SLAM100

Product manual V1.24

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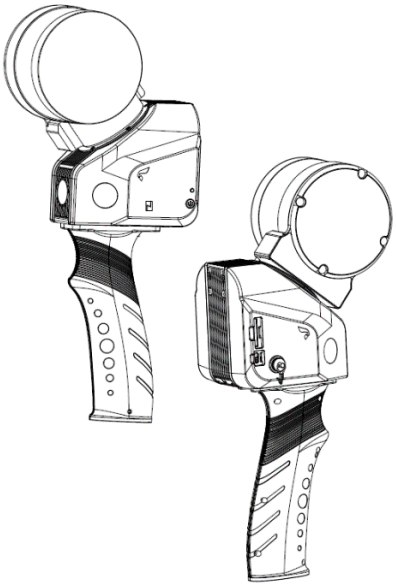

Shenzhen Feima Robotics Technology Co.,Ltd.

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SLAM100 is relatively precise, users should have basic hands-on ability and safety common sense, and need to use it carefully. Please read the SLAM100 product manual first, and then use it after familiarizing yourself with the product functions. Uncertain operation will result in product damage, property damage, and even personal injury. This product is not suitable for children. Do not use SLAM100 with products not provided or recommended by FEIMA, or use it without following the safety guidelines mentioned in the product documentation provided by FEIMA. This document contains instructions for safety guidelines, operation and maintenance. In order to ensure that you can use the SLAM100 correctly and safely, please read all the instructions and warnings mentioned in the product manual and safety guidelines carefully before installation, setup and use, and install and use the SLAM100 in strict accordance with the relevant instructions.

warn :To avoid fire, property loss and personal injury, be sure to follow the following safety guidelines during battery use, charging and storage.

Safe Operation Guidelines

1. SLAM100 is a high-precision control device. Dropping or being hit by external force may damage the SLAM100, resulting in abnormal operation.
2. Make sure that the gimbal rotation is not blocked by external force after the SLAM100 is powered on.
3. Please pay attention to dust and sand when using SLAM100.

Catalog

product description

SLAM100 is the first handheld mobile laser scanner launched by FEIMA, (hereinafter referred to as the scanner)

The system has a 360° Rotatable Gimbal, which can form a 270°×360° point cloud coverage. Combined with the industry-level SLAM algorithm, it can obtain high-precision and high-precision 3D point cloud data of the surrounding environment without light and GPS.

The SLAM100 uses three 5-megapixel cameras, which can form an ultra-wide field of view with a width of 200° and a height of 100°, acquire texture information at the same time under lighting conditions, and produce color point clouds and local panoramas.

SLAM100 adopts integrated structure design, built-in control and storage system, built-in replaceable lithium battery, and one-button start operation, making data acquisition more efficient and convenient.

SLAM100 can use SLAM GO mobile APP software to view and manage projects, automatically display synchronously with cloud project information, perform real-time SLAM puzzles and real-time preview, and perform operations such as firmware upgrade and device maintenance. Based on the

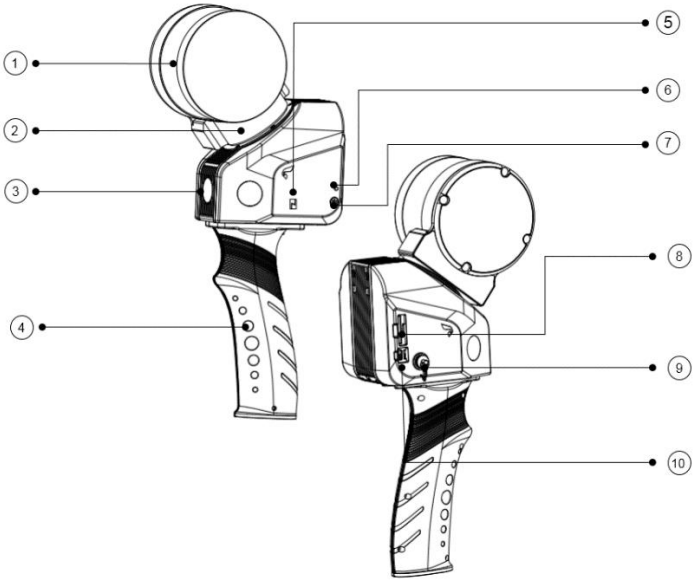
UAV Manager SLAM GO POST software module, it can realize data post-processing, color point cloud production, data stitching, data optimization, browsing and measurement functions.

SLAM100 can be widely used in traditional surveying and mapping, closed space, digital 3D, emergency handling of emergencies and other scenarios due to its portability, no GPS, and the ability to mount a variety of platforms.

SLAM100

The scanner is mainly composed of fuselage, laser sensor and camera sensor. The fuselage contains Rotatable Gimbal, control components and other device. It can not only collect data by hand, but also mount D500, D20 and other drones for low-altitude operation. data collection.

Illustration:



1. Laser sensor
2. Rotatable Gimbal
3. Camera sensor
4. Handle
5. NFC
6. Status light
7. power button
8. SD card slot
9. Extension interface
10. USB interface

Specifications	
Laser field of view	270°×360°
camera field of view	200°（horizontal）×100°（vertical）
Relative accuracy	2cm
absolute accuracy	5cm
storage	32GB（Standard）
Power supply	Internal replaceable lithium battery, external power supply
External supply voltage	20-30V
Internal battery	3350mAh×4
Internal battery life	2.5h
Power consumption	25W
Operating temperature	-10℃~ +45℃
Working humidity	<85% RH
weight	1588g（without battery）
size	372mm×163mm×106mm（Without bottom bracket）
Sensor parameters	
Laser class	Class 1
Number of laser channels	16
Maximum ranging	120m
Dot frequency	320kpts/s
echo strength	8bits
Number of cameras	3
camera resolution	500w
NFC	support

SLAM GO

SLAM GO is a mobile APP for SLAM100. The APP is connected to the SLAM100 device through a mobile phone, and can perform operations such as project management, real-time point cloud puzzle display, image preview, firmware upgrade, etc. It supports Android 8.0 and above systems.

SLAM GO POST

SLAM GO POST is the PC software for SLAM100. This software can perform post-processing of data collected by SLAM100, produce high-precision, high-definition color point clouds, produce partial panoramas, and perform point cloud browsing and optimization processing; SLAM GO POST software supports Windows10 (64-bit) and above systems.

Main component specifications and functions

Status Indicator

The SLAM100 handheld laser scanner mainly has three-color status lights (red, yellow, green), which are used to indicate the current scanner working status and battery power information display. Please refer to the following table to understand the scanning indicated by different flashing methods and colors. The working status and battery level of the instrument.

project	condition	illustrate

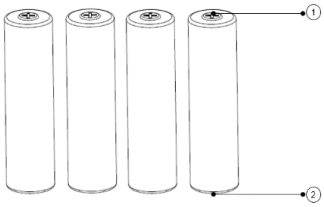
Power display	Green light (flashing slowly)	Voltage > 14.0V
	Yellow light (flashing slowly)	14.0V>Voltage>12.3V
	Red light (flashing slowly)	12.3V>Voltage>11.8V
Device upgrade	On 200ms, cycle 400ms, white light	upgrading
	Steady on or flashing slowly (green, yellow, red)	update successed
	On 200ms, cycle 400ms, red light	Upgrade failed
	On 100ms, cycle 200ms, white light	MCU upgrade
system settings	Press and hold the power button for 10 seconds, the status light turns blue, then press and hold the power button for 2 seconds, the status light off, and after 4 seconds, the status light changes to normal battery display mode	restoration system
shutdown	The blue light flashes, on for 400ms, off for 1100ms, enters the shutdown state	shutdown
error state	The red light flashes quickly (on 100ms, the cycle 200ms), indicating that there is an error, please check the specific error through the SLAM GO APP	error state
working status	Indicator light is always on (green, yellow, red)	device startup

	The indicator light flashes, on 800ms, the cycle 1500ms (green, yellow, red)	data collection

device power

Standard battery

The SLAM100 scanner is equipped with 4 18650 rechargeable batteries as standard, with a single battery capacity of 3350mAh and a voltage of 4.2V. The scanner needs to be loaded with 4 standard rechargeable batteries for normal operation, and the continuous working time of each group (4 batteries) is about 2.5 hours.



1. Positive pole
2. Negative pole

Notice

1. **The battery should be placed in the battery clip during transportation to avoid contact with liquids or bumps with hard objects. Do not immerse the battery in water or get it wet. Never use the battery in the rain or in a wet environment. When the inside of the battery comes into contact with water, a decomposition reaction may occur, causing the battery to spontaneously ignite or even explode.**
2. **If the battery accidentally falls into the water, immediately remove**

the battery and place it in a safe open area away from the battery until it is completely dry. Dried batteries should not be used again and should be disposed of properly according to the disposal methods in this article.

3. **If the battery catches fire, please use water, water mist, sand, fire blanket, dry powder, carbon dioxide fire extinguisher to put out the fire immediately. Please select the fire extinguishing method in the above recommended order according to the actual situation.**
4. **It is strictly forbidden to use batteries not officially provided by FEIMA. If you need to replace a new battery, please buy it on FEIMA's official website or designated channels. FEIMA is not responsible for battery accidents and device failures caused by the use of batteries not officially provided by FEIMA.**
5. **The battery storage temperature and humidity requirements are -20℃~45℃, 45%~90%RH;**
6. **It is strictly forbidden to use bulging, leaking, damaged batteries and charging them. Do not use it when the battery emits odor, heats up, the temperature of the battery itself exceeds 60°C , is deformed, discolored, or has any other abnormality. If the battery is abnormal, please contact FEIMA or other agents designated by FEIMA for further processing.**
7. **Please use the battery in an environment where the temperature is between -10°C and 60°C. Excessive temperature (above 60℃) may cause the battery to catch fire or even explode. Too low temperature (below -10°C) will seriously damage the battery.**
8. **It is forbidden to use the battery in the environment of strong static electricity or magnetic field. Otherwise, the battery protection board will fail.**
9. **Do not disassemble or puncture the battery in any way with sharp objects. Otherwise, battery leakage will cause fire or even explosion.**
10. **Mechanical impact, crushing or throwing of batteries is prohibited.**

Do not place heavy objects on the battery or charger.

11. **The electrolyte inside the battery is highly corrosive. If it accidentally comes into contact with the skin or eyes, please immediately rinse with clean water for at least 15 minutes and seek medical attention immediately.**
12. **If the battery is dropped or subjected to external impact, please stop using the battery.**
13. **Do not heat the battery. Do not place batteries in microwave ovens or pressure cookers.**
14. **Do not place battery cells on conductive surfaces (such as metal table tops, glasses, watches, jewelry, etc.).**
15. **Do not use wires or other metal objects to short-circuit the positive and negative electrodes of the battery.**
16. **If the battery connector is dirty, wipe it with a clean, dry cloth. Failure to do so will result in poor battery contact, resulting in energy loss or charging failure.**

Battery Storage:

1. Please store the battery out of the reach of children and pets.
2. Do not place the battery near a heat source (stove or heater, etc.) and in a car on a hot day. Never store batteries in an environment above 60°C. The ideal storage ambient temperature is 22°C - 28°C.
3. Please store the battery in a dry environment.
4. Do not store the battery for a long time after the battery is completely discharged, to avoid damage to the battery cell caused by the battery entering the over-discharge state, and it will not be able to be restored to use.

Battery Care:

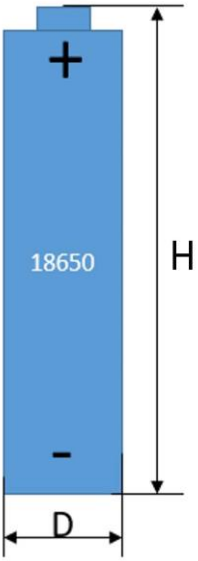
1. Do not overcharge or overdischarge the battery, otherwise it will cause

damage to the battery.

2. If the battery is left idle for a long time, its performance will be affected.
3. Do not use the battery in an environment where the temperature is too high or too low.
4. Do not store batteries where the ambient temperature exceeds 60°C.

Battery disposal:

1. Be sure to completely discharge the battery before disposing of the battery in the designated battery recycling bin. Batteries are hazardous chemicals and should not be disposed of in ordinary trash cans. For details, please follow local battery recycling and disposal laws and regulations.
2. If the battery cannot be completely discharged, do not dispose of the battery directly in the battery recycling box, and contact a professional battery recycling company for further processing.

SLAM100 User-supplied battery selection reference				
	Name	Reference requirements	Remark	
1	Type	Rechargeable 18650 pointed lithium battery with protective plate	Positive pole needs to be pointed	
2	Rated voltage	3.7V		
3	battery capacity	≥3000mAh	suggested value	
4	Charging limit	full charge voltage 4.2V recharging current≥1.5A	If the charging current exceeds 4.2V or the charging current is lower than 1A, the charger provided by FEIMA cannot be used	
5	Maximum discharge current	≥3A	generally satisfied	

6	battery protection board	Conventional protection functions such as overcharge, overdischarge, overcurrent, and overtemperature	*Battery must have its own protective plate, otherwise there is a safety risk, and relevant safety certification is required	
7	Battery outer diameter-D	18.0mm≤D≤18.9 mm		
8	battery height-H	68mm≤H≤71mm		

battery charger

Input: AC 100~240 V /50~60 Hz /600mA (MAX)

DC 12~24V 2000mA (MAX)

Output: DC 4.2V/1000mA (MAX) × 4

Charger settings: The four buttons A/B/C/D on the charger correspond to a charging slot respectively. Short press for 1 second, the current switches

between 500mA and 1000mA; long press for 5 seconds, the two charging modes of lithium-ion battery and iron-lithium battery are switched. This charger defaults to the lithium-ion charging mode, and no switching operation is required.

Notice

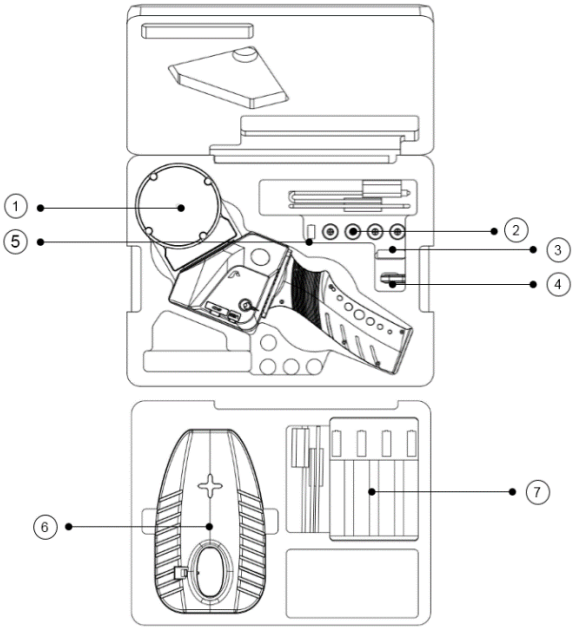
1. The operating environment of the charger is 0℃~40℃, 45%~90%RH;
2. It is strictly forbidden to charge the 18650 battery in a temperature environment below 0°C and above 45°C, otherwise safety hazards or performance problems may occur.
3. The battery will automatically stop charging when fully charged. When charging is complete, disconnect the battery from the charger.
4. For safety reasons, the maximum time allowed by the charger to charge the rechargeable battery is 12 hours, and the charging will be stopped after 12 hours;
5. The battery reverse connection or short-circuit charging protection is activated, the charger stops charging, and the error indicator "Err" is displayed.
6. Do not connect the battery directly to the wall outlet. The battery must be charged with a special charger officially provided by FEIMA. FEIMA will not be responsible for any consequences caused by using a charger not officially provided by FEIMA.
7. Do not charge batteries and chargers near flammable and combustible objects such as carpets and wood products. Please always pay attention to the charging process to prevent accidents.
8. The battery that has just been used is in a high temperature state, and it is forbidden to charge it immediately. Please wait for the battery to cool to room temperature before charging. Charging temperatures above 45°C or below 0°C may result in battery leakage, overheating or damage.

9. Before each use of the charger, please check whether the shell, wires and plugs of the charger are damaged. Do not use damaged chargers. Never use alcohol or other flammable liquids to clean the charger. Disconnect the charger from the power source when not in use.

Device preparation

Introduction to the device in the box

Before preparing for outdoor data collection, please check that the device box is fully equipped and charge the battery in advance.



Details of box device:

1. Scanner × 1	**2. Rechargeable battery × 4**
3. Memory card × 1	**4. Card reader × 1**
5. USB key × 1	**6. Scanner bottom bracket × 1**
7. Smart charger × 1	

Install the memory card

Insert the memory card into the SD card slot with the golden finger side facing the back of the scanner.

Notice

- When installing a memory card, make sure that the memory card is unlocked.

Battery charging and usage requirements

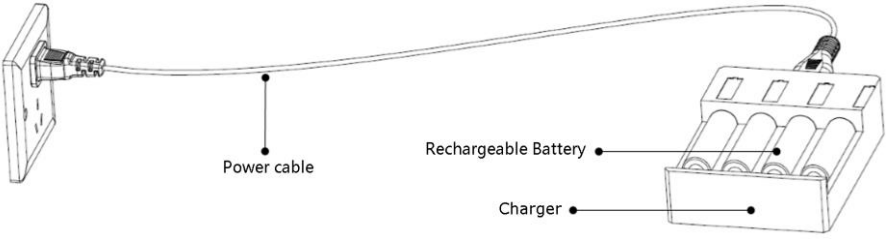
Battery charging

Municipal AC charging

1) Connect the power cord to the charger;

2) Put the battery to be charged into the battery slot of the charger, pay attention to the direction of the positive and negative electrodes;

3) Connect the power cord to an AC outlet with an output voltage in the range of 100~240V. The battery starts charging, and the battery is fully charged in about 3 hours.



Notice

Use:

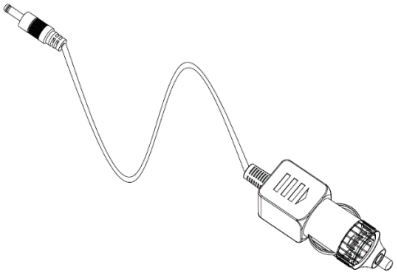
- Please do not use device other than FEIMA's official charger for charging;
- In case of damage or deformation of the battery skin, please do not continue to use it and dispose of it in time.
- Please use it in a dry environment, and disconnect the power supply in time after charging.

Other precautions:

- Please stay away from flammable materials and charge in the isolation area;
- Please do not disassemble, modify the charger or use it for other purposes.

Vehicle-mounted charging

1) Connect the vehicle-mounted charging cable to the charger;
2) Put the battery to be charged into the battery slot of the charger, and pay attention to the orientation of the positive and negative poles;
3) Connect the power cord to the vehicle power socket, and the battery will start charging. The battery will be fully charged for about 3 hours.



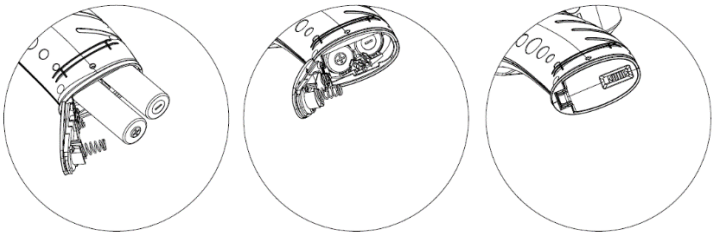
Notice

- It is forbidden to use AC charging and vehicle charging at the same time.

Battery powered

Move the battery compartment cover lock at the bottom of the scanner handle forward, open the battery compartment cover, load batteries according to the requirements of positive and negative poles, and lock the battery lock in the handle;

Move the battery compartment cover lock backward to lock the battery compartment cover.



Notice

- Please check the battery power before starting each time to ensure that

it is fully charged;

- Beware of battery falling damage during disassembly and assembly.

External power supply

Connect charging treasure and scanner USB interface through TYPE-C power cord;

Press the charging treasure on key, the charging treasure power indicator is always on, and the device power supply is normal.

Notice

- Power bank supports standard PD protocol, voltage 20V, output above 2A (power above 40W);
- Recommended Xiaomi PB200SZM 20000mah 20V/2.25A power bank;
- The power bank needs to prepare its own TYPE-C power cable.

Scanner activation

Before using the scanner, you need to register your FEIMA account and activate the device. Please refer to the attached "SLAM GO Operation Manual" for the specific software address, registration and activation process.

Outdoor Data Collection

Device power on

Press the scanner on key for 3 seconds for a long time, and the status indicator light is always green (the battery is fully charged). Wait for the laser head to start rotating, and then the device starts successfully.

Notice

- Please hold the scanner steadily and keep the laser head upright.

Start collecting

Press the scanner on key, and the data acquisition function will be turned on. At this time, the status indicator will turn green (the battery is fully charged) and blink.

Notice

- During data acquisition, please keep the scanner in front of your body, consistent with the walking direction, with the laser head facing up.

Stop collecting

Press the short scanner on key, the device finishes data acquisition, and the status indicator light returns to the normally on state; Press the scanner switch key for a long time to turn off the device. At this time, the status indicator goes out and the laser head stops rotating.

Data Check

Take out the SD card, insert it into the computer, find the folder named "SN_XXXXX" and copy it to the backup directory; This folder will be automatically generated by the system after each data acquisition, and the sequence of data acquisition can be identified according to the size of the tail number of the folder name.

Problem Analysis

When there is a problem with the collected data, please pack and compress the folder named "LOG" in the scanner memory card and submit it to FEIMA after-sales department for analysis.

Notes

- It is recommended that users shut down and restart after completing a single data acquisition before the next data acquisition.
- In principle, the closed-loop path is not required, but in order to ensure the accuracy of data, it is recommended that users take the complete closed-loop path when conditions permit.
- When taking out the scanner from the device box, two hands should cooperate to take it out. Pay attention to protecting the rotating pan/tilt (precision parts).
- During data acquisition, the laser head is forbidden to go down.
- The data acquisition process should be smooth and avoid violent shaking.
- Before using the device, please make sure that the four hand screws fixing the handle are fastened without looseness.
- The device should be handled with care during use, so as to avoid laser damage caused by bumping or violent vibration.
- Single data acquisition time should be greater than 60 seconds.
- Keep the distance between the scanner and the measured object > 0.4m, and avoid the laser head turning against the wall at a short distance (< 0.4m).
- Avoid moving pedestrians in front of the laser head.
- Avoid unnecessary large circles in place.
- Data acquisition should be continuous and ensure a certain degree of overlap.

Appendix

SLAM GO Operation Manual

Overview

Overall description

SLAM GO app can be used with SLAM100 to realize lightweight mobile real-time viewing and processing of scanning data. Through wireless connection to SLAM100, scan data can be displayed in real time, and 2D, 3D and slice display can be performed; Cloud synchronization of APP historical project information; Preview three cameras to get images, etc.

Surroundings requirement

Android 8.0 and above operating system.

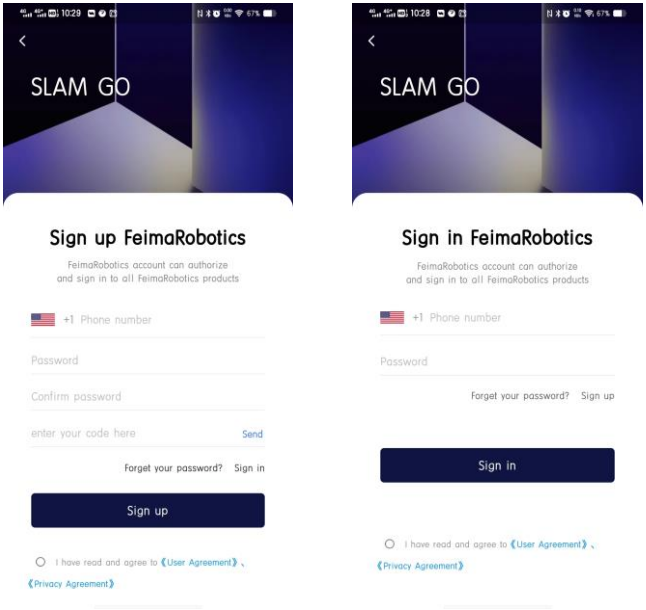
Installation mode

Android version download address:http://ios.feimarobotics.com/3vu9

SLAM GO Function introduction

Sing up FEIMA account

Click “User” on the homepage of the APP, and click “Sing up” to enter the registration page. Select the correct international area code (for example, China's international area code is +86), fill in the correct mobile phone number, and get the verification code. Enter the password, which should be ≥6 digits long. Check the option "I have Read and agree to《User agreement》、《Privacy agreement》" at the bottom of the page, and click “Sing up”.After registration, you can log in. This account can log in to all FEIMA products.



picture1 user registration

Login account number

Open the SLAM GO APP and click “User” to select the correct international area code in the login page that pops up (for example, China's international area code is +86), fill in the FEIMA account and password, check the option "I have Read and agree to《User agreement》、《Privacy agreement》" at the bottom of the page, and click "Login".or click "Login "under"Projects"-”My Projects” in the main interface to log in. If you forget your password, you can reset it by entering the “User” interface and clicking the "Security Center" option.

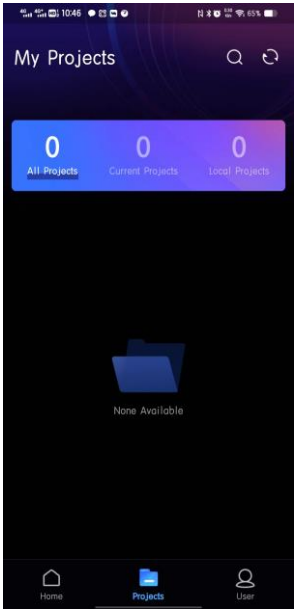


Figure 2 Account login

Personal Center

Personal Center-"User" includes user name and avatar display, modifying user name, security center, viewing activation application, language area, privacy and privacy settings, about SLAM GO, and logging out.

When installing SLAM GO for the first time, you need to click Personal Center - "User" to log in before you can use all the functions of the APP.

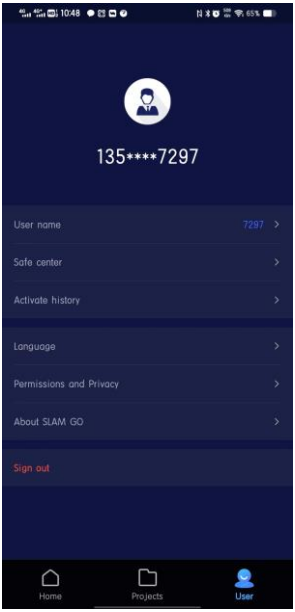


Figure 3 Personal Center

Change login password

Click "Safe Center-Change Password" in the personal center, enter the old password, new password and confirm the new password in the input box in turn, click Finish, and the change is successful, and the system will

automatically log out of the current account. Please re-open the software to log in.

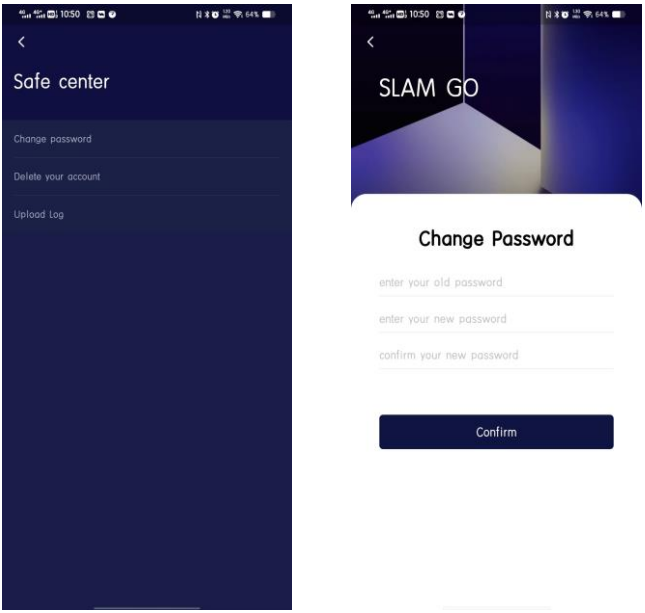


Figure 4 Change login password

Activation application

Click "activation history" in the personal center to view the activation status of all SLAM100 scanners under the current account.

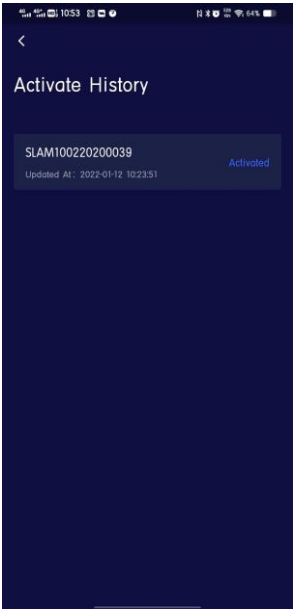


Figure 5 Activation application

Language

You can switch the language of APP to Chinese and English.

Click "User"-"Language", and you can select the language to be switched in the pop-up window of selecting language.

Figure 6 Language

About SLAM GO

You can view the latest version information and current version information of the current APP, and the copyright ownership information of the APP.

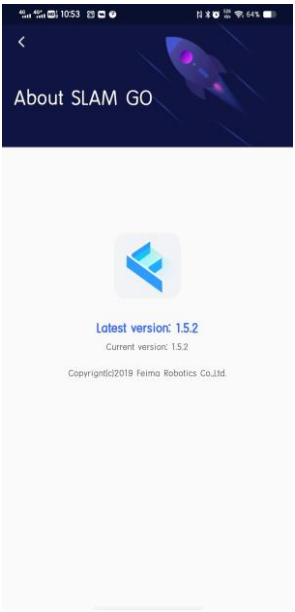


Figure 7 About SLAM GO

Version upgrade

When the About SLAM GO page is opened, the system will automatically detect the version update. If the latest version is inconsistent with the current version, the upgrade button will be displayed at the bottom of the page. Click "Upgrade Now", SLAM GO will automatically download the latest installation package, and click "Install" to update to the latest version.

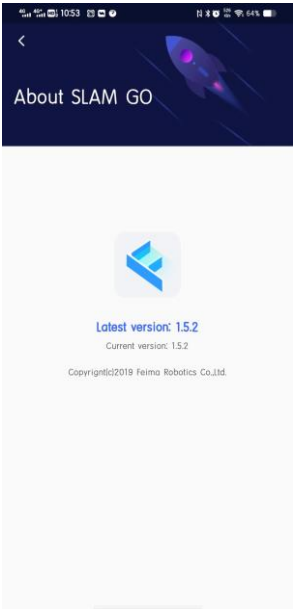


Figure 8 Version upgrade

Sing out

Click "Sing out" to exit the currently logged-in account and return to the login interface.

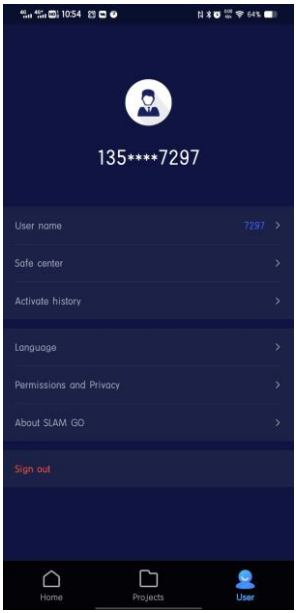


Figure 9 Log out.

APP client home page

Includes home page connected to SLAM100 scanner, activation history, search device, scan code connected device, device type, currently connected device and historically connected device.

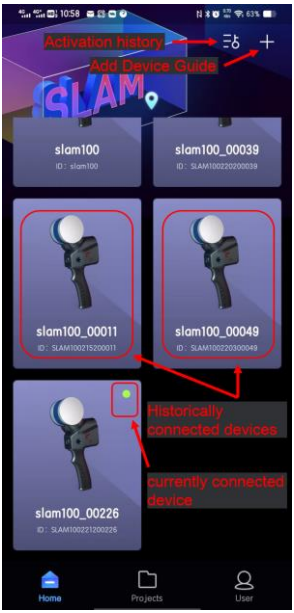


Figure 10 Detailed functions of home page

Bind the device

At present, SLAM100 supports two ways of binding to the homepage of APP:

① Bind via NFC;

② Bind via WiFi connection.

WiFi binding

Open the APP homepage, press and hold the SLAM100 scanner on key for 3 seconds, start the SLAM100 scanner, wait for about one minute, and connect the WiFi of your mobile phone to the AP hotspot of SLAM100

scanner. SLAM100 scanner device will automatically appear on the app homepage and automatically bind SLAM100 scanner to the homepage.

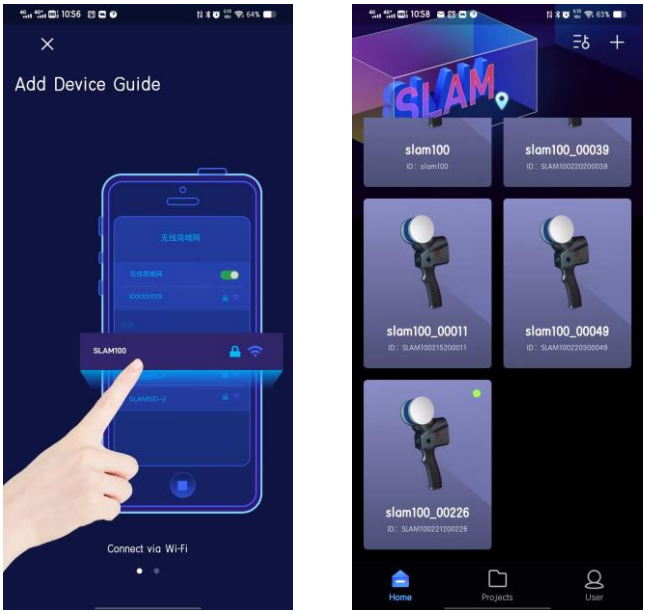


Figure 11 WiFi binding

NFC binding

Click the "Add Device Guide" button on the home page, and in the pop-up page of adding device boot, slide to the right to switch the second page to display NFC adding device boot.

Turn on the NFC switch of the mobile phone (the mobile phone needs to support NFC function), and stick the upper part of the back of the mobile phone (NFC sensing area) against the NFC tag on the key side of SLAM100 scanner to connect and bind. At the same time, update the SLAM100 scanner device information in the home device list.

Figure 12 NFC binding

Device activation

Activation of SLAM100 scanner device needs to be activated through SLAM GO APP. And the activation process needs FEIMA customer service cloud approval before it can be used.

When you purchase a new inactive SLAM100 scanner device, the first NFC-bound or WiFi-bound SLAM GO device will automatically appear on the SLAM GO homepage.

Click on the scanner with the green dot in the upper right corner, and the interface of filling in activation information will pop up. Fill in the activation information, and you can successfully activate the device according to the following operations.

Before activating SLAM100 scanner, please contact FEIMA after-sales in advance for online assistance in activation.

Activation process

1. The mobile phone connects to the inactive SLAM100 scanner via WiFi. After the connection is successful, an online device with a green dot will automatically appear on the home page (if the corresponding device does not appear, please completely close the application and re-enter the app). Click on the SLAM100 scanner device with a green dot.

Figure 13 Device Connection

2. After clicking, the prompt "Device is not activated" pops up on the page. At this time, you need to disconnect the WiFi of SLAM100 scanner. With your

mobile phone in the networked state, click the device to be activated on the page again.

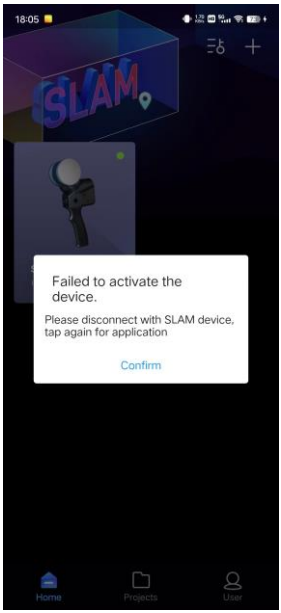


Figure 14 Device is not activated.

3. After clicking on the device, the "Activate Device" page will pop up. Fill in the contact name, contact phone number and contact unit in turn according to the requirements of the page, and click the "Finish" button. At this time, the activation application will be automatically sent to FEIMA customer service, and you can continue to operate the device only after it is approved by FEIMA customer service.

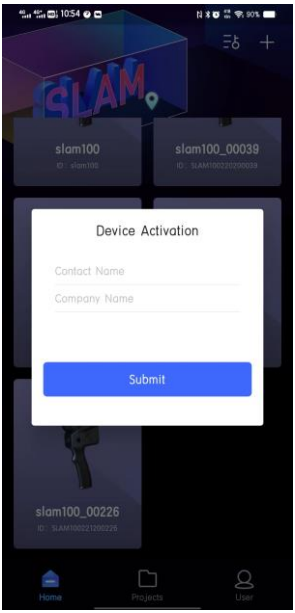


Figure 15 Fill in the activation application

4. After the Application for device activation is approved, please keep your mobile phone connected to the Internet. After waiting for about 1 minute, the device activation information will be automatically uploaded to the server from the app. If the following prompt appears, it means that the SLAM100 scanner has been approved and passed.

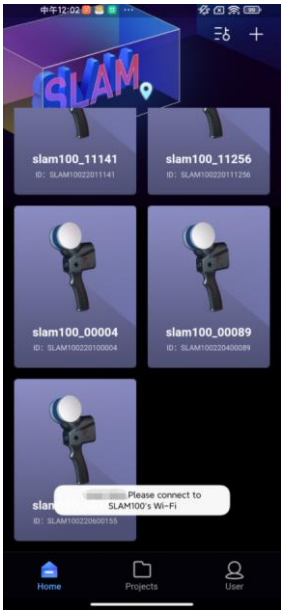


Figure 16 Approved

5. After FEIMA customer service is approved, re-enter the SLAM GO APP. When the prompt "Device activation has passed" appears on the page, click "Confirm" and connect the SLAM100 scanner through WiFi again to complete the synchronous activation of SLAM100 scanner and SLAM GO.

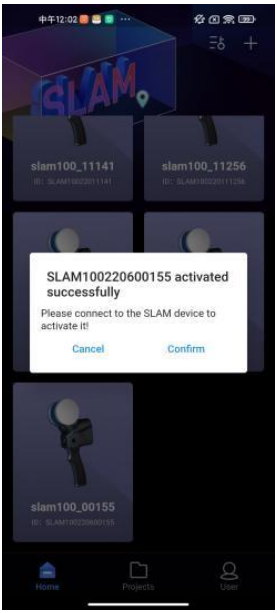


Figure 17 Activation succeeded.

Application approval is in progress.

Complete the activation information, re-enter the APP later, and connect to the WiFi of SLAM100 scanner. Click on the device with a green dot in the upper right corner, and the prompt "activation application under review" pops up. Please wait for FEIMA customer service to approve; If "activation application under review" is still displayed for a long time, please contact FEIMA after-sales customer service for more assistance.

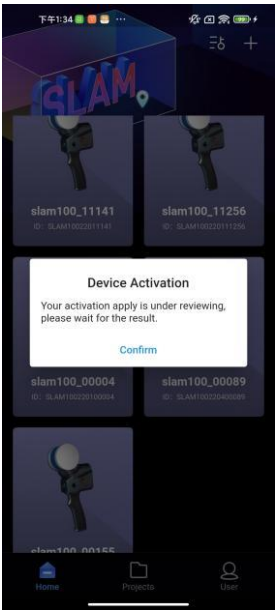


Fig. 18 Activation Audit

Activation application failed.

If your activation application fails during the process of activating SLAM100 scanner, please contact FEIMA customer service in time and reactivate it with the assistance of customer service.

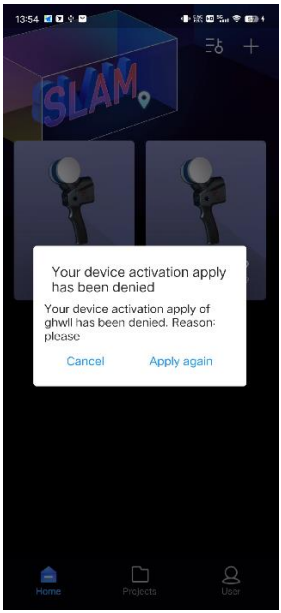


Fig. 19 activation application failed.

Activation history

Click "activation history" in the upper right corner of the home page to view information such as activation history and activation status of SLAM100 device.

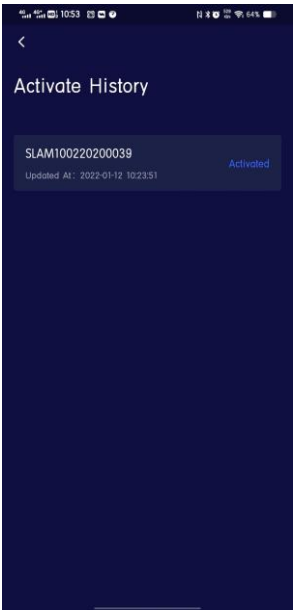


Figure 20 Activation history

Device connection status

Device Status-Connection successful

Connect the SLAM100 scanner through mobile phone WiFi, click on the online device with the green dot logo in the upper right corner of the APP page, and enter the device work page, prompting that the connection is successful and the device is initialized.

Figure 21 Connection succeeded.

Device Status-Initializing

After successful connection, the device will be initialized, and the device will enter the standby state after initialization.

Figure 22 Device initialization

Status-Standby

After the initialization, the device will enter the standby state, at which time the device does not start working.

Figure 23 Standby interface

Device Status-Connection failed.

If the device connection fails, please recheck the device connection status and troubleshoot one by one:

① Check whether the WiFi of SLAM100 is connected to the mobile phone.

② Check whether SLAM100 status indicator keeps green and bright.

③ Exit the work interface, return to the home page, and check whether there is a green cursor in the upper right corner of the connected device icon.

④ Try to completely close the SLAM GO APP, clear the background of SLAM GO, re-enter SLAM GO and try to connect to the SLAM100 device again.

If the connection fails when you re-enter the device interface after the above operation, please contact FEIMA after-sales customer service for more assistance.

Figure 24 Connection failure

Device status-out of communication range

When SLAM GO APP is disconnected from SLAM100, the device status will prompt "Not in communication range". It is necessary to check whether the mobile phone is connected to the device WiFi of SLAM100, or the distance between the mobile phone and the device is too far, and the WiFi signal is weak or disconnected.

Figure 25 is out of communication range.

Standby Shoot

When the device is in standby state, please make sure that the three cameras in front of SLAM100 are unobstructed. Click the shooting button at the bottom of the standby interface to perform Shoot and check the camera status. Swipe left or right in the preview interface to switch the preview images taken by three cameras.

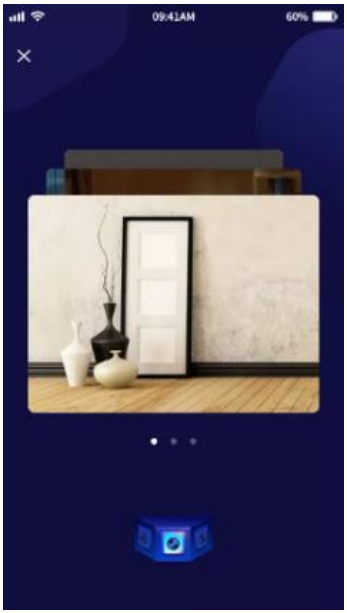


Fig. 26 Schematic diagram of Shoot

Device work

After connecting SLAM100 through SLAM GO APP, the APP enters the standby page, and the system will automatically enter the working page and start to display the laser scanning data in real time by pressing the SLAM100 on key.

The device interface includes device name, device information, settings, working time, working state, real-time display chart, pitch angle control key, and switching 2D or 3D display function.

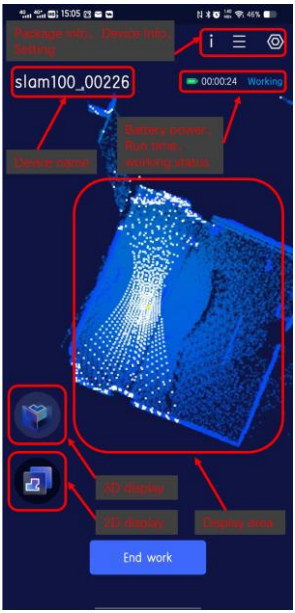


Figure 27 Working interface

Working-real-time 3D scanning display

When the APP is in the standby interface, press the switch key of SLAM100 device briefly to start the operation, and the page will automatically jump to the 3D scanning display interface.

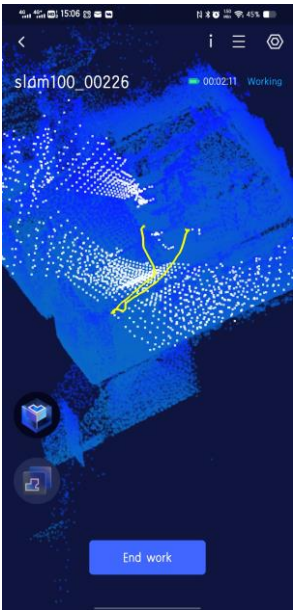


Figure 28 Real-time 3D scanning

Working-View SLAM100 status information

In the process of SLAM100 operation, click the "Device Information" button at the upper right corner of the working interface to view the current basic status information, motor status information, error status information and SD card information of SLAM100 in real time.

Figure 29 Working state

set up

Click the "Settings" button in the upper right corner of the working interface to enter the setting interface. Click "Common Settings" to enter the setting interface, where you can set the device name, measuring distance, camera parameters, and upgrade the firmware.

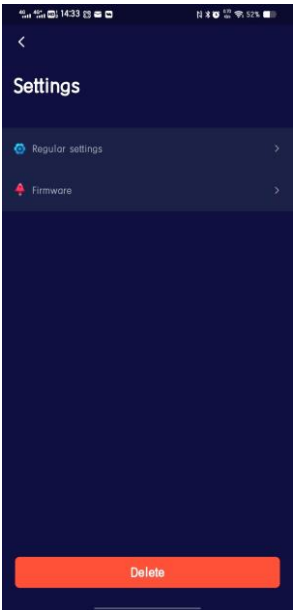


Figure 30 Setup

Modify device name

Click on the device name, enter the content to be modified in the pop-up "Change Device Name" dialog box, and click "Confirm" to modify the device name.

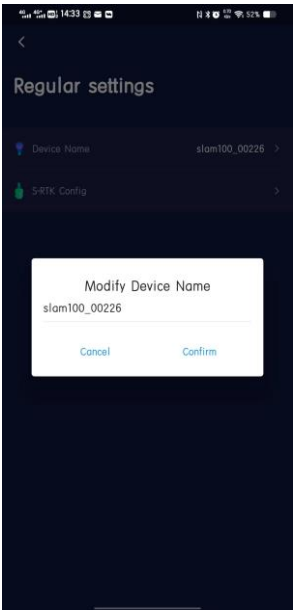


Figure 31 Setup

Firmware upgrade

Firmware update will optimize the performance of firmware or device drivers, as well as the performance of processors or other device hardware. Firmware upgrade can also fix the problems found in the old version.

- **Automatic firmware upgrade reminder**

Every time you open the application to log in, the application will automatically detect the latest firmware version and the local current firmware version. If the latest firmware file is not downloaded locally, you will be reminded to download the latest firmware in the pop-up window on the home

page, so that you can directly update the firmware after connecting the device.

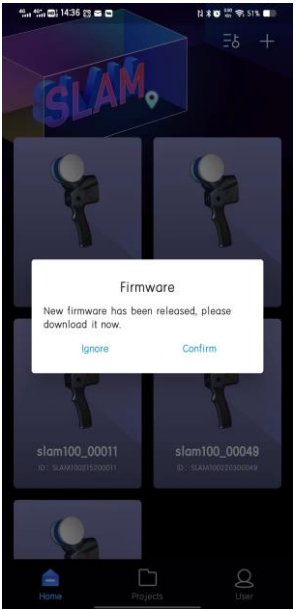


Figure 32 firmware upgrade detection

- **Latest firmware download**

After the firmware of the homepage pop-up window is upgraded, click OK, which will jump to the firmware download window. Click Download to start downloading. At this time, don't operate your mobile phone, wait for the download to complete, and then click OK to exit the firmware upgrade window.

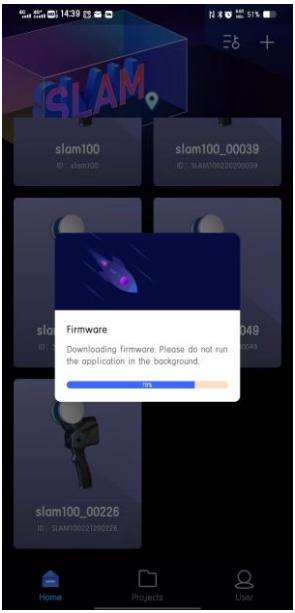


Figure 33 Firmware Download

- **Firmware upgrade process**

1、when the pop-up window on the home page prompts to download firmware, the firmware package has been downloaded locally.

① When opening the app, log in to the account, click Download the latest firmware in the pop-up window to upgrade the firmware, and close the download page after the download is completed.

② Turn on the slam100 device, connect the device WiFi, click "Home" to enter the device details, click the "Settings" button in the upper right corner of the page, and click "Firmware Upgrade".

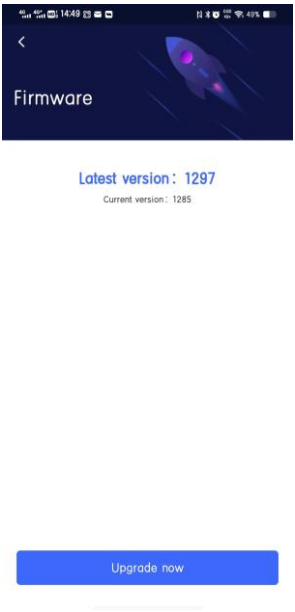


Figure 34 Firmware upgrade

③ Click "Firmware Upgrade" in the firmware upgrade interface, and then click " Upgrade now". Please wait patiently for the firmware upgrade package to be transmitted to the slam100 device. Do not operate the mobile phone or slam100 device at this time.

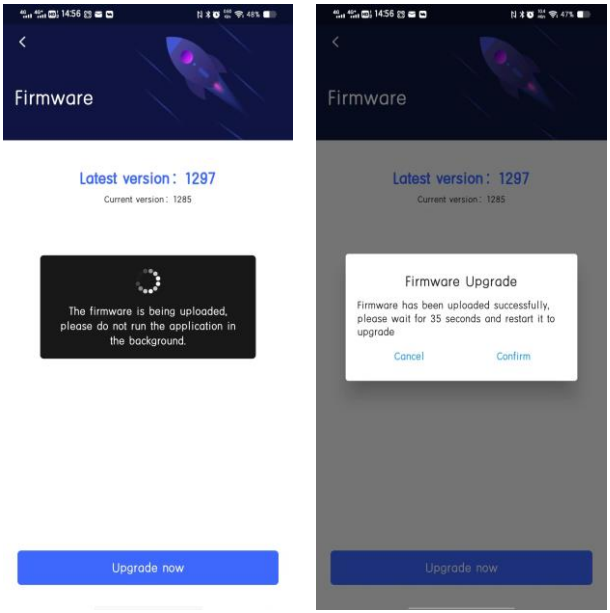


Figure 35 Transferring Firmware Files

④ After the transmission is completed, click OK. At this time, please wait for 35s before manually restarting the device. After restarting the device, wait for the white light of the device indicator to blink and turn green. At this time, the firmware update is successful, and the device can be used normally.

2、The latest firmware package is not downloaded on the home page.

① Turn on the slam100 device, connect the device WiFi, and click the "Home " to enter the device details, and click the "Settings" button in the upper right corner of the page.

② When checking the firmware upgrade, you need to disconnect the WiFi connection of SLAM100 device (if the device has not acquired the latest firmware version, you will be prompted to disconnect the WiFi of the device

and re-enter the firmware upgrade page), keep your mobile phone connected to the Internet, and click "Firmware Upgrade".

③ After the download is completed, reconnect the WiFi of SLAM100 device, exit the firmware upgrade page, and click the device on the home page again to enter the device standby page.

③ Click "Settings" in the upper right corner of the standby page, enter the firmware upgrade page, click "Firmware Upgrade" and then click " Upgrade now" (Figure 34). Please wait patiently for the firmware upgrade package to be transmitted to slam100 device. Please do not operate your mobile phone or slam100 device at this time.

⑤ After the transmission is completed, click OK. At this time, please wait for 35s before manually restarting the device. After restarting the device, wait for the white light of the device indicator to blink and turn green. At this time, the firmware update is successful, and the device can be used normally.

Delete device

Click "Settings" to pop up the "Delete Device" dialog box, and click "OK" to delete the device. The Delete Device function allows you to delete devices that do not need to appear on the front page.

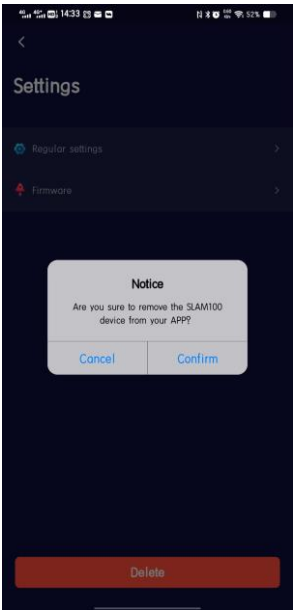


Figure 36 Delete device

- **Project**

Project list

Project interface is divided into three project lists: ① current device ② local projects ③ all projects.

You must log in to the SLAM GO account to get the project list in the cloud and manage the project.

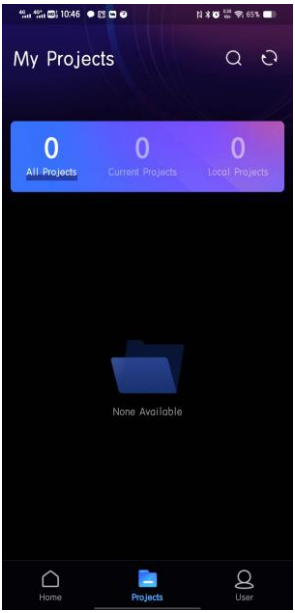


Figure 37 List of projects

① Current projects

The current projects of the device refers to all the projects in the memory of the SLAM100 device to which the APP is connecting.

② Local projects

The projects in the local projects list refer to the projects to be uploaded to the cloud, which are acquired from SLAM100 devices and have not been uploaded to the cloud.

④ All projects

All projects include current device projects, cloud projects and projects that have not been uploaded in local projects (other projects where SLAM100 devices are synchronized to the APP but have not been uploaded to the cloud).

project synchronization

① Get the cloud projects list.

After logging in to SLAM GO account, click the "Sync" button in the upper right corner to get a list of all cloud projects.

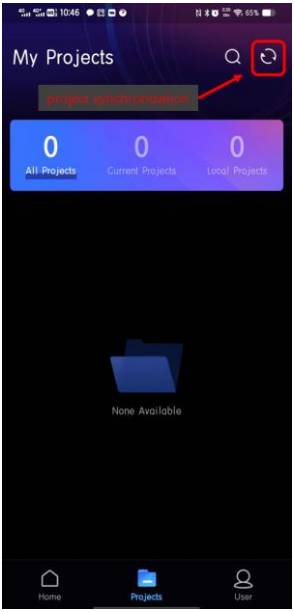


Figure 38 Get the list of cloud projects

② Get the current SLAM100 device project.

Open the SLAM GO APP, connect the SLAM100 device WiFi, click "Home" to confirm that the SLAM100 device has been successfully connected and is in normal condition, click "Project"-click the "Sync" button in the upper right corner, and then start to acquire the project of the SALM100 device and synchronize it to the local project of the APP. Please be patient.

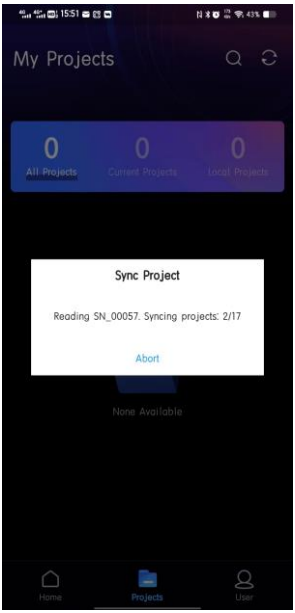


Figure 39 Obtaining the current SLAM100 device project

③ synchronize SLAM100 device project to the cloud

To upload the project of SLAM100 device to the cloud for archiving, you need to keep the APP connected to the Internet, click the "Sync" button in the upper right corner and wait for the project to be uploaded to the cloud.

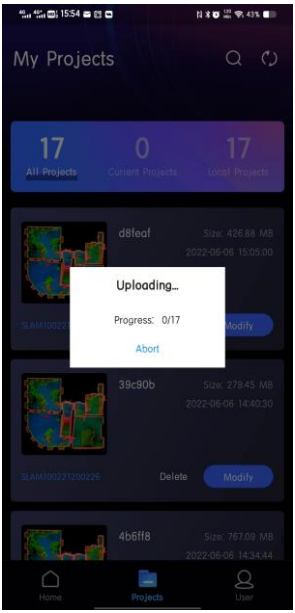


Figure 40 Synchronizing SLAM100 Device Project to Cloud

Project search

Click the "Search" button in the upper right corner, enter the flight number, project name or project ID in the input box, and click the "Confirm" button to complete the search.

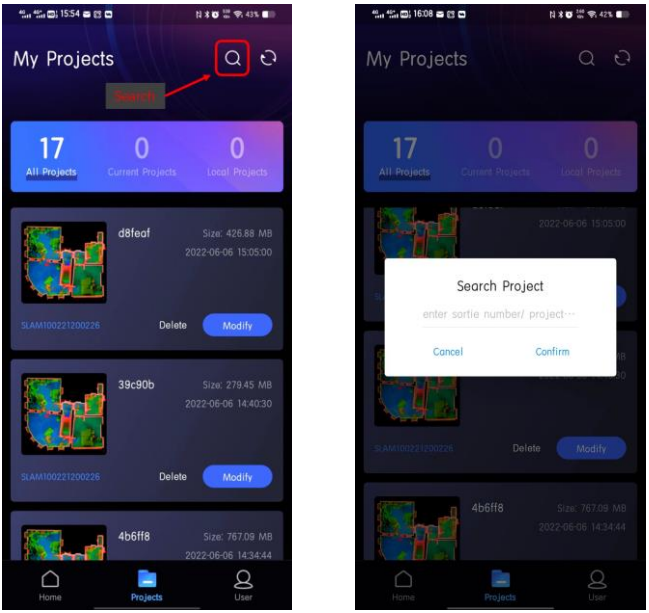


Figure 41 Project Search

Name of project change order

Click the "Modify Name" button in the column of the item to be modified, enter the name to be modified, click OK, and then click the "Synchronize" button in the upper right corner to upload the modified item to the cloud, and the modification can be completed.

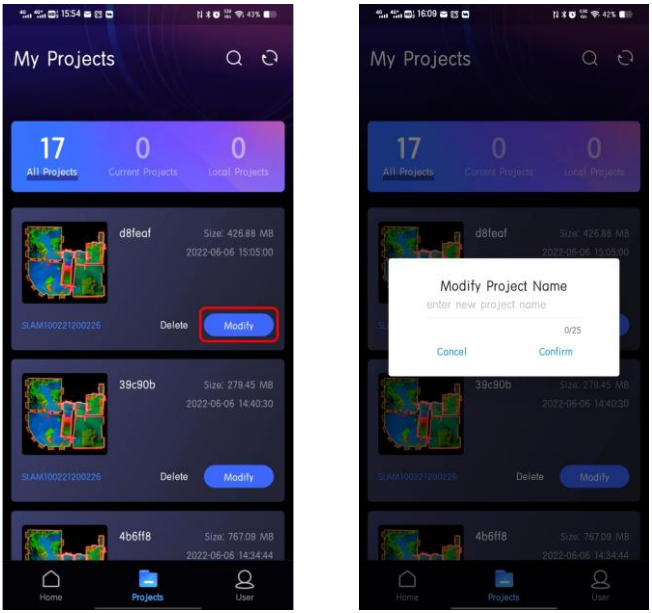


Figure 42 Modifying the project name

Project deletion

Click the "Delete" button in the column of the item to be deleted, click OK, and then click the "Synchronize" button in the upper right corner to upload the deleted item to the cloud, and the modification can be completed.

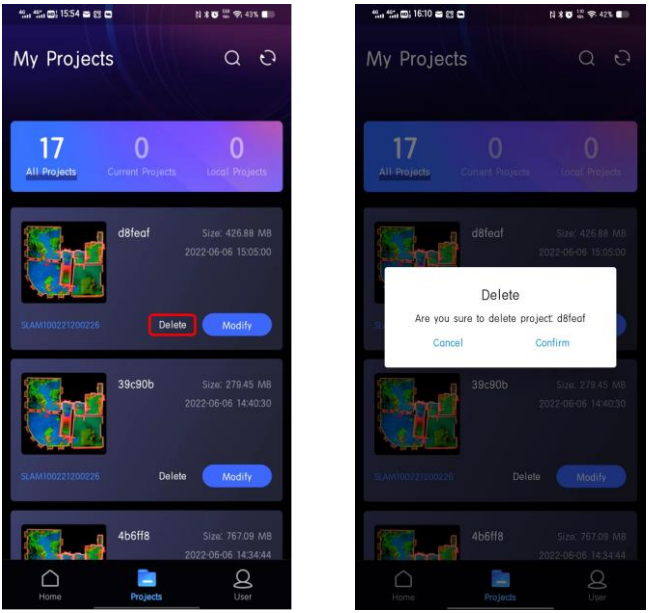


Figure 43 Project deletion

S-RTK Setup

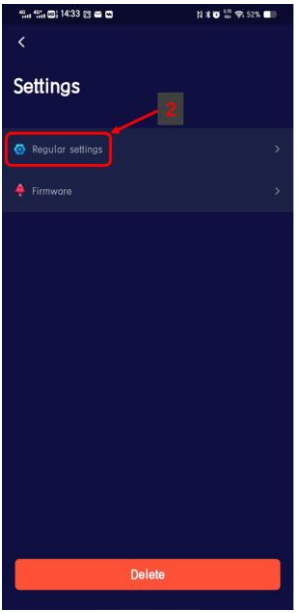
S-RTK is a centimeter-level lightweight measurement device that can be connected to S-RTK by entering

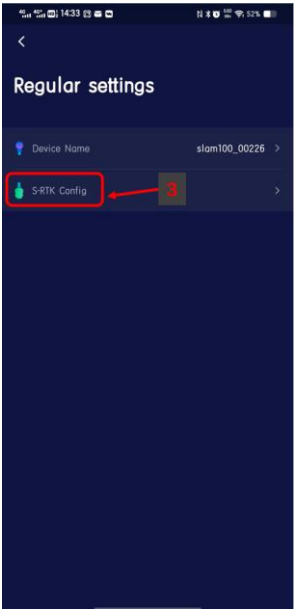
Device Settings-Common Settings-S-RTK Settings.

Connect S-RTK Bluetooth

Before connecting to S-RTK, you need to keep the mobile phone Bluetooth turned on. After opening SLAM GO, connect to SLAM100 and enter the device standby page. Click the Settings button in the upper right corner, click Common Settings, and click S-RTK Settings. A pop-up window for Bluetooth list will pop up. Click the corresponding S-RTK Bluetooth to connect successfully.


slam100_00226
Stopped
1
Start work


Settings
2
Regular settings
Firmware
Delete


Regular settings
Device Name
slam100_00226
S-RTK Config
3

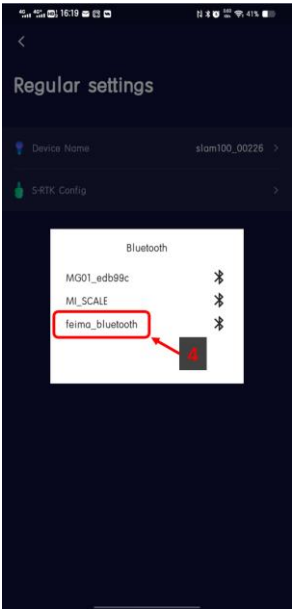

Regular settings
Device Name
slam100_00226
S-RTK Config
Bluetooth
MG01_edb99c
MI_SCALE
feima_bluetooth
4

Figure 44 Connect S-RTK Bluetooth

Configure S-RTK

To use S-RTK, an RTK account is required. After operating according to Figure 44, after entering the S-RTK settings, click Connect to Server, select Chihiro Positioning (or select Custom to configure the server), enter the account name and password, Click Save to successfully configure S-RTK.

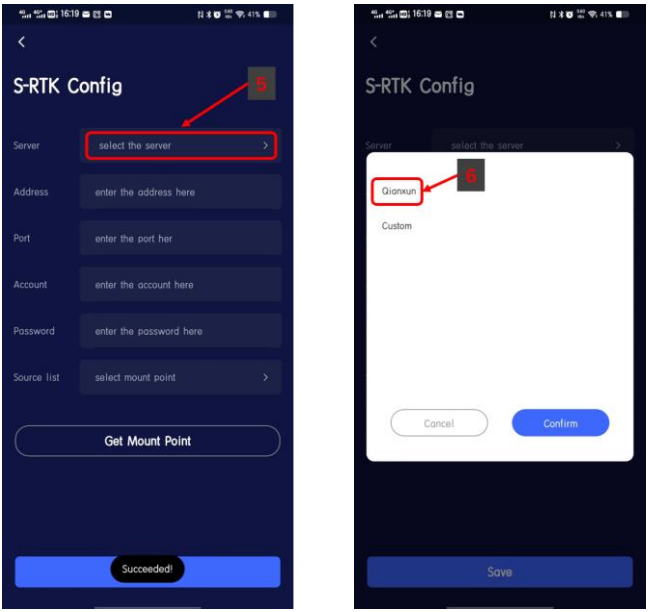


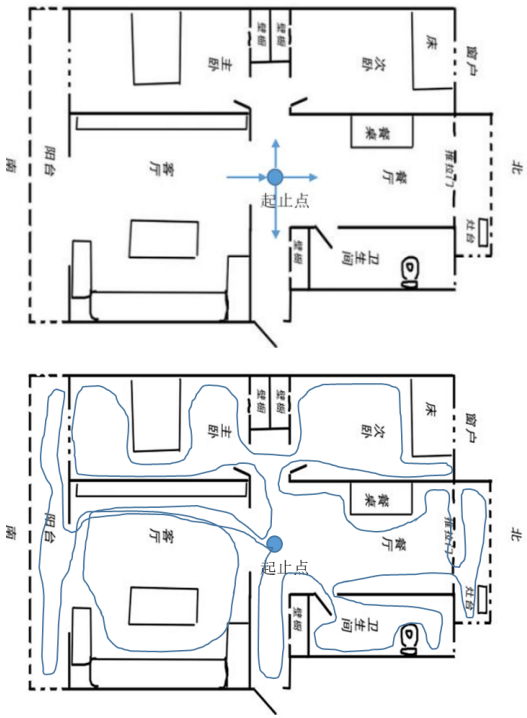
Figure 45 Configure S-RTK

Data Collection Guidelines

Site Survey

indoor climate

If it is an indoor environment, multi-path locations should be selected as far as possible as the starting and ending points of data collection. After the site survey, plan the closed route of the survey area.



Outdoor environment

If it's an outdoor environment, besides finding multi-path locations and planning closed routes, it is also necessary to ensure that the measured object is within the effective measurement range of the scanner (because of the different reflectivity of ground objects, the distance is also different.)

Notice

- A multipath location refers to a location that can be reached from multiple directions.

Closed route

U-shaped closed route

The slender closed route is similar to U-shaped, and the U-shaped route can barely meet the accuracy requirements. If conditions permit, users are advised not to choose this route.

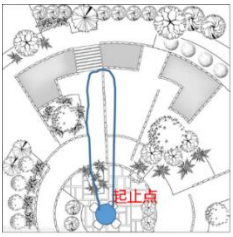
Closed O-route

The trajectory is similar to O-shape, there is no redundant closed loop, and the accuracy of data calculation is good, which is one of the most basic

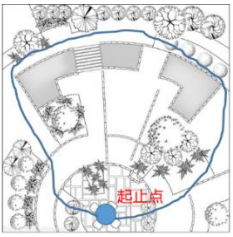
requirements for route selection.

Multi-O route

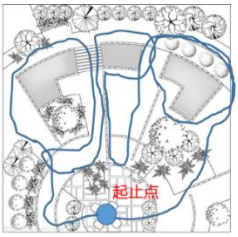
The whole track is similar to O-shaped, with many closed circles, and the data solution accuracy is the best. It is composed of many closed O-shaped routes, which greatly improves the data solution accuracy and is the best route planning.



U型路线



单闭合O型路线



多闭合O型路线

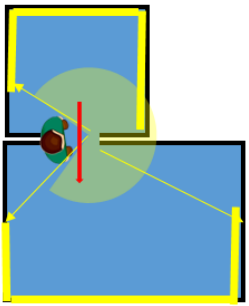
Typical Surroundings Data Collection Considerations

SLAM100 scanner can acquire point cloud data in the range of 360× 270, and the point density decreases with the increase of measurement distance. In the process of data acquisition, the device should be stable and avoid violent shaking, and non-measurement objects such as pedestrians and vehicles should be prevented from blocking the front of the device for a long time, so as to ensure the integrity of data acquisition.

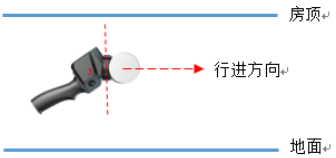
Matters needing attention when passing through the door

When the hand-held scanner passes through the indoor door, it is recommended to pass slowly sideways to ensure that the scanner is relatively stable and the door is open as much as possible. If the door is closed, when approaching the door, you need to turn the scanner back to the door and open the door with the other hand. During the process of passing through the door,

you should fully consider the scanning field of vision and scan the scenes outside the door as much as possible in the room. When closing the door,Try to avoid the scanner scanning the moving door as much as possible, so as to prevent data calculation errors.



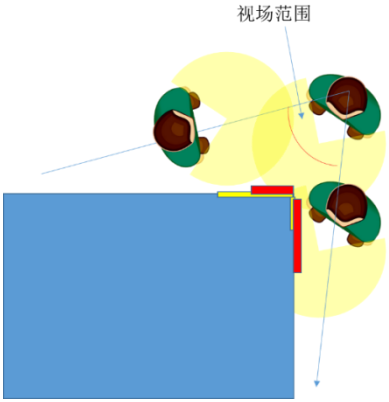
房间内过门



狭长空间激光头朝前采集

Matters needing attention when turning corners

When the hand-held scanner passes through the corner, it is recommended to avoid too fast corner, and the way of corner should be considered in route planning. Get as many point cloud data at the same position before and after the corner as possible to improve the accuracy of data calculation.



Matters needing attention in large-scale data acquisition

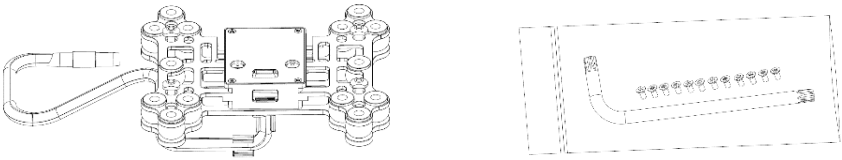
When the scanner is used to collect large-scale data, the whole survey area should be divided in order to facilitate the data calculation efficiency, improve the calculation accuracy and facilitate the survey area management. Divide the larger survey area into several small survey areas. It is suggested that the planned data collection time of each survey area should be 25-30 minutes, and the overlapping range of survey areas should be at least 30%.

Suggestions for scanning long corridors (tunnels)

Generally, the data obtained in areas with rich features and textures will have good calculation results. In order to ensure the calculation accuracy, it is necessary to manually set a feature point with a diameter of about 1 meter every 10 meters or place some objects with complex structures such as chairs and stools in this area.Improve the accuracy of solution. In addition, during data acquisition, attention should be paid to the incident angle of the laser, and data acquisition should be done in the middle of the corridor or tunnel as far as possible, and meaningless in-situ rotation should not be carried out, so as to avoid sudden decrease of the incident angle caused by object occlusion and errors in data calculation.

Connecting to an Airplane

Device preparation

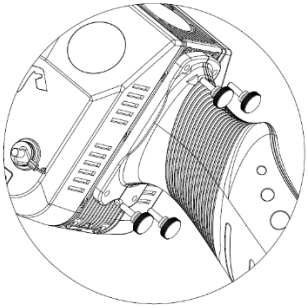


Slam100 Supporting Load Bracket Torx Wrench and Screw

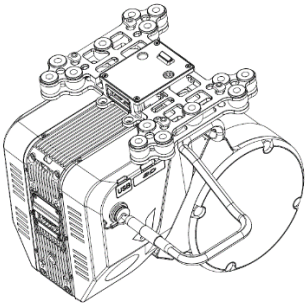
Device connection

Preparation of scanner: Remove four silver thumbscrews that fix the scanner handle, and gently pull the handle down to separate it from the scanner main unit;

Illustration:



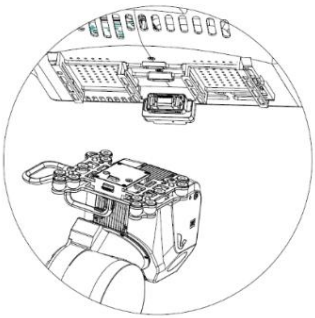
Load mounting: stick the bracket on the side with four screw holes on the back of the scanner body (note that it is not the side connected with the handle), so that the data line on the bracket faces the direction of the scanning head, align the screw holes of the bracket with the holes on the back of the scanner body, and fix and lock all four screws with the accompanying Torx wrench;
Illustration:



Data cable connection: unplug the dust cap (round silver metal cap) of the data interface on the side of the scanner body, and pay attention to aligning the red dot mark at the data cable interface of the bracket with the red dot mark of the data interface of the body before insert link;

Connecting to the aircraft: When connecting to the aircraft, the bracket is up, and the scanner main unit is down. Push the bracket into the load card slot under the aircraft fuselage. When you hear a click, the bracket safety lock is in the locked position, and the assembly is completed.

Illustration:



Notes

- The dark blue part of the laser head is the laser emitting area, so as to avoid friction and collision between this area and hard objects.
- The rotating pan/tilt at the joint between the scanner body and the laser head is a precise mechanism. Please pay attention to protection and handle it with care.
- There are three groups of camera lenses on the side of the fuselage, which should avoid friction or collision with hard objects.

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FCC STATEMENT :

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference, and
(2) This device must accept any interference received, including interference that may cause undesired operation.
Warning: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

Reorient or relocate the receiving antenna.

Increase the separation between the equipment and receiver.

Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

Consult the dealer or an experienced radio/TV technician for help.

RF warning statement:
The device has been evaluated to meet general RF exposure requirement. The device can be used in portable exposure condition without restriction.

SAR Information Statement

The product is designed and manufactured not to exceed the emission limits for exposure to radiofrequency (RF) energy set by the Federal Communications Commission of the U.S. Government. These limits are part of comprehensive guidelines and establish permitted levels of RF energy for the general population. The guidelines are based on standards that were developed by independent scientific organizations through periodic and thorough evaluation of scientific studies. The standards include a substantial safety margin designed to assure the safety of all persons, regardless of age and health. The exposure standard for wireless mobile phones employs a unit of measurement known as the Specific Absorption Rate, or SAR. The SAR limit set by the FCC is 1.6 W/kg. Tests for SAR are conducted with the product transmitting at its highest certified power level in all tested frequency bands. Although the SAR is determined at the highest certified power level, the actual SAR level of the product while operating can be well below the maximum value. This is because the product is designed to operate at multiple power levels so as to use only the power required to reach the network. In general, the closer you are to a wireless base station antenna, the lower the power output. Before a product model is available for sale to the public, it must be tested and certified to the FCC that it does not exceed the limit established by the government adopted requirement for safe exposure. The tests are performed in positions and locations (e.g., at the ear and worn on the body) as required by the FCC for each model. The highest SAR value for this model product when tested for use worn on the body, as described in this user guide, use at the worn on the body is 1.046W/kg.
(Body-worn measurements differ among phone models, depending upon
available accessories and FCC requirements). While there may be differences between the SAR levels of various product and at various positions, they all meet the government requirement for safe exposure. The FCC has granted an Equipment Authorization for this model product with all reported SAR levels evaluated as in compliance with the FCC RF exposure guidelines. SAR information on this model product is on file with the FCC and can be found under the Display Grant section of http://www.fcc.gov/ oet/fccid after searching on.

FCC ID: 2A7JA-SLAM100 Additional information on Specific Absorption Rates (SAR) can be found on the Cellular Telecommunications Industry Asso-ciation (CTIA) web-site at https://www.ctia.org/ In the United States and Canada, the SAR limit is 1.6 watts/kg (W/kg) averaged over onegram of tissue. The standard incorporates a sub-stantial margin of safety to give additional protectionfor the public and to account for any variations in measurements.

Body-worn Operation

This device was tested for typical body-worn operations. To comply with RF exposure requirements, a minimum separation distance of 0mm is used between the user’s body and the handset, including the antenna. Third-party belt-clips, holsters, and similar accessories used by this device should not contain any metallic components. Body-worn accessories that do not meet these requirements may not comply with RF exposure requirements and should be avoided. Use only the supplied or an approved antenna.