



Axxis Biometrics LLC

**BioAxxis L113
Stand-alone Fingerprint Door Lock
(Small office)**




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General

Product Overview

The L113 is a stand-alone fingerprint identify door lock which can be installed on most doors. Unlike a conventional door lock, it uses the touch of a registered fingerprint to unlock the door instead of keys or cards, which can be stolen or copied. Users also do not need to remember any passwords or PIN codes. The fingerprint identify door lock offers both security and convenience.

Features

- Uses the fingerprints of registered users / masters to unlock the door
- For privacy protection, all registered fingerprints are encrypted to templates being stored in memory. The fingerprint template contains only the feature points of the fingerprint and cannot be converted back to fingerprint image
- Uses non-volatile memory for fingerprint storage
- Uses 1:N identification method, no need to key in user ID number
- Each user (except master) can register either one fingerprint template or two fingerprint templates (pair)
- Maximum capacity is 150 users when each user enrolls a pair of fingerprints (2), or 300 users if only one fingerprint template per user is registered, plus 10 master fingerprint templates.
- Programmable and selectable user restriction time zones / table (20)
- If the door is unlocked by fingerprint but is not opened within 5 seconds, the door will automatically lock again
- User restriction mode
- Free ingress mode
- Time restriction mode
- Timed Free ingress mode
- Uses programming kit Model L113 for programming and fingerprint management.
- 4 x AA (LR6) batteries operation
- Low power consumption, new batteries last for 7,000 cycles (alkaline battery)
- Low battery indicator

Operation

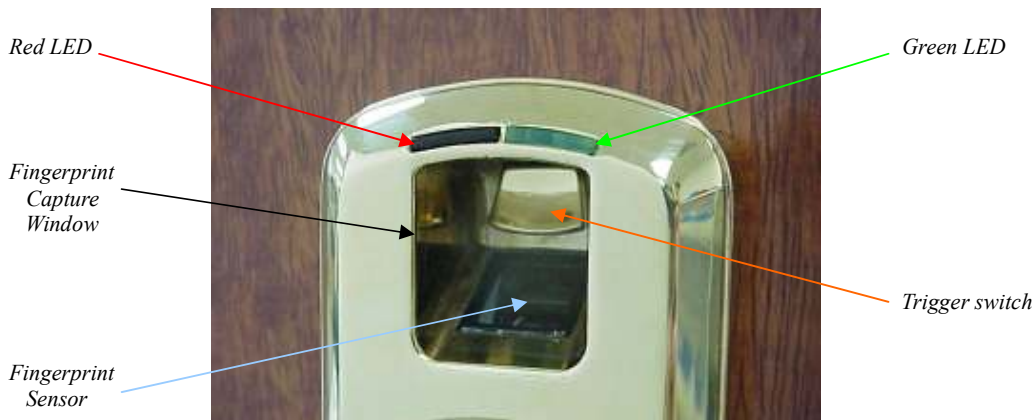
The door lock must be setup before normal operation. It requires at least one master fingerprint to be registered. A maximum of 10 master fingerprints, 150 users × 2 fingerprints, or 300 users × 1 fingerprint, can be registered.

Normal Operation

To unlock the door, use a registered finger to trigger the **Trigger switch** inside the fingerprint capture window and then place the finger on the **Sensor**. If the fingerprint matches with one of the registered fingerprints, the **Green LED** will turn on with a short beep and the door will unlock for 5 seconds, the user can now turn the door lever to open the door. If the **Red LED** flashing with a long beep, it means that the fingerprint is not recognized.

Caution

- *In case of any unknown status or hanging, reset the door lock by removing and reinstalling the batteries. The door lock will revert to standby mode.*
- *All fingerprint templates are stored in non-volatile memory and will not be lost when batteries are replaced or reset.*
- *If the batteries are taken out or totally drained, the door lock will remain locked. The door lock can only be unlocked using the emergency key provided.*
- *If there are not any user or master fingerprint templates in memory, the door lock can be unlocked by triggering the **Trigger switch** without verifying the fingerprint.*



Low Battery Alarm

If the battery power becomes low, the **Red LED** will flash 3 times with short beeps when triggering the switch inside the fingerprint capture window. The fingerprint door lock can still operate normally until the battery power is totally drained (around 300 operations from the 1st alarm).

No fingerprint registered in lock

When no fingerprints are registered in the lock, anyone can unlock the door by pushing the **Trigger switch** inside the fingerprint capture window. The **Red LED** will turn on with a short beep and the door will be unlocked for 5 seconds.

Free ingress

When the lock has been set in free ingress mode, anyone can unlock the door by pushing the **Trigger switch** inside the fingerprint capture window. The **Green LED** will turn on with a short beep and the door will be unlocked for 5 seconds.

User restriction

When the lock has been set in user restriction mode, only a 'master' can unlock the door. If a 'user' tries to unlock the door, the **Red LED** will turn on with two short beeps. If a 'master' tries to unlock the door, the **Green LED** and **Red LED** will turn on with a short beep and the door will be unlocked for 5 seconds, the **Red LED** will turn on for 2 seconds.

Time restriction

When a 'user' was set with time restriction, the 'user' can only unlock the door in a limited time. If the 'user' tries to unlock the door out of the limited time, the **Green LED** will turn on with two short beeps.

Timed free ingress

When the lock's timed free ingress mode is enabled, anyone can unlock the door within a limited time by pushing the **Trigger switch** inside the fingerprint capture window. The **Green LED** will turn on with a short beep and the door will be unlocked for 5 seconds, the **Green LED** will turn on for 2 seconds.

Battery Installation / Replacement

There are four batteries under the battery cover. To replace the batteries, use a coin to unscrew the battery cover screw and remove the battery cover. Remove the four old batteries from the battery compartment. **Before you place the new batteries into the battery compartment, please use a finger to trigger the Trigger Switch inside the fingerprint capture window to reset the low battery indicator.** Then, place four new AA size (LR6) batteries into the battery compartment. Replace the battery cover and tighten hold-down screw with coin.

There is also a coin type lithium battery (CR2032) for the internal real time clock. Under normal operating conditions the battery can last for more than 5 years. However, we recommend replacing this battery every 3 years.

Caution

- *In cold weather, the performance of Lithium batteries will be better than alkaline batteries.*
- *Use only same type of new batteries and do not mix with old batteries.*
- *Never use batteries other than alkaline or lithium.*

Battery Life

Below table is the typical battery life for reference:

No. of operations per day	Battery Life (Alkaline Battery)			
	Latent disabled Adaptive disabled	Latent enabled Adaptive disabled	Latent disabled Adaptive enabled	Latent enabled Adaptive enabled
10	Around 22 months	Around 17 months	Around 17 months	Around 17 months
20	Around 11 months	Around 8 months	Around 8 months	Around 8 months

Note: The actual battery life will vary with different battery brand name and capacity.

External DC power Installation / Requirement

L113 can be powered by external DC power instead of using four batteries. The external power supply must be able to supply 6 volt DC (1000 mA) to the door lock. Please refer to installation manual for instructions to connect the external DC power.

Note: Connecting the door lock to an unstable power source may affect the normal operation of the door lock. An Uninterruptible Power Supply (UPS) is recommended for this application.

Setup the door lock

The L113 Programming Kit is required to setup the door lock and register master and user fingerprints. For details, please refer to the L113 Programming Kit user instructions.

Emergency door access

Two emergency keys are included with each lock. In case of low battery power or other malfunction, the door lock can still be unlocked using the emergency key.

Caution

- *The emergency key is used for unlocking the door only. The door will lock automatically after the key is removed.*



Emergency key cover

Open the door with emergency key



1. Use the small wrench provided to unscrew the emergency key cover.



2. Loosen the key cover by hand.



3. Remove the emergency key cover.



4. Match key orientation and insert to the cam lock.



5. Hold and push the key in and turn 90 degrees in clockwise direction.



6. Turn door lever to open the door.



7. After use, hold and push the key in, then turn 90 degrees in counterclockwise direction and pull out the key.



8. Put on the emergency key cover.



9. Tighten with the small wrench.

Fingerprint Enrollment

How it works

The user is registered in the database after a special minutiae-based algorithm extracts key minutiae points from the live image. At the time of acquisition, it converts the data into a unique mathematical template comparable to a 60-digit password. This unique template is then encrypted and stored – it is important to note that no actual image of the fingerprint is stored, only the minutiae-based template.

Next time a new fingerprint image is scanned by the sensor, the door lock converts the live image into template and compares it with all templates stored in memory to verify the user's identity.

Getting good fingerprint images

The quality of a fingerprint image is relative to the number of minutiae points captured. If the number and locations of the minutiae remain consistent whenever an individual's fingerprint image is scanned and captured, the fingerprint image would easily match to the existing template. A fingerprint image that does not possess an adequate number of minutiae points may not be usable.

Correcting wet/dry fingerprint images

When the temperature is low or the fingerprint is dry, like in the case of after hand washing, the user may moisturize their fingerprint simply by breathing on it before applying it to the sensor. If the fingerprint is too wet, the ridges and valleys are rendered indistinguishable. The lack of minutiae data causes wet fingerprints to be rejected. This can be remedied simply by swiping the fingerprint on a clean towel or cloth.

** All in all, users need to get used to it through some practice.*

Frequently Asked Questions

- Q: What can I do if the door lock frequently or always rejects my fingerprint?
- A: If the door lock always rejects your fingerprint, it may be due to the minutiae number / quality of the live fingerprint image having too much difference with your original registered (stored) template. In this case, try deleting the old fingerprint template, following the 'Delete User/Master' procedure, and then register a new User/Master fingerprint template, as described in the 'Add Master' or 'Add User' procedure.
- Q: The door lock was working well with my finger before but suddenly it cannot identify my finger. What's wrong?
- A: The door lock will find it difficult to identify your finger under the following conditions:
- i) The surface of the fingerprint sensor is too dirty. There may be some dirt or grease on it. Wipe the sensor with a clean towel or cloth.
 - ii) Your finger may be too dirty or wet. Wipe the finger with a clean towel or cloth.
 - iii) The temperature is too low or the fingerprint is dry, like in the case of after hand washing. You may try to moisturize your finger simply by breathing on it, or wiping your finger on your forehead for a little body oil before applying the finger to the sensor.
 - iv) The finger is injured causing the fingerprint to be deformed. Use another registered finger or an emergency key to open the door.
- Q: How much pressure is required to obtain a good-quality fingerprint?
- A: If too much pressure is applied onto the sensor, the ridges adhere to each other and are rendered indistinguishable. In this case, the effect would be similar to the hard-to-find minutiae of the wet fingerprint image. On the other hand, if too little pressure is applied, the resulting image is similar to the dry fingerprint.

Specifications

Item	Description
Model	L113
False Rejection Rate	<0.1%
False Acceptance Rate	< 0.001%
Allowable fingerprint rotation	± 45°
Fingerprint sensor	Optical fingerprint reader
Capacity	300 fingerprint templates for users (150 pair or 300 single templates), and 10 templates for master fingerprints. Master fingerprints use only one template.
Identification Time	Around 1 second
Power	4 × AA size (LR6) alkaline batteries 1 × CR2032 lithium battery
Power Consumption	Standby (idle): <5μA Operational: average 350mA
Battery life ^a	Around 7,000 cycles for AA size (LR6) batteries, 3 years for the CR2032
Operating Temperature	-20°C to +50°C / 0°F to +122°F (non-condensing)
Dimensions	Outer without door lever: 76mm (w) × 243mm (h) × 38mm (d) Inner without door lever: 76mm (w) × 243mm (h) × 36mm (d)

^a the calculation is based on 20 operations per day with both Adaptive and High Security functions disabled. High operations frequency may shorten the battery life due to battery discharge characteristics.

Warranty

Manufacturer warrants its products, including parts and labor, to be free from defects in material and workmanship for two (2) years from the date of retail purchase. If a product proves to be defective in material and workmanship during the warranty period, Manufacturer will replace the product. Replacement products may include remanufactured or refurbished parts or components. Manufacturer reserves the right to replace any defective product with a similar product of equal or superior performance. Warranty applies only to the original retail purchaser of the product.

Manufacturer's warranty does not cover the following:

1. Product on which the serial number is mismatched with the serial number on the warranty card
2. Damage, deterioration, or malfunction resulting from:
 - a. Abuse, tampering; accident; misuse; neglect; fire, lightning or other acts of nature; unauthorized product modification, or failure to follow instructions supplied with the product
 - b. Damage of the product due to the transportation by the purchaser
 - c. Normal wear and tear
 - d. Any other causes which do not relate to a product defect
3. Any service charges related to installation or removal of product
4. Costs incurred due to damage to other property caused by any defects in the products, inconvenience, loss of use of product, loss of time, loss of profits, loss of business opportunity, loss of goodwill, interference with business relationships, or any other commercial loss or damages, or any other claim against the customer by any other party

Revision Summary

Revision	Date	Description	Author
<i>0.10</i>	<i>13 Sept 2005</i>	<i>First Draft</i>	<i>Calvin Kwong</i>
<i>0.11</i>	<i>4 Nov 2005</i>	<i>Changed Specifications</i>	<i>Calvin Kwong</i>
<i>0.12</i>	<i>14 Nov 2005</i>	<i>Add reset instruction when replace batteries</i>	<i>Calvin Kwong</i>
<i>0.13</i>	<i>8 Dec, 2005</i>	<i>Wording and warranty change</i>	<i>Dick Green</i>

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