Fingerprint Safe /Lock module

SB2000S User's Manual

(Rev 1.0)

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Table of Contents

I Specification

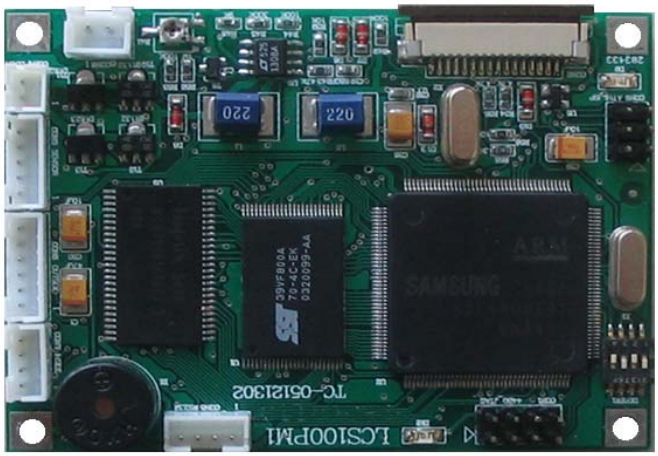
According to the need of products research and producing at present, we developed the fingerprint Safe/Lock module which is based on the ARM7 platform.

Chapter 1 Technical specification

Item		Content	Note
CPU		ARM7 Core Samsung S3C44B0X 66MHz	
Match speed		<= 1second	
FRR		<=0.1%	
FAR		0.00001%	
capacity of fingerprints		50	Include manager
Working voltage		DC+5V	
Working current		<= 250mA	
Standby current		<= 40uA	
Electrostatic Discharge(ESD)		>=15000V	
Power supply		1.5V AA × 4	
Life length of Battery		>=2000 operations	
Alarm voltage		5.2 ± 0.1V	
electrical Start up voltage		5~6V	
Start up current		>=300mA	
Sensor	Sensor	Optical sensor	
	Resolution	403dpi	
	Image grasping area	18mm(W) × 16mm(H)	

Working Environment	Working Environment	0℃—60℃	
	Humidity	20%—80%	
Dimensions		57mm(W) × 77mm(L)	

Chapter 2 Functions



SB2000S module

a) Having two levels of authority of three managers and users.

b) Having function of one finger、two fingers identification.

c) User can enroll, delete a fingerprint and delete all users' fingerprints. But in case of enrollment and deletion, it requires that a manager verify.

d) After successful identification it can drive the motor or electro--magnetism lock, detect the executant's machine's operation situation through sensor signal inspection, and control it.

e) It can turn off the power supply by itself. After the successful fingerprint identification, driving the motor, it opens a safe and module comes into standby mode. When the safe's state is standby state, if press the switch and then the module controls the motor to run and make the safe close ,

module comes into standby mode.

f) Customers can change the working mode (one or two fingerprint identification) by the dip switch (refer to Appendix 2 Dip switch for one and two fingerprints mode).

II One finger Identification.

Chapter 3 Function buttons and Notice

1 Function buttons

1) Outside Function buttons

"Start" button: used for starting system.

2) Inside function buttons

"Enroll" button: used for enrolling the users' fingerprints.

"Delete" button: used for deleting the enrolled users' fingerprints, it can't delete the manager's fingerprints.

"Initialization" button: To delete all fingerprints, including the managers' fingerprints.

2 Indicator LED and buzzer beep notice.

1) Indicator LED

① When it is in normal using situation.

When the green LED flickers: it means that please press the finger.

When the green LED is on continually for 0.5 second: it means that identification is successful.

When the red LED is on continually for 0.5 second: it means that identification fails.

② Enrolling or deleting fingerprints data

When the red and green LED flicker continually at the same time: it means that it can enroll or delete fingerprints data after be successful identified by manager.

When the red LED flickers once, green LED flickers continually: it means that a user can enroll or delete fingerprints data without identification of a manager.

2) Buzzer notice.

When the buzzer emits sound of three short whistling: it means that enrolling a fingerprint or identification is successful.

When the buzzer emits sound of three long whistling: it means that enrolling a fingerprint or identification failed.

After buzzer emit sound of three long whistling and then emit three short whistling: it means that fingerprints are deleted.

When the buzzer emits sound of one long whistling, it means that the fingerprint is enrolled already.

Chapter 4 Using details and flow

In the case of normal using: when the safe box is given to the customers, It must have already enrolled the manager's three fingerprints and user's one fingerprint at least, and then use for customers, in the case of less than manager's three fingerprints enrollment and user's one fingerprint enrollment, any user could unlock the safe and enroll operations .

When give the safe to customer to use, (Having enrolled manager's three fingerprints), user can enroll fingerprint, unlock and management operations such as deletion. Manager can enroll fingerprints, unlock and management operation at any time.

Note:

1. The fist three enrolled fingerprints are manager's one, and after manager's fingerprints are enrolled, the next enrolled fingerprints are user's fingerprints.
2. Delete function only delete user's fingerprints, if you want to delete manager's fingerprints, the initialization function must be use.

1 Unlocking safe box

1) When there is no any enrolled user's fingerprint.

Leaving factory, setting of safe box has no enrolled fingerprints data and it will be unlock by any user.

When only managers' fingerprints are enrolled, namely the first three

fingerprints, it will be also unlock if the user press any finger.

This time, and the operation flow as follows:

Press the "start" button, and then green LED flickers (it means that please press the finger). User should put any his finger on the sensor, it will be unlock while the green LED be off.

2) Normal unlocking safe box (When it has already enrolled user's fingerprints)

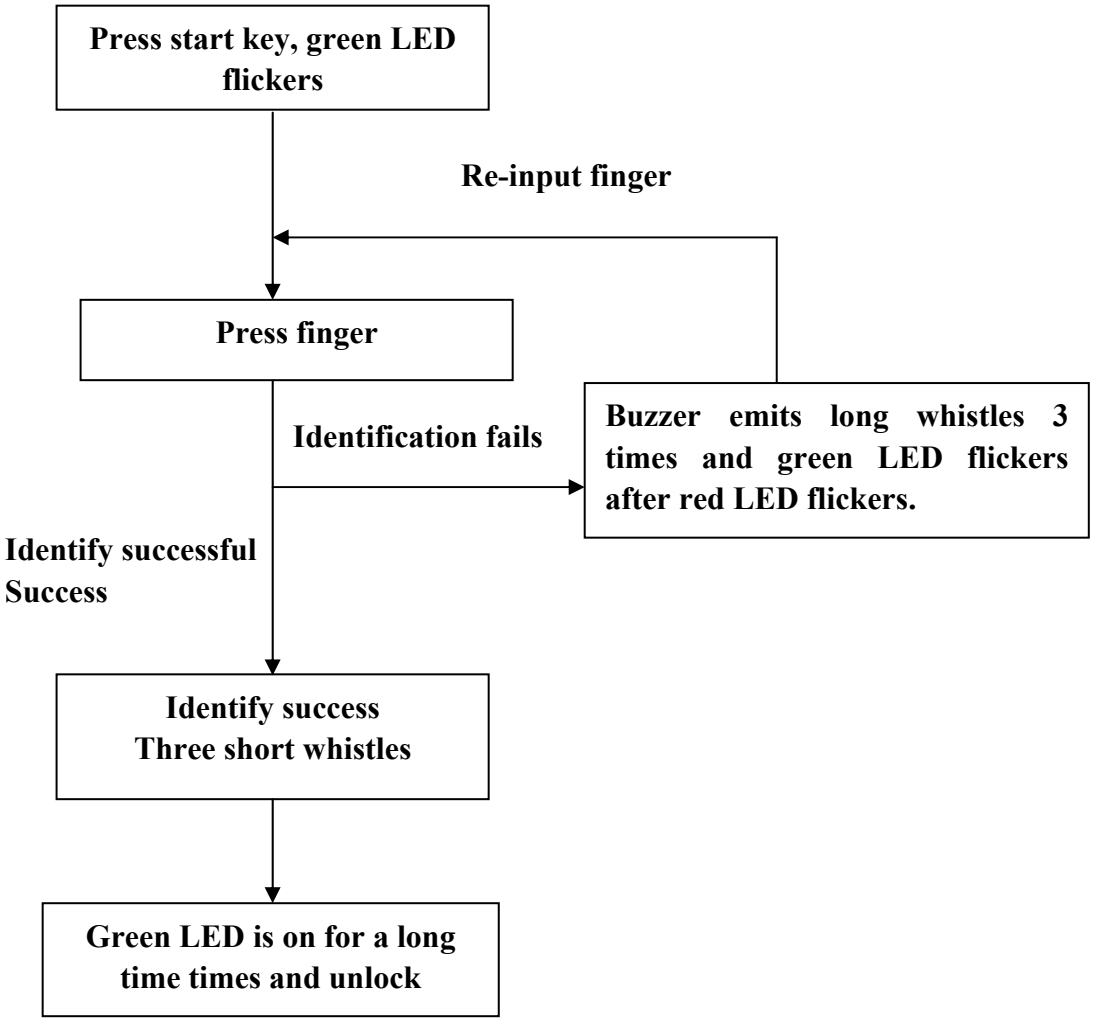
When the manager's fingerprints and user's fingerprint have already enrolled, namely more than four fingerprints are enrolled; opening safe box needs fingerprints identification. This operation flow is follow:

After pressing start button, green LED flickers, and then put enrolled finger on the sensor. If identification is successful, buzzer emits sound continually of three short whistling and green LED is on for a long time (fingerprint identification was successful) and then the safe box is open. If the fingerprints identification fails, buzzer will emit the sound of three long whistling and the green LED flickers after red LED is on, at this time user can re-input the finger to identify.

3) Controlling the executant mechanical part

After the Identification is successful, control motor runs deasil; motor will stop running when switch signal are input or there is no switch signal within 5 seconds; Motor begins running retrorse when door situation switch inputs signal; Motor stop running when shutdown switch signal are input.

◇Opening the safe box as usual, operation flow as follows.



2 Enrolling a fingerprint

The safe box can contain 50 fingerprints, it separate manager and user according to enroll order, the first three fingerprints are managers' and others are users' fingerprints.

At first press the start button and green LED flickers, then press the "enroll" button, after red LED flicker one second it will be off, green LED flickers continually (it is possible to enroll), then user can put one finger on

sensor flatwise.

The user should press one finger three times per an enrollment. After the first time to press the finger green LED flickers and buzzer emits a sound of short whistling.

After this, press the same finger second time, then green LED flickers and buzzer emits a sound of short whistling. At last press the same finger again.

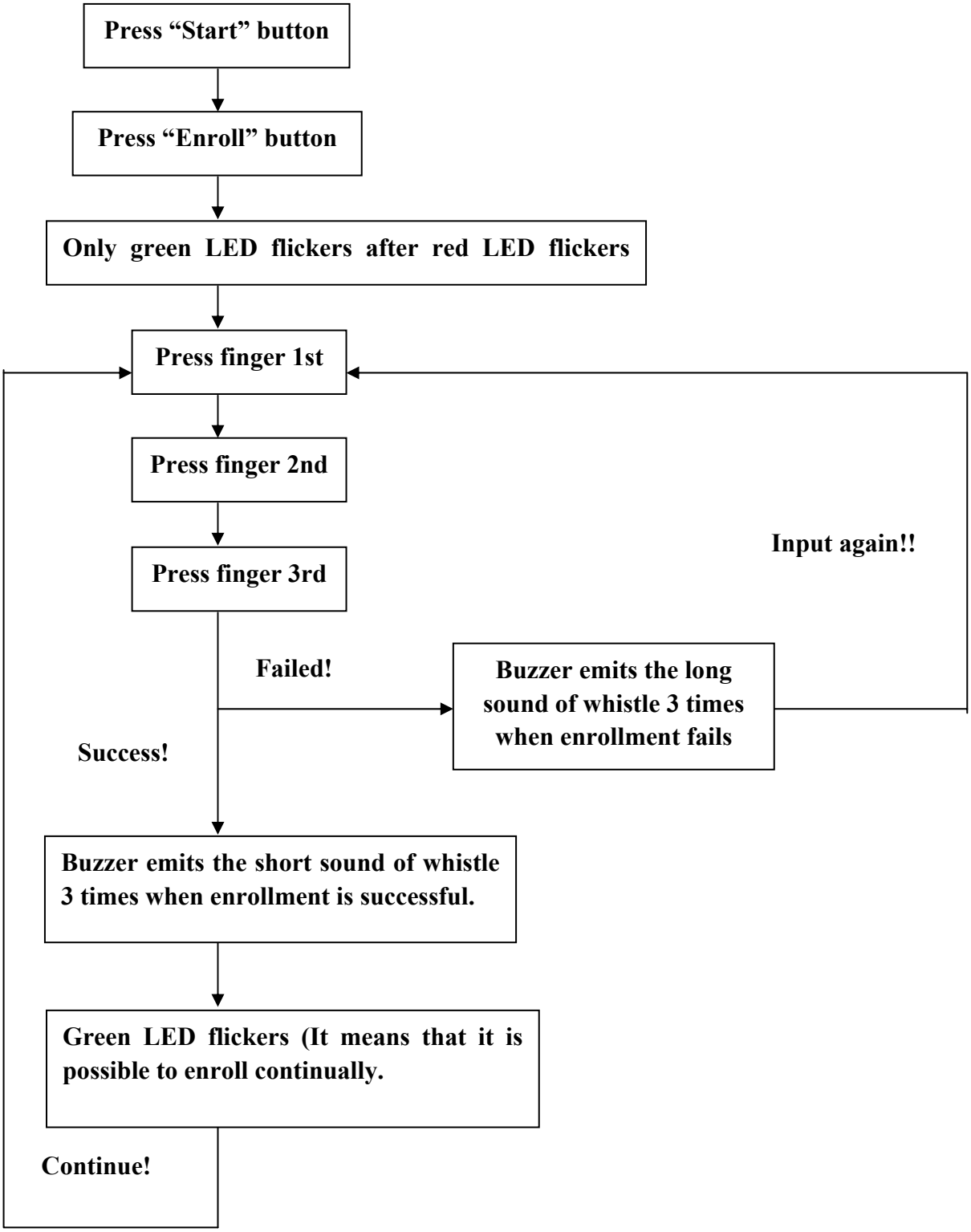
After three times for pressing the finger, if buzzer emits sound of three short whistling, then it means that the enrollment is successful. Green LED flickers continually after successful enrollment, the user can enroll the next finger continually.

If enrollment fails, the buzzer will emit the sound of three long whistling and green LED flickers. At this time, the user can enroll another fingerprint according to the above-mentioned the step.

If the fingerprint repeated, then buzzer will emit the sound of one long whistling, red LED is off for one second, and then green LED flickers. At this time the user should change another finger to enroll.

When the user presses his finger, don't move the finger and try to put your finger on the sensor flatwise. As the enrolled fingerprints concern the convenience and security of using thereafter, it is must to enroll seriously.

◇Fingerprints enrollment operation flow



* It can enrolled more fingerprints continuously, after one user successful enroll, green LED flickers, it can enroll the next user.

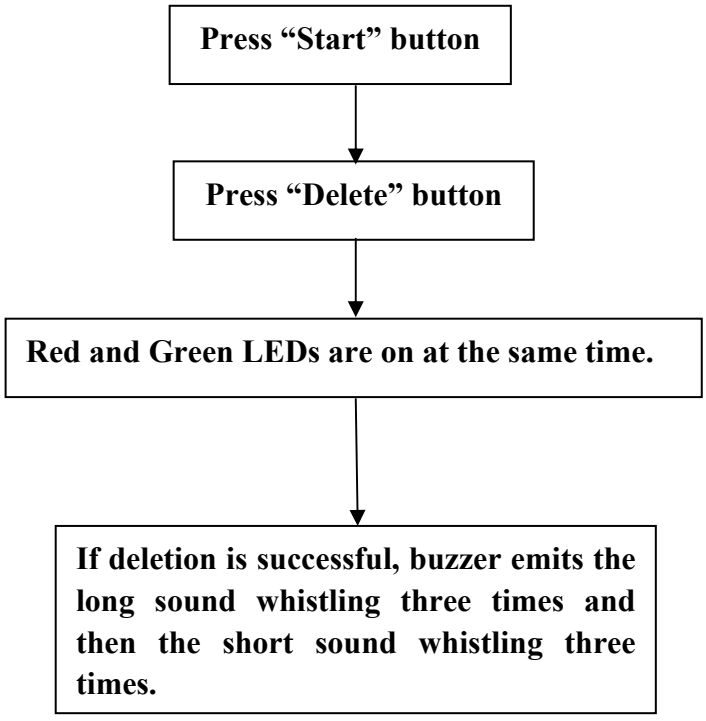
3 Delete fingerprint

"Delete" button is used to delete user's fingerprints, the operation flow as follows.

Press "Start" button and "delete" button, then red LED and green LED flicker for one second , buzzer emits three long sound of whistle(now deleting), and then buzzer emits three short sound of whistle, it means that deleting users' fingerprints are successful.

After having done above operations, all users' fingerprints data are deleted,

◇Deleting fingerprints data operation flow as follows:



If you want to delete the manager's fingerprint, use the "initialization" button.

4 Initialization

First pressing the start button, and then press the initialization button.

Buzzer emits long whistling three times (Now initializing) and short whistling three times continuously, after short beep, initialization will be completed and all the fingerprints data are deleted.

Please do not use this function: recommend you to conceal installing the initialization button

III Two Fingerprints Identification

Note:

As for safe box of two fingerprint mode to be unlocked, it will be use when enrolling manager's three fingerprints and at least one user's fingerprint

The safe will be unlocked only when one of the manager's fingerprints and one of user's fingerprints are identified.

1. It can be unlocked ,if both any one of the manager's and any one of the user's are identified .

2. Enrollment and deletion operation will be possible only after manager's successful identification.

Two fingers mode is only effective in opening and there is no effective in others.

Other using method is the same as one finger to unlock mode.

Chapter 5 Function buttons and Notice

1 Function buttons

1) Outside function buttons

"Start" button: used for system start.

2) Inside function buttons

"Enroll" buttons: used for enrolling fingerprints

"Delete" buttons: used for delete user's fingerprints.

"Initialization" button: used for delete all fingerprints including manager's fingerprints.

2 Indicator LED and buzzer notice

1) Indicator LED

① Normal using

When the green LED flickers: please press the finger.

When the green LED is on for 0.5second: identification success.

When the red LED is on for 0.5second: identification failed.

② Enroll and delete fingerprints data

When red and green LED flicker at the same time, it means that it can enroll or delete fingerprints data after be successful identified by manager.

When the red LED flickers once and then green LED flickers continually: It

means that user can enroll or delete fingerprints data without identification by manager.

2) Buzzer notice

When the buzzer emits sounds of three short whistling: it means that finger enrollment or identification is successful.

When the buzzer emits sounds of three long whistling: it means that finger enrollment or identification fails.

After buzzer emit sound of three long whistling and then emit three short whistling: it means that delete fingerprint.

When the buzzer emits sound of one long whistling: it means it has the enrolled fingerprint already.

Chapter 6 Using flow details

1 Unlocking the safe

1) The first unlocking (there is no enrolled fingerprint in safe box)

Leaving factory Safe box has no any fingerprint data, if user presses any one of Fingers, the safe box will be unlocked.

When you want to use the safe box, first you should press start button, then green LED flickers (please put the finger on sensor). User can put any one of the fingers on the sensor, trying to press the finger, and the safe box will be unlocked when green LED was off.

2) Normal unlocking the safe (have already enrolled fingerprints)

Press start button and then green LED flickers. Put user's enrolled finger on the sensor, if identify is successful, buzzer emits continually sound of three short whistling and green LED is on for a long time (fingerprints identification was successful) and then the safe box is opened.

If the fingerprints identification is failed, buzzer will emit the sound of three long whistling, then after red LED flickers, the green LED flickers, at this time user can re-input the finger to identify.

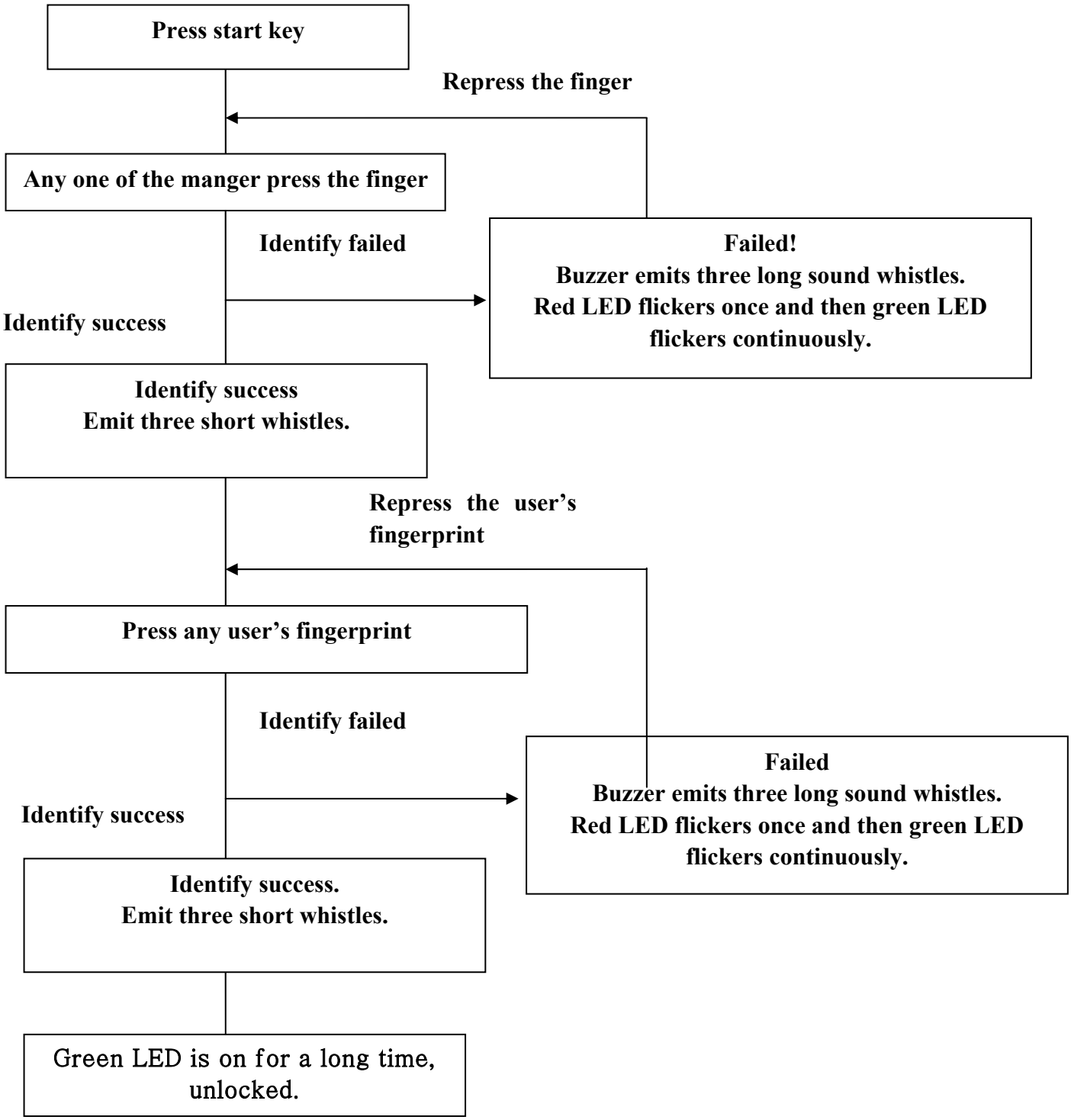
As for two fingers to unlock the safe, it needs to enroll the 3 fingerprints of manager and at least one fingerprint of user.

It can be unlocked when both one of the manager's fingerprint and any one

of the user's fingerprint identification is successful.

1. It can be unlocked only when both any one of the managers and users identification is successful.
2. If manager identify successfully, we can get the authority of the enrollment and deletion. Namely, two fingers mode can take effect to unlock, and take no effect to others.

◇In two fingers mode to unlock the safe box, operation as follows:



Note: Order of pressing the finger of user and manager can reverse; it can identify user's fingerprints and then identify manager's fingerprints.

2 Enrolling fingerprints

The safe box can contain 50 fingerprints, it can be divided manager and user according to the order of enrollment, and the first 3 fingerprints are managers', others are users'.

Manager has all authorities of the safe box such as enrolling, deleting fingerprints and unlocking the safe; User only has an authority of unlock.

1) Enrolling first fingerprint (Have not any enrolled fingerprints)

At first, pressing the start button, and green LED flickers, pressing the enroll button, after red LED flicker once, green LED flickers continually (mean that can enroll operation), then user can put one finger on sensor flatwise.

If user wants to enroll one fingerprint, user should press one finger three times according to the notice. After the first time to press the finger green LED flickers and buzzer emit sound of short whistling

After this, user should press finger second time, green LED flickers and buzzer emit sound of short whistling, after user hears the sound, press the finger again.

After three times for pressing the finger, if buzzer emits sound of three short whistling and then it means that enrollment is successful. Green LED flickers continually after successful enrollment, the user can enroll the next finger.

If enrollment is failed, the buzzer will emit the sound of three long whistling And green LED flickers. At this time, the user can enroll another fingerprint

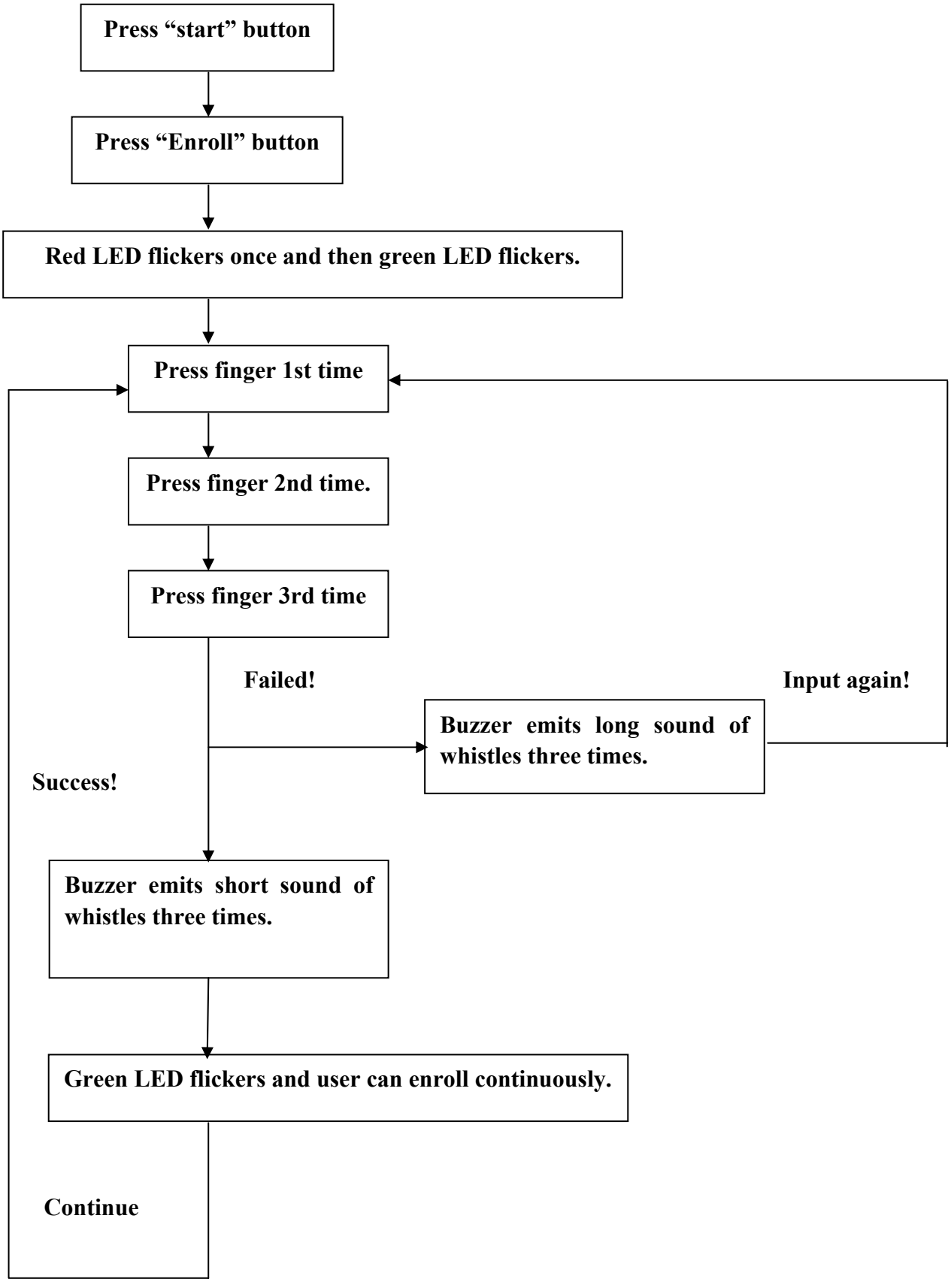
according to the above-mentioned the step.

If the fingerprint repeated, then buzzer will emit the sound of one long whistling, red LED flickers once, and green LED flickers, at this time you should change another finger to enroll.

When press your finger, do not move finger, try put finger on the sensor flatwise.

As the fingerprints enrollment concerns the convenience and security of using in future, it is must to enroll seriously

◇The first time to enroll fingerprints, operation flow as follows



2) Enrolling fingerprints (having enrolled the manger's fingerprints)

When there are some enrolled manager's fingerprints and enroll the user's fingerprint, it can't be performed until manager identify successfully.

First press the "start" button, and then press "enroll" button.

Then red and green LED flicker at the same time, this time manager puts his finger on the sensor.

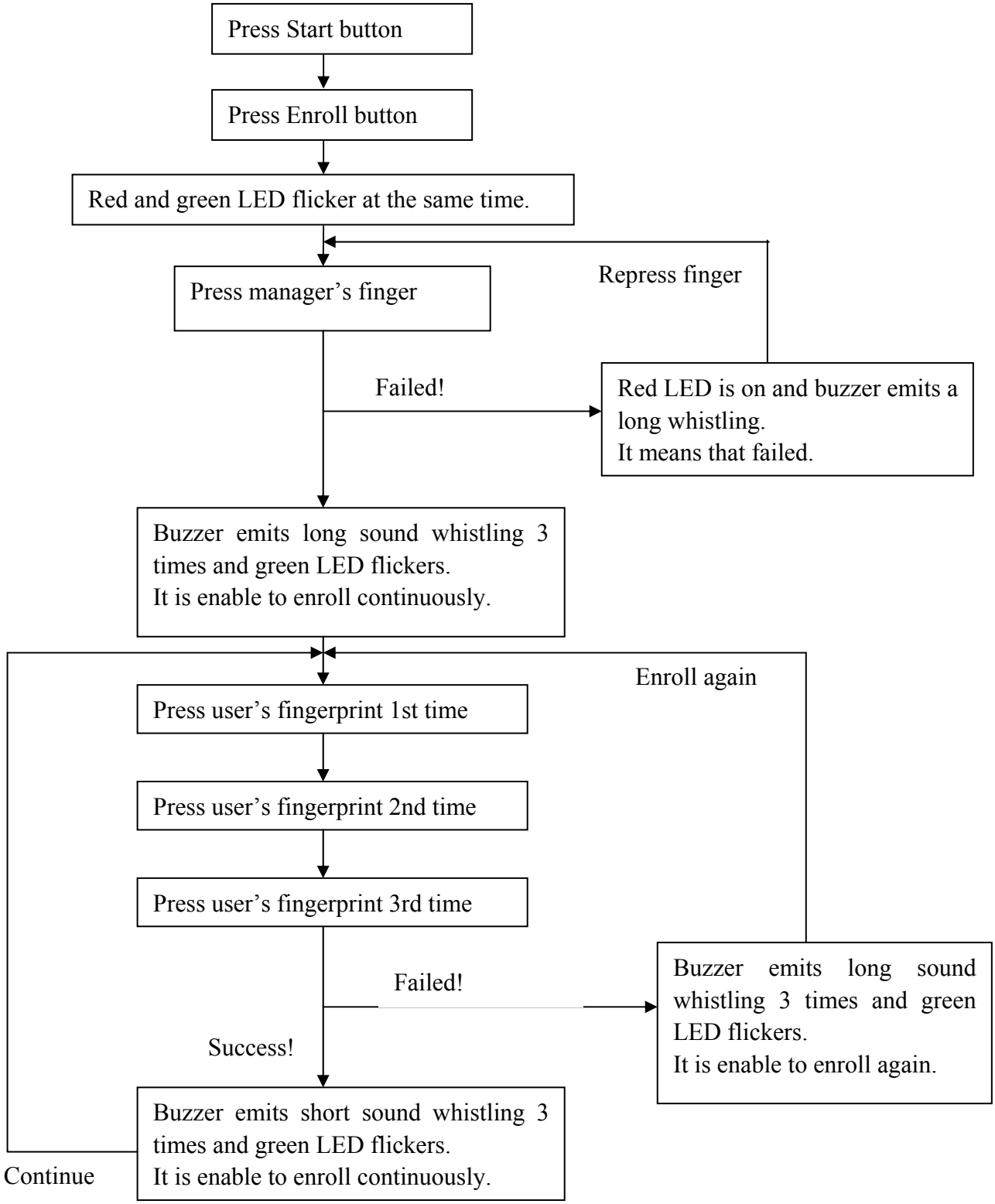
If the manager identifies successfully, buzzer will emit the sound of short whistles, and then green LED flickers, user can go into the enroll fingerprints process.

If manager's fingerprints were not successfully identified, buzzer will emit one long sound whistling, and then red and green LED flicker at the same time.

Please identify manager's fingerprints again at this time.

*It can be enrolled more than one fingerprint continually, when one user is enrolled successfully, green LED will flicker, and the user can keep on enrolling the next user.

◇ When there are some enrolled manager's fingerprints and enroll the user's fingerprint, operation flow as follows:



3 Delete fingerprints

Manager's fingerprints and user's fingerprints can be deleted respectively.

1) Deleting user's fingerprints

Press "Start" button and then press "delete" button.

At this time red and green LEDs flicker at a time, and manager identifies his identity by pressing his finger first time.

If the manager identifies successfully, buzzer will emit sound of short whistling 3 times, and deleting user's fingerprints are successful,

After red and green LED flicker, Safe goes over the process for deleting manager's fingerprints

If manager identify failed, red LED will flicker once, at the same time buzzer emit long sound whistling once.

Then red and green LED flicker at a time which indicates that it needs to identify the manager's fingerprint again.

2) Deleting manager's fingerprints

After perform the above the user's fingerprints deleting, red and green LED flicker at a time which indicates that it needs to identify the manager's fingerprint again.

And then manager put the finger on the sensor (if you do not want to delete manager's fingerprints, you can skip this step), and if manager's identification is successful all manager's fingerprints data will be deleted.

After identify was successful, buzzer emits long sound whistling 3 times (it

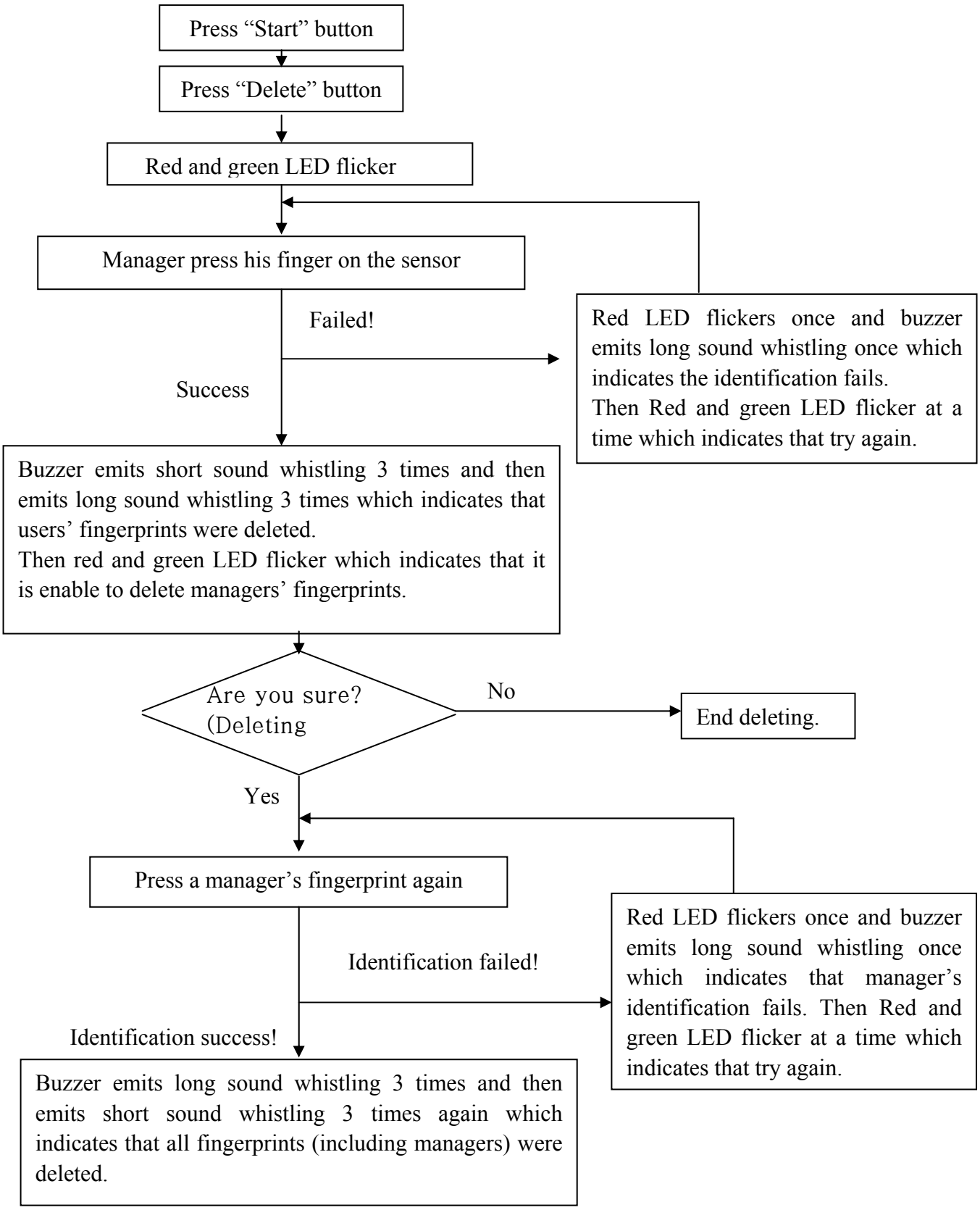
means that it is deleting now), and then emits short sound 3 times again. When indicator LEDs are off, manager's fingerprints are deleted successfully.

If the identification is failed, the red LED will flicker one time and emits long sound whistling once.

Then red and green LED flicker, it means that manager should identify again.

When finished above operation, all fingerprints data of safe box will be deleted completely

◇ Deleting fingerprints data, operation flow as follows.



4 Initialization

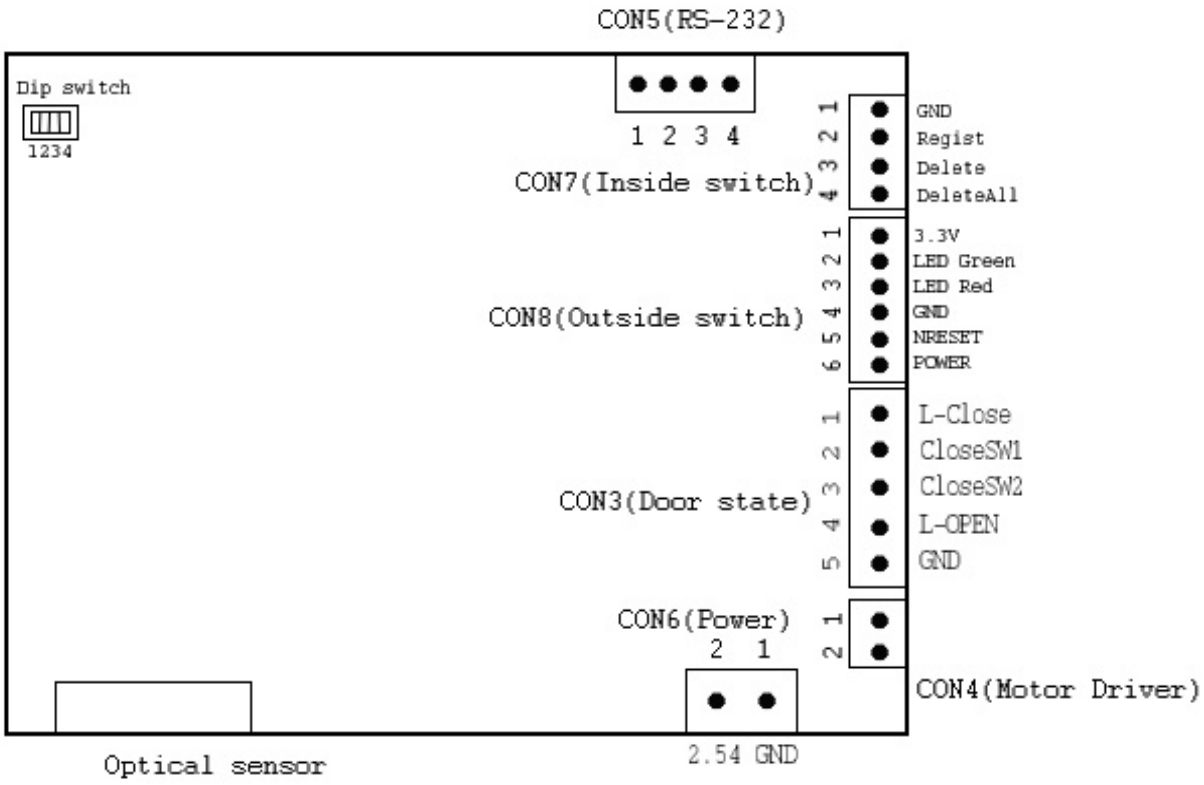
Press the "Start" button and then press the "initialization" button.

Buzzer emits long sound whistling 3 times (it is initializing now) and emits short sound whistling 3 times continuously, then initialization will be completed and all the fingerprints data are deleted.

Please do not use this function: recommend you to conceal installing the initialization button

IV Appendix

1. Connectors of the safe module and Signals)



※ RS232 communication function is offered on the customers' request.

CON6：Power Input

DC Input 2PIN 2.54 interval	Pin1	GND	Earthing
	Pin2	DC_IN	<= 6.5V，alkaline battery

CON6：Communication Port

RS232 4PIN 2.0 Interval	Pin1	GND	
	Pin2	Rs232-Tx	Rs232 Transmitter
	Pin3	Rs232-Rx	Rs232 Receiver
	Pin4	VCC	

CON8：Outside switch

Outside switch and indicator LED. 5PIN 2.0 interval	Pin1	VCC	+5V Output
	Pin2	LED-G	Green LED Output
	Pin3	LED-R	Red LED Output
	Pin4	GND	
	Pin5	Reset	Reset switch(connecting GND)
	Pin6	POWERKEY	Start switch (connecting GND)

CON7：Inside switch

Inside switch 4PIN 2.0 interval	Pin1	GND	
	Pin2	Enroll-KEY	Enrollment key(connecting GND)
	Pin3	Delete-KEY	Deletion Key(connecting GND): delete only users
	Pin4	ALL Delete	All delete key（connecting GND）: Delete all users including managers.

CON4：Motor driver output

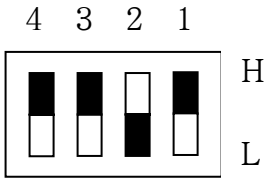
Motor control output 2PIN, 2.0 Interval	Pin1	Motor0	Motor driver output 0
	Pin2	Motor1	Motor driver output 1

CON1：Door state and Open/Closing Control

Control Door state 5PIN 2.0 Interval	Pin1	Close processing switch	Detect whether door was closed already and stop the motor.
	Pin2	Close Swtich1	When close the door Close switch 1 and 2 is connected. Then mechanical executant part starts the motor to closing direction.
	Pin3	Close Switch2	When close the door Close switch 1 and 2 is connected. Then mechanical executant part starts the motor to closing direction.
	Pin4	Open Processing switch	Detect whether door was opened already and stop the motor
	Pin5	GND	

2. Dip switch for one and two fingerprints mode

User can change the mode of the identification by Dip switch 2.



Dip switch 2 Switch of the identifi--cation mode	High	One fingerprint mode
	Low	Two fingerprint mode