EF-45NC User Manual

Next Generation Dual Iris Recognition Terminal

Version 2.0.0, April 2024

APPLICATION

Compact wall mountable and desktop terminal for access control, time and attendance, and general ID management applications

About This Manual

EF-45NC is a next generation dual iris recognition terminal that provides highly accurate iris recognition in an embedded system. This manual contains the descriptions and operational instructions for EF-45NC device. It is intended and written for system administrators who are in charge of overall operation including installation and management. We recommend you familiarize yourself with this manual in order to make use of the product correctly and effectively.

- The figures and screenshots in this guide are given for illustration purposes only and may differ from the actual product.
- Due to continuous technological improvements, the guide may not contain the most updated information. For further information not covered in this guide, please contact us at service@cmi-tech.com or sales@cmi-tech.com.

Revision History

Version	Date	Description	Note
2.0.0	2024-04-18	• Initial release in new docs format • Updated product specification	

Conventions in This Manual

The following symbols are used throughout this manual. Make sure that you fully understand the meaning of each symbol and follow the instructions accompanied.

Symbol	Name	Description
	WARNING	Indicates information that should be followed with the utmost care. Failure to comply with a warning could cause severe damage to the equipment or injury to personnel.
	CAUTION	Indicates a potentially hazardous situation which, if not avoided, could result in equipment damage, data loss, performance degradation, or unexpected results.
	IMPORTANT	Emphasizes essential information required for user success.
	NOTE	Provides important supplemental information that might enhance users' understanding or alternative steps to accomplish their goals.
	TIP	Provides optional information to help users be more successful in their tasks.

Safety Instructions

Follow the safety instructions to use the product safely and prevent any risk of personal injury or damage to the product.

WARNING

Choosing Location

- DO NOT expose the product to direct sunlight, excess heat, open flames, corrosive gasses, moisture, or dust. Doing so may cause electrical shock, electrical short, or fire.
- DO NOT install the product near heaters, air conditioners, electrical fans, refrigerators, or water. Doing so may create the risk of a short circuit or fire caused by water or condensation that may come into contact with the product.
- DO NOT install the product in an environment that is susceptible to explosion.

Operation

- DO NOT let any type of liquid, mists, or sprays get into the product. Doing so may cause electrical shock, electrical short, or product damage.
- If smoke, odors or noise rise from the device, stop using the device immediately, disconnect the power cable, and contact our customer support.

Maintenance

- DO NOT attempt to dissemble, repair, or modify the device yourself. Opening or removing covers may expose you to electrical shock or other risks and may void your warranty. If the product does not work correctly, contact your dealer or our customer support.

CAUTION

Choosing Location

- Keep the front side of the device away from strong ambient light, direct sunlight, or both. Sunlight, halogen lamps or other strong illumination may degrade the performance of the device, that is, increase in failure-to-capture rates or occasional authentication problem.
- DO NOT install the product outdoors unless environmental factors such as water, temperature, or sunlight in the location are controlled by means of proper protection.
- DO NOT expose the product to high electro-magnetic radiation. Device failure or performance degradation may occur caused by electro-magnetic interference.
- DO NOT install the product next to devices that contain magnets or generate magnetic fields such as speakers. Device malfunction or performance degradation may occur caused by magnetic interference.

Installation

- DO NOT install the product on a surface subject to vibration or physical shock. Doing so can cause damage to the product.
- When you install the product on a wall, make sure that you secure the product with the provided fasteners. Dropping from the wall may cause damage to device casing, internal parts, or both.
- DO NOT install the power supply cable in a high-traffic area where people pass by. Doing so may create a trip hazard and cause the cable to become worn or frayed.
- Use only a power cord set complying with the national regulation of the countries intended for sale.
- Use only the power adapter which is either provided or approved by CMITECH for the product to operate properly and safely.
- DO NOT connect multiple devices to one power adapter. Overload on power adapter may cause over-heat or fire hazard.
- DO NOT use any type of extension cord to connect the product to a power supply.

Operation

- DO NOT use any sharp tools when pressing the buttons to prevent damage to the touch screen from scratches or cuts.

Maintenance

- When cleaning the product, wipe the product with a soft and dry cloth. Do not apply water, benzene, alcohol, or spray cleaner. These may cause product failure or fire.

Contents

1. Introduction to EF-45NC

The EF-45NC iris recognition system offers highly intuitive, hands-free iris biometrics imaging in a compact and elegantly designed identification and authentication terminal for use in a wide range of identity management applications.

The front facing nominal 5.0 inch LCD serves to display the user's face image for fast, easy and highly natural positioning for proper iris image capture. The subject merely puts his or her face in the positioning box at the top of the LCD, and then moves toward the system to size his or her head to the box to be in proper range. Image capture is fast and automatic. While user instructions are very simple, almost all subjects will be able to interact with the system without any direction.

The capture range is a robust 33 to 47 cm, also contributing to the system's ease of use. There is an optional "fast capture mode", in which the range is further extended to 30 to 47 cm, although in this mode, images may not conform to ISO 19794-6 2011 or ISO 29794-6 standards.

And the internal automatic tilt mechanism adjusts to the user's height or vertical position over a range of 40 cm (about 16 inches), making the EF-45NC ideal for wall mount, countertop, desktop, or kiosk installations.

EF-45NC model is a Time-of-Flight (TOF) positioning sensor, which makes subject finding and the initial distance calculation more accurate and robust. Also new is a faster tilt motor that improves system responsiveness and smoothness.

The EF-45NC is an embedded terminal, which means that all image processing and machine control is performed on the internal Linux-on-ARM mainboard. Typical connectivity to host systems is through TCP/IP (Ethernet). And iris biometric encoding and matching is typically performed on-board as well, so identification or authentication decisions can be made locally for fast responsiveness. For access control, there are Wiegand connections for dedicated, local communications to door controllers or panels.

Other options include WiFi and a smart card reader.

For all specifications, please see Specifications section.

1.1. Key Features

- Intuitive LCD face display positioning for fast, simple and natural iris user experience—similar to face display facial recognition systems.
- Contactless iris imaging at range of 33 to 47 cm stand-off in standard mode

36 to 44 in Enrollment, 33 to 47 in Recognition

- Internal, automatic face and iris camera tilt mechanism with nominal height range of 40 cm
- Positioning guidance vocalizations selectable on / off and delay time. English is standard; all other supported languages are available with .wav file substitution
- Simultaneous dual iris recognition with typical capture speed of about 0.5 second
- On-board iris encoding and matching, with internal data base of up to 100,000 users in either 1:1 (verification) or 1:N (identification) modes.
- Face Recognition and Combined Face and Iris modes:
    - Supplemental face recognition in case of iris recognition failure-to-capture (FTC) in enrollment. Face recognition is used as primary modality in authentication for specific individuals.
- Time-of-Flight (TOF) subject detection sensor
- Supports dual factor authentication with card or PIN
- Optimized imaging for difficult ambient lighting conditions
- Optimized image capture for most sunglasses, glasses, and facial veils
- Supports imaging of all iris colors
- Kensington lock slot standard
- Standard communications connectors and protocols for TCP/IP (Ethernet RJ-45), RS-485 and RS-232, Wiegand IN, Wiegand OUT, TTL, and dry contact relay
- Connection cables with press-in connectors included in accessories kit
- External audio connector (For EF-45, EF-45N only)
- Tamper switch on rear panel
- Access control (AC) configuration includes wall mount plate
- Optional WiFi support (USB dongle module)
- Integrated Smart Card reader (MIFARE Classic, DesFire card)
- Meets CE mark, FCC, IEC 62471 eye safety, and RoHS standards. Iris recognition meets ISO 19794-6 2011 and ISO 29794-6 standards.
- Design and production processes meet ISO:9001 2008 standard.

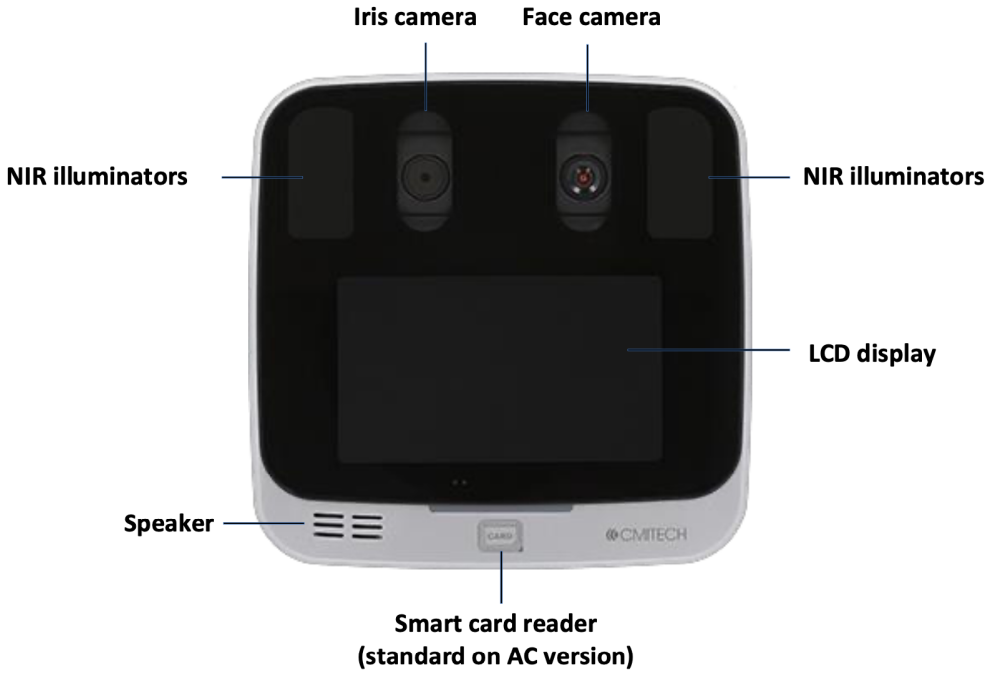
1.2. Components

Before you begin, make sure that all the following items are included with your device. If you find anything is missing, contact your dealer.

Component	ID (ID Management) version	AC (Access Control / Time & Attendance) version
EF-45NC	Yes	Yes
Power supply (IEC C13 female)	Yes	Yes
Power cord (IEC C14 male), power side connector type by country	Yes	Yes
Basic MiFare Classic and DesFire card reader (internal)	No	Yes
Standard back cover	Yes	No
Wall mount bracket	No	Yes
AC I/O cables with push in connectors for device, and pig tails for external connections, Includes cables for Wiegand (2), RS 485, RS 232, TTL (2), dry contact relay	No	Yes
Diode	No	Yes
Plate screw (M3) (not security type)	No	Yes

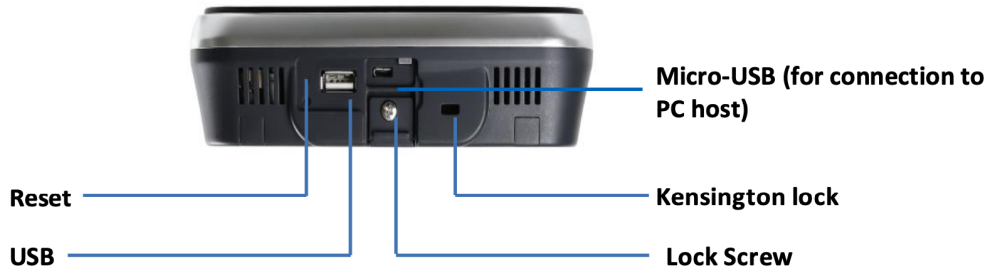
1.3. Parts and Controls

1.3.1. Front



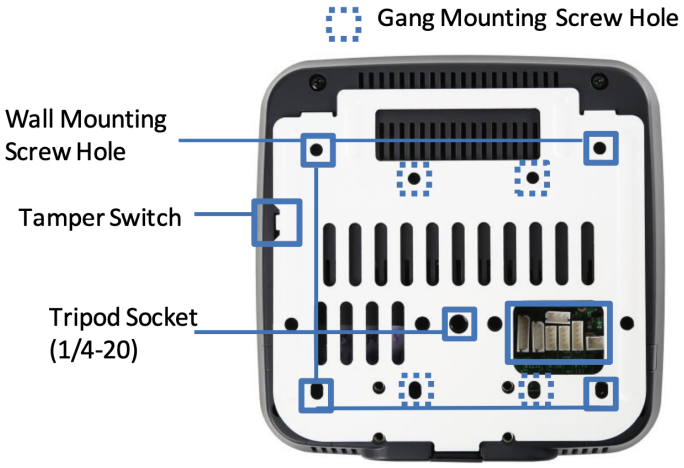
Name	Description	Note
Iris Camera	Captures the iris images	
Face Camera	Captures the face images	
NIR Illuminators	Illuminates the face using the NIR lighting when capturing the faces	
LCD display	Shows preview images before capture and provides a graphical interface for enrollment and device configuration	
Smart card reader	Indicates the area where RF cards can be read	For AC version only
Speaker	Delivers sound from device	

1.3.2. Bottom



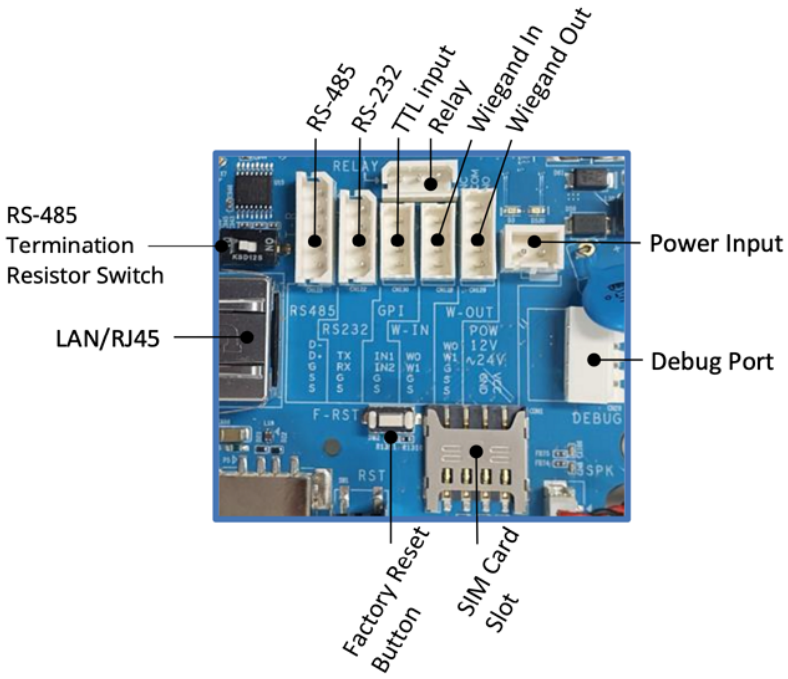
Name	Description	Note
Micro-USB port	Connects the unit to a PC host	
Kensington lock	Secures the unit to object with cable and lock	
Lock Screw	Attaches the mounting plate to the unit	
USB port	Connects a USB flash drive to the unit	
Reset button	Restarts device	

1.3.3. Rear



Name	Description	Note
Wall Mounting Screw Hole	Indicates the holes for screwing the mounting plate to a wall.	
Gang Mounting Screw Hole	Indicates the holes for screwing the mounting plate to a gang box.	
Tamper Switch	Starts an alarm, if configured, when a physical tampering attempt is detected	
Tripod socket	Attaches the unit with a tripod that has the standard ¼-20 UNC screw	

1.3.4. Connector



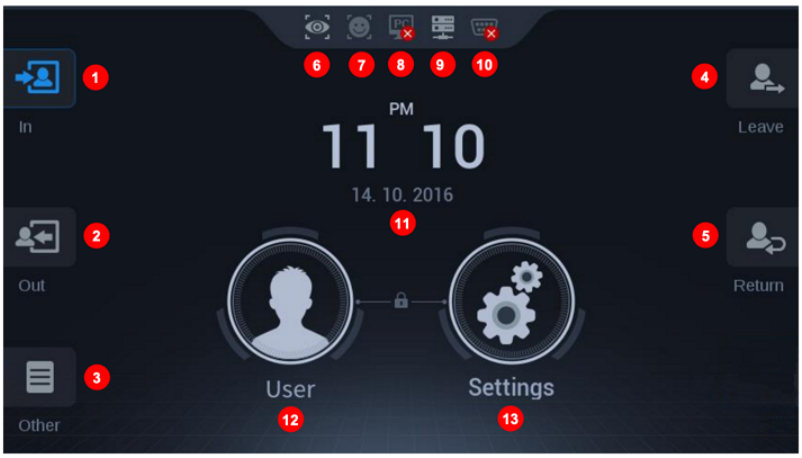
Name	Description	Note
RS-485	Connects the RS-485 cable	
RS-232	Connects the RS-232 cable	
TTL input	Connects the GPI cable	
Relay	Connect the relay cable	
Wiegand In	Connects the Wiegand cable as input	
Wiegand Out	Connects the Wiegand cable as output	
Power Input	Connects the power cable	
Debug Port	Reserved for debugging purposes only	
SIM Card Slot	A SIM card can be inserted	Optional for EF-45, EF-45N only
Factory Reset Button	Restores the device to its original manufacturer settings	
LAN/RJ45	Connects an ethernet cable	
RS-485 Termination Resistor Switch	Provides termination when the device is located at the physical end of RS-485 wiring	

2. Using EF-45NC

2.1. On-board Demonstration Application

The on-board demo showcases the EF-45NC's image capture capabilities, including subject positioning via face display interface, enrollment, and on-board matching. The system boots into this demo, initiated by a video-based motion detector that locates the subject from about 1 meter away, then proceeds with iris image capture for recognition/authentication.

2.2. Menu Overview



No.	Name
1	Check Attendance (F1 Key)
2	Leave Work (F2 Key)
3	Supplement T&A (F3 Key)
4	Go Out (F4 Key)
5	Return Button (same as F5 Key)
6	Notice Icon of Iris mode is operating
7	Notice Icon of Face mode is operating
8	Notice Icon of CMID manager is connected
9	Notice Icon of IP network is connected
10	Notice Icon of Serial Communication is connected
11	Clock display
12	User Button for registration, search, modification and deletion
13	Settings Button for system configuration

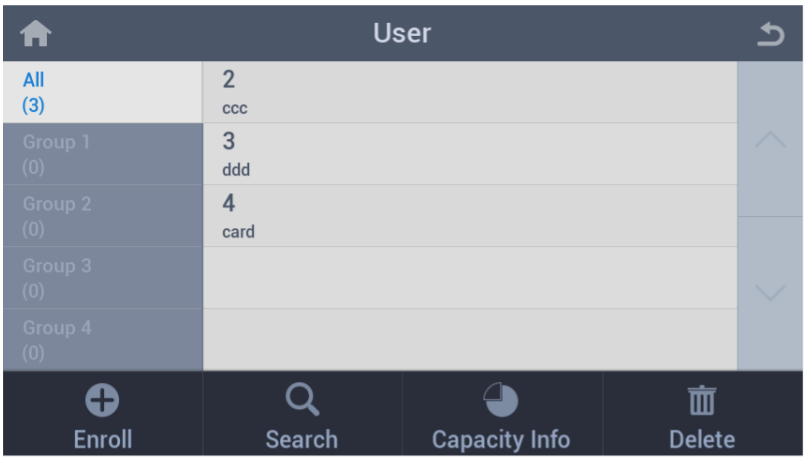
2.3. Enrollment

This section gives the procedural information to enroll users to the device.

1. To switch to enrollment mode, press large User icon in center of main Launcher page.

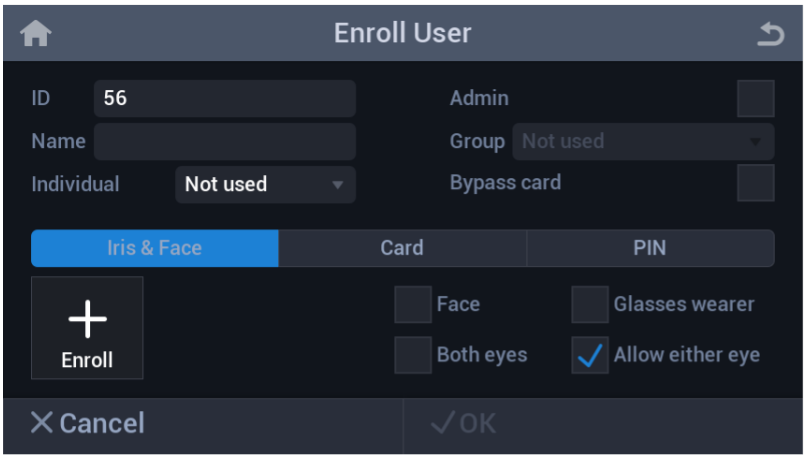
> If the system is in image capture mode, press Home icon (🏠) on top left of active user interface display, which will stop Recognition mode and return system to Launcher page.

2. The main User screen appears.



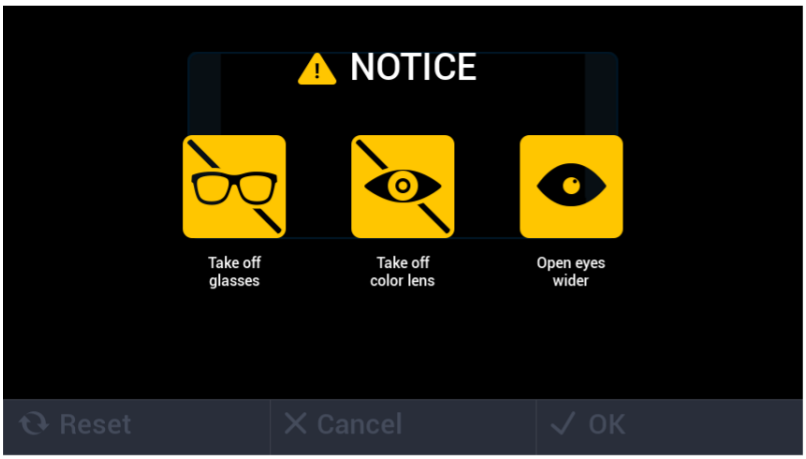
> This user screen also allows simple database management. By tapping the **Delete** icon in the bottom right, one can easily delete information of enrolled users.

3. To enroll a new user, press the **Enroll** icon to bring up **Enroll User** screen.

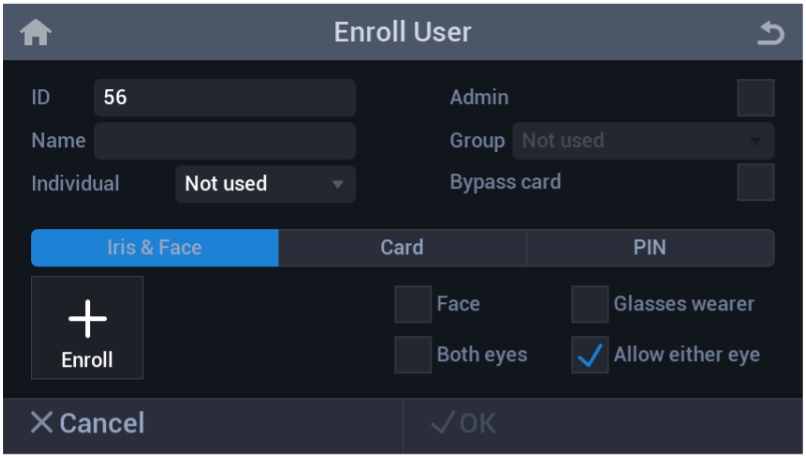


4. Press the plus (+) button in the bottom left to capture image of the new user.

5. An instruction screen will appear for 3 to 5 seconds, and then switch to the user interface. (The timing of this display can be changed in Settings.)



6. After successfully capturing iris images, click ✓ **OK** to accept images. The system then returns to Enroll User screen.
7. Click on the **Name** field to enter name of subject, then click on ✓ **OK** to complete enrollment.



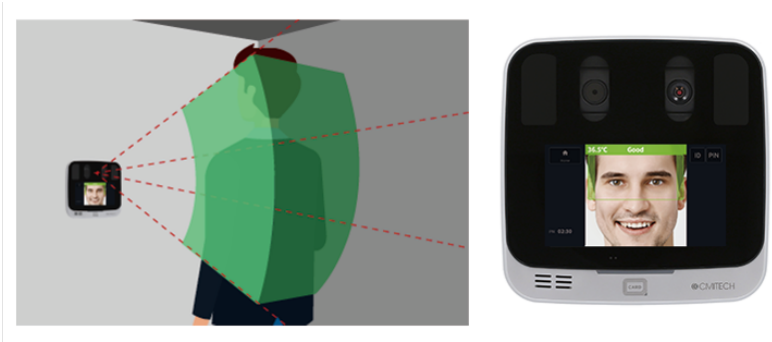
8. Press the Home icon (🏠) to return to the Launcher page to re-start Recognition and Authentication mode.

2.4. Authentication

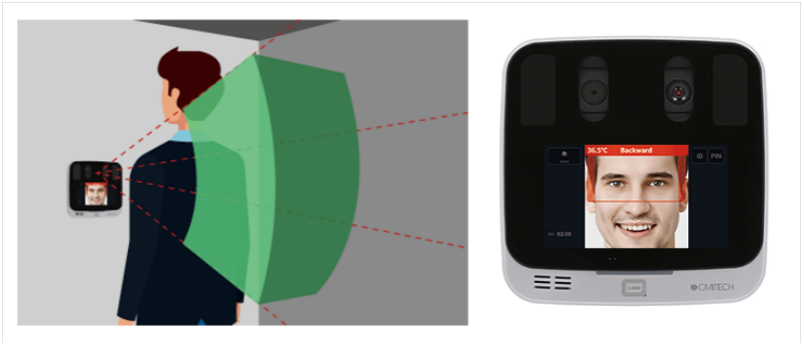
EF-45NC detects a subject and captures the images of subject's irises and face automatically once it's at an appropriate distance and position.

1. Position yourself facing straight at the LCD display. When the device detects your movement within 1.0meter range, it initiates the image capture sequence. A rectangular-shaped user guide box will appear on the screen. If it is BLUE, it means you are too far from the device. Move forward.

2. Move towards the system to size your face to the LCD display. If the user guide box flashes GREEN, it means you are at an appropriate position. Stop and hold your position until the device captures image of your face and/or iris.



3. If you are standing too close to the device, your face will not fit in the LCD display. When the user guide box flashes RED, it means the device cannot capture your image because you are too close. Move back until the box turns green.



3. Technical Specifications

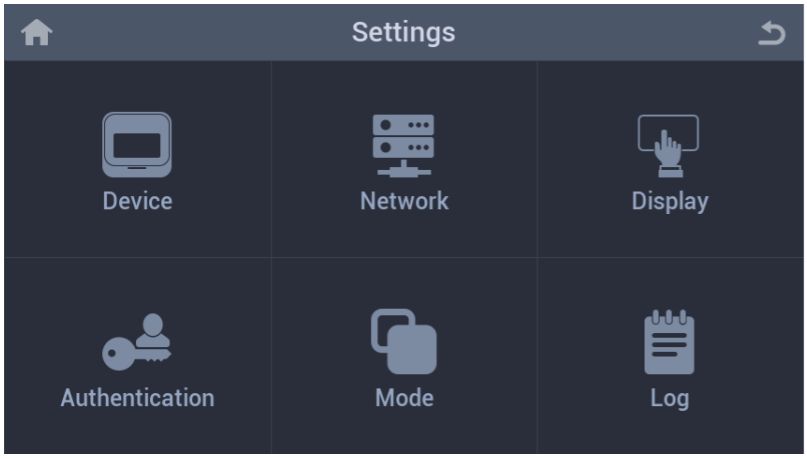
Specification	Description
Embedded CPU	ARM quad-core
On-board Iris algorithm for encoding and matching	Standard in all configurations
Flexible Software Development Kit (SDK) configurations	High Level SDKs offered in C# (.NET), C++, C, and Java versions. Includes host side reference application to connect to EF-45NC resident services layer so that integrator does not need to program EF-45NC device.
Configuration Utility software application	This host side software application provides centralized (network) control and setup of system configuration, Wiegand settings, and IP address settings, as well as providing for centralized FW upgrades.
Compatibility with prior generation EF-45/EF-45N	Fully backward compatible to prior SDK versions for the EF-45/EF-45N, which means that no API changes are necessary when installing in legacy solutions.
Dimensions	166 x 166 x 43 mm (6.5 x 6.5 x 1.7 inches) without mounting wall plate
Weight	630 g without wall plate
On-board data storage	Up to 100,000 iris template pairs with match speed about 1.0 second either in 1:N mode (identification) or 1:1 mode (verification). Up to 3,000 face templates in 1:N or 1:1 modes
Dual factor authentication	Iris with either smart card or PIN as second factor
Iris image pixel resolution	Meets ISO 19794-6 2011 and ISO 29794-6 iris imaging standards
Iris image output	640 x 480 pixels, 8bit depth, supports multiple formats
Adjustable FAR (false accept rate)	Adjustable iris algorithm threshold range of 10^{-5} to 10^{-14} FMR at 10^{-6} FNMR. Default is FMR of 10^{-8}.
Enrollment mode operational iris imaging distance (stand-off range) and depth of field	36 to 44 cm range (7 cm depth of capture range) in enrollment mode. Meets ISO 19794-6 2011 and ISO 29794-6 specifications.
Recognition mode operational iris imaging distance	Recognition mode provides up to 33 to 47 cm range (12 cm depth of capture) for small scale applications. Does not necessarily meet ISO specifications. Range selectable in SDK.

Specification	Description
Iris positioning indicators	Face positioning within box in LCD serves to center users face in X-Y dimensions. Subject will fit size of face to box size within LCD display for distance(Z) positioning, with simultaneous color bar display for correct distance positioning: • **Blue**: too far away • **Green**: OK • **Red**: too close Supplemental voice distance feedback is also simultaneous. Vocalizations convertible to local language via .wav file substitution.
Auto tilt	Internal auto tilt range of +25 to -20 degrees, which corresponds to height range of approximately 40 cm. System can be mounted at any height to accommodate local user population.
Time of iris image capture and authentication	Typically about 0.5 second from time the subject's eyes are properly placed within capture volume.
IR illumination for iris imaging	Dual wavelength LEDs (spectral range of 700 to 900 nm) that conforms to ISO best practices for iris imaging.
Face image capture	Standard 24bit color and NIR images, both accessible from SDK
Face recognition	Optional on-board encoding and matching
Audio	1W embedded speaker
Operating temperature range	-20 to 50°C
Humidity range	10 to 90% RH, non-condensing
Illuminator eye safety standard	IEC 62471
Network interface, standard	10/100 Base-T Ethernet (RJ45 connector), USB OTG support
RFID Card reader	Integrated CMITech MiFare Classic and DesFire reader (in EF-45NC AC version only)
SIM card socket	Factory option
Mounting	¼ - 20 UNC (consumer camera tripod mount type) standard
Kensington lock slot	Standard

Specification	Description
Physical access control (EF-45NC AC) version accessories	Detachable wall mount plate for easy wall installation. Terminal and wired connectors for: Wiegand IN, Wiegand OUT, RS-232, RS-485, 2X TTL (GPIO) inputs, 1 dry contact relay
ID management (EF-45NC ID) version accessories	Rear cover
Power requirement	12 to 24V DC AC power adapter included in all versions.
Power consumption	Maximum 30 W

Appendix A: Settings Menu

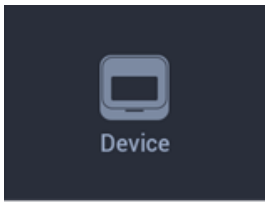
This appendix gives the details about **Settings** menus of EF-45NC device that appears when you press the **Settings** button on the main screen.



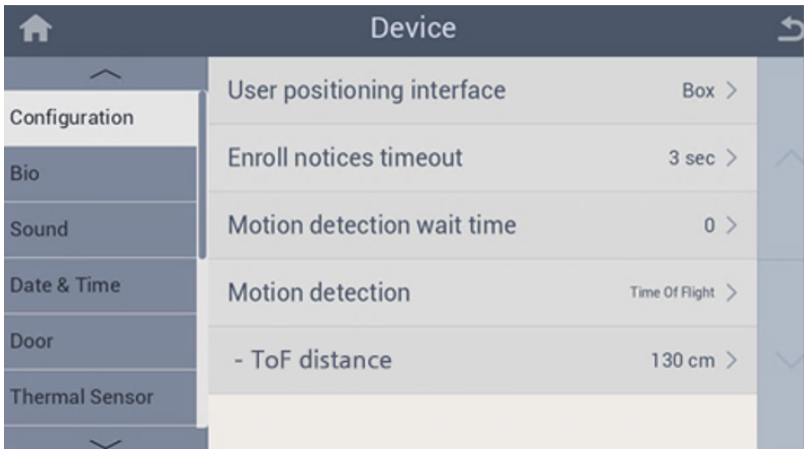
Name	Description
Device	Configuration for device operating
Network	Configuration for IP & serial communication
Display	Configuration for screen display
Authentication	Configuration for authentication method and T&A
Mode	Configuration for recognition operation
Log	Information of saved log and log search viewer

A.1. Device

Configure settings for device operation.

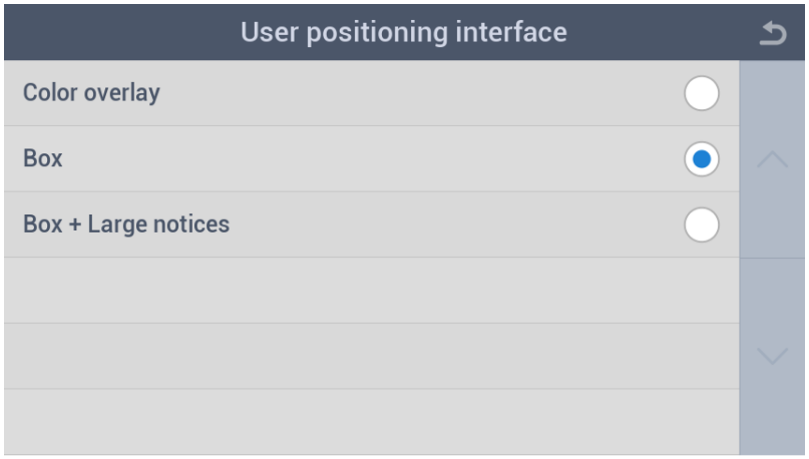


A.1.1. Configuration



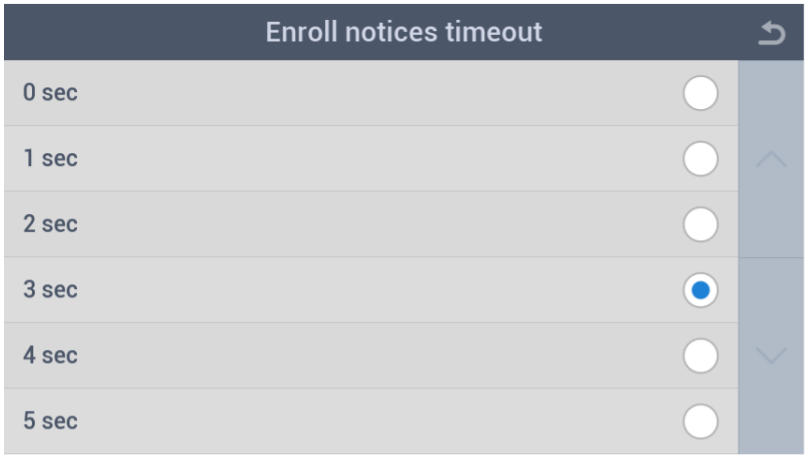
Name	Description
User Positioning Interface	Select a guide display UI when enrollment and recognition
Enroll notices timeout	Set notice time out time during enrollment process
Motion wait time	Set motion detection delay time from last recognition operating
Motion detection	Select motion detection enable/disable and detection type for starting recognition
ToF distance	When ToF is selected, it enables to control distance recognizing objects.

Configuration > User Positioning Interface



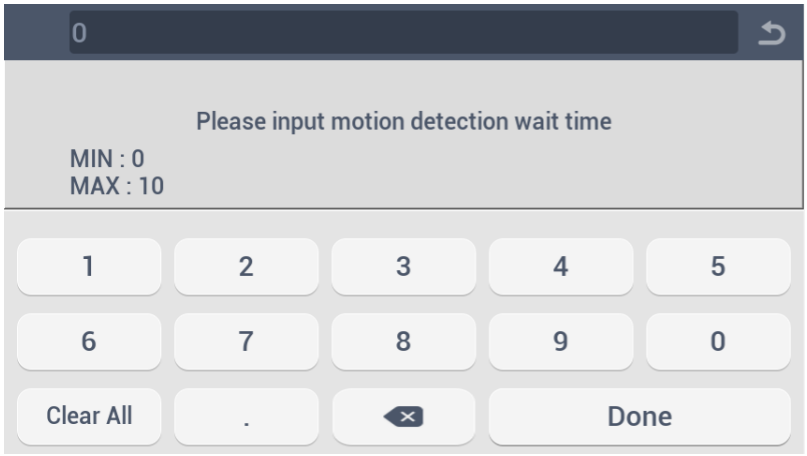
Name	Description
Color Overlay	Select Color overlay type guide UI display
Box	Select tracking box type guide UI display
Box + Large notices	Select tracking box + large guidance text type UI display

Configuration > Enroll notices timeout

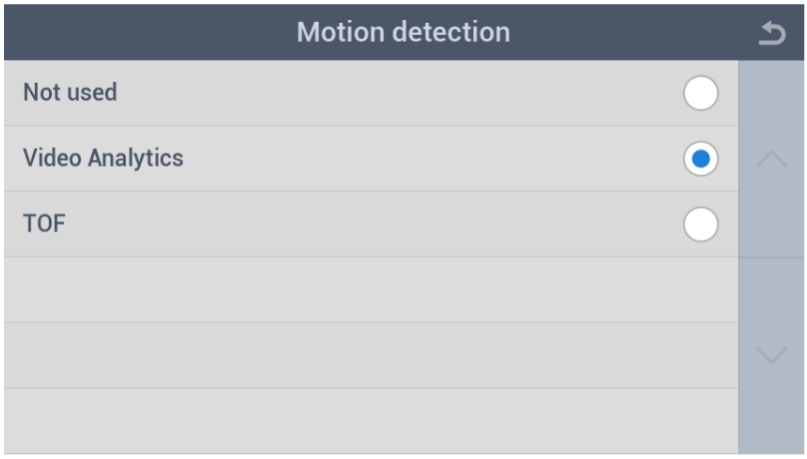


Default timeout is set to 3 sec.

Configuration > Motion Wait Time

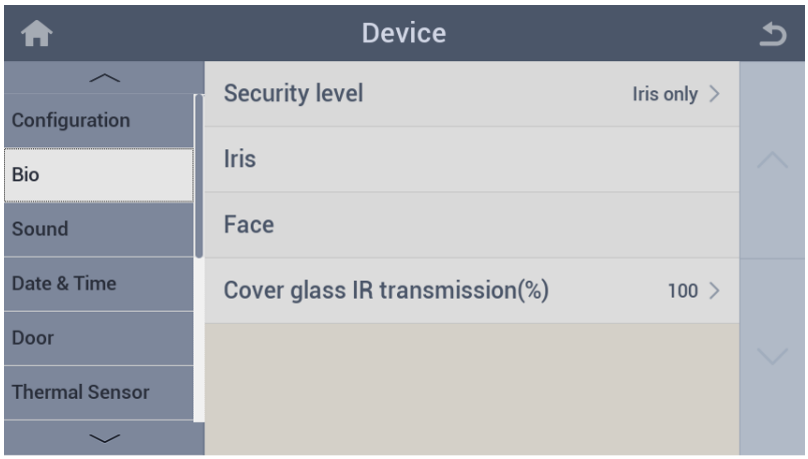


Configuration > Motion detection



Name	Description
Not used	Select not used
Video Analytics	Select video analytics for motion detection
TOF	Select TOF sensor for motion detection

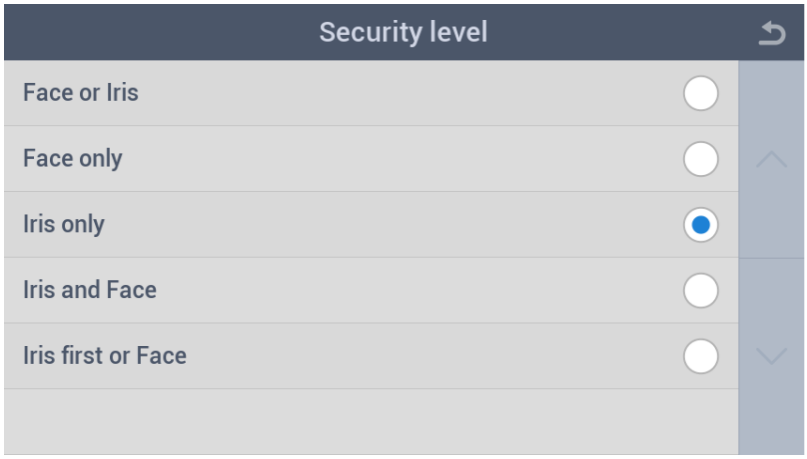
A.1.2. Bio (for Biometrics Selection)



Name	Description
Security Level	Select a combination mode of Face and Iris
Iris	Additional configuration for Iris enrollment and recognition
Face	Additional configuration for Face enrollment and recognition
Cover glass IR transmission (%)	Adjust IR transmission attenuation if a cover glass is in front of the EF-45NC

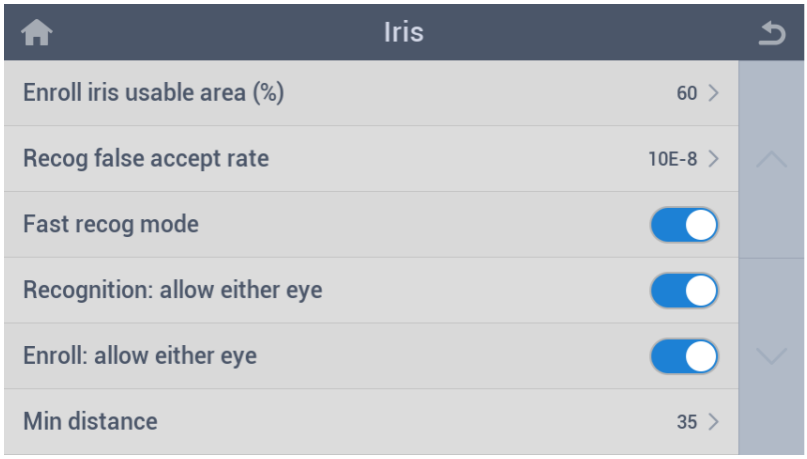
Do not change this value unless advised to do so.

Bio > Security Level



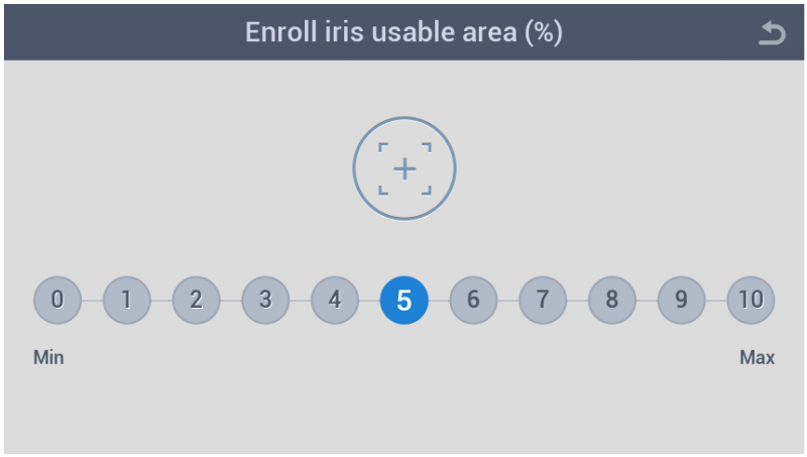
Name	Description
Face or Iris	Select two stages “Face or Iris” recognition mode
	Face recognition first, and then automatic switch-over to Iris upon Face recognition non-match
Face only	Select Face only recognition mode
Iris only	Select Iris only recognition mode
Face and Iris	Select Face and Iris recognition mode
	The EF-45NC reader captures Iris and Face at the same time from the Iris capture distance. If it finds the matches both in Iris and Face of the user, it will grant access to the user.
Iris first or Face	Select one stage “Face or Iris” recognition mode for faster recognition
	The EF-45NC reader captures Iris and Face at the same time from the Iris capture distance. If it finds a match in Iris or Face of the user, it will grant access to the user.

Bio > Iris



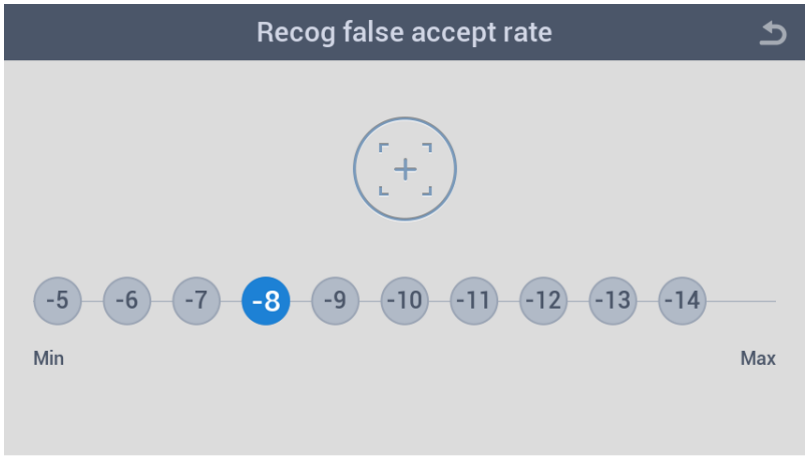
Name	Description
Enroll iris usable area (%)	Set usable area for Iris enrollment
Recog false accept rate	Set false accept rate for Iris recognition
Fast recog mode	Select enable/disable for fast recognition mode
Recognition: allow either eye	Select enable/disable for either eye recognition mode
Enroll: either eye	Select enable/disable for either eye enrollment mode
Min distance	Set min distance for Iris recognition

Bio > Iris > Enroll Iris usable area (%)



Default set to 60%.

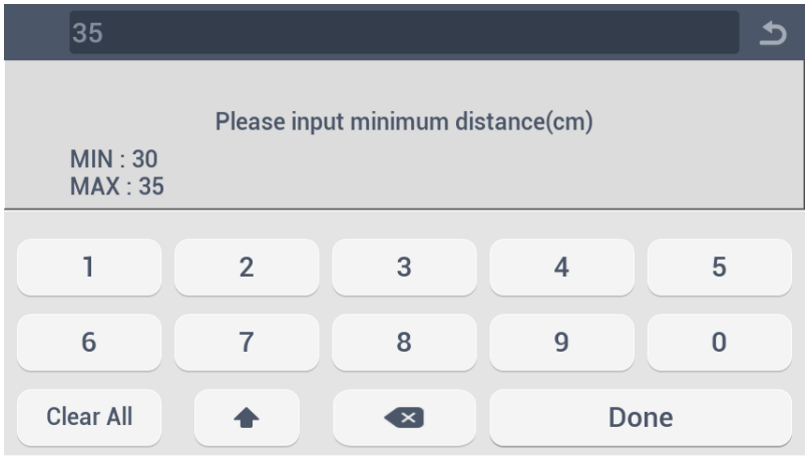
Bio > Iris > Recog false accept rate



Default set at 10^{-8}.

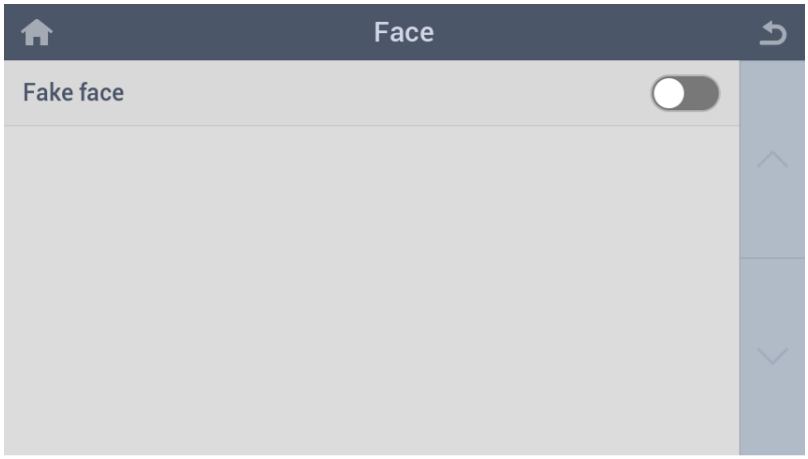
Decreasing Recog FAR will increase false reject rate (FRR).

Bio > Iris > Min distance



Default set at 30 cm.

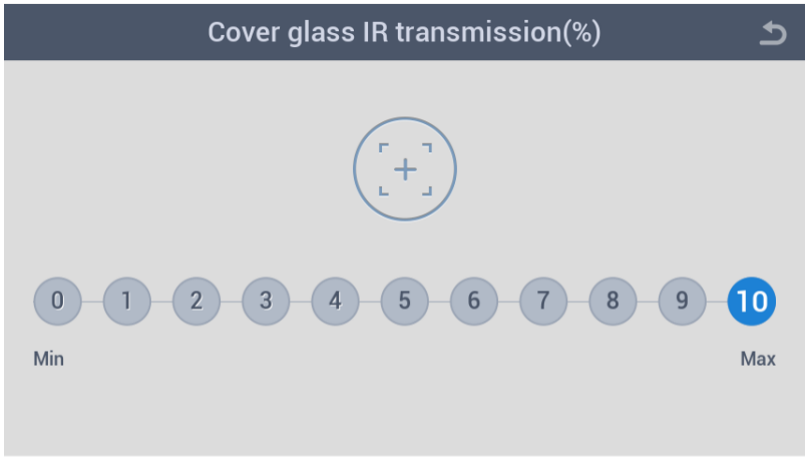
Bio > Face



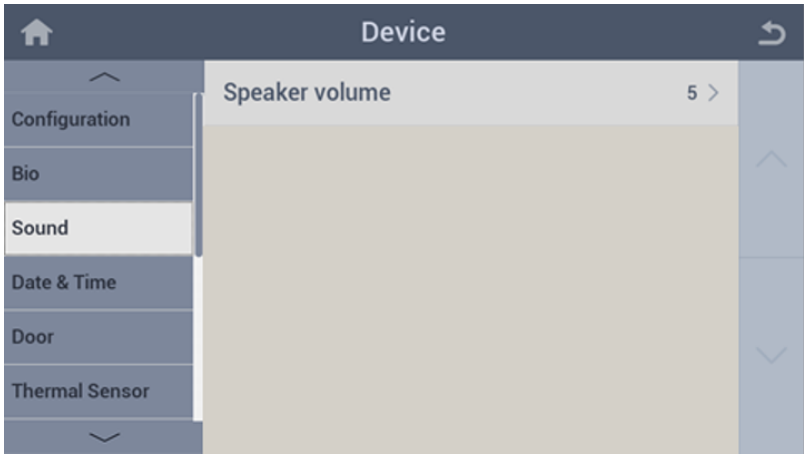
Name	Description
Fake face	Enable/Disable fake face detection (e.g. face photo)

With Fake face enabled, it may take a little more time to recognize face than if disabled

Bio > Cover glass IR transmission (%)

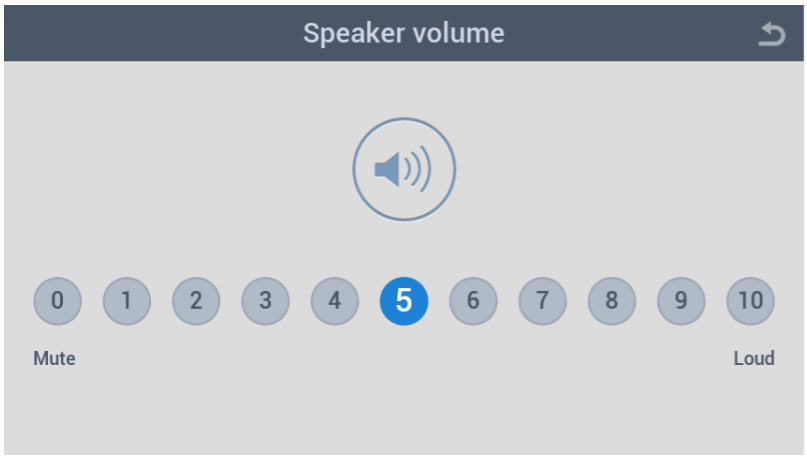


A.1.3. Sound

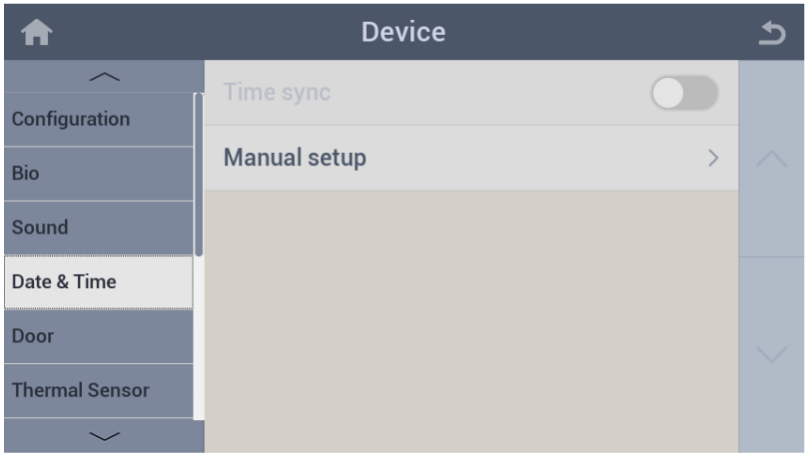


Name	Description
Speaker volume	Set speaker volume for instruction sound and interphone voice

Sound > Speaker Volume

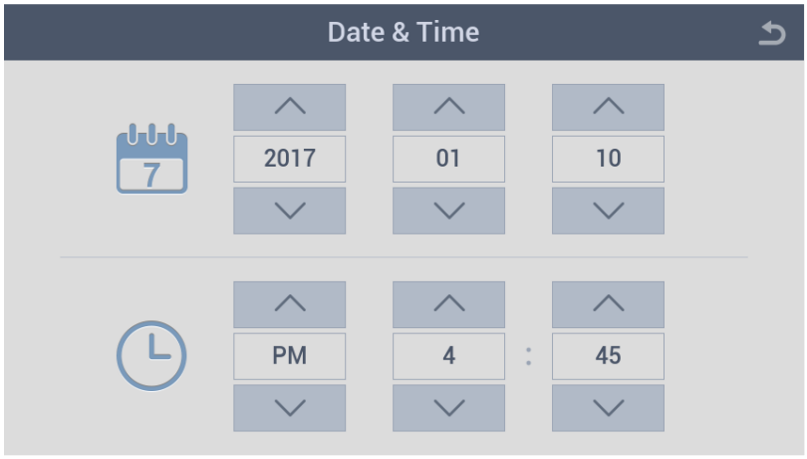


A.1.4. Date & Time

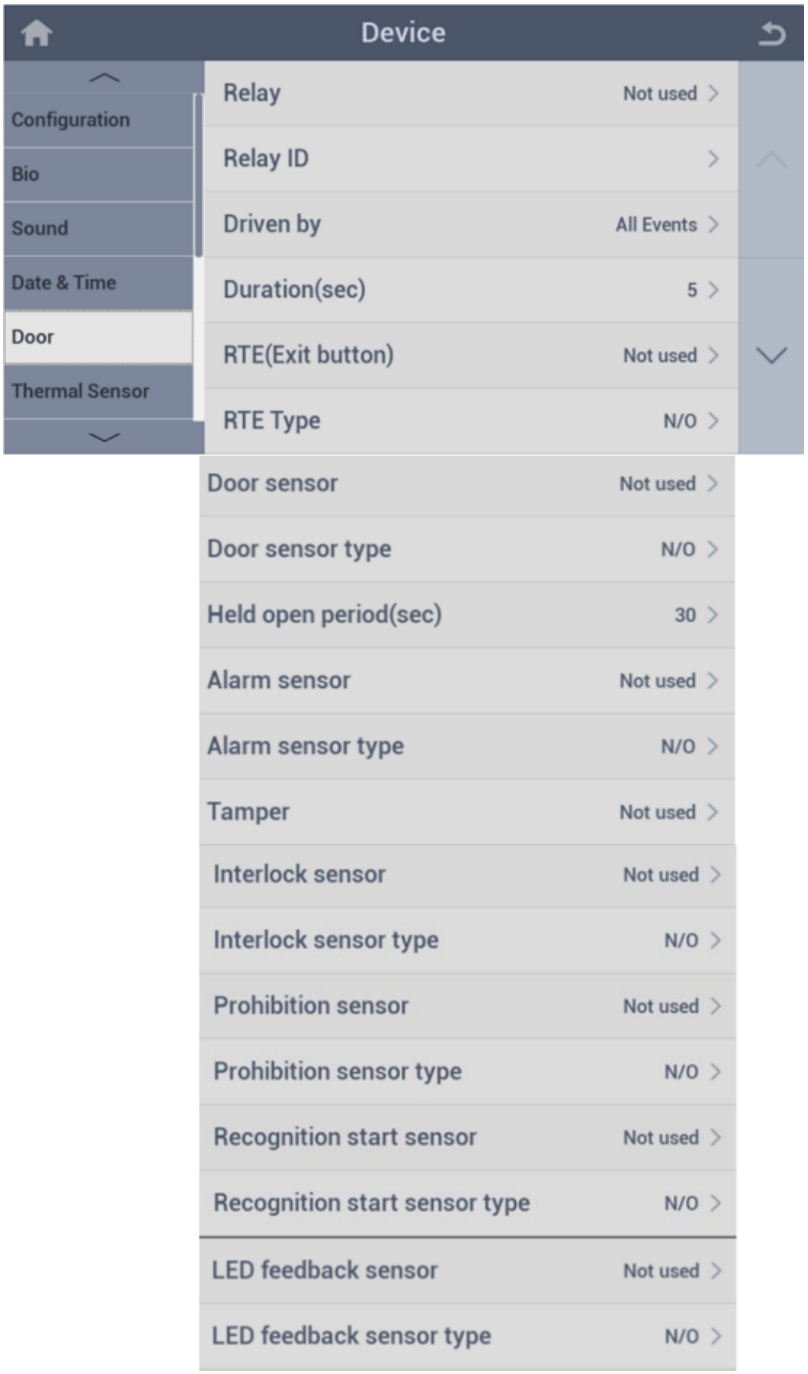


Name	Description
Time sync	Not available
Manual setup	Set date and time manually

Date & Time > Manual Setup



A.1.5. Door



Name	Description
Relay	Select a door open relay
Relay ID	Relay ID when relay is used
Driven by	Select an event mode for door open relay
Duration (sec)	Set time duration for door open relay operation
RTE (Exit button)	Select a door exit button
RTE Type	Select relay operation type of RTE

Name	Description
Door sensor	Select Door sensor input
Door sensor Type	Select Door sensor type
Held open period (sec)	Select Door open period
Alarm sensor	Select Alarm sensor input

An **alarm sensor** monitors an input port and causes the output relay to open the door on an event (e.g. Fire alarm) basis.

Alarm sensor type	Select Alarm sensor type
Tamper	Select enable/disable Tamper function
Interlock sensor	Select Interlock sensor input

An **interlock sensor** monitors an input port and causes the output relay to open or close the door depending on an interlock status after successful authentication and displays the “Wait” message while the interlock is activated.

Interlock sensor type	Select Interlock sensor type
Prohibition sensor	Select Prohibition sensor input

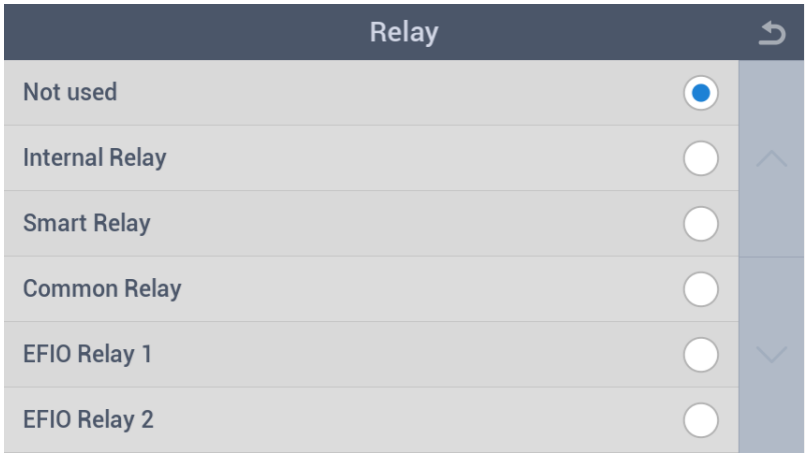
A **prohibition sensor** monitors an input port and causes the output relay to close the door on an event basis after successful authentication and displays a message that informs the device is not available.

Prohibition sensor type	Select Prohibition sensor type
Recognition start sensor	Select Recognition start sensor input

A **recognition start sensor** monitors an input port and causes device to start recognition procedure on an event (e.g. pressing button) basis.

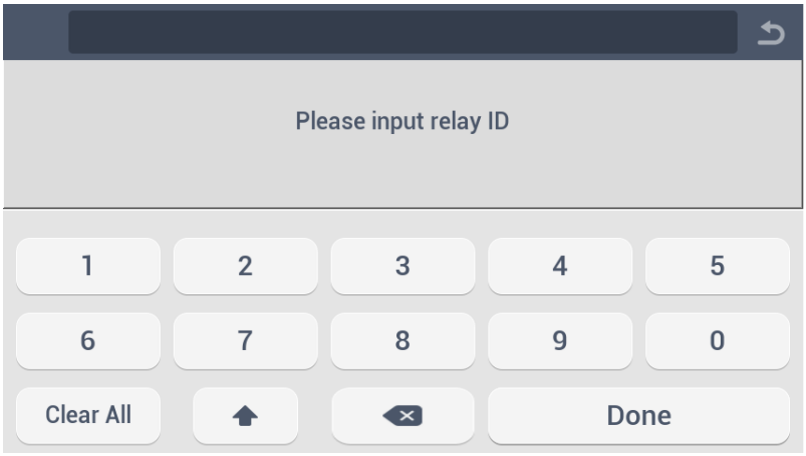
Name	Description
Recognition start sensor type	Select Recognition start sensor type
LED feedback sensor	Select LED feedback sensor input
	A **LED feedback sensor** activates ACU authentication feedback wait function.
LED feedback sensor type	Select LED feedback sensor type

Door > Relay



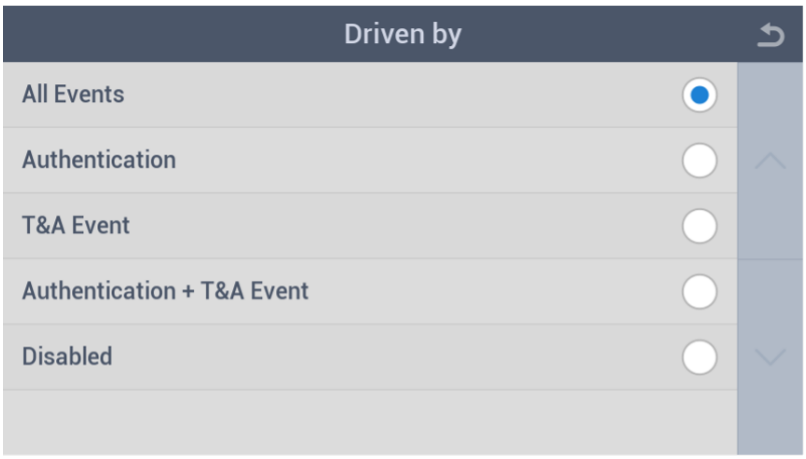
Name	Description
Not used	Select not used
Internal Relay	Select internal relay
Smart Relay	Select external relay
Common Relay	Select common relay
EFIO Relay 1	Select to use EFIO Relay 1
EFIO Relay 2	Select to use EFIO Relay 2

Door > Relay ID



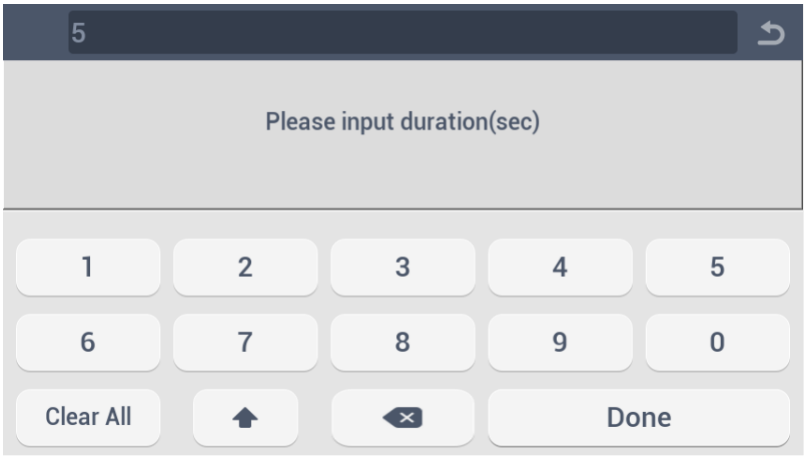
Enter the ID when using Smart Relay.

Door > Driven by



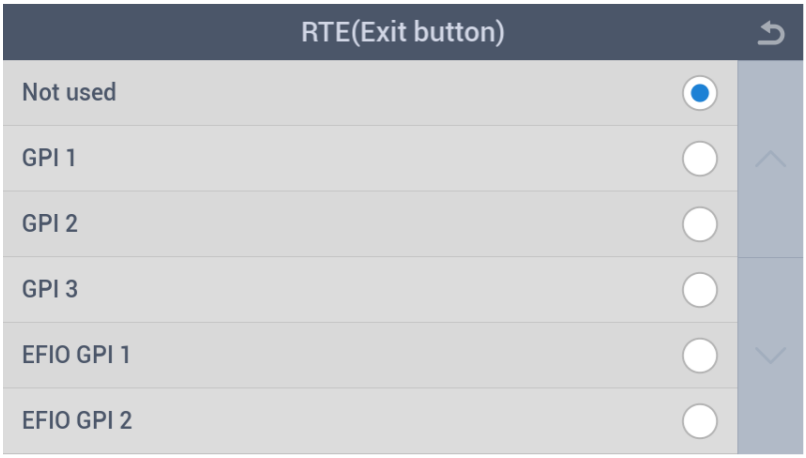
Name	Description
All Events	Select door open for all events
Authentication	Select door open for authentication event
T&A Event	Select door open for T&A event
Authentication + T&A Event	Select door open for authentication plus T&A event
Disabled	Select door open disable

Door > Duration (sec)



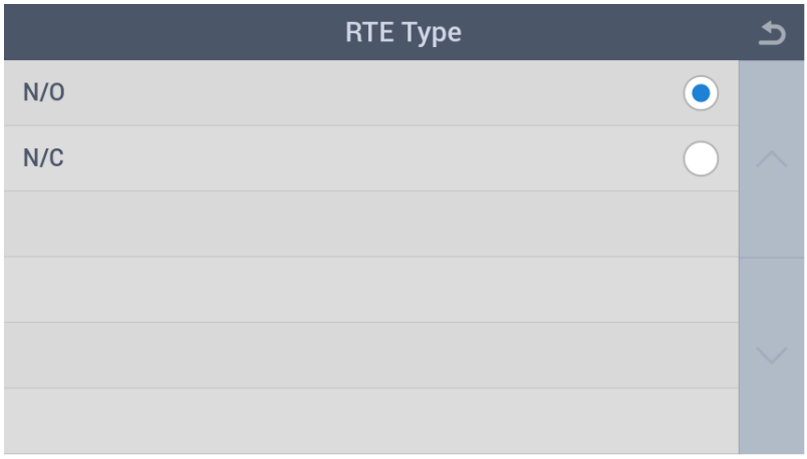
Configure the duration time of door open function.

Door > RTE (Exit button)



Name	Description
Not used	Select not to use RTE (Exit button)
GPI1	Select to use GPI1 as RTE (Exit button)
GPI2	Select to use GPI2 as RTE (Exit button)
GPI3	Select to use GPI3 as RTE (Exit button)
EFIO GPI1	Select to use EFIO GPI1 as RTE (Exit button)
EFIO GPI2	Select to use EFIO GPI2 as RTE (Exit button)

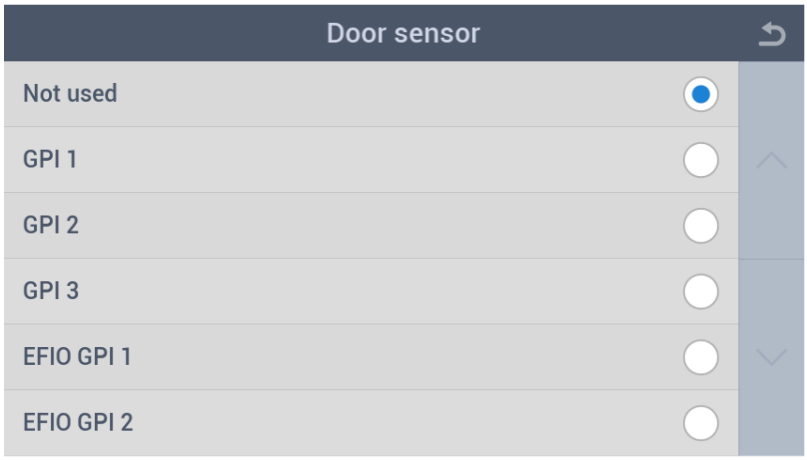
Door > RTE Type



Select type of door sensor.

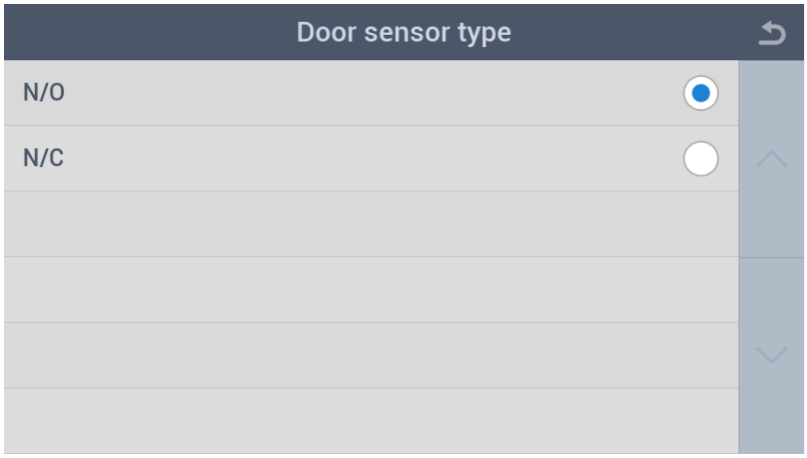
Name	Description
N/O	Normally Open
N/C	Normally Close

Door > Door sensor



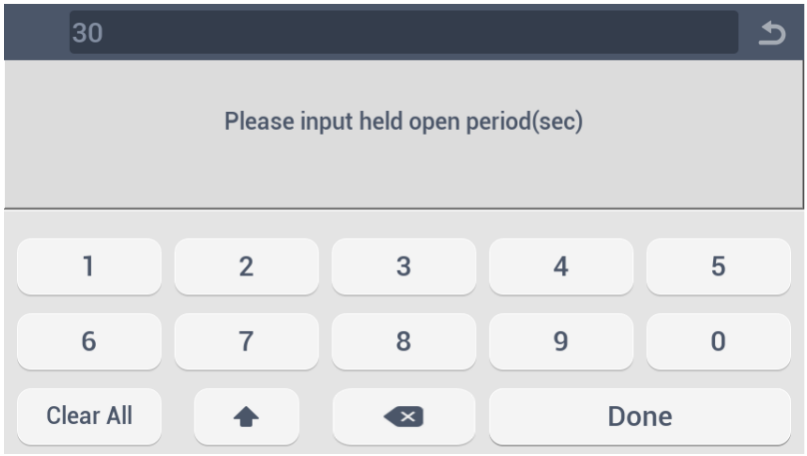
Name	Description
Not used	Select not to use Door sensor
GPI1	Select to use GPI1 as Door sensor
GPI2	Select to use GPI2 as Door sensor
GPI3	Select to use GPI3 as Door sensor
EFIO GPI1	Select to use EFIO GPI1 as RTE (Exit button)
EFIO GPI2	Select to use EFIO GPI2 as RTE (Exit button)

Door > Door sensor type



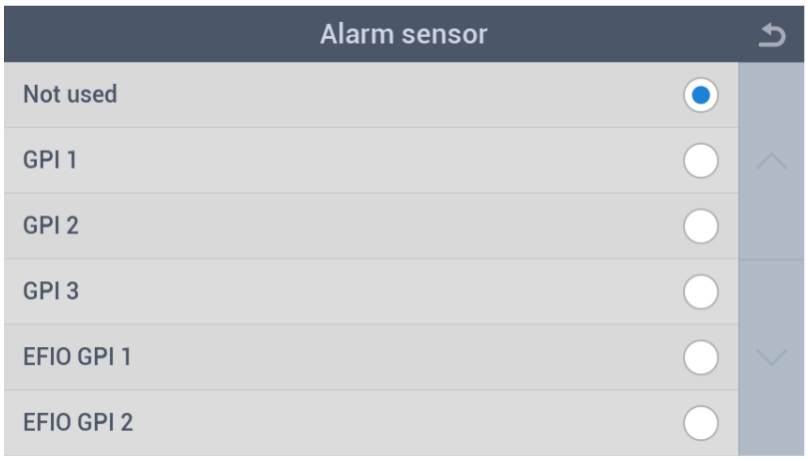
Select type of door sensor (normally open or normally closed).

Door > Hold open period (sec)



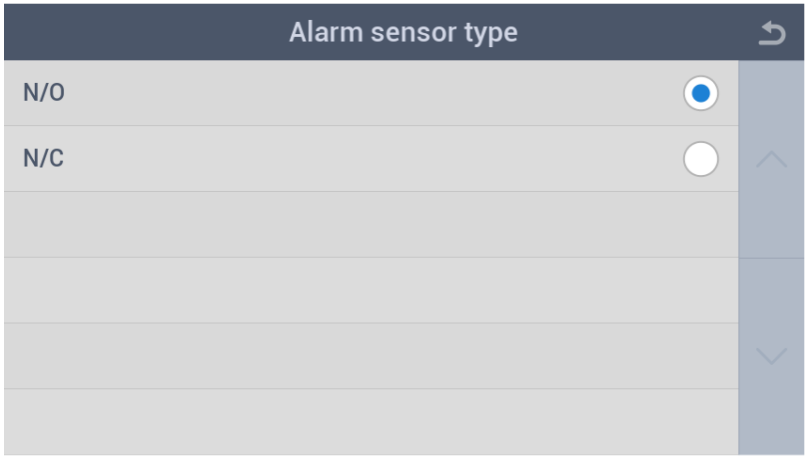
Configure the hold open period (sec) for alarm if the door is not closed.

Door > Alarm sensor



Name	Description
Not used	Select not to use Alarm sensor
GPI1	Select to use GPI1 as Alarm sensor
GPI2	Select to use GPI2 as Alarm sensor
GPI3	Select to use GPI3 as Alarm sensor
EFIO GPI1	Select to use EFIO GPI1 as RTE (Exit button)
EFIO GPI2	Select to use EFIO GPI2 as RTE (Exit button)

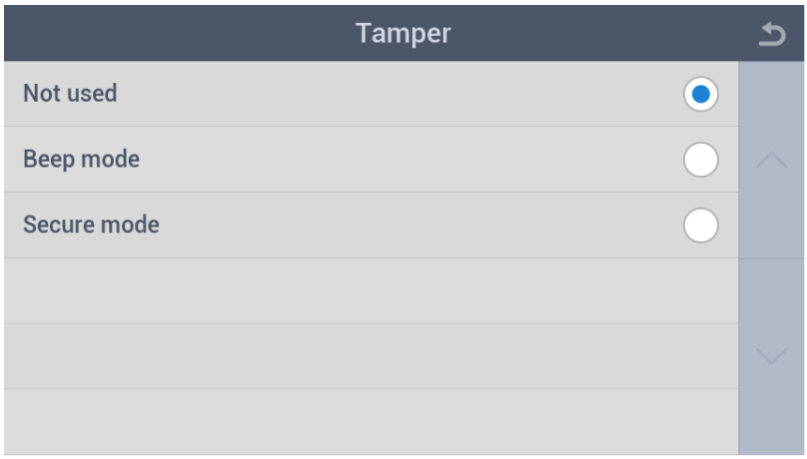
Door > Alarm Sensor Type



Select type of alarm sensor.

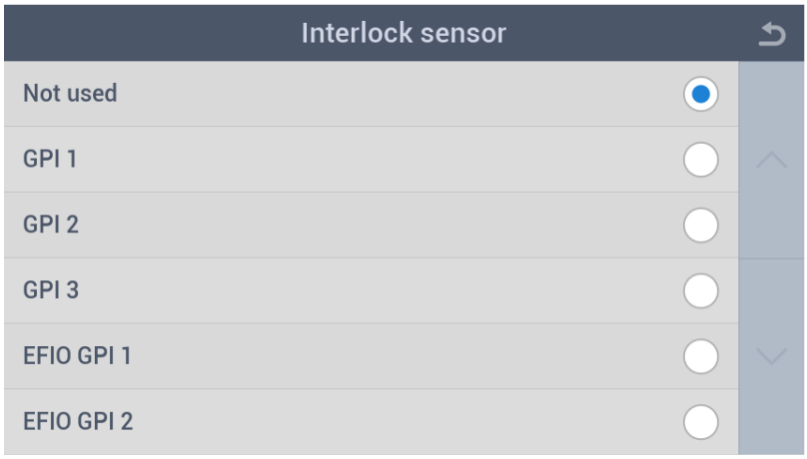
Name	Description
N/O	Normally Open
N/C	Normally Close

Door > Tamper



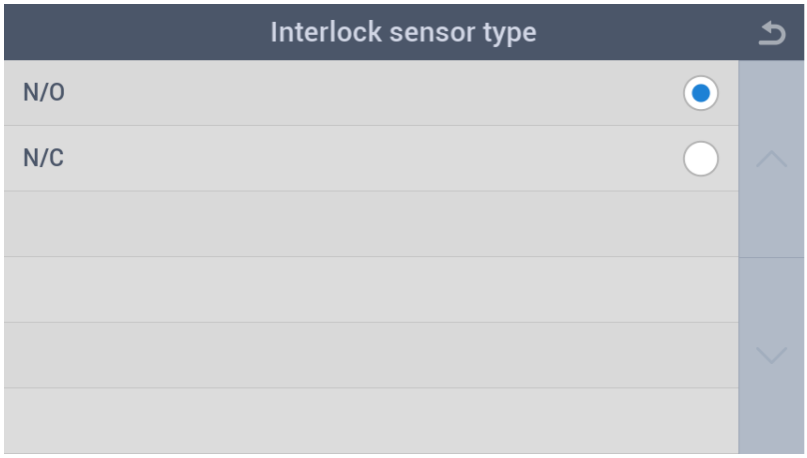
Name	Description
Not used	Select not to use Tamper
Beep mode	When physical tampering is attempted, the device sounds the alarm.
Secure mode	When physical tampering is attempted, all the data and settings are deleted.

Door > Interlock Sensor



Name	Description
Not used	Select not to use Interlock Sensor
GPI1	Select to use GPI1 as Interlock Sensor
GPI2	Select to use GPI2 as Interlock Sensor
GPI3	Select to use GPI3 as Interlock Sensor
EFIO GPI1	Select to use EFIO GPI1 as RTE (Exit button)
EFIO GPI2	Select to use EFIO GPI2 as RTE (Exit button)

Door > Interlock Sensor Type



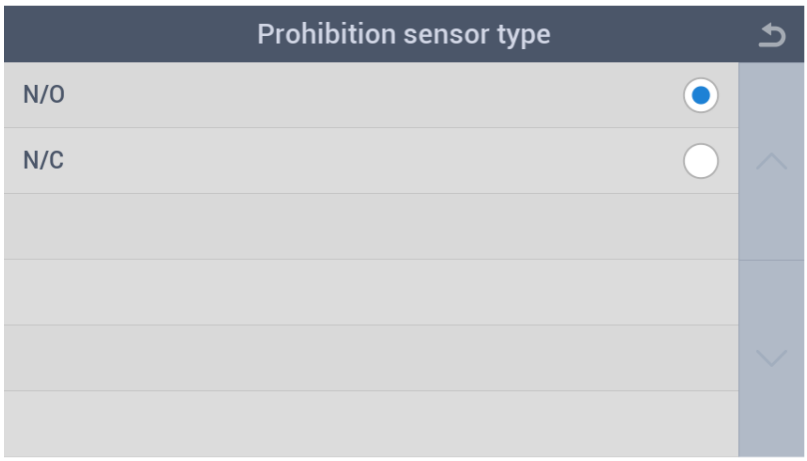
Select type of interlock sensor.

Name	Description
N/O	Normally Open
N/C	Normally Close

Door > Prohibition Sensor

Name	Description
Not used	Select not to use Prohibition Sensor
GPI1	Select to use GPI1 as Prohibition Sensor
GPI2	Select to use GPI2 as Prohibition Sensor
GPI3	Select to use GPI3 as Prohibition Sensor
EFIO GPI1	Select to use EFIO GPI1 as RTE (Exit button)
EFIO GPI2	Select to use EFIO GPI2 as RTE (Exit button)

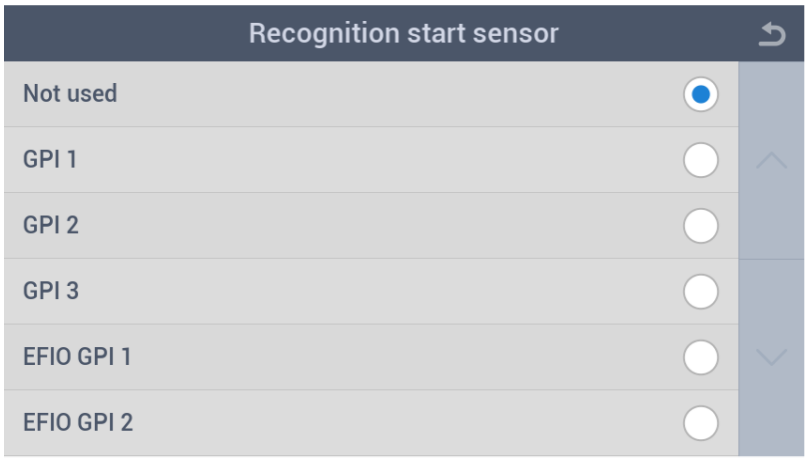
Door > Prohibition Sensor Type



Select type of Prohibition sensor.

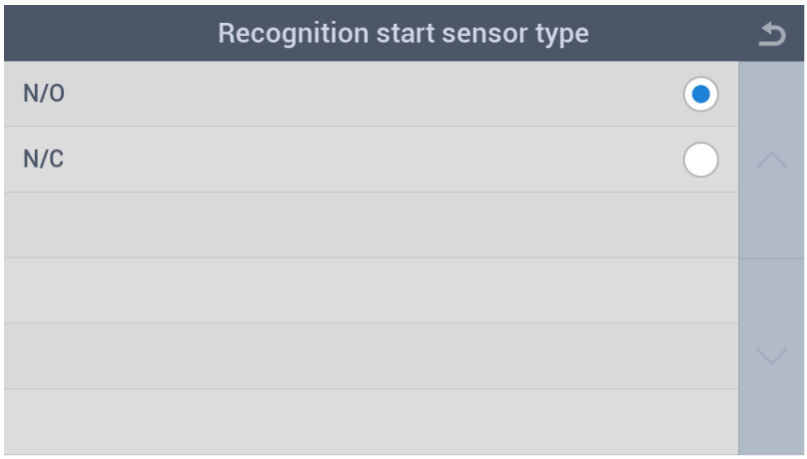
Name	Description
N/O	Normally Open
N/C	Normally Close

Door > Recognition start sensor



Name	Description
Not used	Select not to use Recognition start sensor
GPI1	Select to use GPI1 as Recognition start sensor
GPI2	Select to use GPI2 as Recognition start sensor
GPI3	Select to use GPI3 as Recognition start sensor
EFIO GPI1	Select to use EFIO GPI1 as RTE (Exit button)
EFIO GPI2	Select to use EFIO GPI2 as RTE (Exit button)

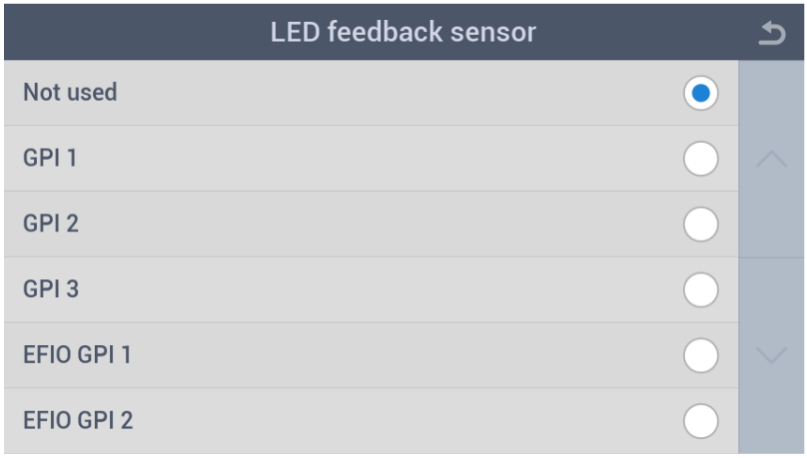
Door > Recognition start sensor type



Select type of Recognition start sensor type.

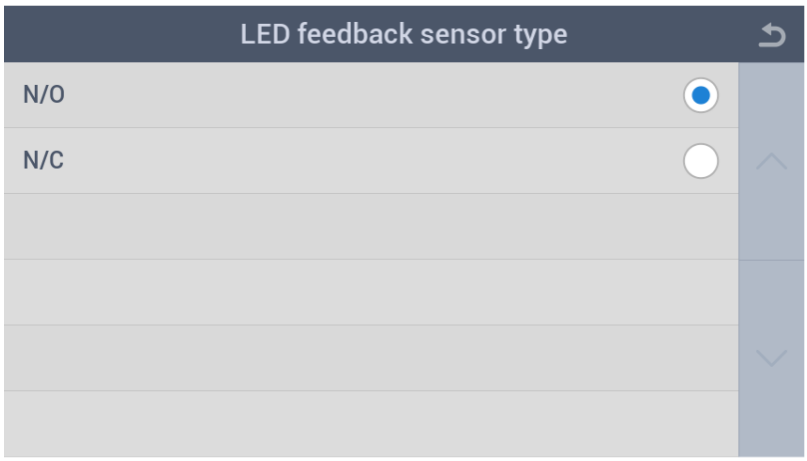
Name	Description
N/O	Normally Open
N/C	Normally Close

Door > LED feedback sensor



Name	Description
Not used	Select not to use LED feedback sensor
GPI1	Select to use GPI1 as LED feedback sensor
GPI2	Select to use GPI2 as LED feedback sensor
GPI3	Select to use GPI3 as LED feedback sensor
EFIO GPI1	Select to use EFIO GPI1 as RTE (Exit button)
EFIO GPI2	Select to use EFIO GPI2 as RTE (Exit button)

Door > LED feedback sensor type



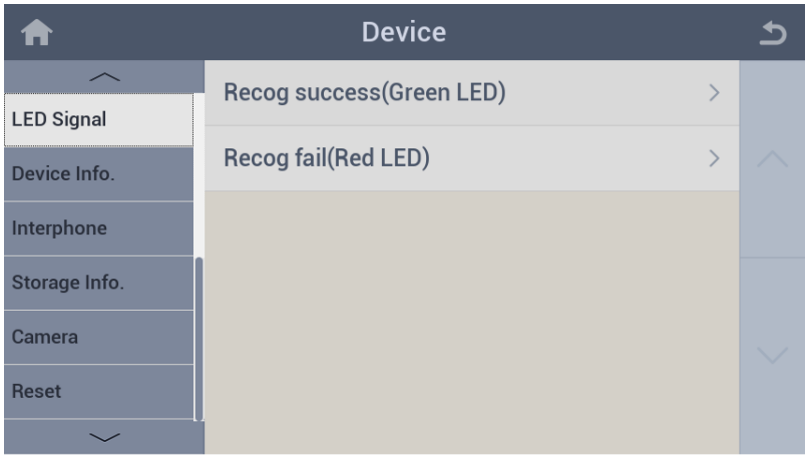
Select type of LED feedback sensor type.

Name	Description
N/O	Normally Open
N/C	Normally Close

A.1.6. LED Signal

LED Signal cause the EF-IO relays to work upon authentication to turn on LED light connected to the relays.

LED Signal assumes you have the EF-IO unit connected to EF-45NC through RS-485.

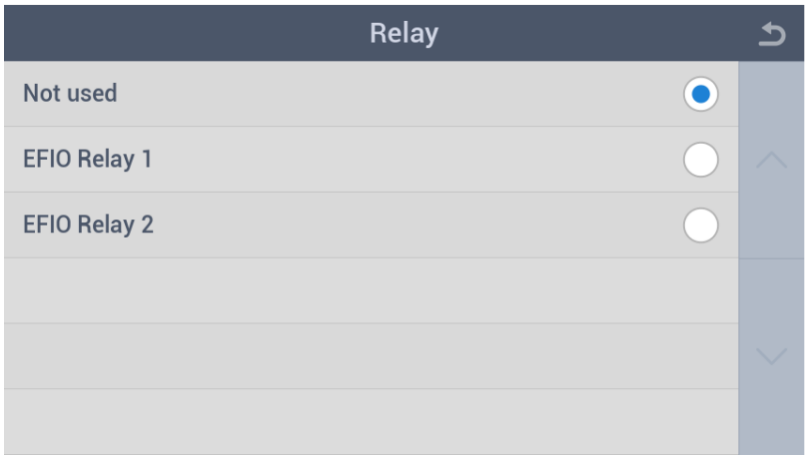


Name	Description
Recog success(Green LED)	Configures relay that work on recognition success
Recog fail(Red LED)	Configures relay that work on recognition fail

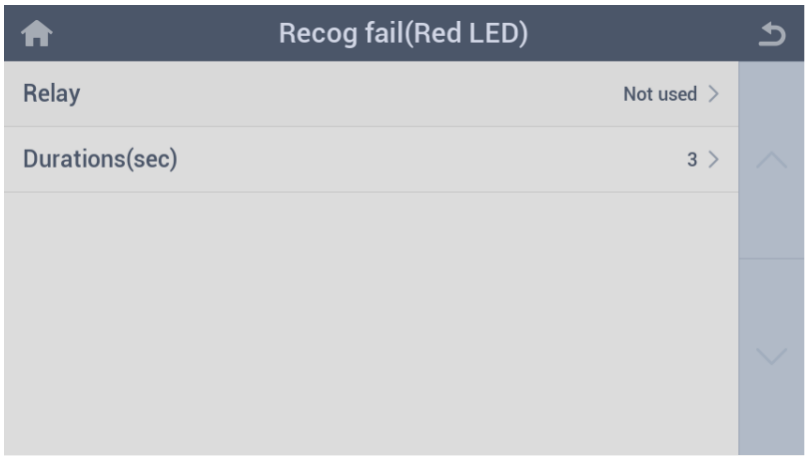
LED Signal > Recog success(Green LED)

Name	Description
Relay	Select relay to use
Duration(sec)	Set the time how long the LED signal lasts

LED Signal > Recog success(Green LED) > Relay

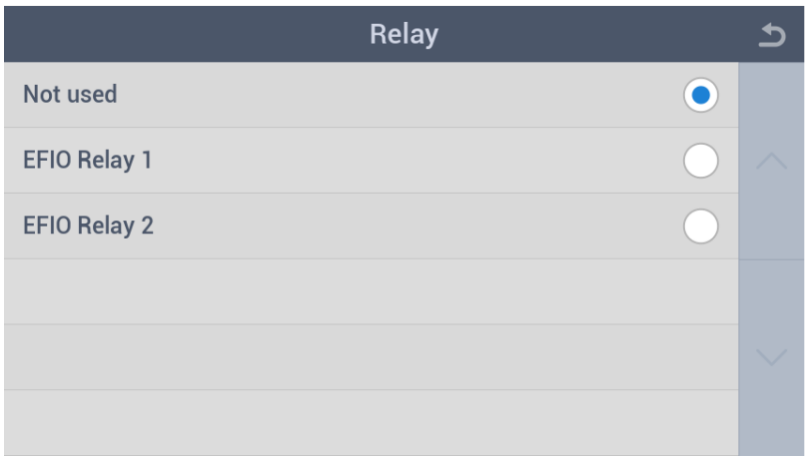


LED Signal > Recog failed(Red LED)

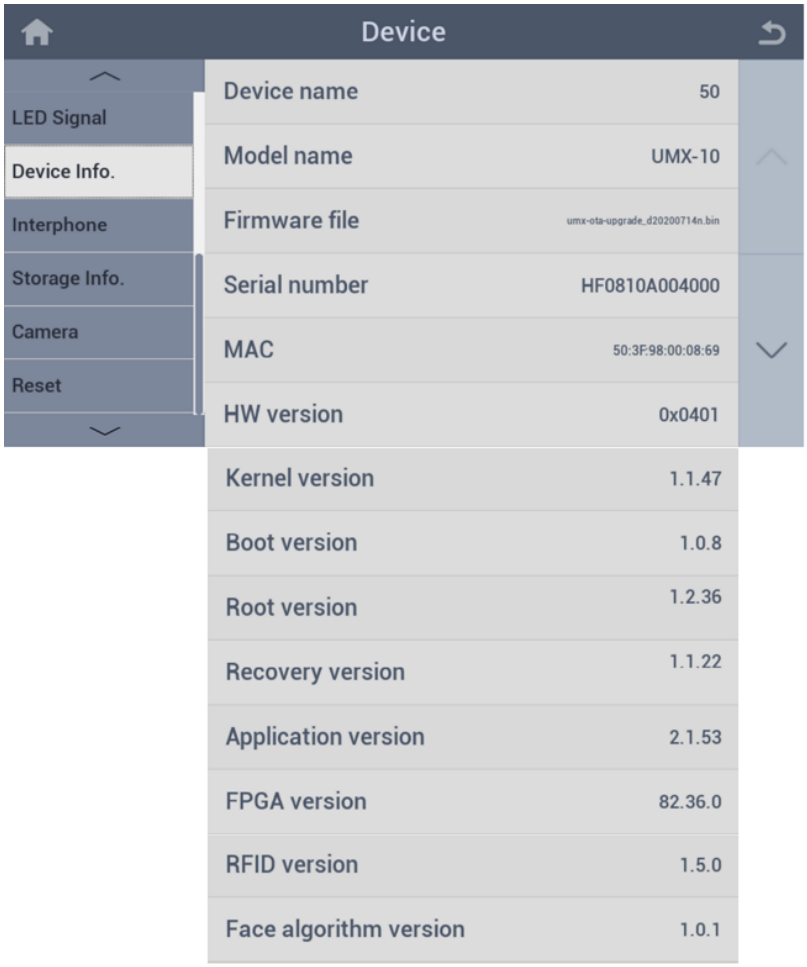


Name	Description
Relay	Select relay to use
Duration(sec)	Set the time how long the LED signal lasts

LED Signal > Recog failed(Red LED) > Relay



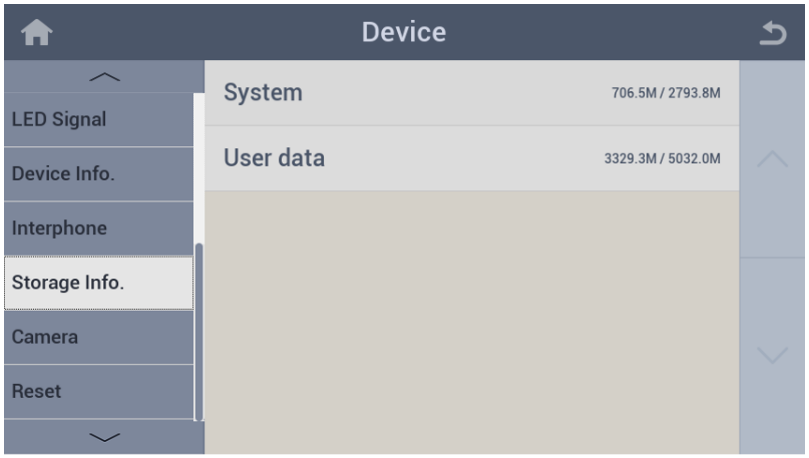
A.1.7. Device Info.



Name	Description
Device name	Device ID
Model name	Model name of this device
Firmware file	Version name of installed firmware (FW) file
Serial number	Identification number of this device
MAC	MAC address of this device
HW version	Revision number of hardware board
Kernel version	Revision number of kernel
Boot version	Revision number of boot loader
Root version	Revision number of root file system
Recovery version	Revision number of recovery firmware
Application version	Revision number of Launcher application
FPGA version	Revision number of Camera FPGA firmware
RFID version	Revision number of RFID firmware

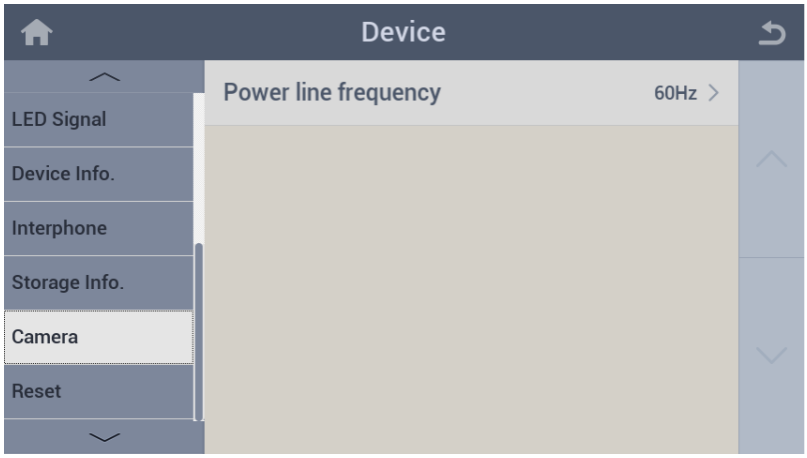
Name	Description
Face algorithm version	Revision number of Face algorithm

A.1.8. Storage Info.



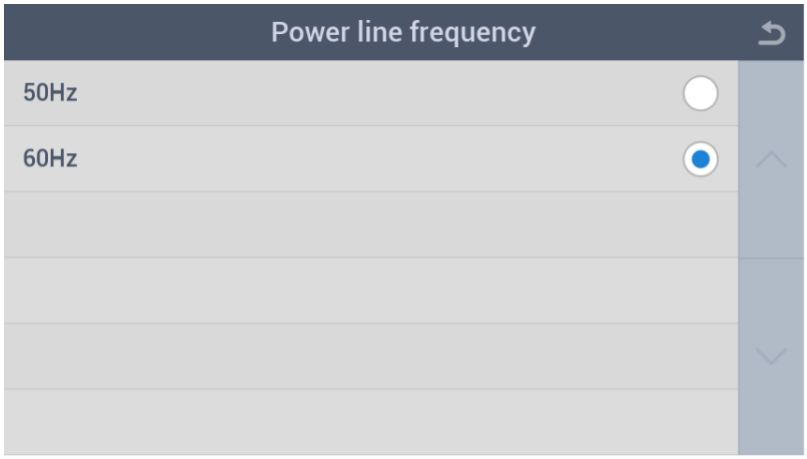
Name	Description
System	Memory capacity of system area
User data	Memory capacity of user area

A.1.9. Camera



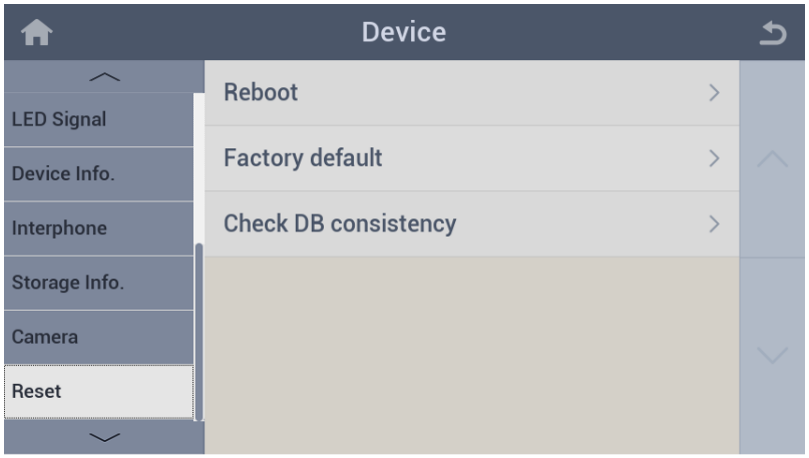
Name	Description
Power line frequency	Select power line frequency that supplying to device

Camera > Power Line Frequency



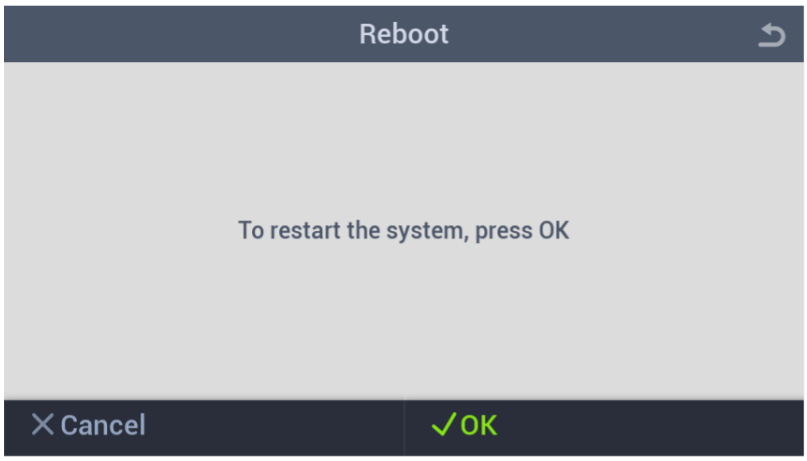
Name	Description
50Hz	Select power line frequency to 50Hz
60Hz	Select power line frequency to 60Hz

A.1.10. Reset



Name	Description
Reboot	Reboots device
Factory Default	Resets all configuration settings and/or deletes all user data
Check DB consistency	Checks and updates old DB for compatibility with new firmware manually

Reset > Reboot

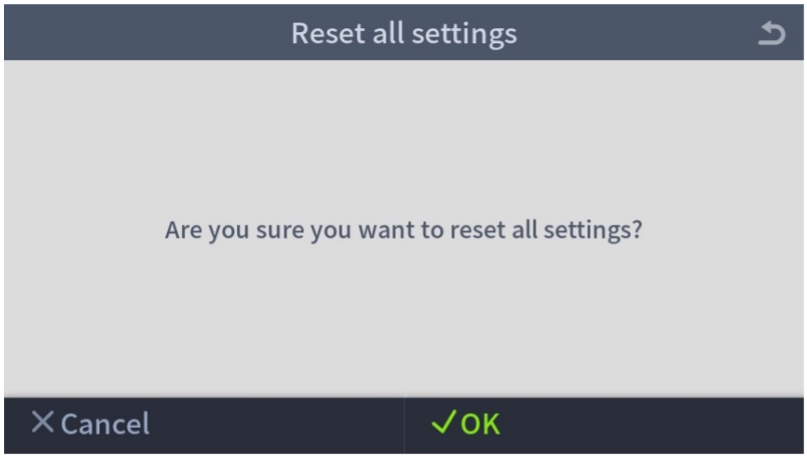


The main purpose of this command is that it is replicated in the EF-45NC SDK's host side application, which allows for device reboot from a management console on the network.

Reset > Factory Default

Name	Description
Reset all settings	Reset all configuration setting
Delete all data	Delete all user data
Delete all data and reset all settings	Reset all configuration settings and delete all user data

Reset > Factory Default > Reset All Settings

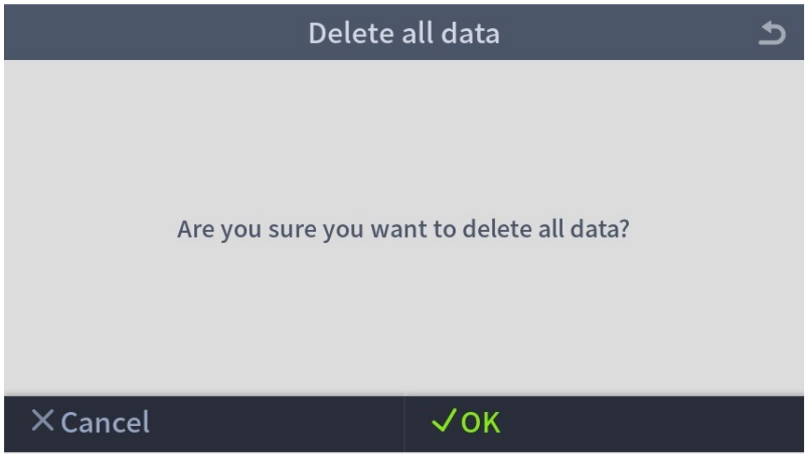


How to do the factory set by using reset button when the Settings menu is not accessible

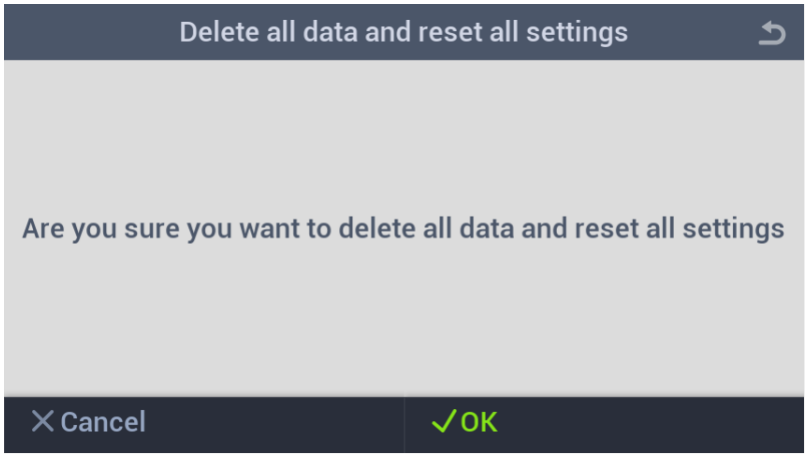
1. Find the factory reset button in the device's rear panel.

2. Press the button more than 2 secs, which will delete all the data and reset all the settings.
3. The device will reboot automatically.

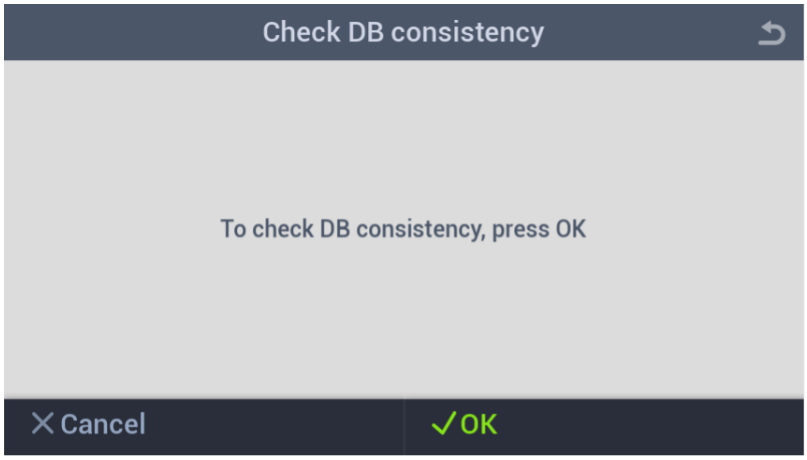
Reset > Factory Default > Delete All Data



Reset > Factory Default > Delete All Data and Reset All Settings



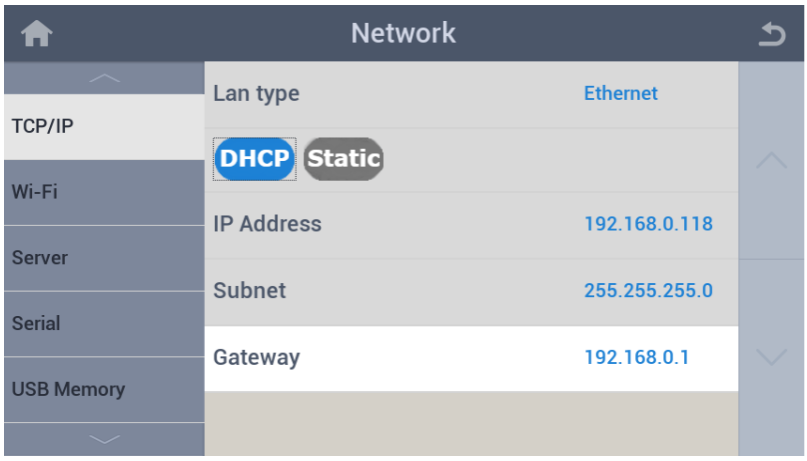
Reset > Check DB consistency



A.2. Network

Configure settings for IP and serial communication.

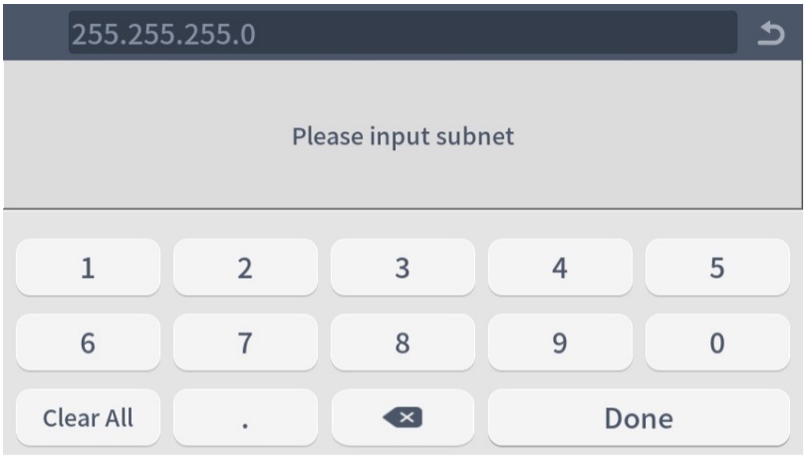
A.2.1. TCP/IP



Name	Description
LAN type	Show the LAN type
DHCP/Static	Select enable/disable DHCP mode
	When you will use Static mode, you should enter all necessary information: IP Address, Subnet, Gateway.
IP Address	Set static IP address
Subnet	Set static subnet mask
Gateway	Set static gateway IP address

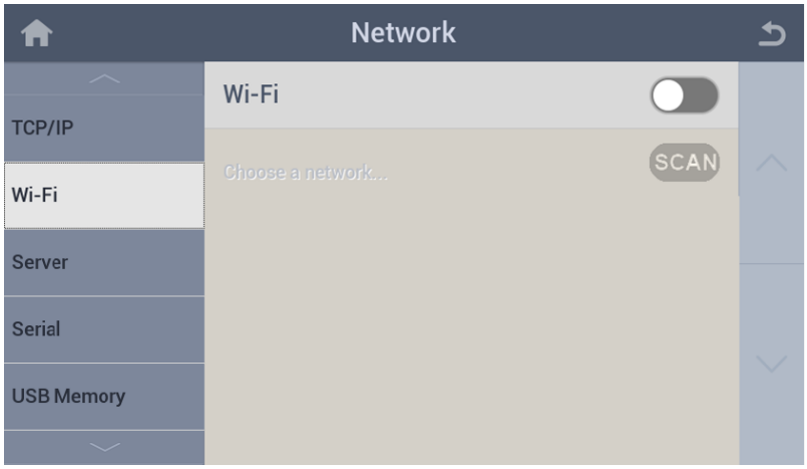
TCP/IP > IP Address

TCP/IP > Subnet



TCP/IP > Gateway

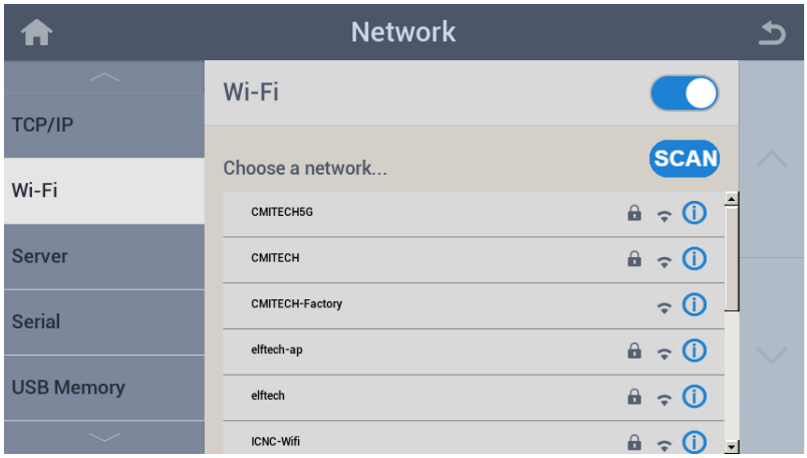
A.2.2. Wi-Fi



To enable WiFi function after plugging in USB WiFi adapter. Requires reboot of the system.

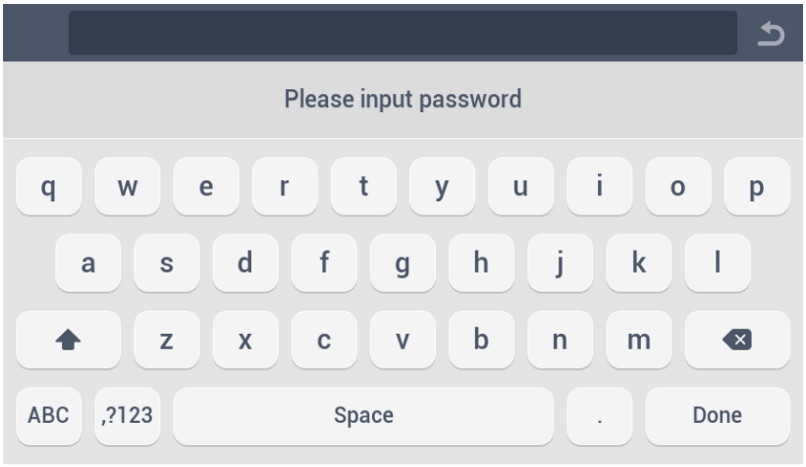
Only factory supported WiFi dongles are compatible. Please contact service@cmi-tech.com for more information.

Wi-Fi > WiFi Scanning



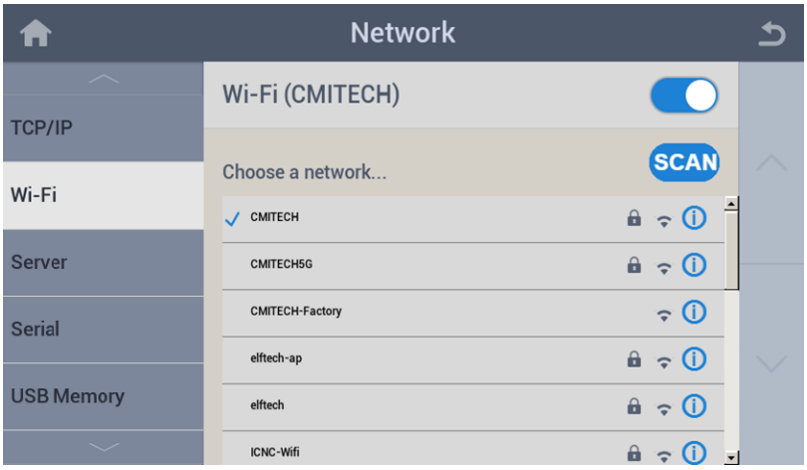
After Wi-Fi is enabled, system will search all Wi-Fi networks to present selections.

Wi-Fi > Enter the password

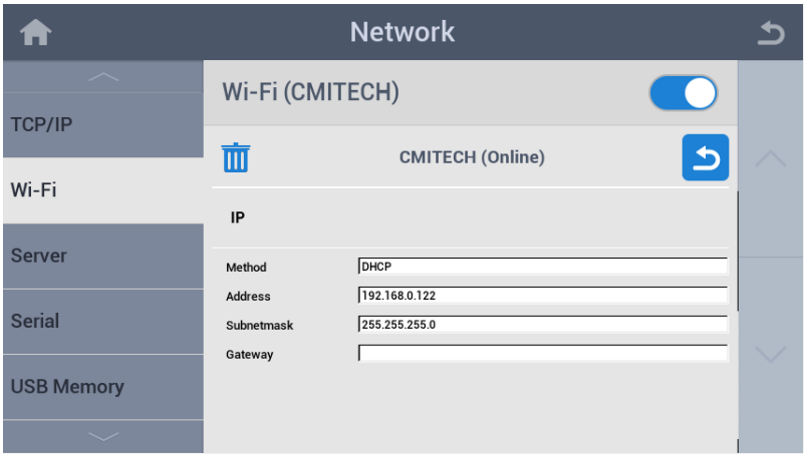


Enter the selected Wi-Fi password to connect. (It does not support all characters.)

Wi-Fi > Wi-Fi Selected

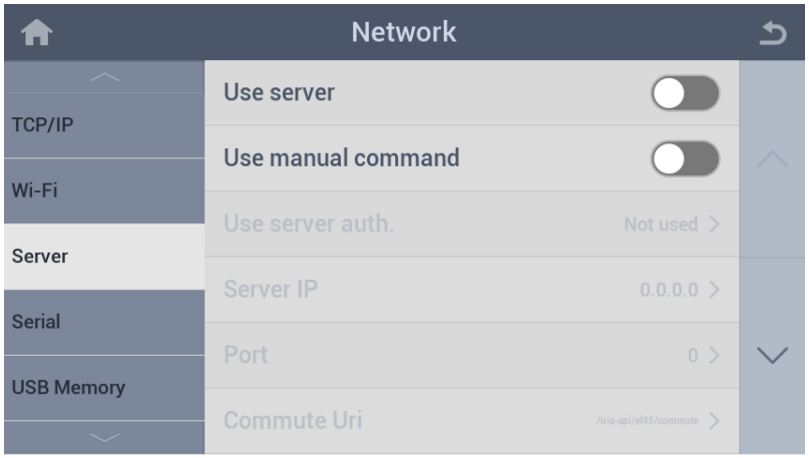


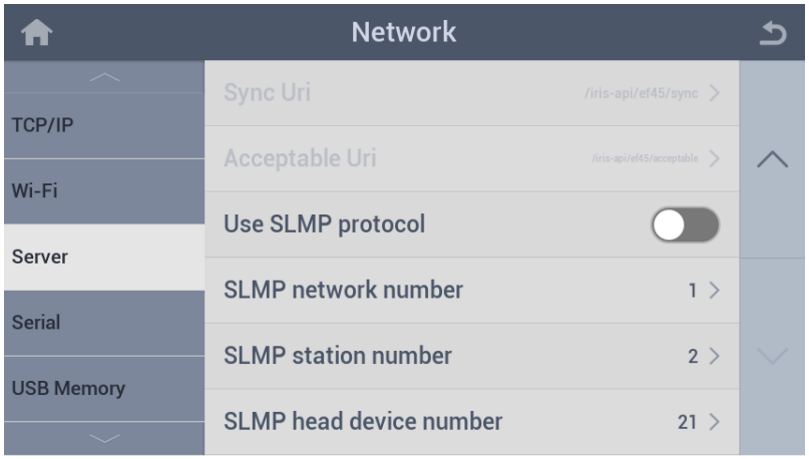
Wi-Fi > Selected Information



Connection information for selected Wi-Fi.

A.2.3. Server

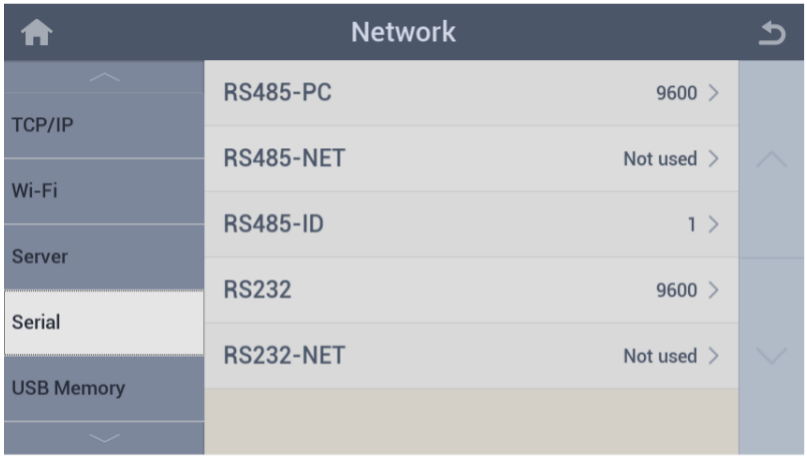




Set the server configuration for push dedicated data (e.g. event/log, image/template for server match) to network. If you want to use to this function, please contact service@cmi-tech.com

The SLMP settings are not intended for general purpose and only applicable to a specific network environment. They will not work even when enabled and configured. Thus, keep this option disabled as default.

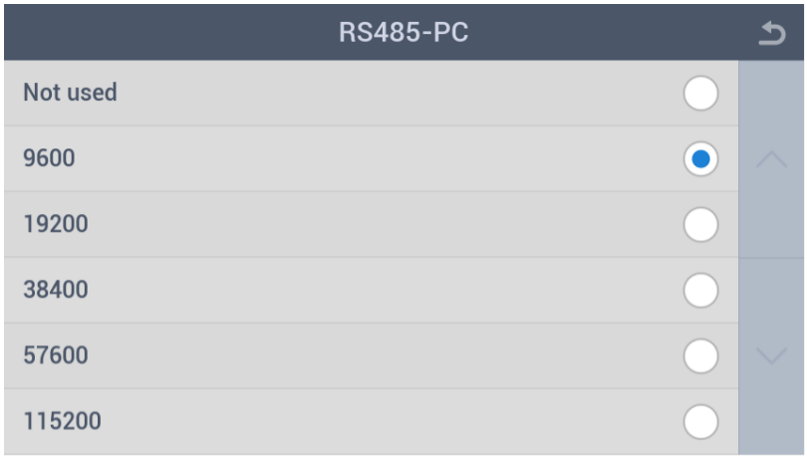
A.2.4. Serial



Name	Description
RS485-PC	Select a baud rate for RS485 (optional, on demand)
RS485-NET	Select an operating mode for RS485 (optional, on demand)
RS485-ID	Select device ID when the operating mode is SLAVE
RS232	Select a baud rate for RS232 (optional, on demand)
RS232-NET	Select an operating mode for RS232 (optional, on demand)

If you want to use these functions, please contact service@cmi-tech.com.

Serial > RS485-PC



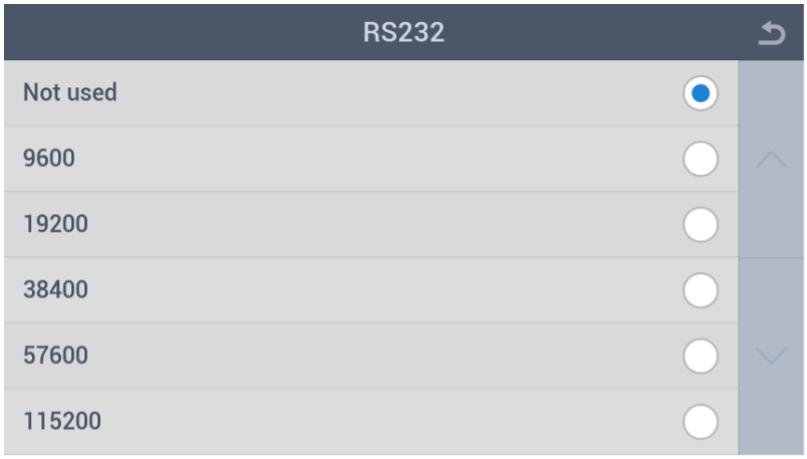
Select Serial Baud rate if you want to use RS485

Serial > RS485-NET

Name	Description
Not used	Disable RS485
NET-HOST	Set RS485 operating mode as host
NET-SLAVE	Set RS485 operating mode as slave
NET-OSDP	
NET-EFIO	
NET-TOUCH	Select a device type connected to RS485
NET-JEI	
NET-EFIO ELEVATOR	

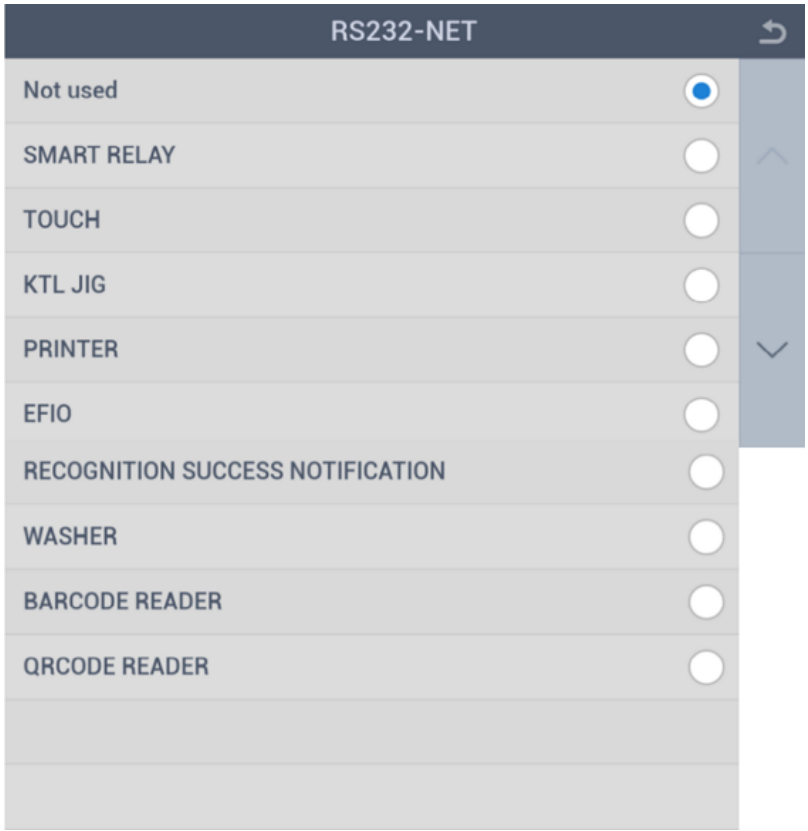
Serial > RS485-ID

Serial > RS232



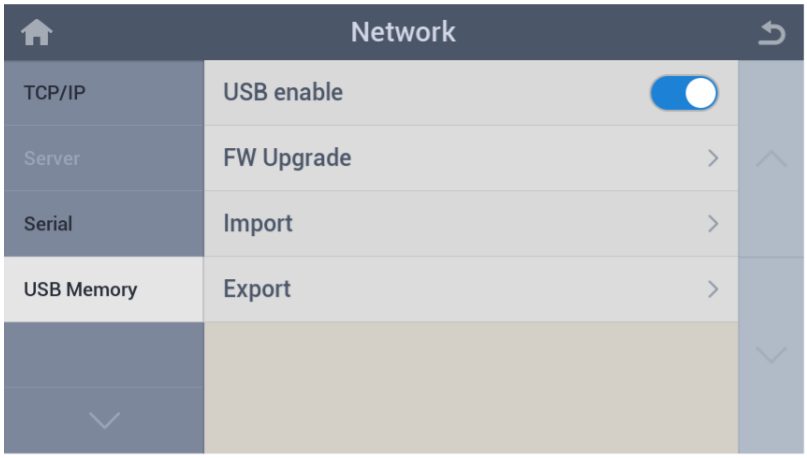
Select Baud rate if you want to use RS232.

Serial > RS232-NET

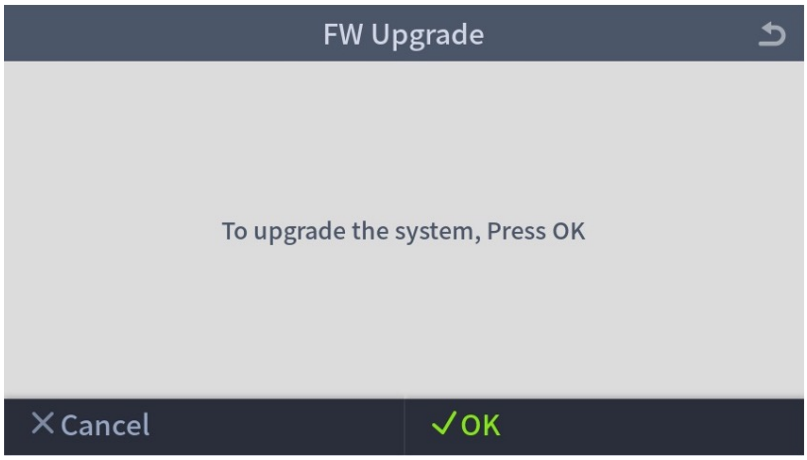


Select a device type connected to RS232.

A.2.5. USB Memory

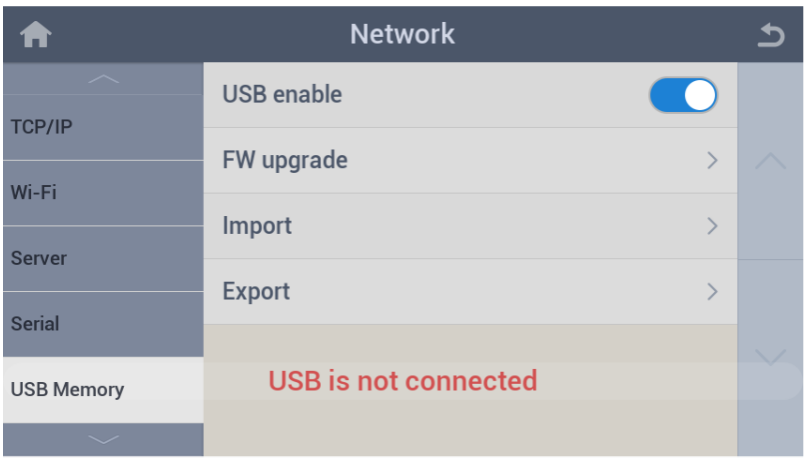


USB Memory > FW Upgrade

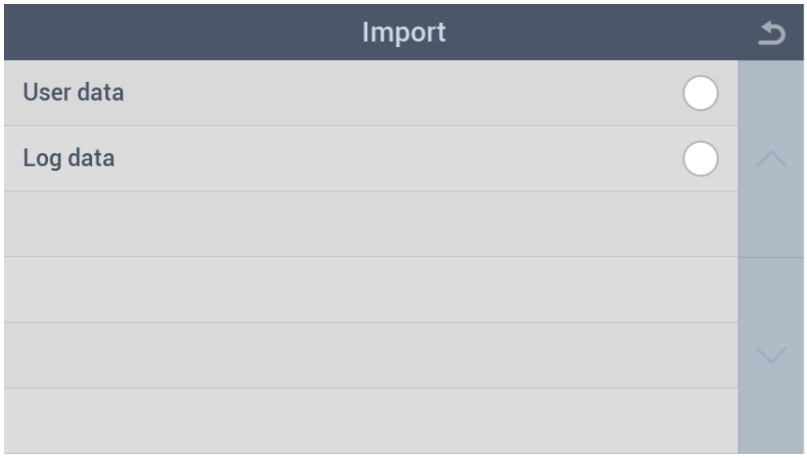


Initiate FW Upgrade by tapping on ✓ **OK** button on bottom right.

If the FW file (new firmware / operating libraries) does not exist in USB memory drive, or FW file is same or older version than what is on system, a message will appear as shown below.

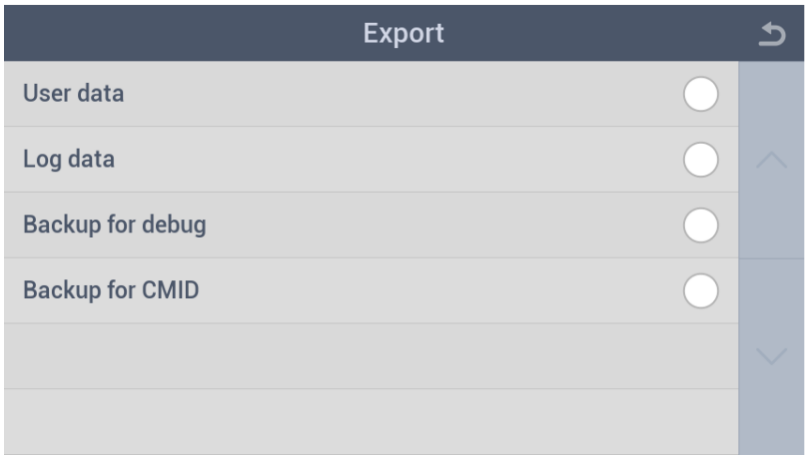


USB Memory > Import



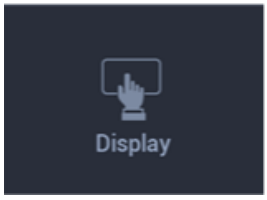
Name	Description
User data	Restore user enroll data from USB memory
Log data	Restore log data from USB memory

USB Memory > Export



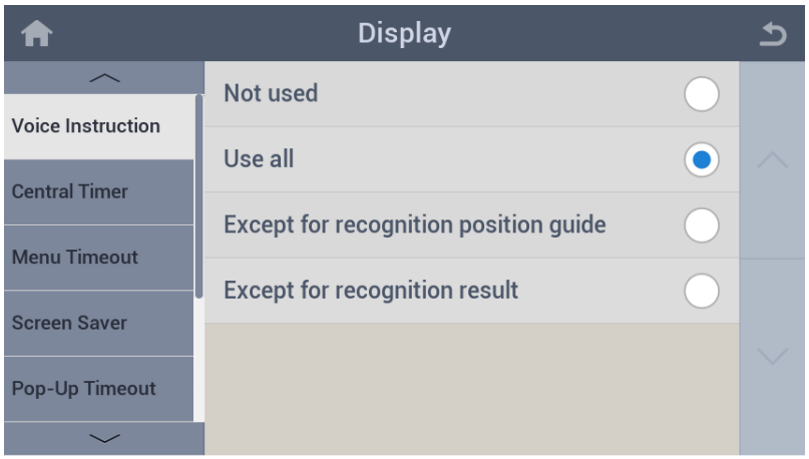
Name	Description
User data	Backup user enroll data to USB memory
Log data	Backup log data and copies debug files to USB memory
Backup for debug	Backup debug files to USB memory
Backup for CMID	Backup user data and log data files for CMID to USB memory

A.3. Display



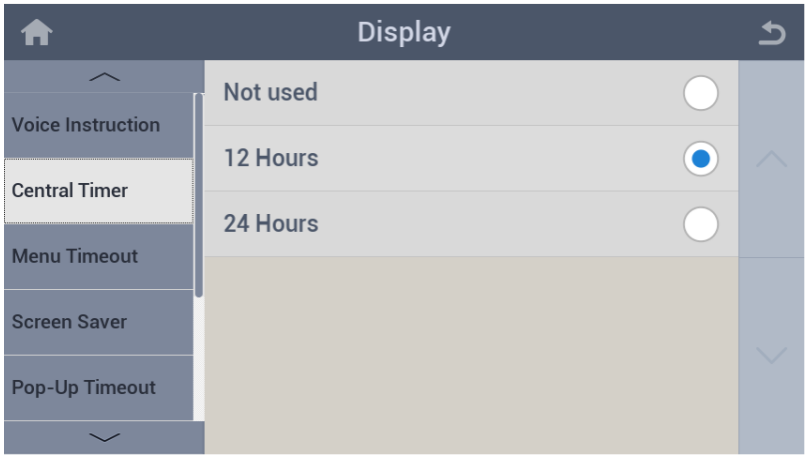
Configure settings for screen display.

A.3.1. Voice Instruction



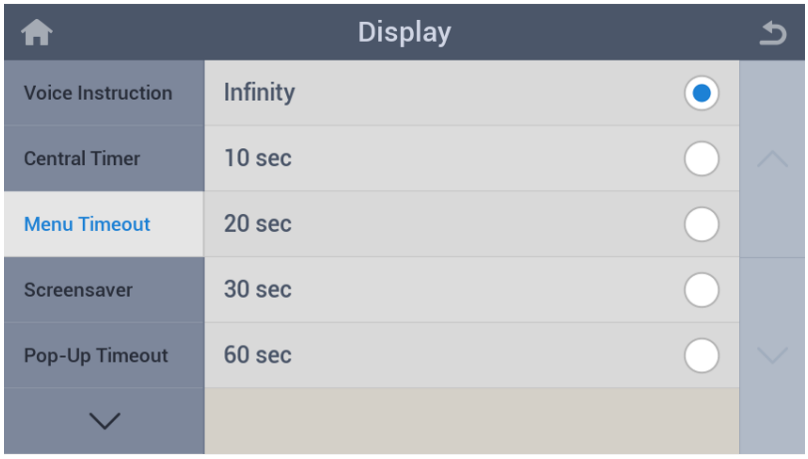
Name	Description
Not used	Select to disable all voice instructions
Use all	Select to enable all voice instructions
Except for recognition position guide	Select to disable voice position guide for recognition only
Except for recognition result	Select to disable recognition result voice only

A.3.2. Central Timer



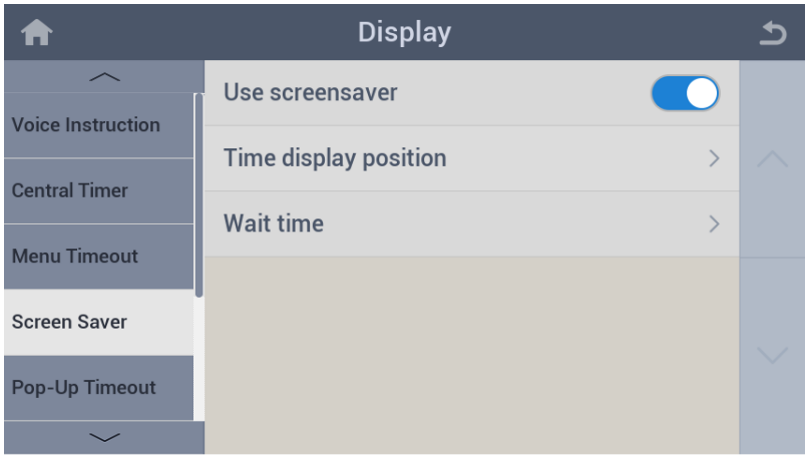
Name	Description
Not Used	Select to disable Central Timer
12 Hours	Select to enable Central Timer as 12-hour clock format
24 Hours	Select to enable Central Timer as 24-hour clock format

A.3.3. Menu Timeout



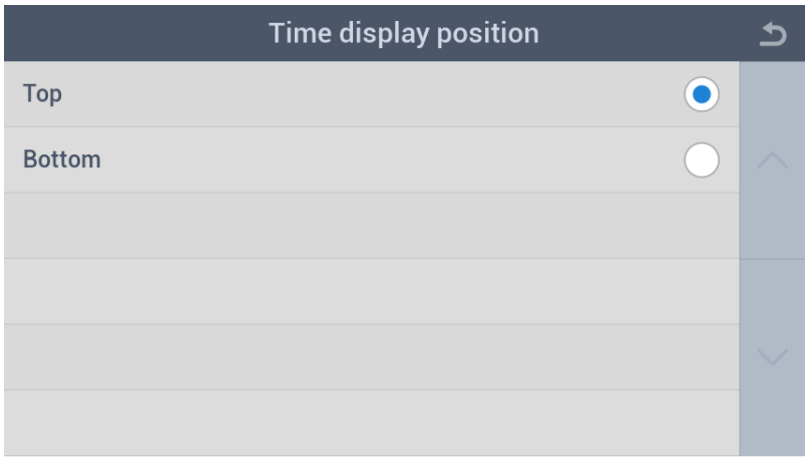
Name	Description
Menu Timeout	Set timeout for auto exit from menu display after leaving it untouched

A.3.4. Screensaver

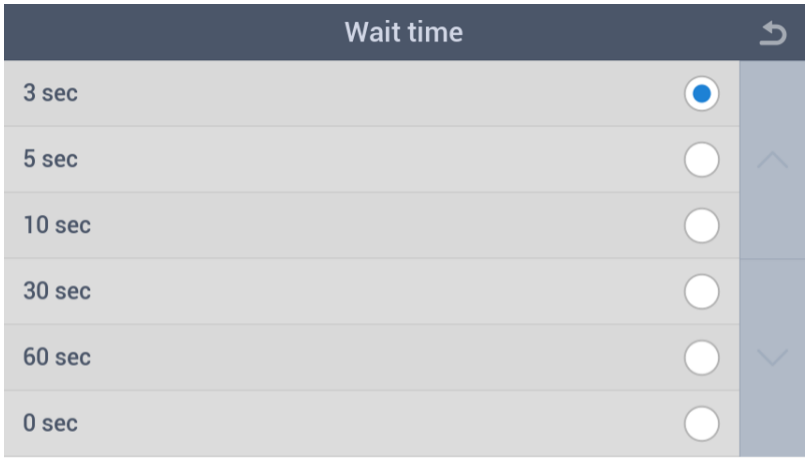


Name	Description
User screensaver	Enable/Disable screensaver
Time display position	Select Time display position in the screensaver
Wait time	Set the amount of idle time that must elapse before the screensaver is activated

Screensaver > Time display position



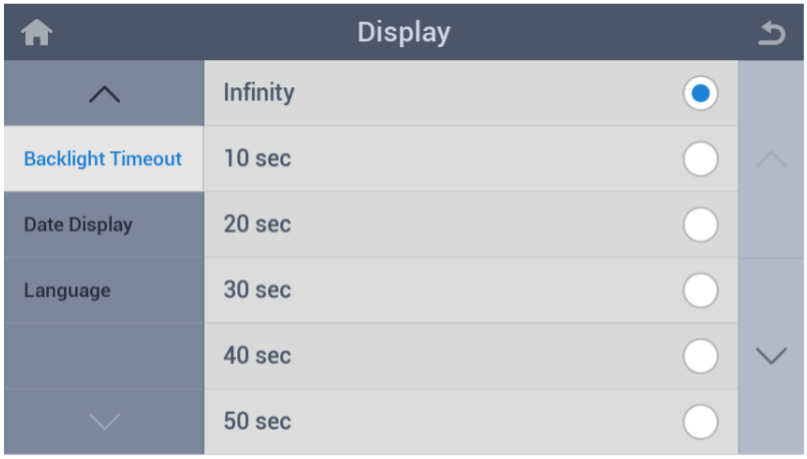
Screensaver > Wait time



A.3.5. Pop-Up Timeout

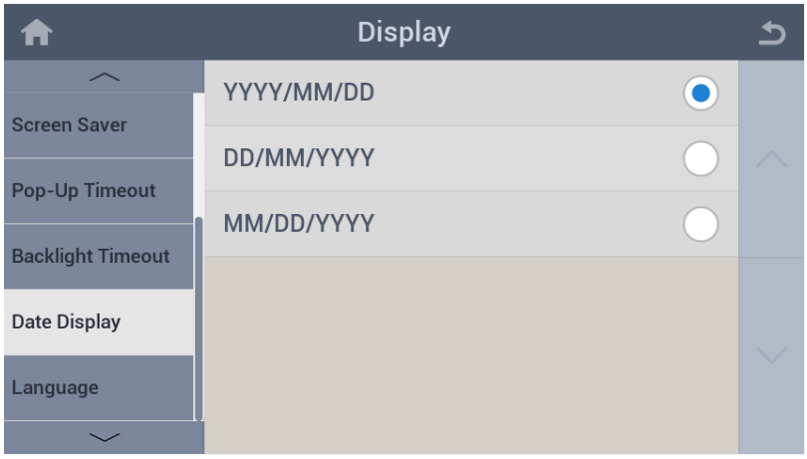
Name	Description
Pop-Up Timeout	Set pop-up message window (recognition complete etc.) display duration

A.3.6. Backlight Timeout



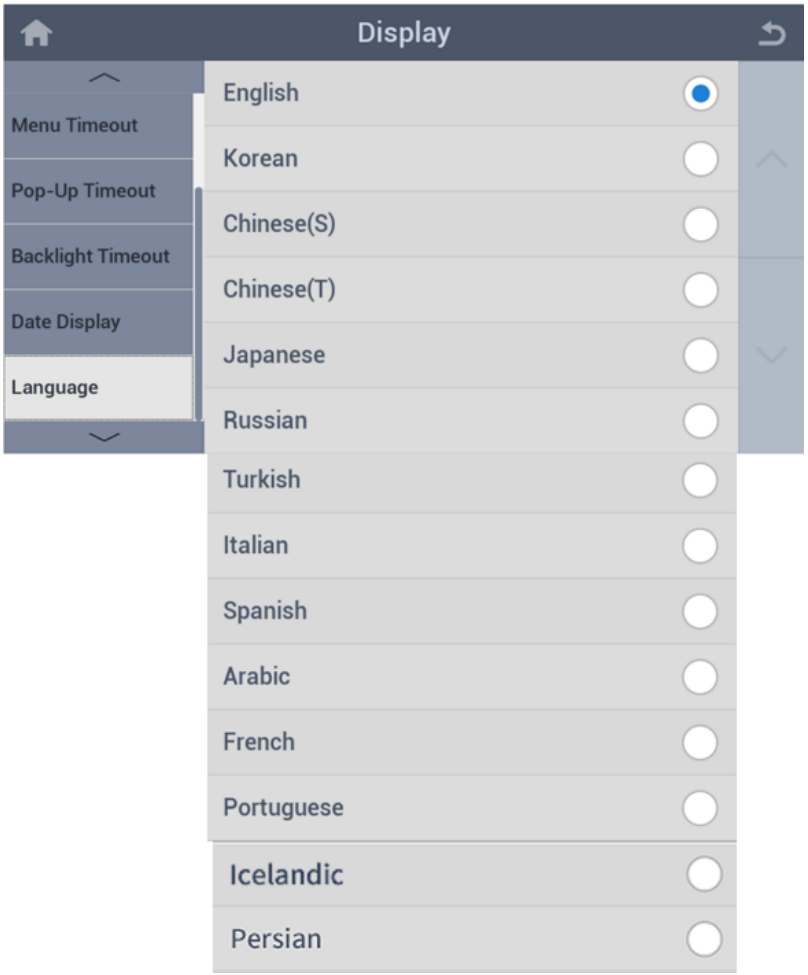
Name	Description
Backlight Timeout	Set timeout for auto off LCD backlight after leaving unused

A.3.7. Date Display



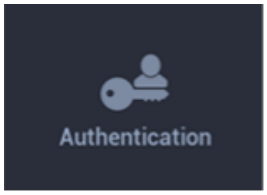
Name	Description
YYYY/MM/DD	Select year/month/day display mode
DD/MM/YYYY	Select day/month/year display mode
DD/MM/YYYY	Select day/month/year display mode

A.3.8. Language



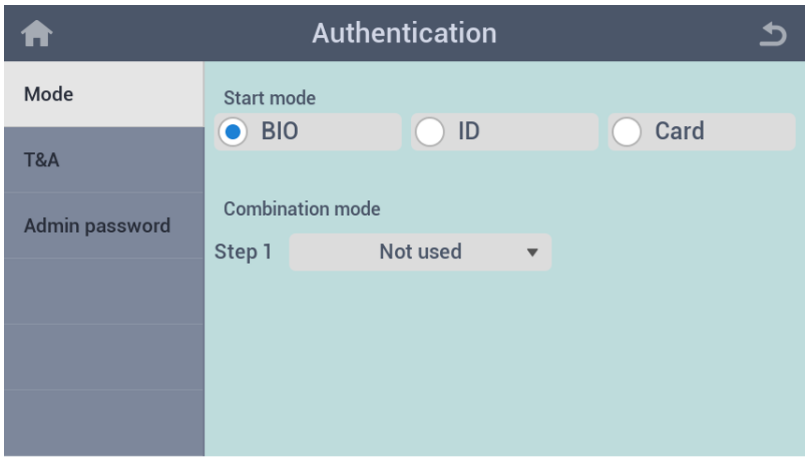
Name	Description
Language	Select a language to use (English, Korean, Chinese(S), Chinese(T), Japanese, Russian, Turkish, Spanish, Italian, Arabic, French, Portuguese, Icelandic, Persian)

A.4. Authentication



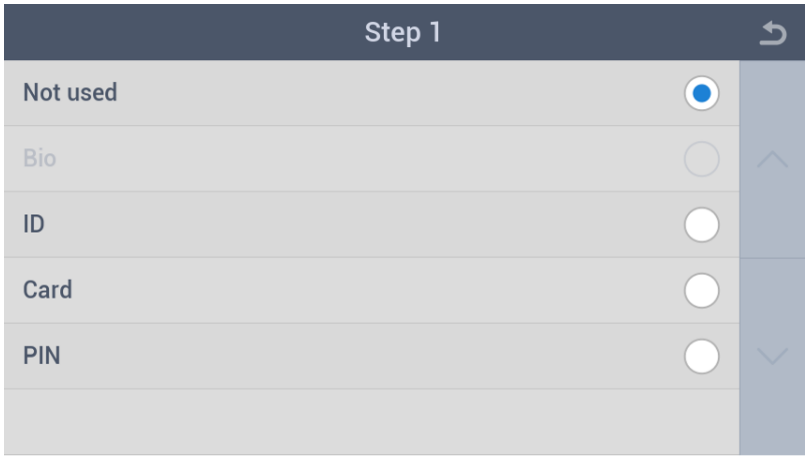
Configure settings for authentication method and Time & Attendance mode.

A.4.1. Mode



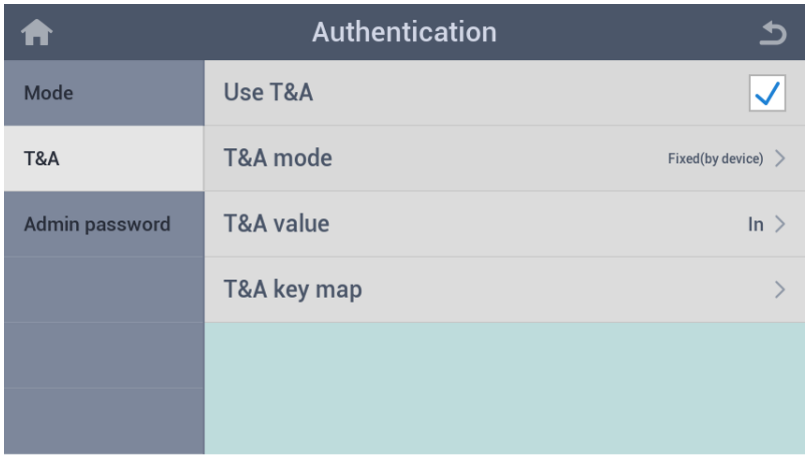
Name	Description
Start mode	Select the initial (basic) recognition method
Combination mode	Select a combination (additional) recognition method if necessary

Mode > Combination Mode (Step 1)



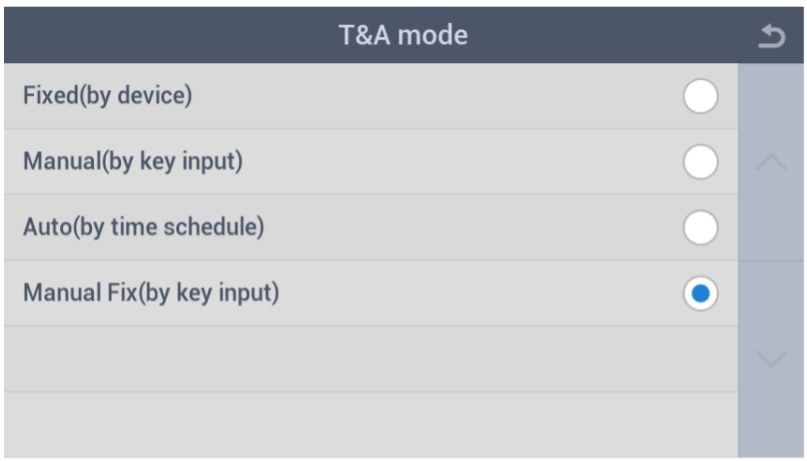
Select a combination (additional) recognition method.

A.4.2. T&A



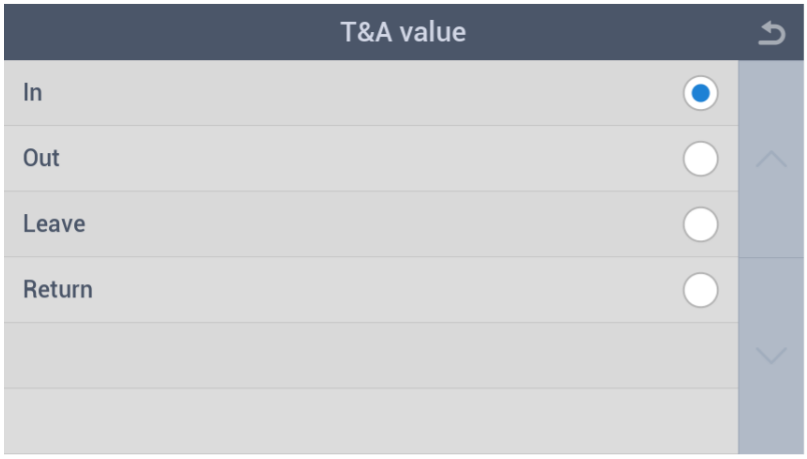
Name	Description
Use T&A	Select enable/disable for T&A usage mode
T&A mode	Select T&A mode (Attendance etc.)
T&A value	Select a T&A value: In, Out, Leave, Return
	Enabled when the T&A mode is set to “Fixed (by device)” or “Manual Fix (by key input)”
T&A order	Select when to do T&A check
	Enabled when the T&A mode is set to “Manual (by key input)”
T&A key map	Select a T&A value for each Function key

T&A > T&A Mode



Name	Description
Fixed (by device)	When selected, authentication is available only with the fixed T&A event. You can define a fixed T&A event in T&A value menu.
Manual (by key input)	When selected, you can press a Function key that is assigned to a T&A event you want. The selected T&A event is released after authentication.
Auto (by time schedule)	When selected, the pre-defined T&A event will be automatically applied according to the specified time period which is set within device.
Manual Fix (by key input)	**Manual Fix** works like **Manual**. However, in **Manual Fix** mode, once a T&A event is selected, the event is kept until another T&A event is selected.

T&A > T&A value

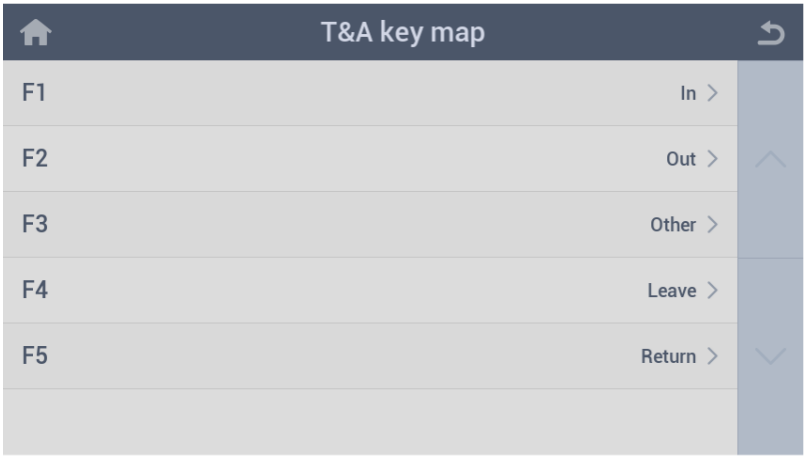


The T&A value menu appears when you select “Fixed (by device)” or “Manual Fix (by key input)” as a T&A mode.

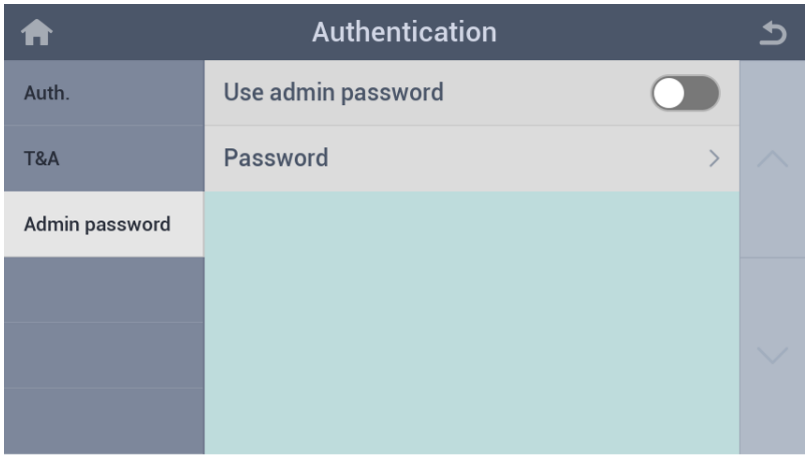
T&A > T&A order

The T&A order menu appears when you select “Manual (by key input)” as a T&A mode.

T&A > T&A key map

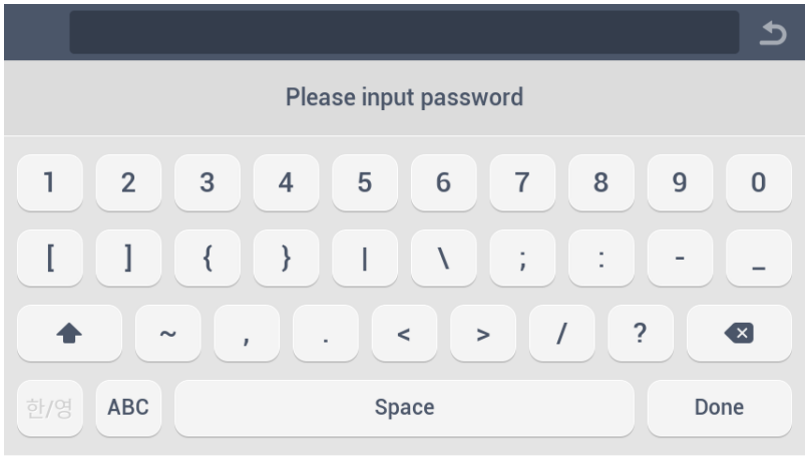


A.4.3. Admin password



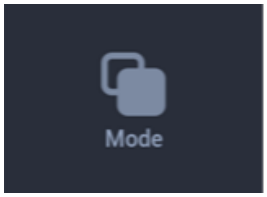
Name	Description
Use admin password	Enable/Disable admin password usage
Password	Set admin password

Admin password > Password



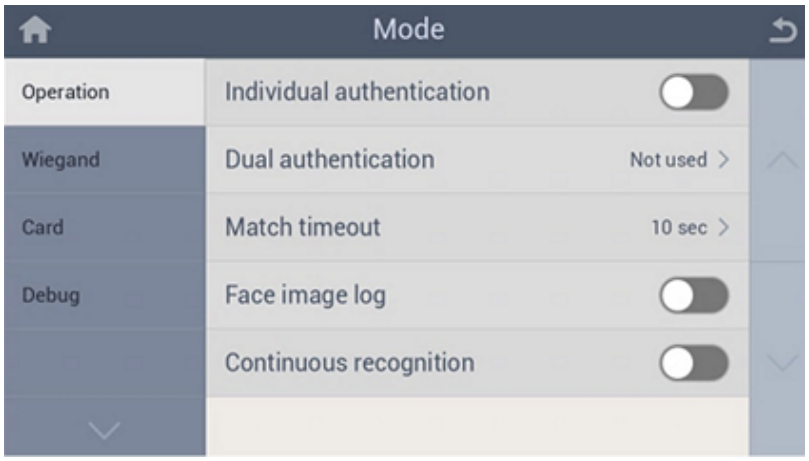
When you enable and set the admin password, you need to press the ADMIN button to input the password before entering User or Settings menu.

A.5. Mode



Configure settings for recognition operations.

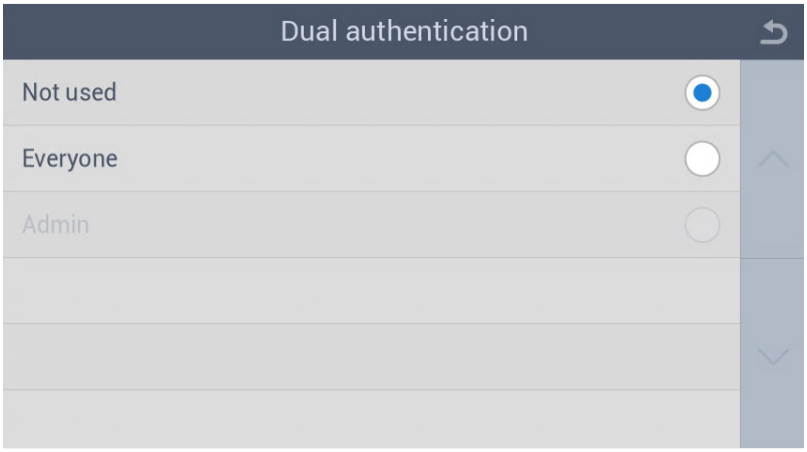
A.5.1. Operation



Name	Description
Individual authentication	Enable/disable for permission of individual authentication
	• If enabled, the authentication mode of the user will be determined by Individual mode selection in the **User** setting. • If disabled, the authentication mode will be determined by the global authentication mode settings at **Settings** > **Authentication** > **Mode**.
Dual authentication	Select a dual authentication method (simultaneous 2 persons)
	Currently, it works only when “Everyone” selected.
Match timeout	Set a recognition trying timeout

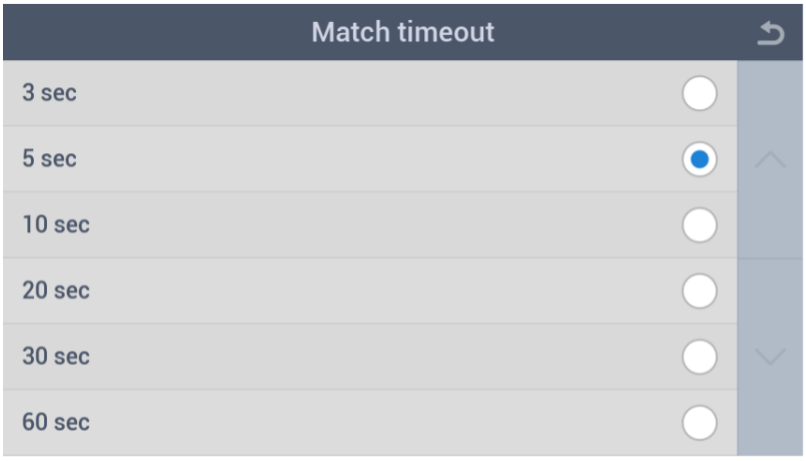
Name	Description
Face image log	Select to include face image file in the log.
	With this option disabled, user's face is not displayed on recognition result screen.
Continuous recognition	Enable/Disable continuous recognition mode
	When enabled, the system does not return to the home screen after each recognition.

Operation > Dual Authentication



When selected, Dual authentication will apply to "Everyone". "Admin" option is under development.

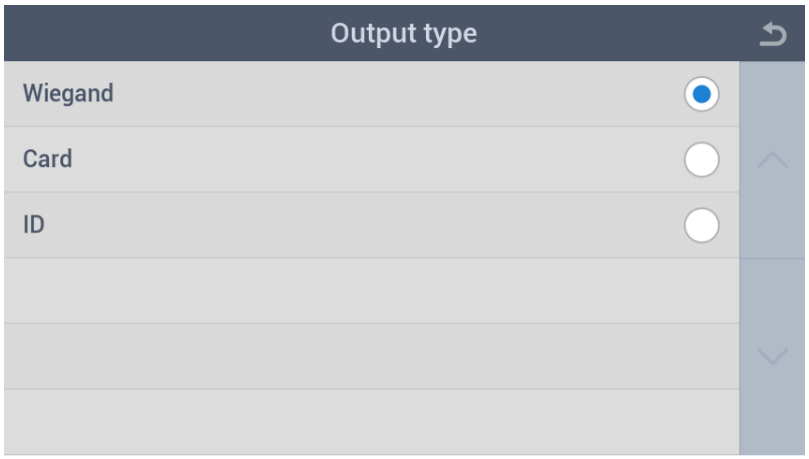
Operation > Match Timeout



A.5.2. Wiegand

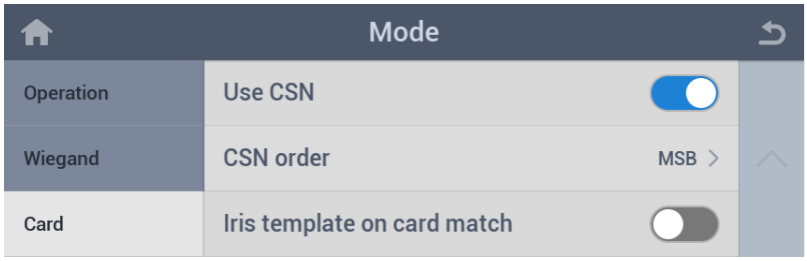
Name	Description
Output type	Select Wiegand Output type

Wiegand > Output type



Name	Description
Wiegand	Send customized Wiegand data out
Card	Send Card data out
ID	Send User ID out

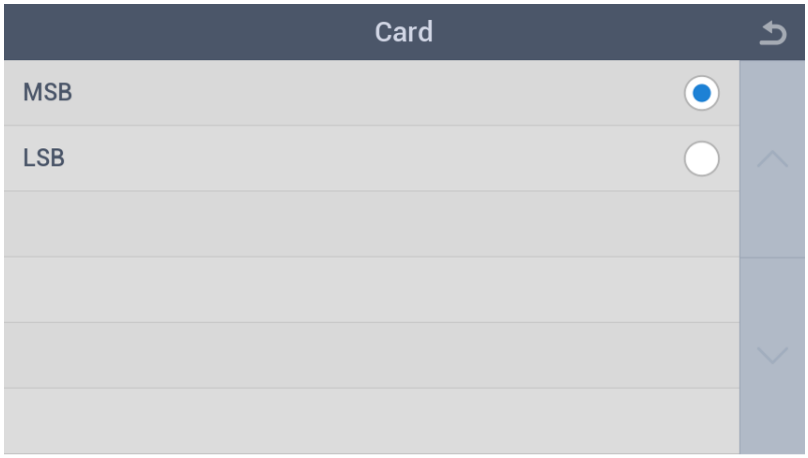
A.5.3. Card



Name	Description
Use CSN	Enable to read card CSN, Disable to read card memory data written by user
CSN order	Select Card CSN read order
Iris template on card match	Enable to use TOC (Template-on-card)

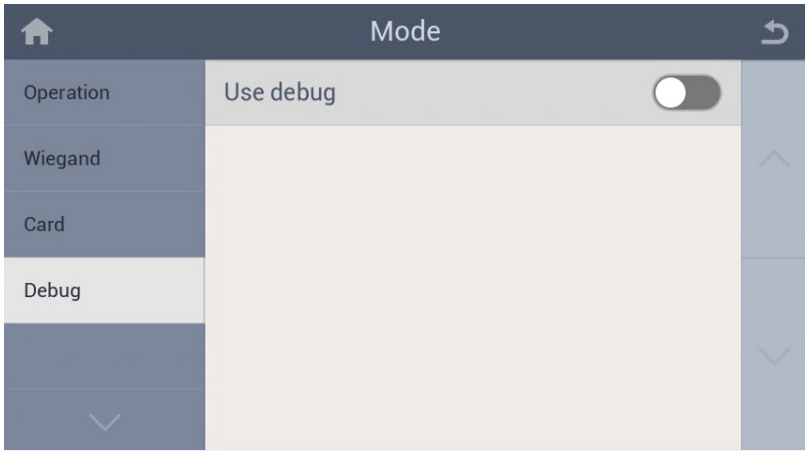
Only Mifare DESfire EV1 card is supported currently. For the compatible RFID card reader and whether your device supports TOC, contact us at sales@cmi-tech.com.

Card > CSN order



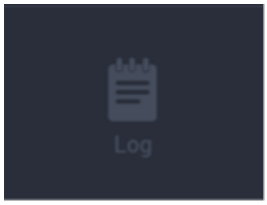
Name	Description
MSB	Select to read CSN's most significant bit first (Reverse)
LSB	Select to read CSN's least significant bit first (Forward)

A.5.4. Debug



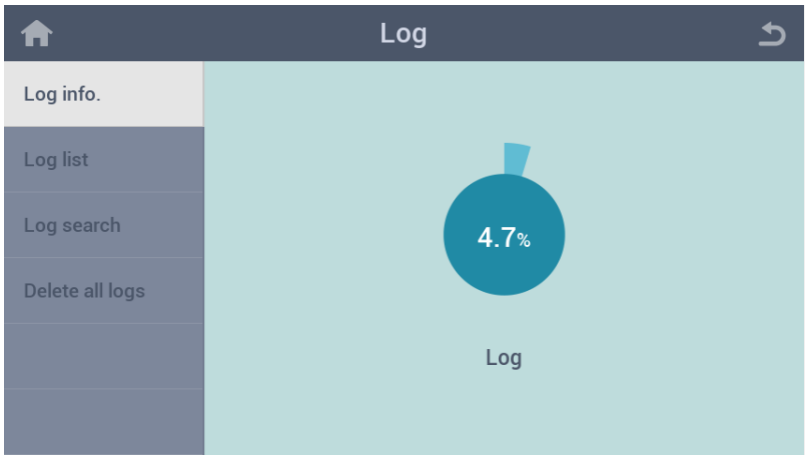
Name	Description
Use debug	Select Debug mode enable/disable (captures image stream for off-line analysis)

A.6. Log



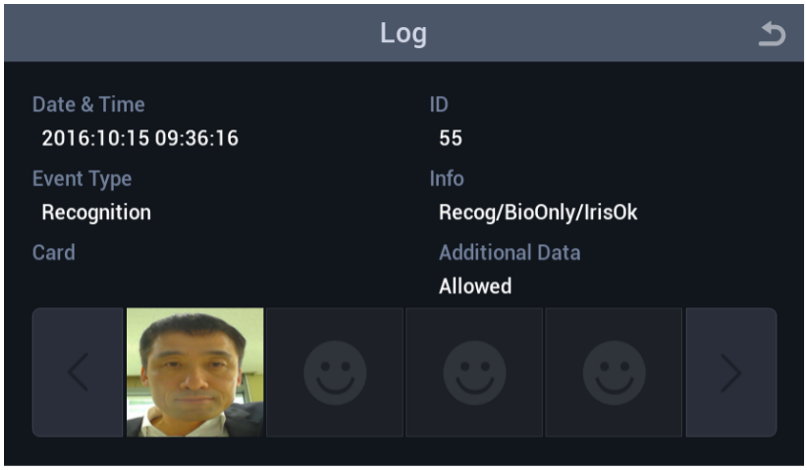
View information of saved log and log search viewer.

A.6.1. Log info



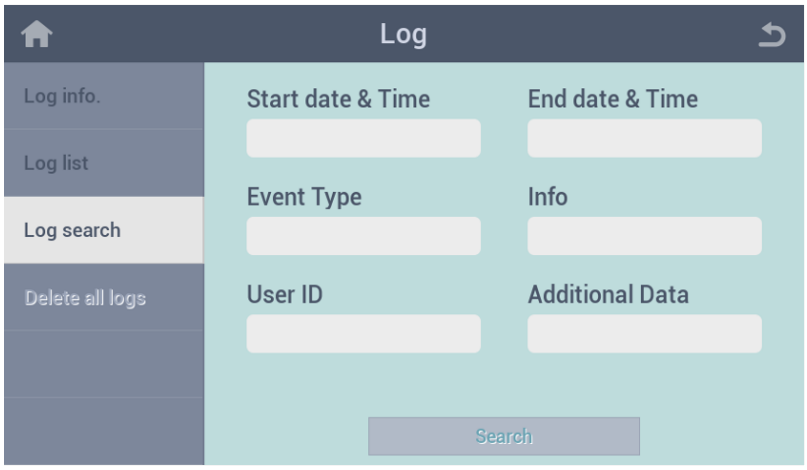
A.6.2. Log list

Log list information

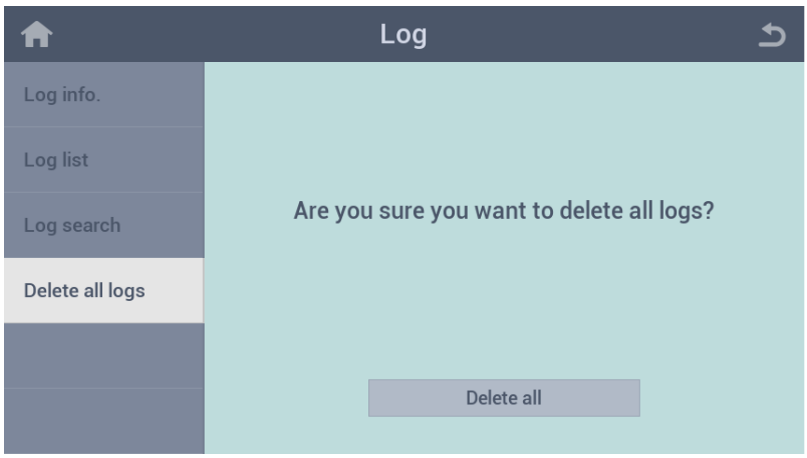


If you select the log list, you can find information like above.

A.6.3. Log search



A.6.4. Delete all logs

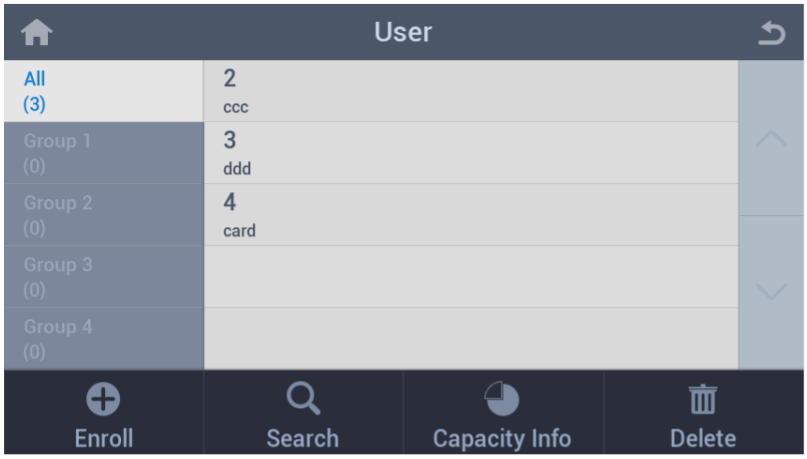


If you want to delete all the logs then select Delete all tab.

Appendix B: User Menu

This appendix gives the details about **User** menus of EF-45NC device that appears when you press the **User** button on the main screen.

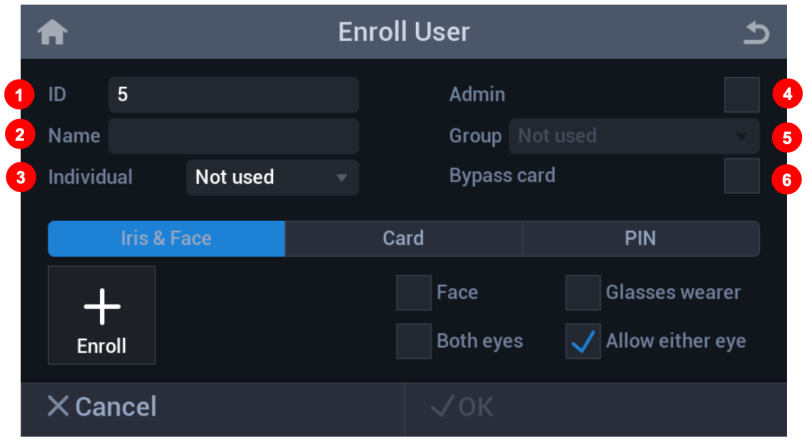
Tap the **User** icon in Home screen.



Name	Description
User list	Displays the registered user lists in All and Group 1, 2, 3, 4
Enroll button	Switch to enroll process
Search button	Switch to search process
Capacity Info button	Shows the used memory percentage
Delete button	Switch to delete process

B.1. Enroll

Tap the **Enroll** button to enroll a new user.

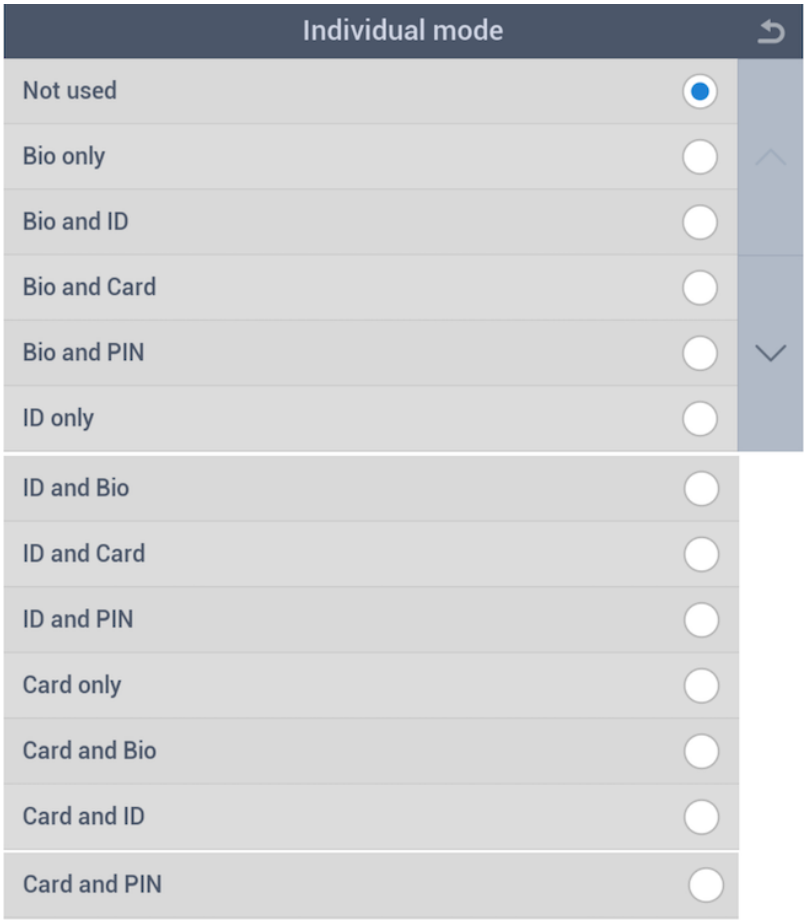


Enroll User Screen

No.	Name	Description
1	ID	Created a user ID number automatically or input manually
2	Name	Input user name manually
3	Individual	Set user individual authentication mode if necessary
4	Admin	Can make a user administrator or not
5	Group	Can make a user belong to a group
6	Bypass Card	Can register a user who holding bypass card (highest priority card)

B.1.1. Name

B.1.2. Individual



Select an individual authentication mode.

B.1.3. Admin

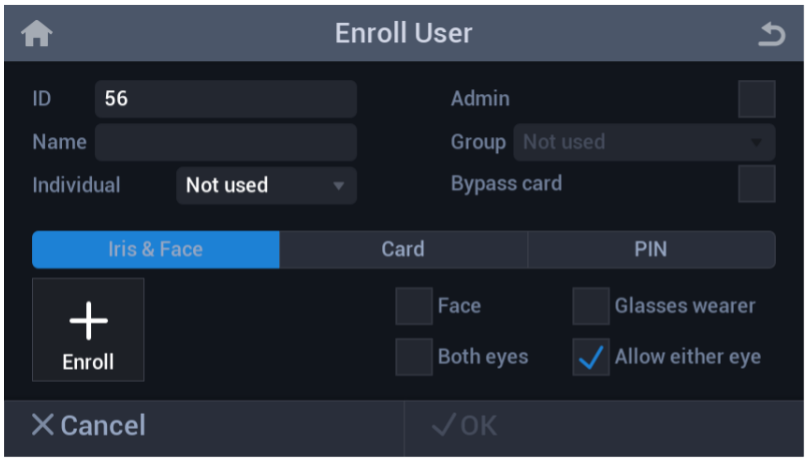
Set this user to be main Administrator to login the Settings and User.

After setting main Administrator login, only this Administrator can access the Settings and User functions.

B.1.4. Group

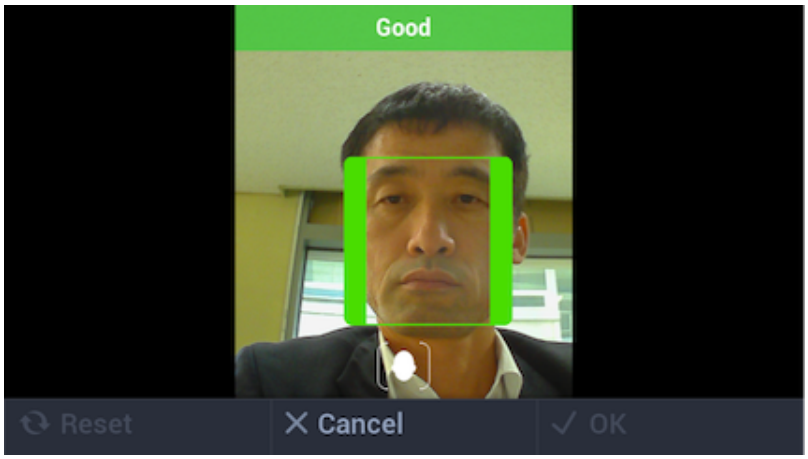
This function is under development.

B.1.5. Iris & Face Enrollment Process



Name	Description
Iris & Face tab	Selection changes tab to blue color, Bio select check boxes are shown
Face	Select box for face image capture
Glasses wearer	Select box to change enrollment process, instructing users to take glasses off
Both eyes	Select box for “both eyes” Iris mode
Either eye	Select box for “either eye” Iris mode
Enroll (+) button	Switch to enroll process

Iris & Face Capture Process > Face Capture (far face)

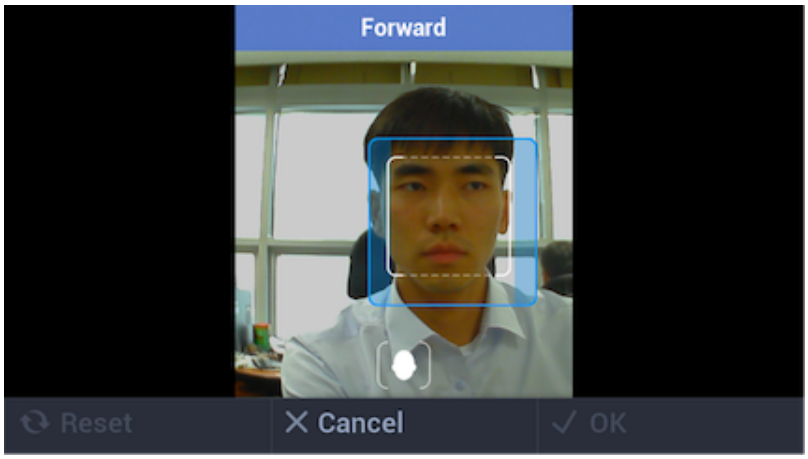


Switch to Iris Capture stage after good face image acquisition.

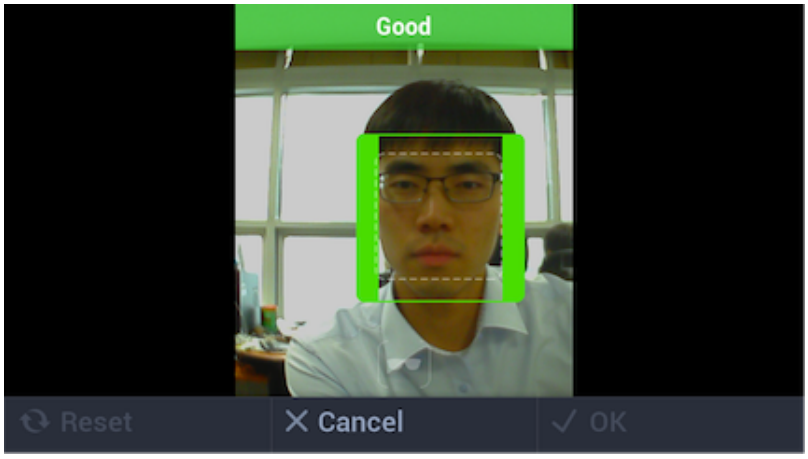
Only operational if “Combined Face and Iris” mode is active.

Name	Description
Color Overlay	BLUE means too far GREEN means OK RED means too close.

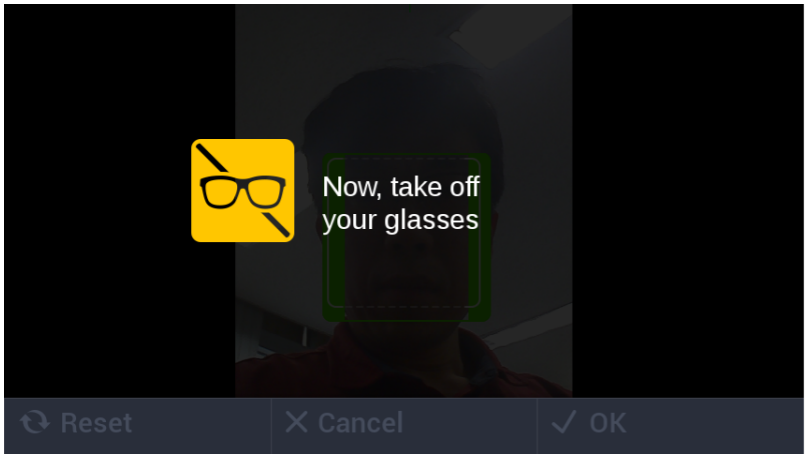
Iris & Face Capture Process > Face Capture > Tracking Guide Box UI



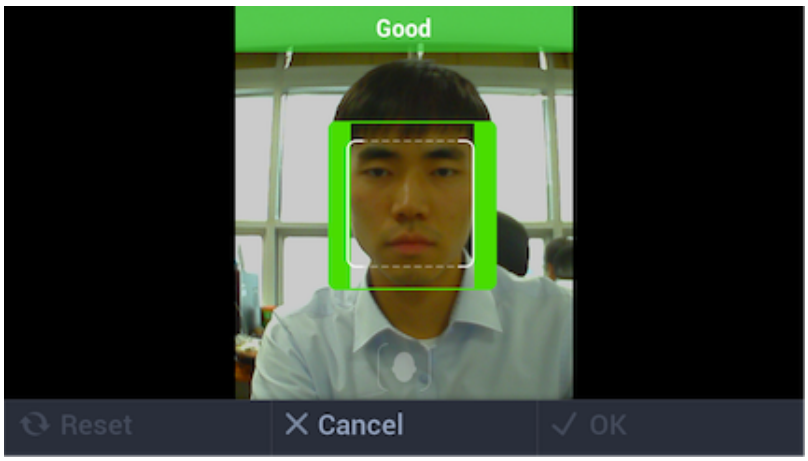
Positioning box appears in order to guide subject.



Capture normal face images.

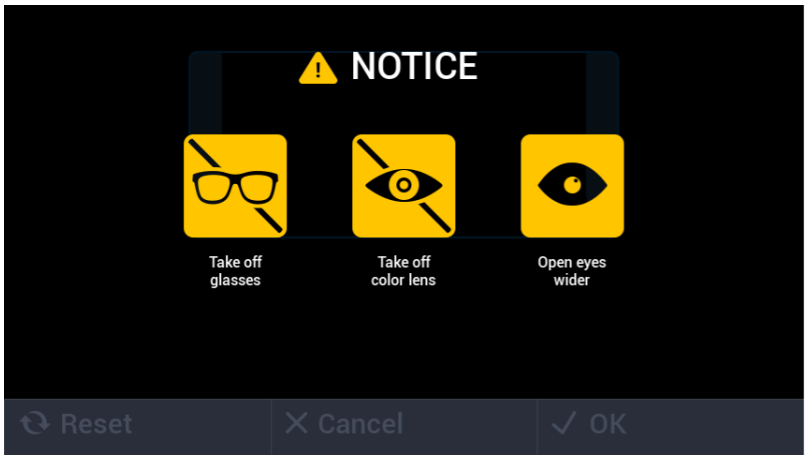


In case of selection of Glasses wearer check box, will be active for about 3 to 5 seconds.



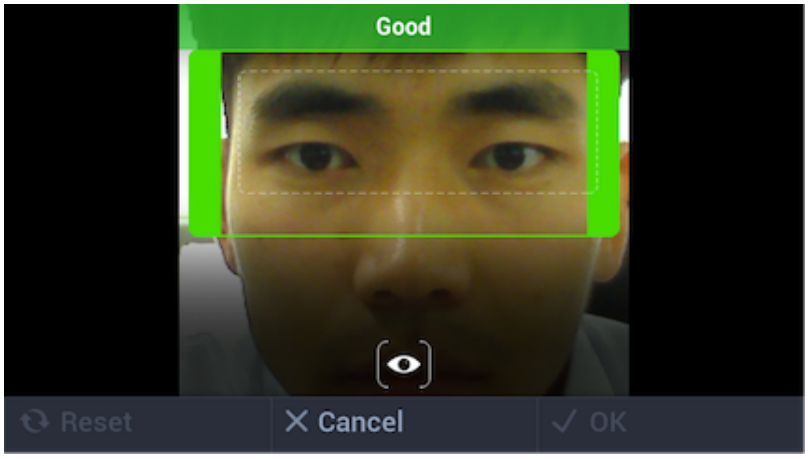
Capture additional face images with glasses off.

Iris & Face Capture Process > Iris Capture



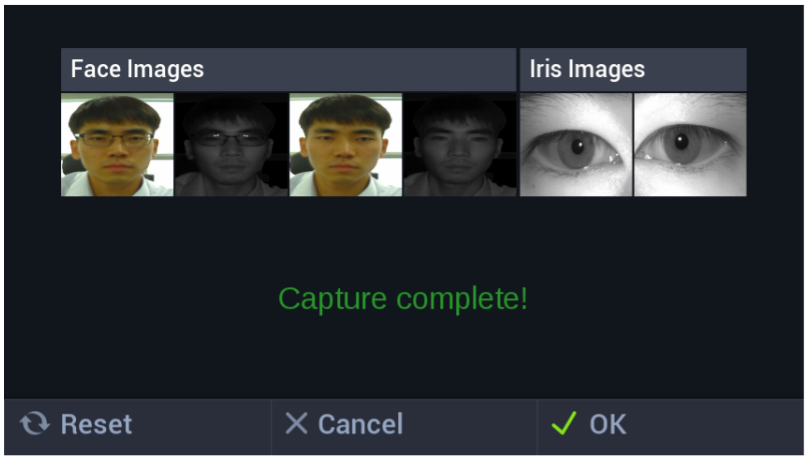
In case of Tracking Guide Box UI mode, display will be active for about 3 to 5 seconds.

Iris & Face Capture Process > Iris Capture > Tracking Guide Box UI



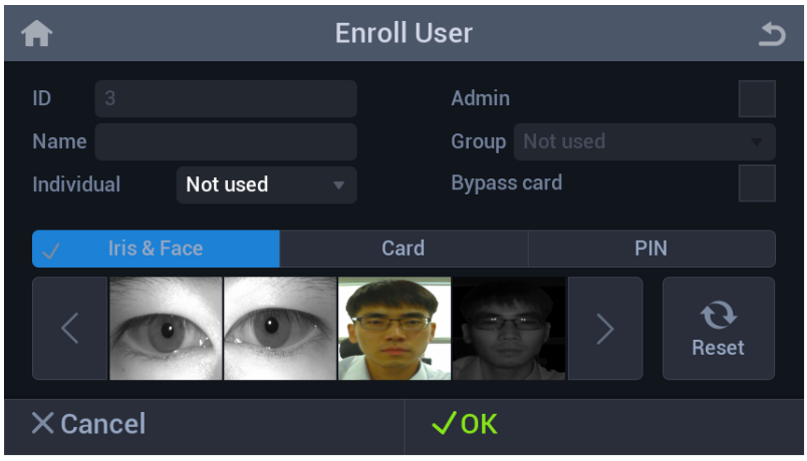
Accepted capture of iris images.

Iris & Face Capture Process > Save Data / Complete Enrollment



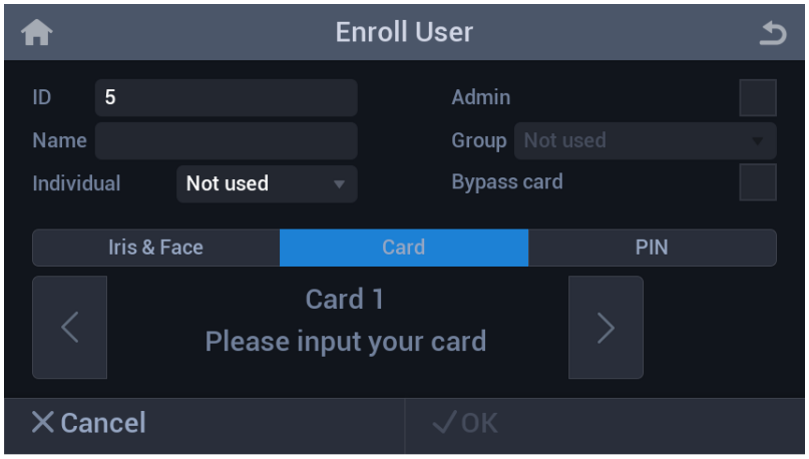
Name	Description
Reset	Return to face capture stage
Cancel	Return to face capture stage
OK	Move to next screen to complete enrollment

Iris & Face Capture Process > Complete Enrollment



Name	Description
Cancel	Return to User Main screen
OK	Save user data to complete biometrics enrollment, then return to User Main screen

B.1.6. Card

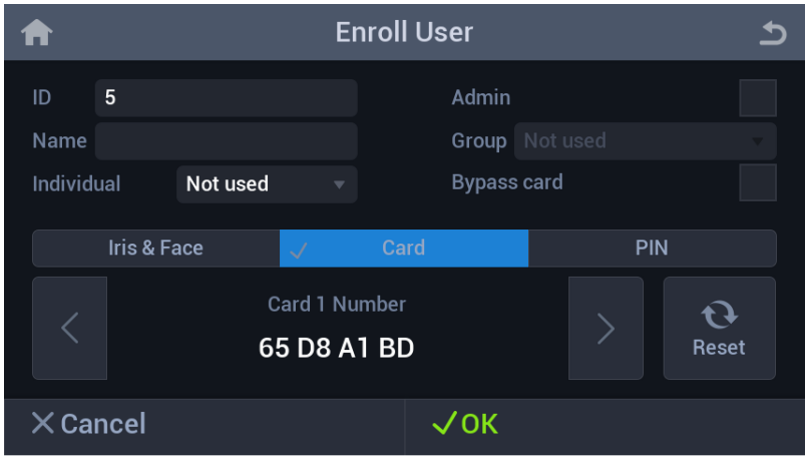


Name	Description
Card tab	Selection changes tab to blue color

When “Please place your card” message appears, touch front-bottom part of device with user card.

Multiple card registration is supported (max. eight cards per user).

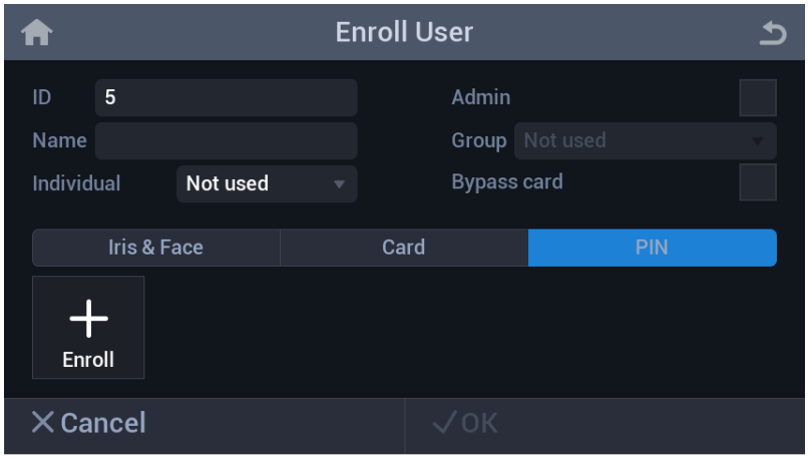
Card > Save Data



Card number is shown on tagging a card

Name	Description
Reset	Clear card number and "Please tag your card" message is shown
Cancel	Return to User Main screen
OK	Save user data and return to User Main screen

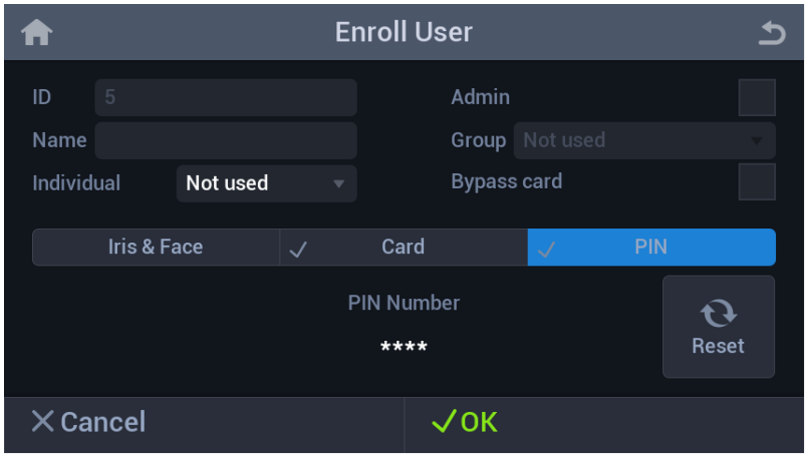
B.1.7. Pin



Name	Description
PIN tab	Selection changes tab to blue color
Enroll (+) button	Switch to input screen

Pin > Input

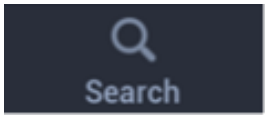
Pin > Save Data



Pin number is shown as character.

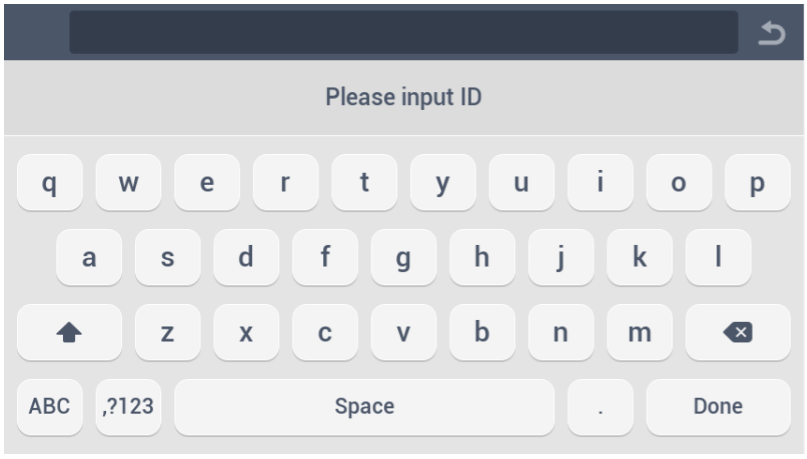
Name	Description
Reset	Clear pin number and (+) button is shown
Cancel	Return to User Main screen
OK	Save user data to complete PIN enrollment / return to User Main screen

B.2. Search

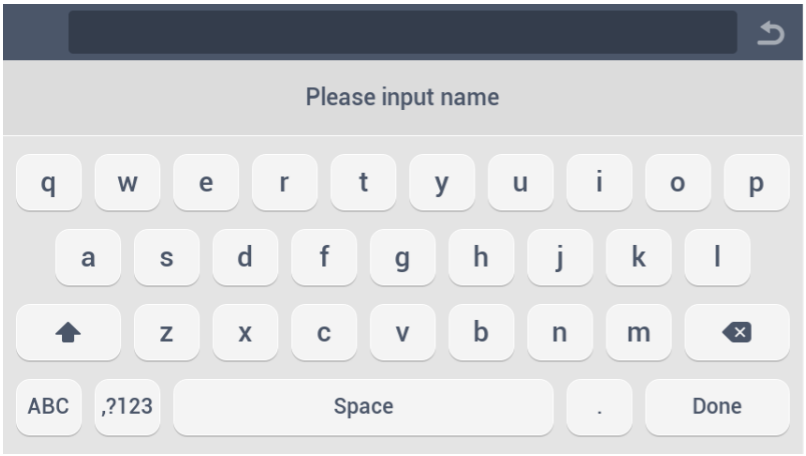


Tap the **Search** icon to browse list of enrolled users.

B.2.1. Search > ID

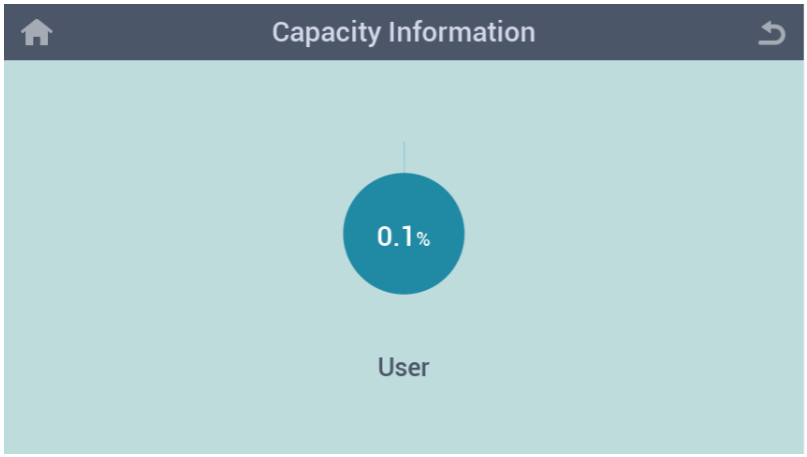


B.2.2. Search > Name

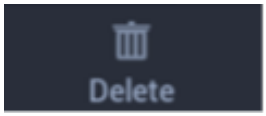


B.3. Capacity Info

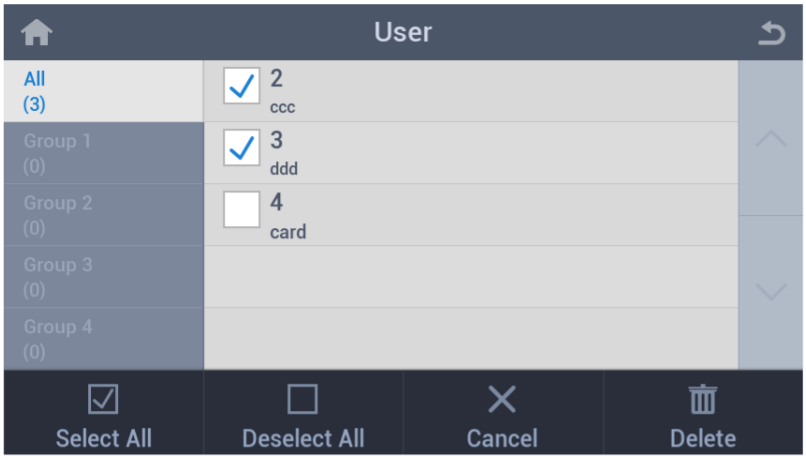
Tap the **Capacity Info** icon to check storage space.



B.4. Delete



Delete information of enrolled user.



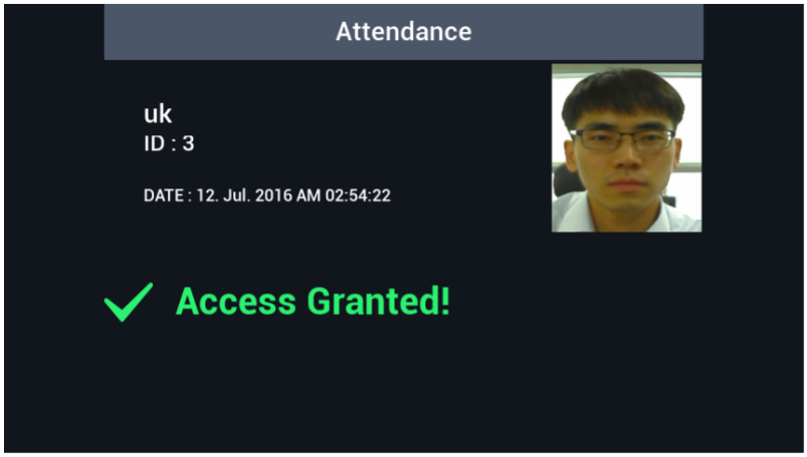
Name	Description
Select All	Select all users
Deselect All	Deselect all users
Cancel	Return to User Main screen
Delete	Delete selected user(s)

B.5. Recognition

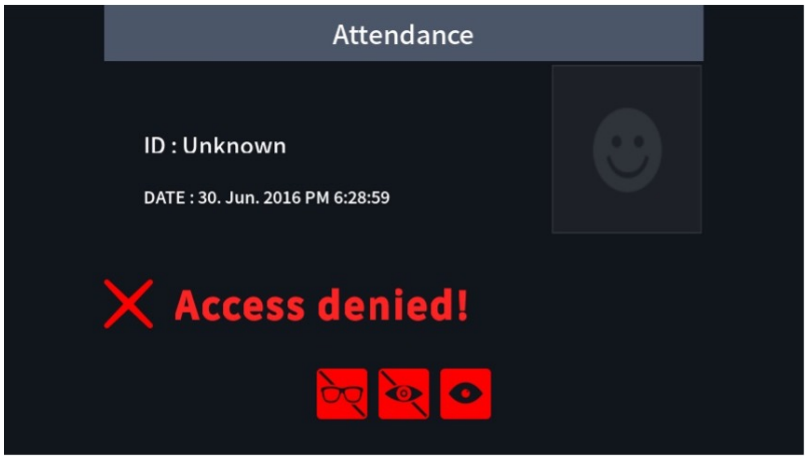
B.5.1. Recognition Process

Recognition process is identical to the enrollment process.

B.5.2. Recognition / Authentication Success



B.5.3. Recognition / Authentication Failure



When access is denied, warning icons can appear on the screen.

- Glasses: Device detects occlusion by glasses.
- Color Lens: Device detects colored lenses.
- Small Eye: Device cannot fully detect iris due to eyelid.

Appendix C: Legal Information

C.1. Disclaimer

The words of which the initial letter is capitalized have meanings defined under the following conditions. The following definitions shall have the same meaning regardless of whether they appear in singular or in plural.

For the purposes of this Disclaimer:

- **Company** (referred to as either "the Company", "We", "Us" or "Our" in this Disclaimer) refers to CMITech Co. Ltd.
- **You** means the individual accessing the Product, or the company, or other legal entity on behalf of which such individual is accessing or using the Product, as applicable.
- **Product** means the electronic device provided by the Company named EF-45NC and its manual.

The information contained on the Product is for general information purposes only. The Company assumes no responsibility for errors or omissions in the contents of the Product. In no event shall the Company be liable for any special, direct, indirect, consequential, or incidental damages or any damages whatsoever, whether in an action of contract, negligence or other tort, arising out of or in connection with the use of the Product or the contents of the Product. The Company reserves the right to make additions, deletions, or modifications to the contents on the Product at any time without prior notice.

The Product may contain links to external websites that are not provided or maintained by or in any way affiliated with the Company. Please note that the Company does not guarantee the accuracy, relevance, timeliness, or completeness of any information on these external websites.

The information given by the Product is for general guidance on matters of interest only. Even if the Company takes every precaution to insure that the content of the Product is both current and accurate, errors can occur. Plus, given the changing nature of laws, rules and regulations, there may be delays, omissions or inaccuracies in the information contained on the Product. The Company is not responsible for any errors or omissions, or for the results obtained from the use of this information.

All information in the Product is provided "as is", with no guarantee of completeness, accuracy, timeliness or of the results obtained from the use of this information, and without warranty of any kind, express or implied, including, but not limited to warranties of performance, merchantability and fitness for a particular purpose. The Company will not be liable to You or anyone else for any decision made or action taken in reliance on the information given by the Product or for any consequential, special or similar damages, even if advised of the possibility of such damages.

C.2. Copyright Notice

We reserve the right to make any alterations which may be required due to technical improvement. For the most current information, contact your CMITech representative.

Appendix D: Regulatory Information

D.1. FCC compliance 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.

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 to 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.

Changes or modifications to this product not authorized by CMITech could void the electromagnetic compatibility (EMC) and wireless compliance and negate your authority to operate the product.

This product has demonstrated EMC compliance under conditions that included the use of compliant peripheral devices and shielded cables between system components. It is important that you use compliant peripheral devices and shielded cables between system components to reduce the possibility of causing interference to radios, television sets, and other electronic devices.

D.2. EU Declaration of Conformity (CE)

This product is CE marked according to the provisions of the RED (Radio Equipment Directive) Directive (2014/53/EU). CMITech Co., Ltd. hereby declares that this product is in compliance with the essential requirements and other relevant provisions of Directive 2014/53/EU. This device is a class 1 radio device according to the directive. For more information, contact us using the following contact information.

CMITech Company, Ltd.

- Website: https://www.cmi-tech.com/
- Address: 4F, #417 - 419, 136, LS-ro, Dongan-gu, Anyang-si, Gyeonggi-do, 14118, Republic of Korea
- Tel: +82-70-8633-8278 / Fax: +82-31-624-4490

Appendix E: Contact Information

CMITech Company, Ltd.
4th Floor, #417 - 419, 136, LS-ro, Dongan-gu, Anyang-si, Gyeonggi-do, 14118, Republic of Korea

Tel: +82-70-8633-8277

CMITech America, Inc.
2033 Gateway Place, Suite 500
San Jose, CA 95110 USA

Tel: (1) 408 573-6930

sales@cmi-tech.com or service@cmi-tech.com