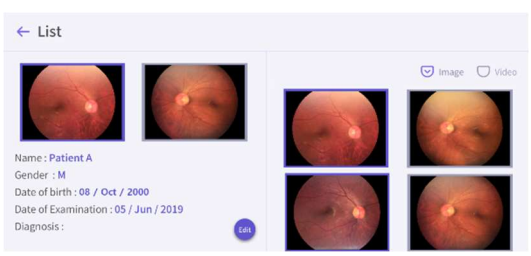
CHAPTER 3- ELECTROMAGNETIC COMPATIBILITY

CHAPTER 1- HOW TO USE

PURPOSE OF USE AND USAGE OF PRODUCT

- This portable fundus camera nun+ is designed for use in a medical environment.
- The nun+ WFC-01 using user's android smartphone is a portable fundus camera that records images and videos of the patient's retina.
- The 'nun+' is a medical device which can find the retinal disease by observing the retina of the human or animal. User can focus on the retinal surface by manual focusing knob viewing with IR light source, and get the visible image with white LED flash. So there is no need to use any pupil dilation agent.
- Using the user's Android OS smartphone, the user can get the view of the retinal image and control the level of lighting, etc.



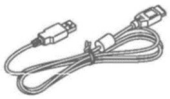


CHAPTER 1- HOW TO USE

COMPONENTS

1. Body of the fundus camera

2. DC power supply & plug



3. Mini USB power cable

4. Eye cup

5. OTG cable

6. OTG gender

7. Cradle for battery charging

8. User manual (Download at homepage)

9. nun+ App

Any of these components may be changed without notice for enhancing the performance or quality of the product.

CHAPTER 1- HOW TO USE

COMPOSITION OF BODY

No.	Item	Description
①	Eye cup	External light interception, pupil tracking function
②	Diopter	-20D to 20D focus adjustment
③	Shot button	Retina image capture
④	Battery cover	Cover to replace the battery
⑤	DC power terminal	DC power terminal for lithium-ion battery charging
⑥	Smartphone holder	Universal holder
⑦	Charging indicator	Amber LED lighting when charging, Green LED lighting when charging is complete
⑧	Main power on/off switch	Main body power on/off switch
⑨	USB mini B type port	Data interface between smartphone and medical device

CHAPTER 1- HOW TO USE

FEATURES OF PRODUCT

NON MYDRIATIC

- **Focusing with IR light source, and get the retinal image with white LED flash**

WIDE FIELD OF VIEW

- **>45˚(horizontal), > 40˚(Vertical)**

MANUAL FOCUS ADJUSTMENT

- **RANGE OF DIOPTER: -20D - +20D**

Android OS SMARTPHONE

- **The nun+ App for android is available so that it can conveniently manage the patient's retinal image and video.**

CHAPTER 1- HOW TO USE

STEP FOR CHARGING THE DEVICE

To charge the battery, connect the mini USB connector on the mini USB power cable to the fundus camera charging cradle and connect the USB connector to a DC power adapter USB port that plugs into a PC or wall power socket.

Place the device on the cradle and set the main power switch to OFF"○" to charge. The charging indicator LED is amber during charging, but turns to green when charging is complete.

CHAPTER 1- HOW TO USE

HOW TO REPLACE THE BATTERY, DC POWER SUPPLY AND MINI USB POWER CABLE

HOW TO REPALCE BATTERY

When the rechargeable battery cannot be recharged any longer, please replace that as follows.

■ Ensure that the device is powered off when replacing the battery.

■ Open the battery cover by sliding the battery cover release knob.

■ Remove the old battery to be replaced. Insert the new 3.6V 3500mAh protection circuit 18650 battery in the correct polarity direction and press the cover firmly into place.

■ Connect the user's smartphone to this unit turn on the power to check the operation status through device recognition.

HOW TO REPALCE THE DC POWER SUPPLY AND MINI USB POWER CABLE

When the DC power supply and mini USB power cable are no longer available. Please replace them as follows.

■ Mini USB power cable can be replaced by purchasing another new mini USB power cable.

■ The DC power supply be purchased from WikiOptics or a medical power supply with integral USB jack, compliant with 2MOPP.

CHAPTER 1- HOW TO USE

INSTALLATION OF nun+ APP ON THE USER'S SMARTPHONE

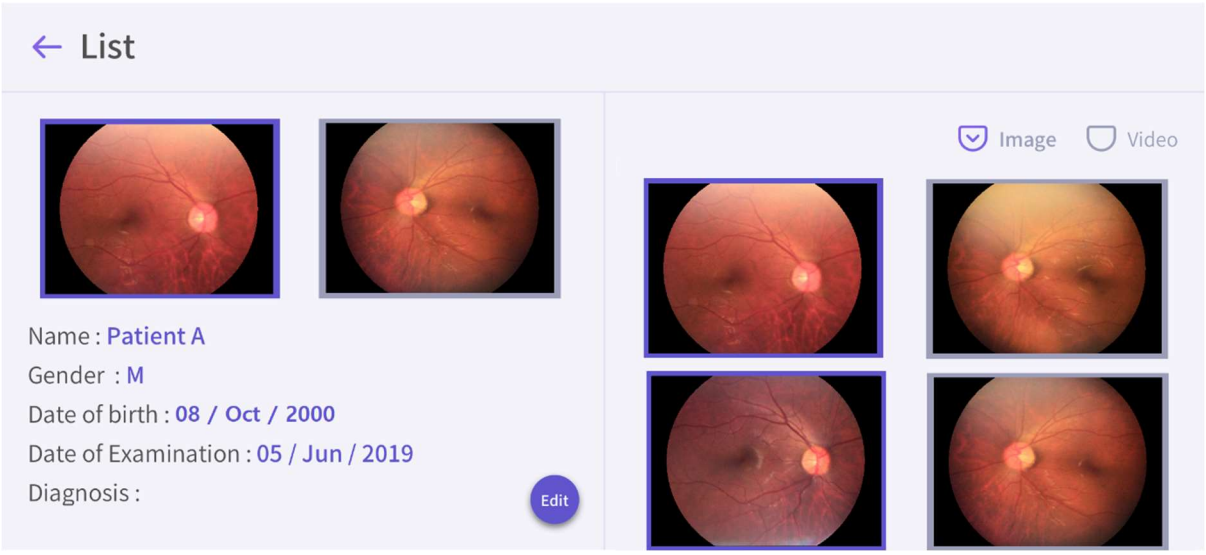
-. The nun+ app accessory of the WFC-01

-. Smartphone environment for running nun+ app

System	Description
OS	Android 5.0
CPU	Quad-core 1.6GHz
RAM	2.0GB
LCD display	5.1inch display, 1080x1920

Download and install nun+ app on the user's smartphone from the homepage of WikiOptics, Inc.

The device can be used through the app by creating an account of the installed app.

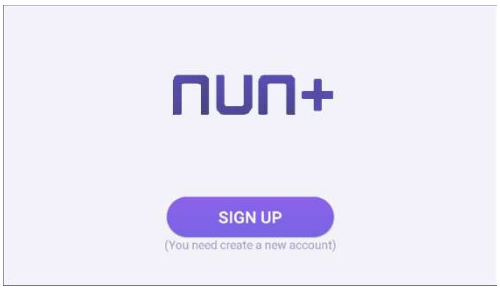


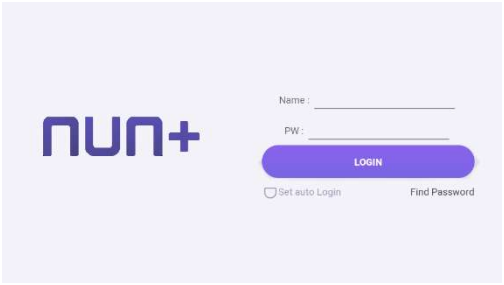
Create account

■ The first time the user run the app, the user needs to create an account.

■ If the user already has an account, verify the account by name and password.

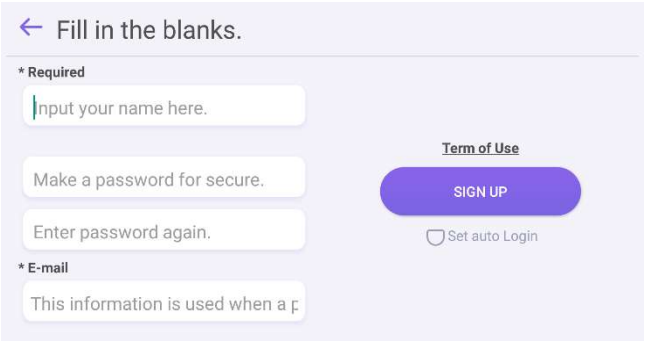
■ If the user set up automatic login during the creation process, the account verification process is skipped in the later execution.





■ The account requires user name and password.

■ The additional information may be used to verify the identity when the user lost the password.



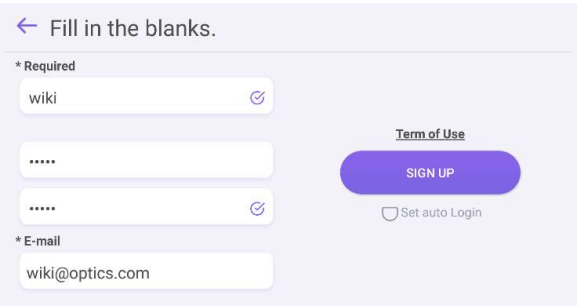
■ The account is created after confirming that the name and password meet the conditions. The conditions are as follow;

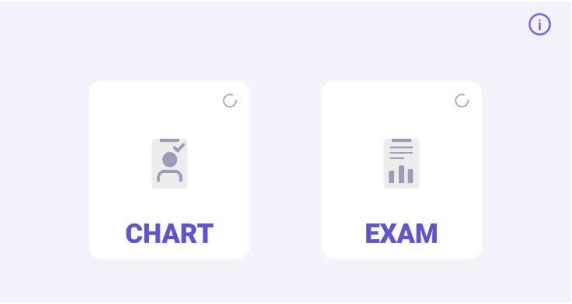
A) The name should not contain numbers or special characters.

B) The name must be at least 3 characters long.

C) There is no separate condition for the password, but the retyped password must be the same.

If the user logs in successfully, the main screen will appear as below.





CHAPTER 1- HOW TO USE

EYE CUP

It helps to block external light and guide the patient's eyes properly with fixation LEDs.

Place the eye cup on the objective lens barrel of the device.

CLAMPING USER'S SMARTPHONE ON THE DEVICE

Raise up the clamp to put the smartphone on the device.

Clamping is available maximum up to 78mm smartphone width.

Note.) Galaxy Smartphone width: Galaxy note 9 : 76.4mm, Galaxy note10+ : 77.2mm

Galaxy S20 ultra: 76mm, Galaxy S10+ : 74.1mm

Interface for user's smartphone

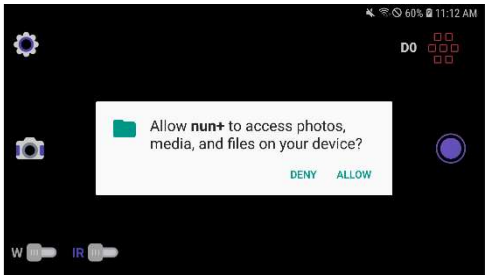
The device is operated by mobile app by wired connection with the user's smartphone using 0.3m OTG cable.

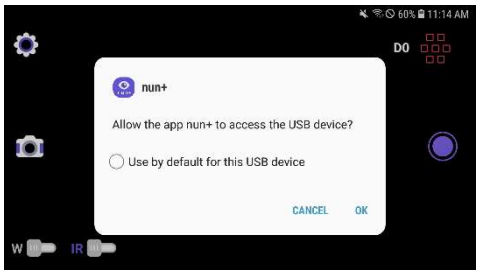
- One connector of the OTG cable is USB C type to be connected to the smartphone and the other is a mini USB type to be connected to the mini USB port on the device.
- If the device is powered on, the connected smartphone can recognize and operate it.

Permissions for user

- External save : save video / image
- Allow USB device access (twice) : Camera(Preview / Video or image capturing), LED light control

■ Both cases must be allowed.





PRECAUSIONS FOR PROPER USE OF THE DEVICE

■ The examining room needs to be as dark as possible when examining the retina.

■ The examiner holds the fundus camera handle with a hand and the eye cup with the other.

■ The device must be leveled with the patient's eye.

■ Guide the patient's eye to the fixation target light and ask him/her to cover the other eye by hand.

■ Approach slowly so that the patient's retina can be seen (until the optical disk image is visible).

■ When the optic disk is observed, adjust the focus with the manual focusing knob of the device.

■ Let the retina image full. The working distance between the objective lens and the cornea is about 25mm.

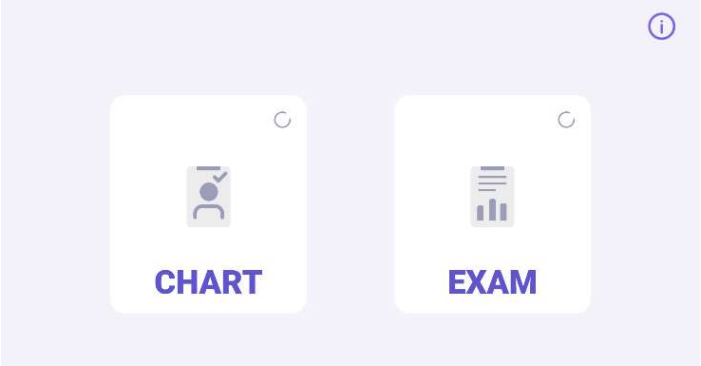
■ If the patient's retinal image is well focused, press the shooting button to take a good retinal image.

CHAPTER 1- HOW TO USE

USE GUIDE OF MOBILE APP (Ver. 1.0)

A. Main screen

■ If the user logs in successfully after creating an account, it appears as below.

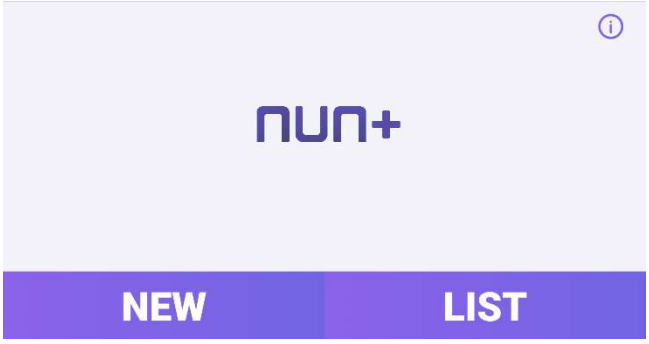


■ CHART is the menu where the user can check the basic information and retinal images of each patient.

■ EXAM is the menu that moves to the screen for shooting (new examination).

■ Before examining the retina by selecting EXAM, check if it is the patient's first examination.

- List: for patients who have been examined previously more than once, use this menu.
- New: for new patients (registration process required).

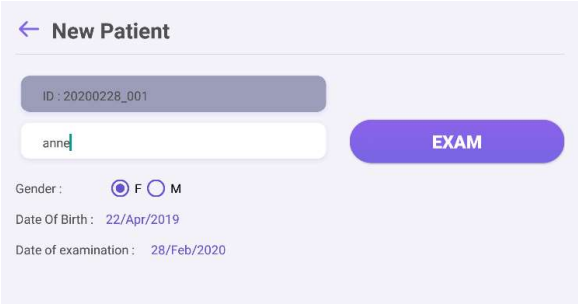


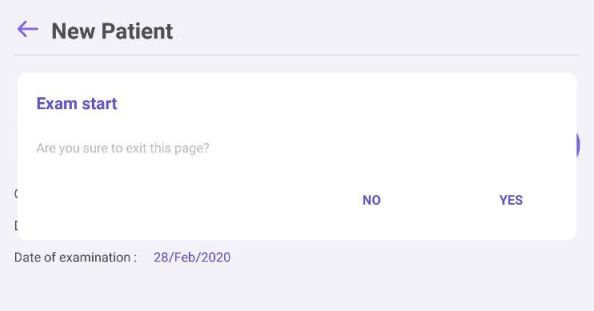
B. Examination

■ The examination can be proceeded after selecting the patient.

a. The first examination

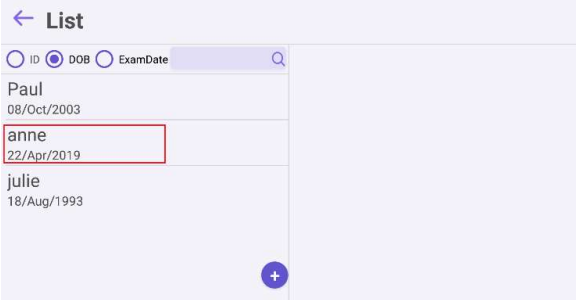
- If the user selects NEW, the user can enter new patient's information.
- Enter the patient's name, date of birth, and gender.
- The examination date is automatically generated based on the real date.
- The date of birth can be set by dial adjustment or by direct input.
- If the user touches "YES" in the pop-up of Exam start, the screen moves to the camera screen.

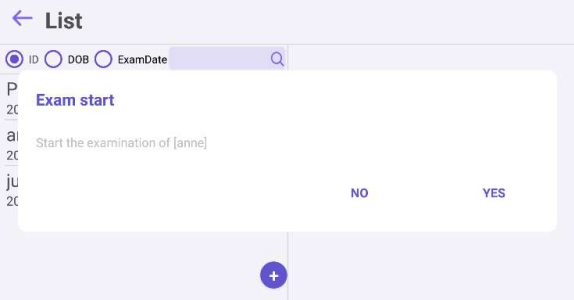




b. Re-Examination

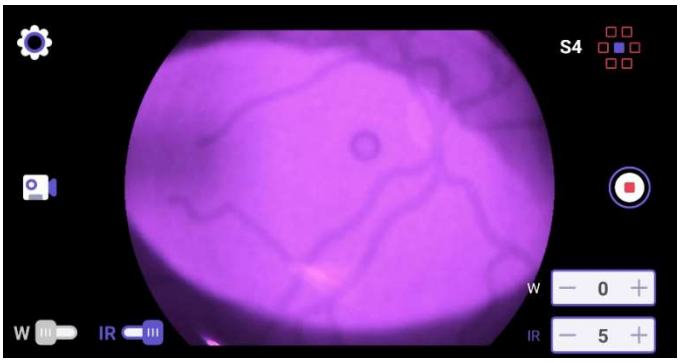
- Touch LIST and select the patient to be examined from the list of existing patients.
- Touch the patient's name from the list.
- If the user touches "YES" in the pop-up of Exam start, the screen moves to the camera screen.



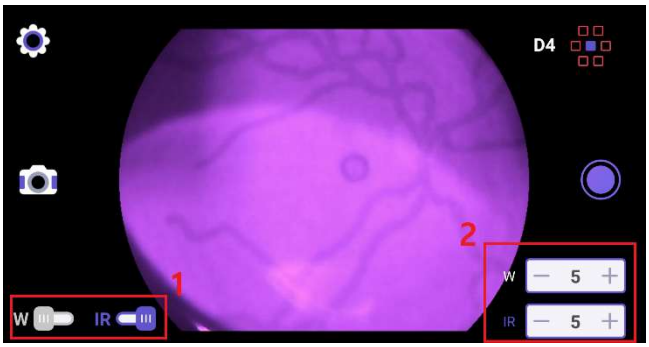


c. Taking retinal images and save

- Permissions for user
- Choose the eye to shoot. After selecting the eye, the screen is as in the below.

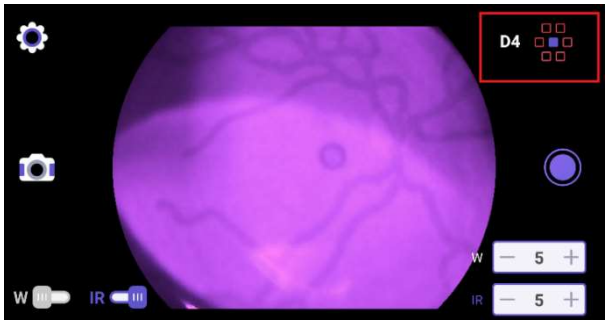


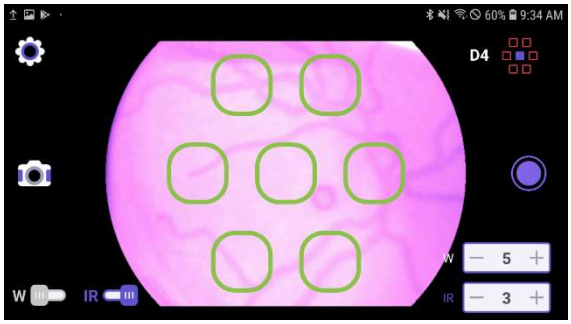
- Light source(white or IR) can be chosen by ① on the screen and brightness can be adjusted by ②.



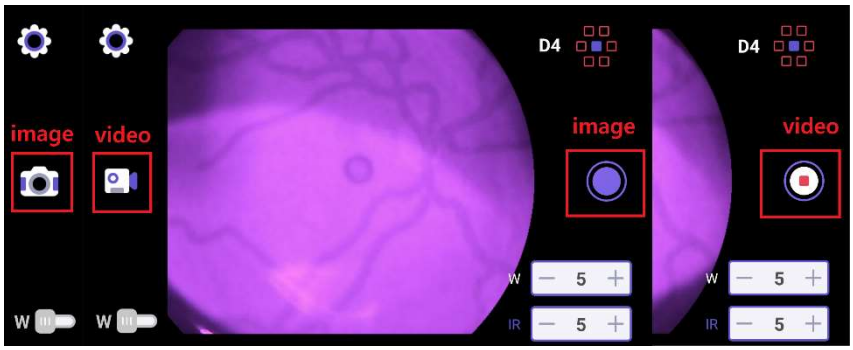
- Fixation LEDs guide the patient's eye.

- Touch Fixation LED icon and choose the fixation target to guide the patient's eye.

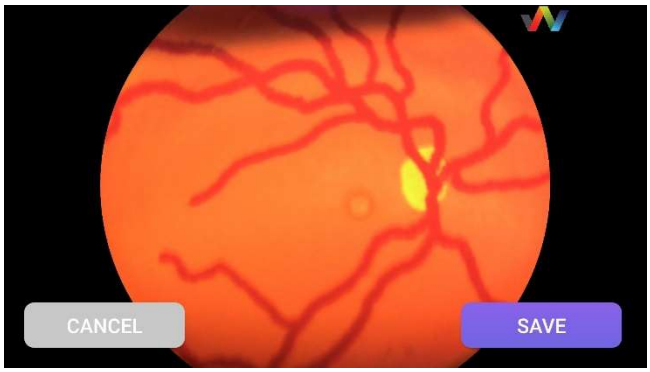


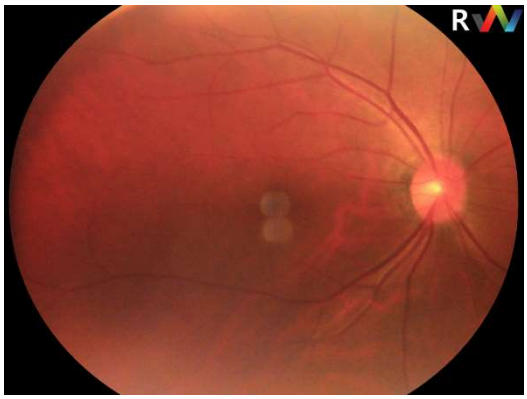


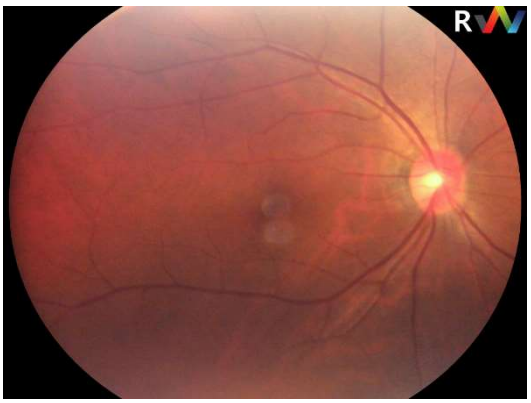
- The user can change modes(Image ↔ Video) by touching icons.



- After shooting, the user can view the taken image. The user can select save or cancel.



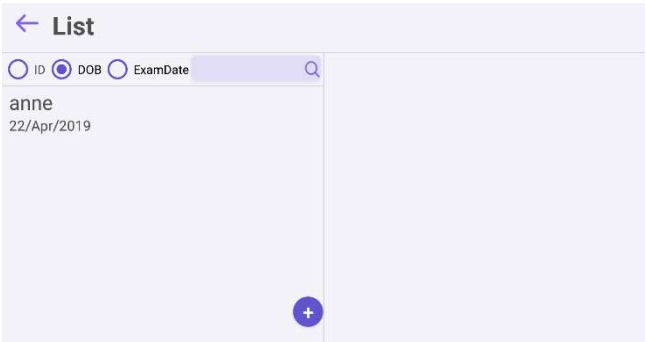




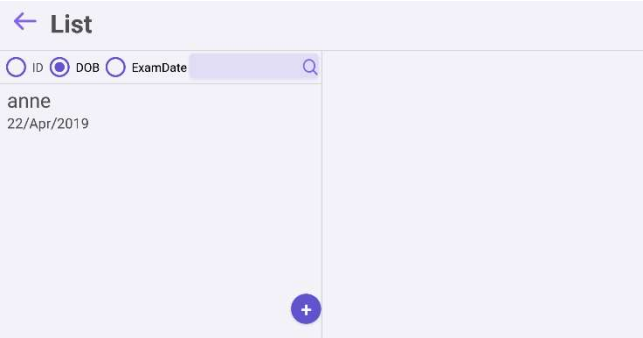
NOTE! As shown in the above photos, artifacts may appear on the captured images, which are reflected from the surfaces of the objective lens. The user doesn't need to consider them since they do not come from the patient's eye.

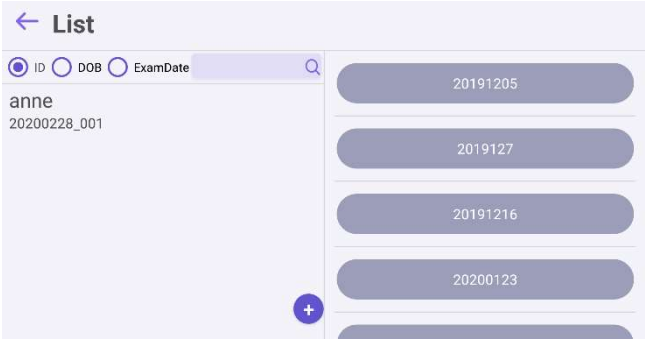
C. Recording the patient's information

a. If the user selects CHART, the user can check the saved patients' data.



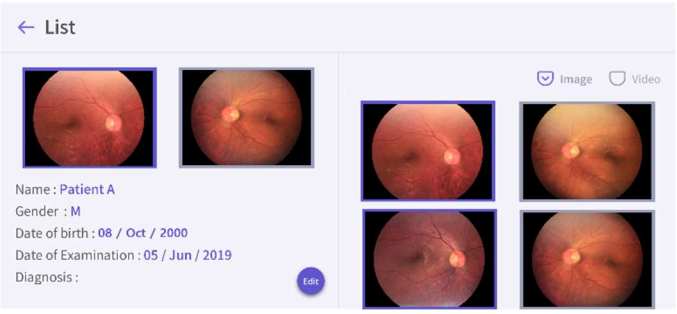
b. If there are existing data, the user can see the previously saved data of examination.





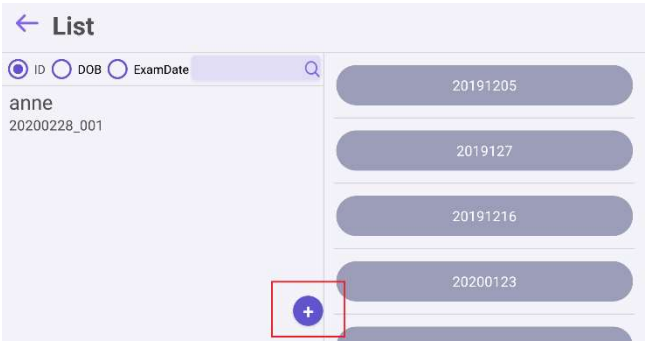
c. If the user chooses a date, the data taken on that date will be provided.

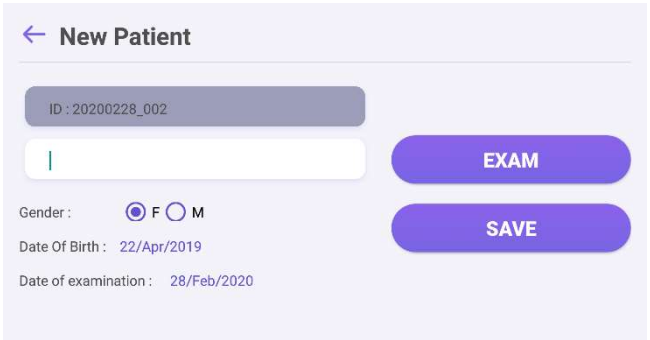
d. Photos are provided first, but the user can also see the videos by touching VIDEO.



e. If the user press+, the user can register a new patient.

f. After entering the information, the user can start shooting with the 'EXAM' or just save information with 'SAVE' to return to the patient list.



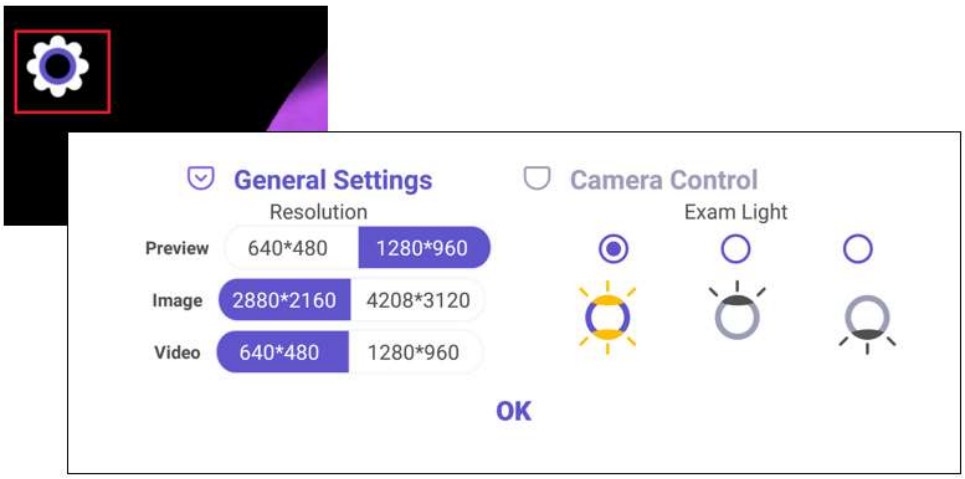


D. Exam (setting)

■ General setting : resolution, LED control

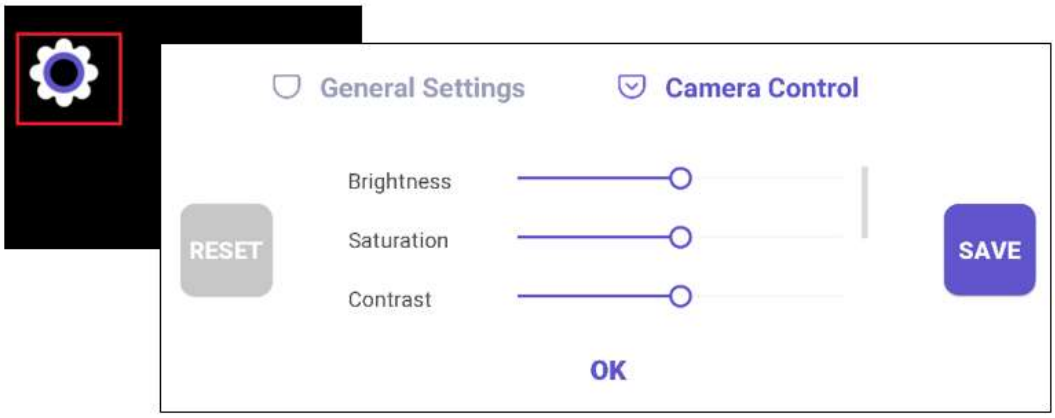
- Typically, 2 pairs of LEDs are used in a vertically symmetrical structure, but only 1 pair of LEDs can be used for small pupil imaging. When shooting small pupil, the user can choose 1 pair of LEDs (up or down).

- The resolution of preview and video may be supported in HD (1280*960), but it may not be supported properly depending on the resolution of smartphone itself.

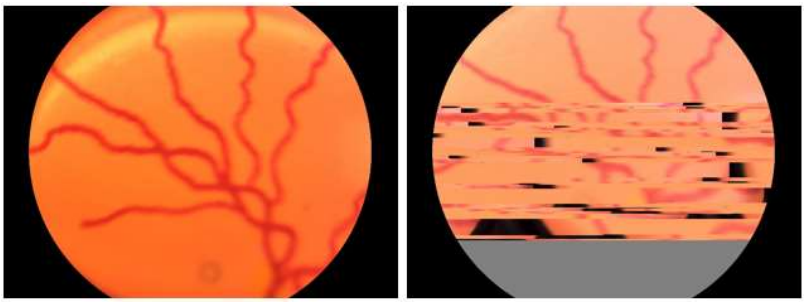


■ Camera control : Set the details of camera

- If there are much difference with default setting values, the taken images may be damaged.



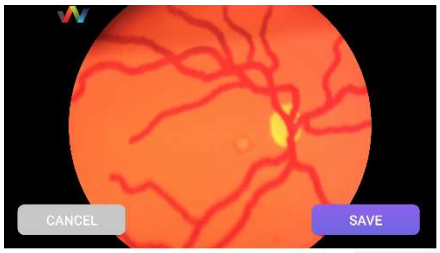
- An example of error that can occur when the camera control is over-set.

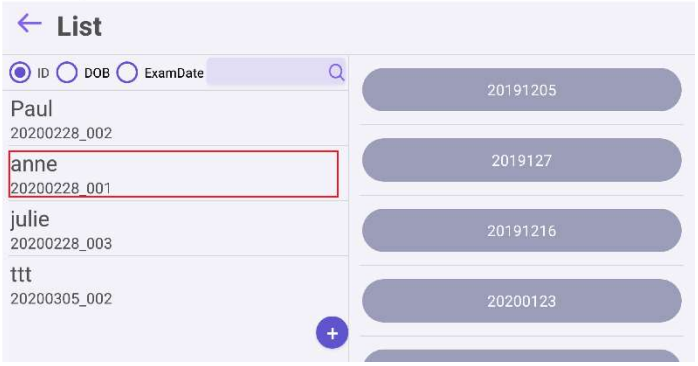


E. Chart

■ Exam – Saved images

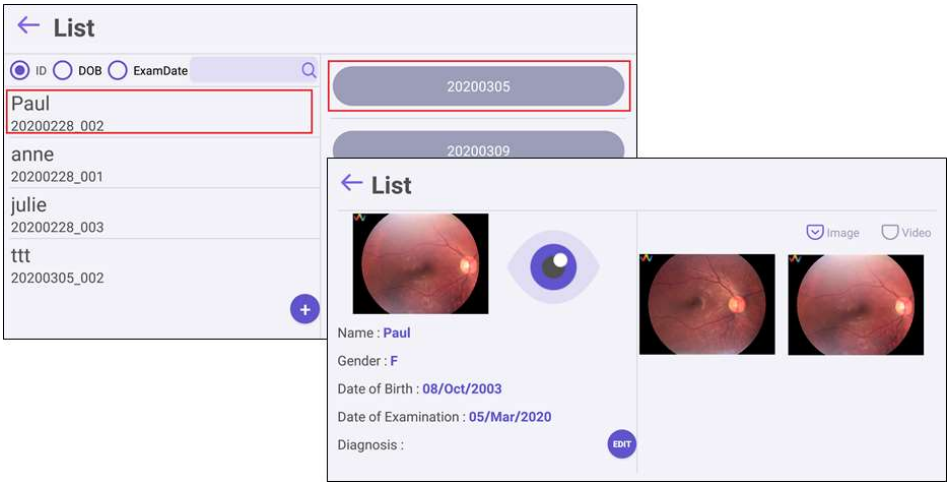
- Create a folder in the order of ID-date, based on the entered patients' IDs.
- The saved images can be also reviewed in external storages such as a gallery or file explorer.





■ Data review

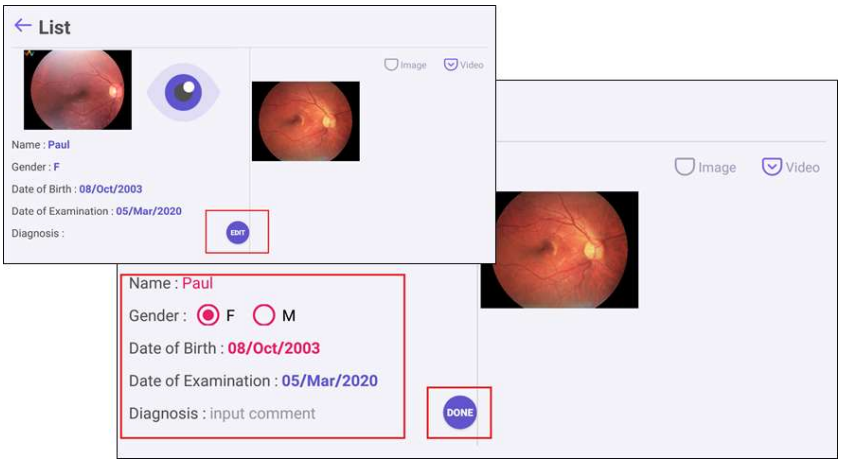
- If the patient who has previous examination data is selected, a list of the corresponding date is displayed, and when a date is selected, the screen changes to display the corresponding examination data of that date.



- If the user touches the selected image long among the images on the right, it automatically appears as the representative image on the left.

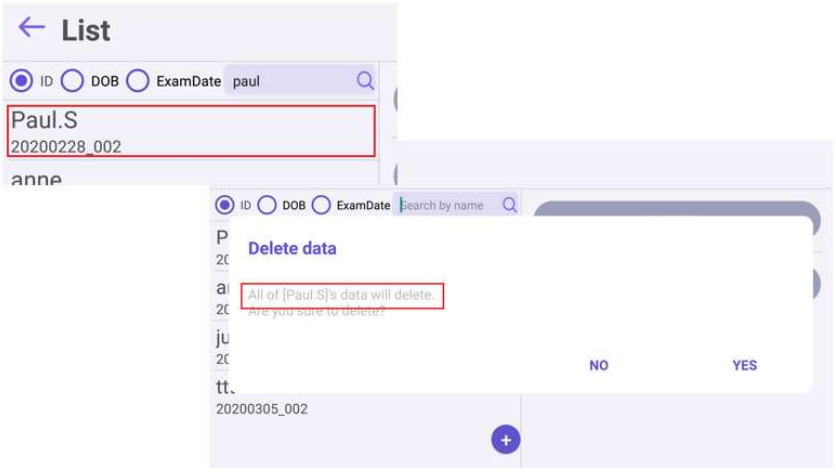
■ Modify patient's data

- The user can modify the patient's data by touching EDIT button.
- There is no problem in data review even after modification since data base is operated based on ID.

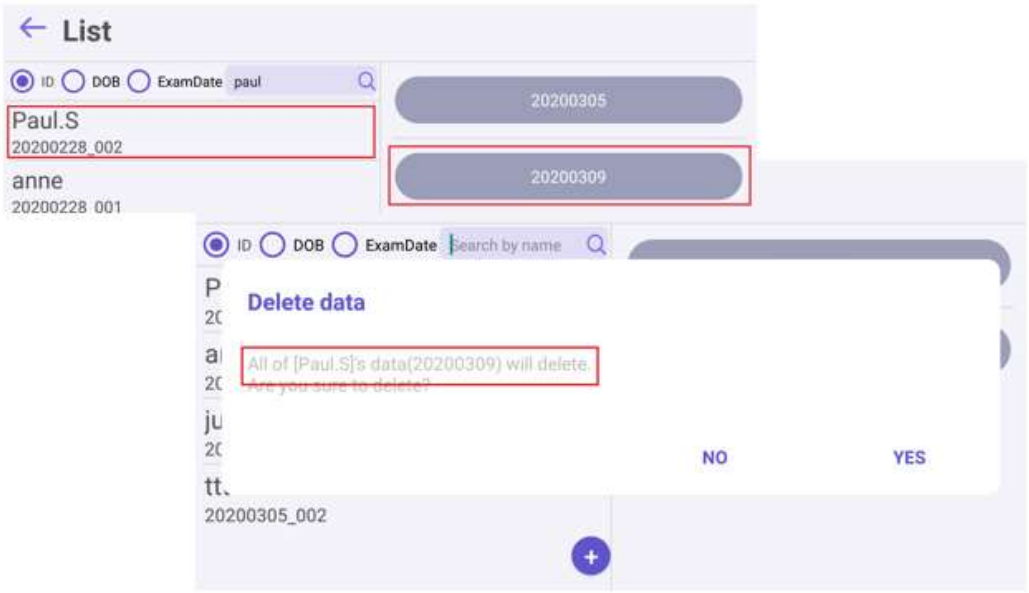


Delete patient's data

- If the user touches the patient' name long from the list, all the patient's data can be deleted (a guidance phrase provided).



- If the user touches a date long after searching the date, only the data of the date is deleted (a guidance phrase provided).



REPAIRING

- This product shall be repaired at the head office or a factory.

WASHING FOR CONTINUOUS USE

- Lens

  A fundus camera, 'nun+', is a precise optical device.

  Please never use any detergent-based solvent for washing the lens.

- Housing

  Clean the housing with a dry cleaning cloth.

⚠ CAUTIONS

- Please do not wet a cleaning cloth too much with some disinfectant or detergent.
- Please do not soak the product in any solvent.
- Please do not sterilize the product at a high temperature or pressure.

CHAPTER 1- HOW TO USE

PRODUCT SPECIFICATIONS

■ Optical specification

Field of view (FOV) : >45˚(Hor.), >40˚(Ver.),

Diopter: -20D to +20D (manual focus)

Light source: Infrared LEDs for focus, Natural White LEDs for flash, Fixation 7 LEDs for fixation target

Image format: JPEG

Image sensor: 13Mp

Image resolution: 4208x3120

USB connectivity: Mini USB2.0

■ User's smartphone environment for running nun+ app

OS: Android 5.0 over

CPU: Quad-core 1.6GHz over

RAM: 2.0GB over

Display: 5.1inch display, 1080x1920 over

■ Dimensions

Fundus camera 'nun+', body - [L] 223.4mm x [W] 66.4mm x [H] 187mm

Cradle - [L] 224.6mm x [W] 79.7mm x [H] 87.9mm

■ Weight

Fundus camera 'nun+', body : 531g, Cradle : 224g

■ Rechargeable battery

3.6V 3500mAh protection circuit 18650

■ Waterproof grade

IPXØ: This product is NOT protected from any penetration of water.

■ Operating environment

Operating temperature : 0℃ - +45℃
Storage temperature : -20℃ - +55℃
Operating Humidity : 30% - 90%
Storage Humidity : 10% - 95%
Operating and Storage atmospheric pressure: 800 – 1060hPa

■ DC power supply (for charging)

IEC60601-1 Medical power supply, compliant with 2MOPP

- Model name : GTM46101-1005-USB
- Input: 100-240V, 50-60Hz, 0.3A
- Output: DC 5.0 V, 2.0A

The medical device is class II equipment / internal electrical power source equipment.

CHAPTER 1- HOW TO USE

CALIBRATION AND SERVICE

- The accuracy of this fundus camera has been carefully tested and designed to last long.
- Periodic inspections are recommended every two years to ensure proper operation and accuracy of the fundus camera "nun+".
- If the user has any question or problem, please contact the place of purchase or head office.
- Preventive inspections to ensure continuous safe use follow as;
    - Before using the fundus camera "nun+", connect it to the user's smartphone, complete the settings, check the image preview, and turn on the white LED to check the brightness level adjustment. Adjust the focus adjustment knob to check the focus status.

STANDARDS

The nun+ WFC-01 complies with the following standards:

IEC60601-1 : 2012 (EN60601-1:2013)

IEC60601-1-2 : 2014 (EN60601-1-2:2015)

ISO15004-2 : 2007

ISO10940 : 2009

ISO10993-1 : 2009

IEC62133-2 : 2017

CHAPTER 3 - ELECTROMAGNETIC COMPATIBILITY

EMC

- This device has been tested and found to comply with the limits for medical devices to the IEC60601-1-2(Edition4.0):2014.
- Electromagnetic Interference – Although this equipment conforms with the intent of the directive 2014/108/EC in relation to Electromagnetic Compatibility (EMC), all electrical equipment may produce interference. If interference is suspected, move equipment away from sensitive devices or contact the manufacturer.

⚠ Caution!

Do not use this equipment adjacent to other equipment. It may not work properly. The device should not work near high frequency surgical equipment.

⚠ Caution!

Use of anything other than accessories, transducers, and cables provided or supported by the manufacturer of this equipment may result in increased electromagnetic emissions or decreased electromagnetic immunity of this equipment, it may cause malfunction of equipment.

⚠ Caution!

Portable RF communications equipment (including peripherals such as antenna cables and external antennas) should be used no closer than 30cm (12inches) to any part of the nun+ including cables specified by the manufacturer. Otherwise, degradation of the performance of this equipment could result.

- Medical electrical equipment needs special precautions regarding EMC and needs to be installed and put into service according to the EMC information in the following tables.

- The following tables document compliance levels and guidance from the IEC 60601-1-2:2014 Standard, for the electromagnetic environment in which the WFC-01 Unit should be used a clinical environment.

Guidance and manufacturer's declaration – electromagnetic emissions		
The REF WFC-01 is intended for use in the electromagnetic environment specified below. The customer or the user of the REF WFC-01 should assure that it is used such an environment.		
Emissions test	Compliance	Electromagnetic environment -
RF emissions CISPR 11	Group1	The REF WFC-01 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 A	
Harmonic emissions IEC 61000-3-2	Class A	
Voltage fluctuations/ Flicker emissions IEC 61000-3-3	Complies	
	[See 5.2.2.1 c) and Figure 1]	The REF WFC-01 is suitable for use in all establishments, including domestic establishments and those directly connected to the public low voltage power supply network that supplies buildings used for domestic purposes.
	[See 5.2.2.1 c) and Figure 1]	The REF WFC-01 is suitable for use in all establishments other than domestic, and may be used in domestic establishments and those directly connected to the public low voltage power supply network that supplies buildings used for domestic purposes, provided the following warning is heeded: Warning: This equipment/system is intended for use by healthcare professionals only. This equipment/system may cause radio interference

		or may disrupt the operation of nearby equipment. It such as re-orienting or relocating the REF WFC-01 or shielding the location.
	[See 5.2.2.1 c) and Figure 1]	The REF WFC-01 is suitable for use in all establishments other than domestic and those directly connected to the public low voltage power supply network that supplies buildings used for domestic purposes.
RF emissions CISPR14-1	Complies	The REF WFC-01 is not suitable for interconnection with other equipment.
RF emissions CISPR 15	Complies	The REF WFC-01 is not suitable for interconnection with other equipment.

Guidance and manufacturer's declaration – electromagnetic immunity			
The REF WFC-01 is intended for use in the electromagnetic environment specified below. The customer or the user of the REF WFC-01 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	± 8kV contact ± 15kV air	± 8kV contact ± 15kV 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 IEC61000-4-4	± 2kV for power supply lines ± 1kV for input/ output line(s)	± 2kV for power supply lines ± 1kV for input/ output line(s)	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	± 1kV line(s) to lines(s) ± 2kV line(s) to	± 1kV line(s) to lines(s) ± 2kV line(s) to	Main power quality should be that of a typical commercial or hospital environment.

	earth	earth	
Voltage dips, short Interruptions and voltage variations on power supply input lines IEC 61000-4-11	0% U_T (100% dip in U_T) for 0.5 cycle 0% U_T (100% dip in U_T) for 1 cycles 70% U_T (30% dip in U_T) for 25 cycles 0% U_T (100% dip in U_T) for 5 s	0% U_T (100% dip in U_T) for 0.5 cycle 0% U_T (100% dip in U_T) for 1 cycles 70% U_T (30% dip in U_T) for 25 cycles 0% U_T (100% dip in U_T) for 5 s	Main power quality should be that of a typical commercial of hospital environment. If the user of the REF WFC-01 requires continued operation during power mains interruptions, it is recommended that the REF WFC-01 be powered from an uninterruptible power supply or a battery.
Power frequency (50/60Hz) magnetic field IEC 61000-4-8	30 A/m	30 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.
NOTE U_T is the a.c. mains voltage prior to application of the test level.			

Guidance and manufacturer's declaration – electromagnetic immunity			
The REF WFC-01 is intended for use in the electromagnetic environment specified below. The customer or the user of the REF WFC-01 should assure that it is used in such an environment.			
Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment-guidance

Conducted RF IEC61000-4-6 Radiated RF IEC61000-4-3	3Vrms 150kHz to 80MHz 3V/m 80MHz to 2.5GHz	3Vrms 150kHz to 80MHz 3V/m 80MHz to 2.5GHz	Portable and mobile RF communications equipment should be used no closer to any part of the REF WFC-01, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. Recommended separation distance $d = 1.2\sqrt{p}$ $d = 1.2\sqrt{p}$ 80M to 800MHz $d = 2.3\sqrt{p}$ 80M to 2.7GHz 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). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey,[a] should be less than the compliance level in each frequency range.[b] Interference may occur in the vicinity of equipment marked with the following symbol : 
NOTE 1 At 80MHz and 800MHz, the higher frequency range applies. NOTE2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.			

[a] 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 cannot be predicted theoretically survey should be considered. If the measured field strength in the location

in which the REF WFC-01 is used exceeds the applicable RF Compliance level above, the REF WFC-01 should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as re-orienting or relocating the REF WFC-01.

[b] Over the frequency range 150kHz to 80MHz, field strengths should be than 3 V/m.

Recommended separation distances between portable and mobile RF communications equipment and the REF WFC-01

The REF WFC-01 is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or user of the REF WFC-01 can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the REF WFC-01 portable Fundus Camera 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 $d = 1.2\sqrt{p}$	80MHz to 800MHz $d = 1.2\sqrt{p}$	800MHz to 2.7GHz $d = 2.3\sqrt{p}$
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23

For transmitters rated at a maximum output power not listed above, the recommended separation distanced in meters(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.

Note 1: At 80MHz and 800MHz, the separation distance for the higher frequency range applies.

Note 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by

absorption and reflection from structures, objects, and people.

WARRANTY STATEMENT

This product is manufactured based on the standard procedures for product management and inspection process that are defined by WIKIOPTICS, Inc.

It is promised that the product bought by you shall be repaired free of charge only in case that the one is newly purchased at the head office of WIKIOPTICS, an exclusive sales agency or a branch, the warranty period is not expired and the product had been normally used in accordance with the user manual before it is broken.

If a charged repair item is occurred even within the warranty period, the relevant additional expense might be charged.

This warranty statement shall not be reissued, so please keep it well not to be lost.

When you request a repair, please show this warranty statement without missing.

The battery and all kinds of accessories other than the fundus camera is consumables.

FREE-OF-CHARGE REPAIRING

- Only in case that a problem is occurred to the product bought by you under the normal use within the warranty period from the date of purchasing.

CHARGED REPAIRING

- In case that the warranty period is expired or there is no warranty statement.
- In case of a failure due to a mistake or negligence while using the product (dropping, flooding, an Impact, a damage or excessive operation)
- In case of a failure due to the abnormality of operating power or an inferiority of a connected device,
- In case of a failure due to the use of an accessory which is not provided or authorized by WIKIOPTICS, Inc.
- In case of a failure due to the disassembling or remodeling at your discretion,
- In case of a failure due to the repairing at a place other than the head office of WIKIOPTICS

or an authorized service center.

- In case of a failure due to an act of God, such as, a fire, an earthquake and flooding, etc.

Model name		(Model No.)
Serial no.		
Client	Name	
	Tel.	
	Address	
Date of purchasing (warranty period: Fundus camera = 1 year, battery= 6months, accessary =3months)		
Sales agency	Branch name	
	Tel.	
	Address	

A/S SERVICE REQUEST FORM

Model name		
Date of purchasing		
Description of failure 1		
Description of failure 2		
Description of failure 3		
Name		
Contact info.	Tel.:	Cell Phone:
Address for product registration		
Comments		

Contact information

Address of customer service center: Rm. 205, U-Tower, 120, Heungdeokjungang-ro, Giheung-gu, Yongin-si, Gyeonggi-do, 16950, Korea
Technical Support: http://www.wikioptics.com
Tel.: +82-70-4667-4271
Fax: +82-303-3448-4280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