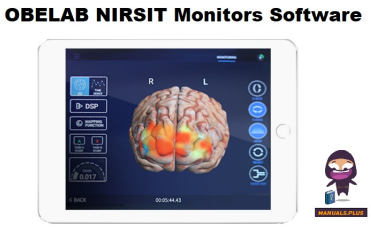


OBELAB NIRSIT Monitors Software User Manual

Contents

OBELAB NIRSIT Monitors Software

Product Information

Specifications

- Software: NIRSIT Software
- Mode: Quick Mode
- Measurement: Cerebral oxygen saturation (rSO2)
- Data Display: Numeric format and graphical format in realtime

Product Usage Instructions

Using the Software in Quick Mode

In Quick Mode, the NIRSIT software monitors the subject's cerebral oxygen saturation (rSO2) without an active account. rSO2 values are displayed in numeric format and graphical format in real time.

Step 1: Enable Quick Mode

To use NIRSIT in Quick Mode, follow these steps:

1. Select MENU BAR > SETTINGS.
2. Set Quick Mode to On.

Real-time Monitoring

On the START TO MEASURE screen, select GO to start real-time monitoring of the subject's cerebral oxygen saturation (rSO2).

Quick Mode Screen Overview

No.	Description
1	EVENT items selected from MENU BAR > SETTINGS > Events will be displayed in the EVENT list below. (see 4.7 Configuring Initial NIRSIT Settings)
2	Items pre-defined in EVENT and Setting are shown. Mark an event by selecting on the Event. The selected event marker is displayed on the corresponding time axis in graph format.
3	During initialization (for 30 seconds) after the start of the measurement, the box maintains a green background and the values are displayed as –. The background becomes red during measurement if measurement results are deemed incorrect. This may occur when the device is put on the subject incorrectly or the device is exposed to bright sunlight.
4	The measurement date and duration are displayed.
5	BASELINE setting button
6	Set values obtained by selecting the basic-value setting (BASELINE) button as basic values.
7	Variations between the current values and the reference values are shown (blue indicates a decrease while red indicates an increase).
8	Left and Right oxygen saturation values (rSO2) are shown.
9	Set the alarm on or off, according to the alarm conditions specified in initial settings.
10	Left and right measurements are displayed in graph format, where x axis denotes the measurement time period in minutes. Selected events are displayed with green markers.

Saving Data
To save measurement data, follow these steps:

1. After the measurement is complete, either in Quick Mode or Normal Mode, select DONE at the bottom of the screen.
2. A window will pop up asking if you want to finish the measurement.
   To automatically save measurement data and display the main screen for the current mode, select DONE.
   Make sure that AutoSave is set to On in MENU BAR > SETTINGS.
3. Select DONE. The measurement stops and a pop-up window appears asking if you want to save the data.
4. Select YES. The data is automatically saved, and the device displays the main screen in the current mode.

Playing Back Saved Data
To play back saved data, follow these steps:

1. At the top of the screen, select MENU BAR > DATA.
2. To play data, you must confirm the password for the logged-in observer account.
3. Enter the password for the logged-in observer account, and then select DONE at the bottom of the screen.
4. Select the data item to play. The selected data will be played. The data list is sorted by the subject name and

measurement date.

5. Select whether to apply additional functions, used during measurement, according to the Replay option setting (On/Off) under MENU BAR > SETTINGS. See 4.7 Configuring Initial NIRSIT Settings for details.

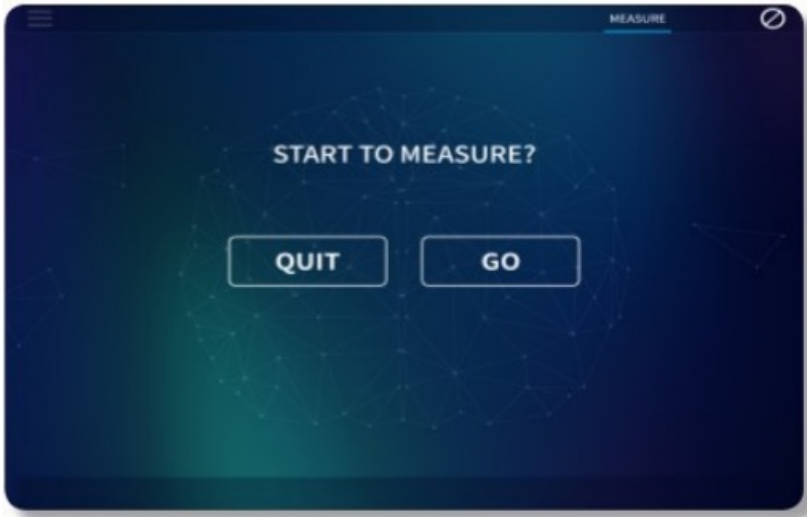
Using the Software in Quick Mode

In Quick Mode, the NIRSIT software monitors the subject's cerebral oxygen saturation (rSO2) without an active account. In Quick Mode, rSO2 values are displayed in numeric format and graphical format in real time.

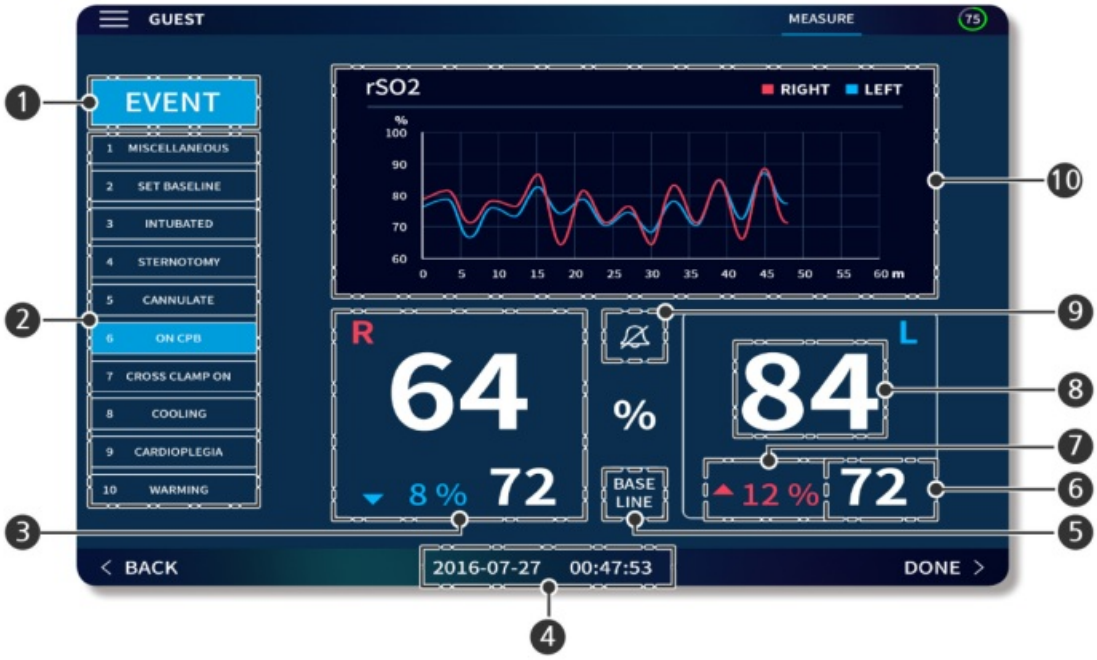
To use NIRSIT in Quick Mode, select **MENU BAR** > **SETTINGS** and set Quick Mode to On.

Real-time Monitoring

On the START TO MEASURE screen, select GO.



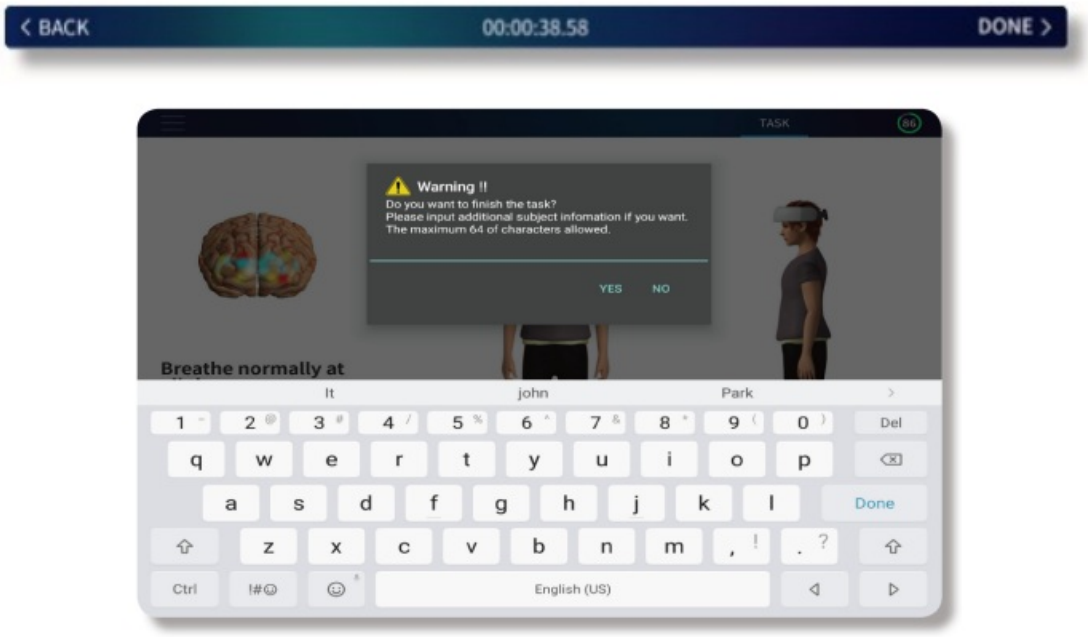
Quick Mode Screen Overview



No.	Description
1	EVENT items selected from **MENU BAR > SETTINGS > Events** will be displayed in the EVENT list be low. (see 4.7 Configuring Initial NIRSIT Settings)
2	Items pre-defined in **EVENT** and **Setting** are shown. Mark an event by selecting on the Event. The sel ected event marker is displayed on the corresponding time axis in graph format.
3	During initialization (for 30 seconds) after the start of the measurement, the box maintains a green bac kground and the values are displayed as "–." The background becomes red during measurement if me asurement results are deemed incorrect. This may occur when the device is put on the subject incorre ctly or the device is exposed to a bright sunlight.
4	The measurement date and duration are displayed.
5	**BASELINE** setting button
6	Set values obtained by selecting the basic-value setting (BASELINE) button as basic values.
7	Variations between the current values and the reference values are shown (blue indicates a decrease while red indicates an increase).
8	Left and Right oxygen saturation values (rSO2) are shown.
9	Set the alarm on or off, according to the alarm conditions specified in initial settings.
10	Left and right measurements are displayed in graph format, where x axis denotes measurement time period in minutes. Selected events are displayed with green markers).

Saving Data
Save measurement data.

1. After the measurement is complete, either in Quick Mode or Normal Mode, select DONE at the bottom of the screen. A window will pop up asking if you want to finish measurement.



NOTE

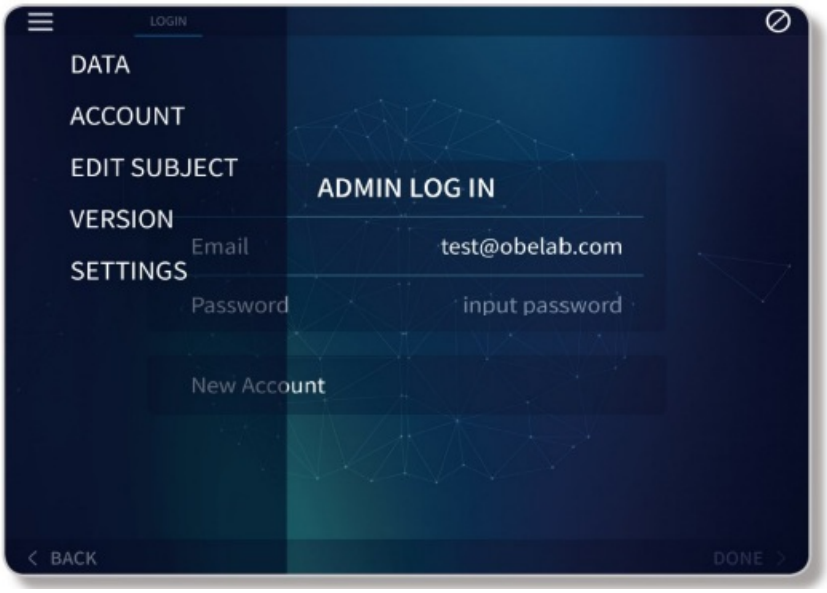
To automatically save measurement data and display the main screen for the current mode, select DONE.

Make sure that Auto Save is set to Onin MENU BAR > SETTINGS.

2. Select DONE. The measurement stops and a pop-up window appears asking if you want to save the data.
3. Select YES. The data is automatically saved and the device displays the main screen in the current mode.

Playing Back Saved Data

1. At the top of the screen, select MENU BAR > DATA. To play data, you must confirm the password for the logged-in observer account.



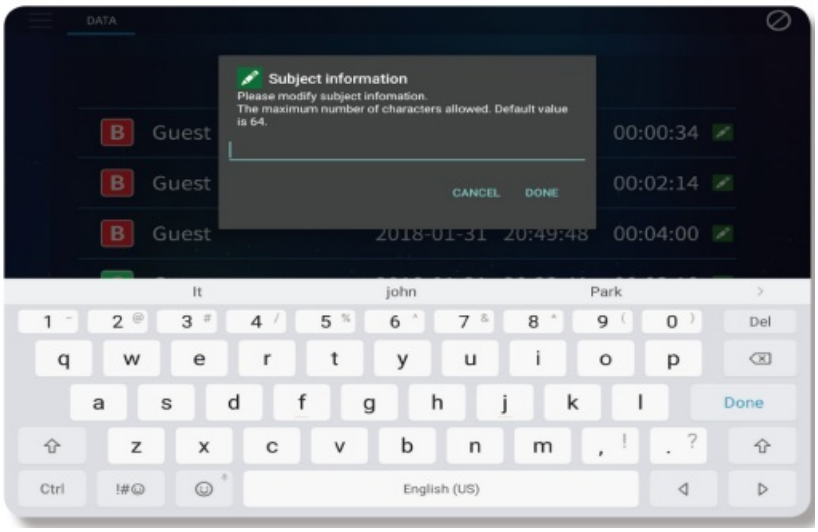
2. Enter the password for the logged-in observer account, and then select DONE at the bottom of the screen. Select the data item to play. The selected data will be played. Data list is sorted by the subject name and measurement date. Select whether to apply additional functions, used during measurement, according to the Replay option setting (On/Off) under MENU BAR > SETTINGS. See “4.7 Configuring Initial NIRSIT Settings” for details.

NOTE

- M next to the subject name denotes MONITORING Mode Data
- B next to the subject name denotes TASK Mode > BEHAVIORAL Task Data
- C next to the subject name denotes TASK Mode > COGNITIVE Task

Adding
Notes can be added to saved data.

1. Select the icon next to the measurement data item and add any information to identify the measurement data. Select DONE when complete.



Exporting

Saved data can be exported as a file for further analysis. Exported files are saved in the tablet My Files > Device Storage > NIRS folder > nirsit_export.db. The nirsit_export.db file can be converted to .csv format. See “8.2 Using the NIRSIT DB Browser” for details.

1. Press and hold the measurement data item file name to export. The data item will be selected and a red vertical line will appear at the left corner of the selected data item.
2. Use the same method in step 1 to select as many data items as you want to export. To select all items, select the checkbox (■) in the top left of the SAVED DATA screen.

3. Select EXPORT at the bottom of the screen.

Deleting

Saved data can be deleted.

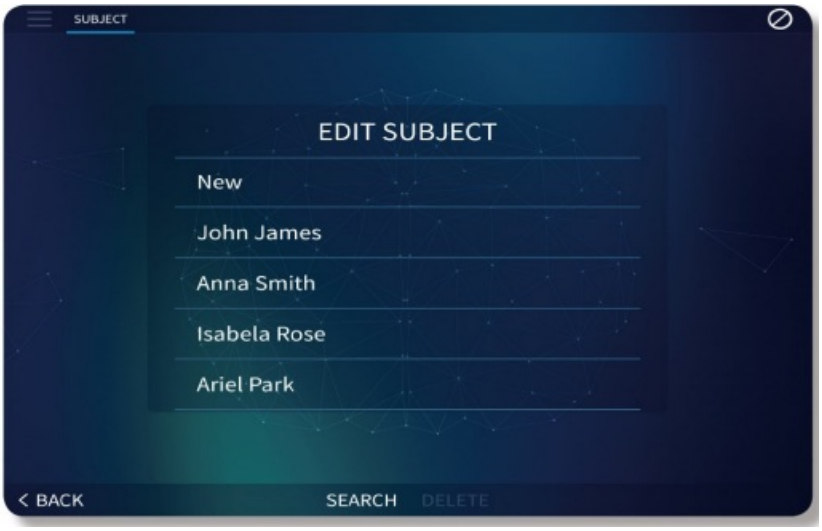
1. Press and hold the measurement data item to delete. The data item will be selected.
2. Use the same method in Step 1 to select as many data items as you want to delete. To select all items, select the checkbox (■) in the top left of the SAVED DATA screen.

3. Select DELETE at the bottom of the screen.

Edit Subject

Editing the subject

1. Select MENU BAR >EDIT SUBJECT.
2. Enter the password for the logged-in observer account and select DONE.
3. Select the subject name.

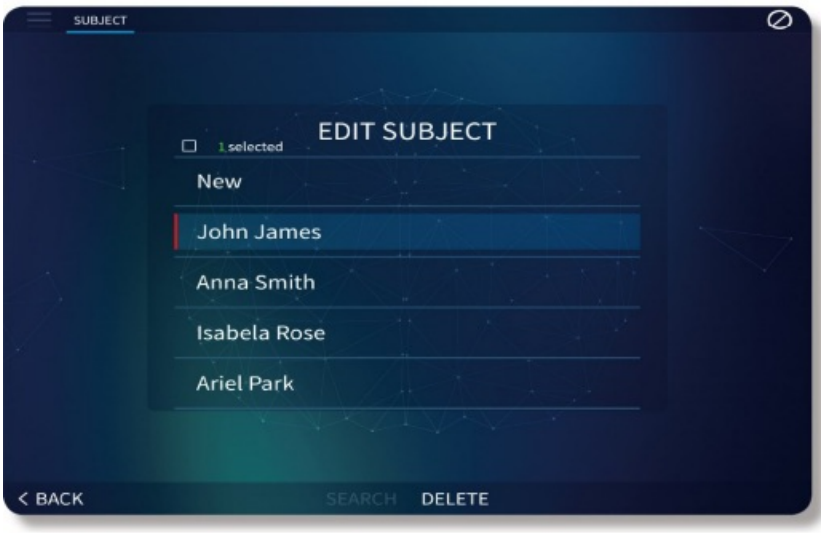


4. Edit their information on the QUESTIONNAIRE window.

5. After editing the information, select DONE.

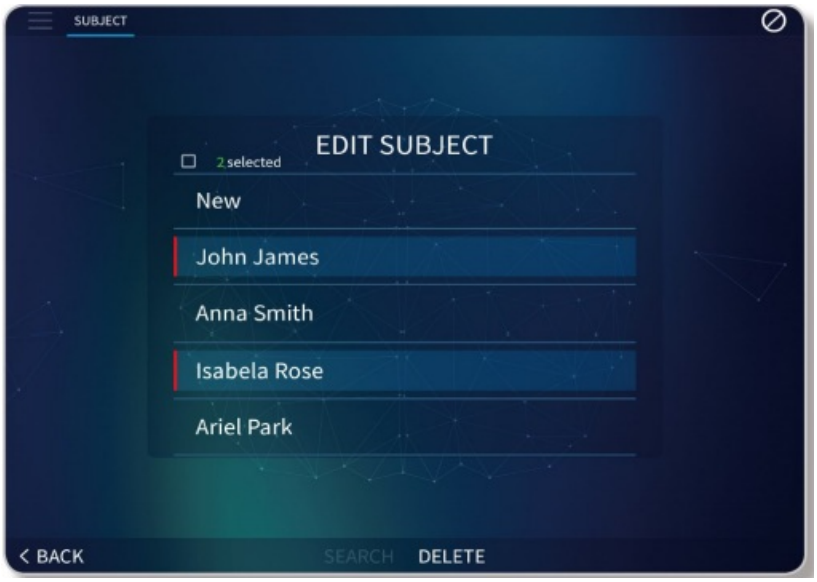
Deleting the subject(s)

1. Select MENU BAR >EDIT SUBJECT.
2. Enter the password for the logged-in observer account and select DONE.
3. To delete one of the subjects, select and hold the desired subject name until the red vertical line is displayed in front of the subject name



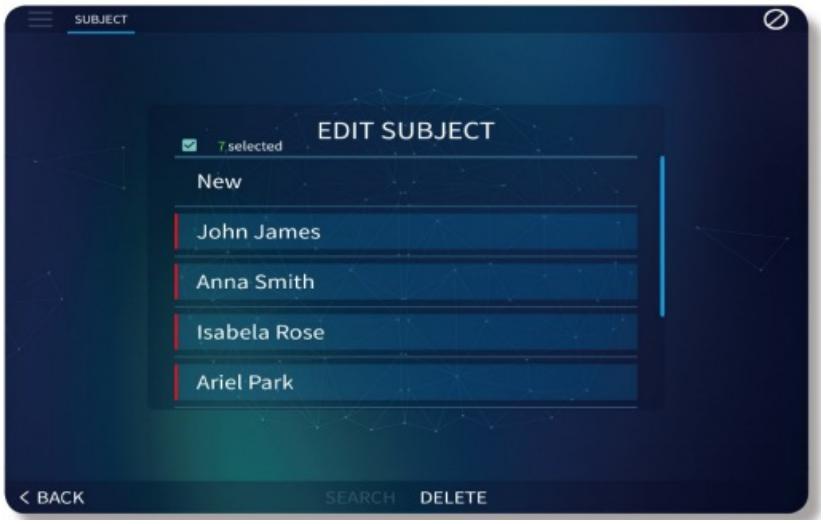
To delete multiple subjects

First, select and hold one of the subject names until the red vertical line is displayed in front of the subject name. And then select any other desired subject name(s).

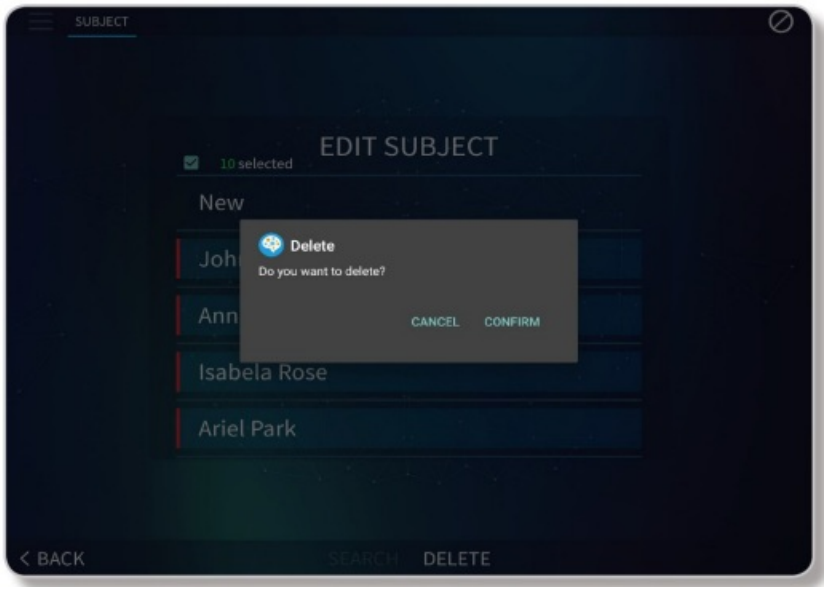


To delete all the subjects

Select and hold one of the subject name. And then check the check box (■) on the left of the EDIT SUBJECT window.



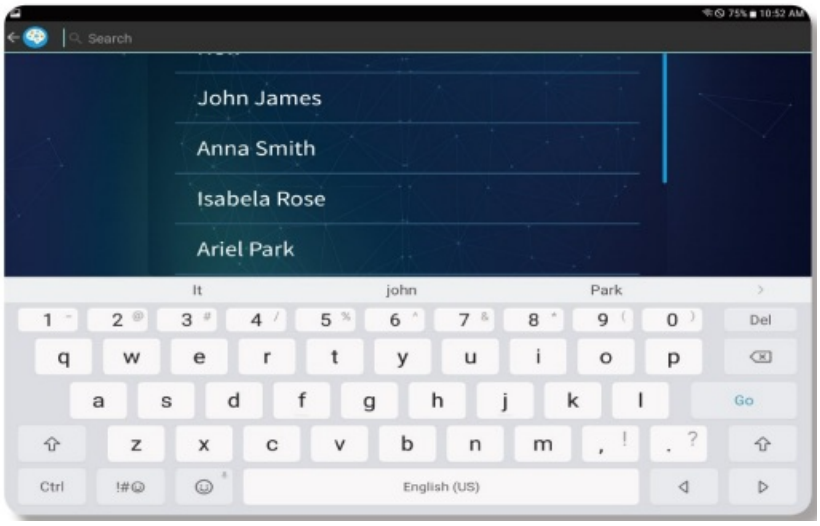
4. After selecting the subject name, select DELETE at the bottom of the screen.
5. The message “Do you want to delete?” appears. To delete it, select CONFIRM. To cancel, select CANCEL.



NOTE
To deselect a subject, select the subject name again and the red vertical line on the left will disappear. To deselect all the subjects, press back button ( ) on the tablet itself.

Searching the subject

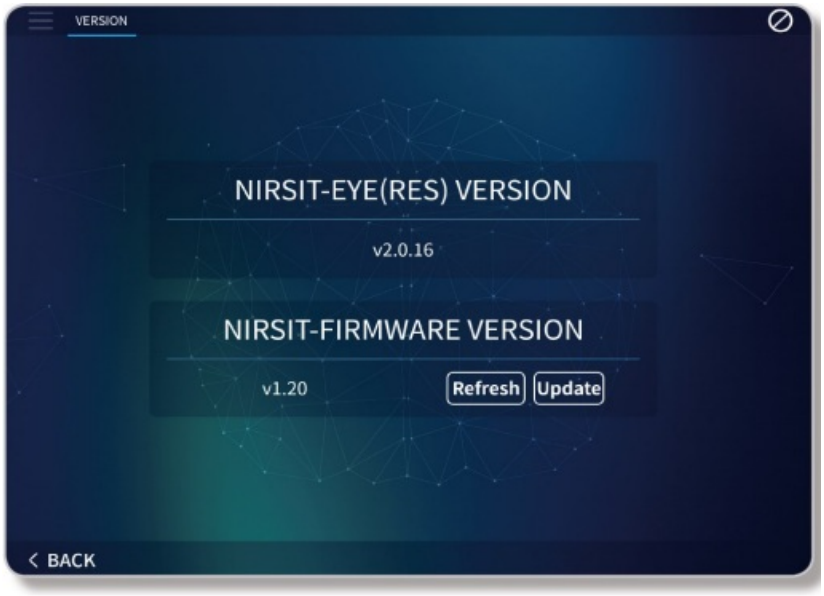
1. Select MENU BAR >EDIT SUBJECT.
2. Enter the password for the logged-in observer account and select DONE.
3. Select SEARCH at the bottom of the screen.



4. Enter the subject name (regardless of last name or first name).

Checking and Updating the Software Version

- Select MENU BAR > VERSION. Use the VERSION screen to view the latest updated versions for NIRSIT-EYE and NIRSIT-FIRMWARE. If the current version is not the latest, use the Update button to update. NIRSIT-EYE can only be updated when the device is connected.



Maintenance

Replacing Accessories and Components

Replacing Straps

Replace with a new strap if the current strap is dirty, damaged or feels loose. A strap can be removed by following the installation instructions in reverse order

Replacing the Disposable Patch (sold separately)

Disposable patches are for single use only. Replace the patch after each use to ensure proper hygiene. To purchase accessories, please contact OBELAB or an authorized dealer.

1. Remove the used disposable patch.
2. Attach a new disposable patch on the sensor unit inside the device by aligning the holes.
3. Press all the sensors to ensure that the disposable patch is securely attached to the sensors.

Cleaning
Make sure to turn off the NIRSIT device before cleaning. The device must be cleaned and stored after use. If not properly cleaned, or if exposed to direct sunlight, the device may become discolored.

Cleaning Silicon Caps
Wipe with an alcohol-moistened soft cloth. Silicon caps are frequently in contact with subjects. Take extra care to maintain hygiene.

Cleaning NIRSIT

1. Wipe with a soft cloth moistened with a non-abrasive cleaning solution mixed with water.

   WARNING

   - Make sure that liquid does not enter the device. This can cause device failure.
   - Do not spray directly on the device.
   - Do not use abrasive agents e.g. acetone as they can damage the surface.
2. Use a dry cloth to wipe off the moisture.
3. To remove foreign objects from the sensor, use a cotton ball soaked with alcohol.

NOTE
NIRSIT can be sterilized with ultraviolet rays.

Troubleshooting

Symptoms	Possible cause	Solution
The device will not turn on.	The battery is discharged.	Charge the battery
The battery will not charge.	The battery has expired.	Contact OBELAB or an authorized dealer.
	The cable is damaged or severed.	If you have a spare, replace the cable. If you do not have a spare, p urchase a new cable.
	This environment is not suitable to store or operate the product.	Meet environmental requirements.
Cannot connect with the tablet.	The Wi-Fi feature is turned off.	Turn on the tablet's Wi-Fi.
	Sometimes a wireless connection c annot be established due to environ mental factors (e.g. congested area s such as a big event venue).	Use a USB cable for a wired conne ction.

NOTE
Information related to after-sales services and other technical information on the device can be found in the service manual provided by OBELAB

Product Specifications

Mechanical Characteristics

Mechanical Characteristics	**Mechanical Characteristics**
Mechanical Characteristics	**Mechanical Characteristics**
Mechanical Characteristics	**Mechanical Characteristics**

Technical Characteristics

Item		**Description**
Source	Source Type	Dual wavelength VCSEL laser
	Number of Sources	24
	Laser Output	1 mW
	Wavelength	780 nm, 850 nm
	Operation Mode	CW
Detector	Detector Type	Active detection sensor
	Number of Detectors	32
	Number of channels	Up to 204 channels
Measurement	Source-Detector distance	1.5 cm, 2.12 cm, 3 cm, 3.35 cm
	System Scan Rate	Up to 8.138 Hz
	Operation Mode	CW

Electrical Characteristics

Item		**Description**
Input Voltage (via USB port)		5 V
Maximum Current (via USB port)		2.1 A
Battery	Type	Lithium-ion polymer battery
	Usage Time	Up to 8 hours (when fully charged)
	Voltage	3.7 V
	Capacity	3000 mAh
Data Storage		Built-in memory in Tablet or PC storage
Communication	Wireless	WLAN (2.4 GHz 802.11b/g/n)

Item		**Description**
	Wired	Serial Communication

Tablet Requirements

Item	Description
Operating System	Android 5.0(Lollipop) or higher
CPU	QuadCore or higher
RAM	3 GB or greater
Internal Memory	32 G or greater
Resolution	16:9 UI supported
Camera	8MP or higher

NOTE
The provided tablet is to be used only with NIRSIT. Do not use this tablet for other purposes. Please do not install other apps. Other apps may disrupt NIRSIT performance.

Environmental Requirements

Item		Description
Operating Environment	Temperature	15°C ~ 35°C (For CE -20°C ~ 50°C)
	Humidity	20% ~ 80%
Storage Environment	Temperature	-10°C ~ 40°C
	Humidity	20% ~ 80%

Guidance and Manufacturer’s Declaration

Guidance and Manufacturer’s Declaration – Electromagnetic Emissions
This system is intended for use in the electromagnetic environment specified below. The customer or user of the system should ensure that it is used in such an environment.

Emissions test	Compliance	Electromagnetic environment – guidance
RF emission	Group 1	This system uses RF energy only for its internal functions. Therefor e, its RF emissions are very low and are not likely to cause any int erference in nearby electronic equipment.
CISPR 11		
RF emission	Class A	This system is suitable for use in all establishments other than dom estic establishments and those directly connected to the public low -voltage power supply network.
CISPR 11		
Harmonic emissions	N/A	
IEC 61000-3-2		
Voltage fluctuations / Flicker emissions	N/A	
IEC 61000-3-3		

Immunity test	Compliance level	Electromagnetic environment – guidance
Electrostatic discharge (ESD) IEC 61000-4-2	±6 kV contact ±8 kV air	The floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.

The use of cables and components other than those specified for this system is not recommended. Using cables or components that do not meet the system specifications may affect emission quality.

Guidance and Manufacturer's Declaration – Electronmagnetic Immunity
This system is intended for use in the electromagnetic environment specified below. The customer or user of the system should ensure that it is used in such an environment.

Immunity test	Compliance level	Electromagnetic environment – guidance
Electrostatic discharge (ESD) IEC 61000-4-2	±6 kV contact ±8 kV air	The floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.

NOTE

1. UT is the AC mains voltage prior to application of the test level.
2. The use of cables and components other than those specified for the current system is not recommended. Using cables or components other than those specified for the current system may affect the immunity

Guidance and Manufacturer's Declaration – Electronmagnetic Immunity – Equipment & Systems that are NOT life-supporting

This system is intended for use in the electromagnetic environment specified below. The customer or user of the system should ensure that it is used in such an environment.

Immunity test	Compliance level	Electromagnetic environment – guidance
Radiated RF IEC 61000-4-3	3 V/m	80 MHz – 800 MHz: d = 1.2 800 MHz – 2.5 GHz: d = 2.3 where P is the maximum output power rating of the transmitter in watts (W) and d is the recommended separation distance in meters (m), based on the transmitter manufacturer's standard. 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. Interference may occur in the vicinity of equipment marked with the following symbol:

NOTE

1. At 80 MHz and 800 MHz, the higher frequency range applies.
2. These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects, and people.
3. The use of cables and components other than those specified for the system is not recommended. This may result in decreased electromagnetic immunity of the system.

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 broadcasts, and TV broadcasts, cannot be predicted theoretically with any degree of accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the system is used exceeds the applicable RF compliance level above, the system should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the system.
b	Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.

Recommended separation distances between portable and mobile RF communications equipment and the system

For systems that are not NOT life supporting

This system is intended for use in an electromagnetic environment in which radiated RF disturbances are

controlled. The customer or user of the system can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the system as recommended below, according to the maximum output power of the communications equipment.

Rated max. the output power of the transmitter (W)	**Separation distance according to frequency of the transmitter (m)**		
	150 kHz – 80 MHz **d = 1.2 √P**	**80 MHz – 800 MHz** **d = 1.2 √P**	**800 MHz – 2.5 GHz** **d = 2.3 √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 distance d 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's standard.

Guidance and Manufacturer's Declaration – Specific Absorption Rate (SAR)
The product's specific absorption rate (SAR), which measures the amount of electromagnetic waves absorbed by the human body, satisfies the "Electromagnetic Wave Protection Standards" set by the Ministry of Science and ICT. The product was tested according to the "SAR Measurement Standards" of the National Radio Research Agency, with the maximum output condition and in proximity to the head. The maximum SAR measurement value for the head absorption rate at 2.4 GHz WLAN frequency is as follows:

Model Name	Head SAR (2.4 WLAN)
NS1-H20B	Location: Rear#1 (right contact position) / Mid Ch. (2442.0 MHz) SAR: 0.259 W/kg (Grade 1)

In South Korea, the SAR (Specific Absorption Rate) is regulated to a stricter standard of 1.6 W/kg, which is lower than the international recommended standard of 2 W/kg It is important to note that in everyday use, the actual SAR is significantly lower than the maximum output condition during testing.
More detailed information about SAR can be found on the website of the National Radio Research Agency **(www.rra.go.kr)** or the manufacturer's website

Using the NIRSIT DB Browser

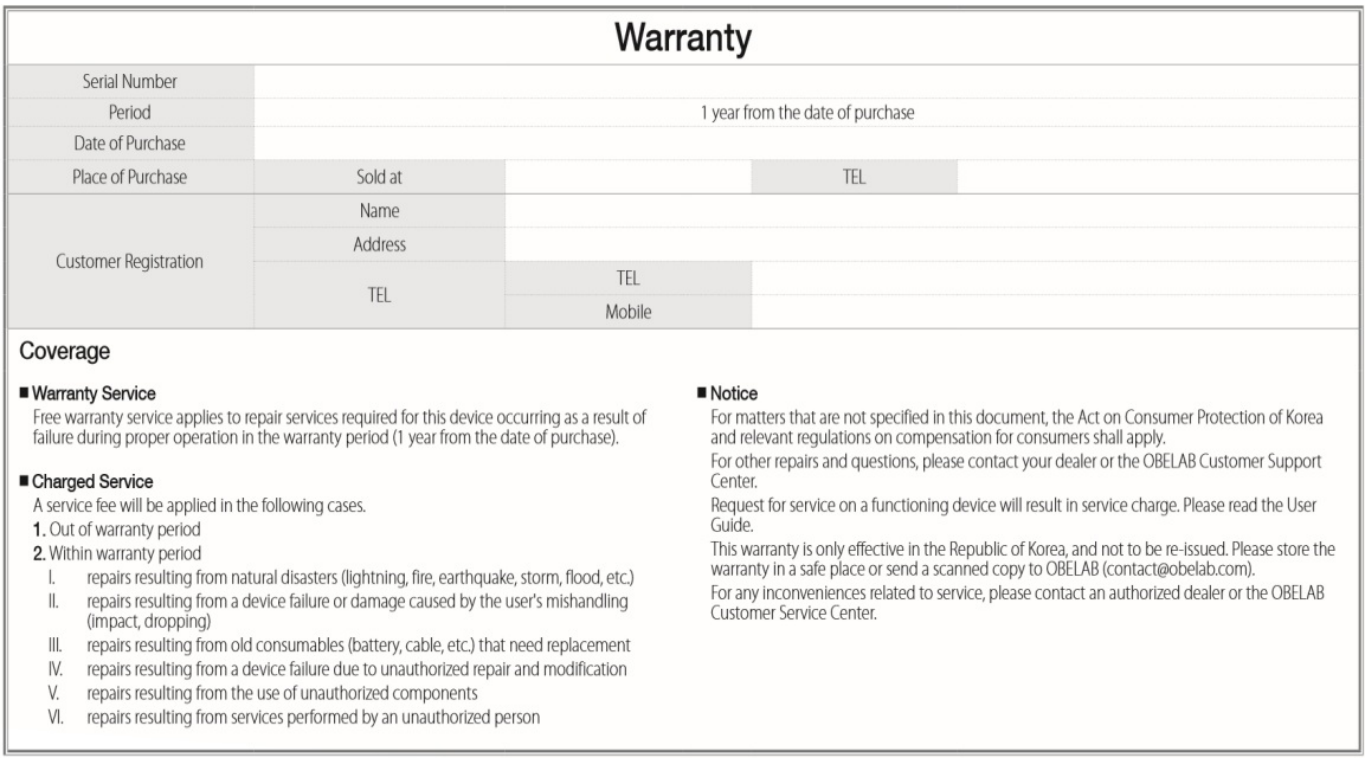
NIRSIT DB Browser is a computer-based application designed to view data in the nirsit_export.db file, sent from NIRSIT, on your computer. You can also convert the file to CSV format for use as material for research on cerebral activity. On the computer desktop, double-click the application icon to launch the NIRSIT DB Browser.

Loading the Database File

1. Click the Load button.
2. Move to the directory where the nirsit_export.db file is located, select the file, and then click Open (O).
3. In the Selected Data area, click the desired data item. Specific information appears on the right.

Converting to CSV Format
Click Convert to CSV. Convert the nirsit_export.db file to CSV format.

NOTE
The converted file can be found in the same folder as the database file.



Warranty

Serial Number				
Period	1 year from the date of purchase			
Date of Purchase				
Place of Purchase	Sold at		TEL	
Customer Registration	Name			
	Address			
	TEL	TEL		
		Mobile		

Coverage

■ **Warranty Service**
Free warranty service applies to repair services required for this device occurring as a result of failure during proper operation in the warranty period (1 year from the date of purchase).

■ **Charged Service**
A service fee will be applied in the following cases.
1. Out of warranty period
2. Within warranty period
   - I. repairs resulting from natural disasters (lightning, fire, earthquake, storm, flood, etc.)
   - II. repairs resulting from a device failure or damage caused by the user's mishandling (impact, dropping)
   - III. repairs resulting from old consumables (battery, cable, etc.) that need replacement
   - IV. repairs resulting from a device failure due to unauthorized repair and modification
   - V. repairs resulting from the use of unauthorized components
   - VI. repairs resulting from services performed by an unauthorized person

■ **Notice**
For matters that are not specified in this document, the Act on Consumer Protection of Korea and relevant regulations on compensation for consumers shall apply.
For other repairs and questions, please contact your dealer or the OBELAB Customer Support Center.
Request for service on a functioning device will result in service charge. Please read the User Guide.
This warranty is only effective in the Republic of Korea, and not to be re-issued. Please store the warranty in a safe place or send a scanned copy to OBELAB (contact@obelab.com).
For any inconveniences related to service, please contact an authorized dealer or the OBELAB Customer Service Center.

FAQ

Q: What is Quick Mode in NIRSIT Software?

A: Quick Mode in NIRSIT Software allows monitoring of cerebral oxygen saturation (rSO2) without an active account.

Q: How can I enable Quick Mode?

A: To enable Quick Mode, select MENU BAR > SETTINGS and set Quick Mode to On.

Q: How do I save measurement data?

A: After the measurement is complete, select DONE at the bottom of the screen. A pop-up window will appear asking if you want to save the data. Select YES to automatically save the data.

Q: How can I play back saved data?

A: Select MENU BAR > DATA at the top of the screen. Enter the password for the logged-in observer account and select DONE. Then, select the data item to play.

Documents / Resources

	OBELAB NIRSIT Monitors Software [pdf] User Manual NIRSIT Monitors Software, NIRSIT, Monitors Software, Software

References

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- User Manual