

Functional design battery lock (SLIM)

This functional design describes the functionalities and scenario's for the of Battery locks.

There are two different Battery locks models: Pincode and RFID. Both types have Bluetooth to enable access for admin (managing lock) and for user (use).



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1 Model description

1.1 Functionalities Pincode:

- Keynius design Battery lock PINCODE
- Keynius Cam lock mechanism
- Capacitive touch sensors
- External battery pack (placed on the inside of the locker, 4X AA batteries)
- At least 2 years of battery life
- LED available for communication with user/admin (Bluetooth sign and Pin numbers)
- Beep/buzzer available for communication with user/admin, possibility to turn on/off.
- Internal USB-C connector for 1 time use (in case of dead battery)
- Confirmation button (replace '0')
- Bluetooth to communicate with Keynius app
- Override (emergency unlock)
- Auto-unlock
- Update firmware via Bluetooth (Mobile app)



1.2 Functionalities RFID:

- Keynius design Battery lock RFID
- Keynius Cam lock mechanism
- Mifare card reader (13,56 MHz)
- Possibility to store up to 32 cards per lock (in case of assigned use you can make a group locker)
- External battery pack (placed on the inside of the locker, 4X AA batteries)
- At least 2 years of battery life
- LED available for communication with user/admin (Bluetooth sign, top LED)
- Beep/buzzer available for communication with user/admin, possibility to turn on/off.
- Internal USB-C connector for 1 time use (in case of dead battery)
- Bluetooth to communicate with Keynius app
- Override (emergency unlock)
- Auto-unlock
- Update firmware via Bluetooth (Mobile app)



2 Scenario's

2.1 Flex use (one time):

In this scenario a user will be able to claim an **available** locker (1. Apply offline or online? If it is offline, it is easy. If it is online, how to deal with authorization, cabinet number, lock number association and so on will need to consider With flex use, the user can only apply physically on the battery lock itself (so offline) see 2.1.1.1

) , store belongings and then close the locker. After opening the locker is again free to claim/use for everyone.

Flex use (one time) is set as a **default scenario** (also after factory reset).

2.1.1 Pincode

After pressing every button (number) all LED's will blink WHITE for 1 second (2. Blink 1 second is a little long, 200ms is recommended, 1 second the user experience is not good) Agreed, let's do 200 ms instead of 1 second. and a Beep is heard.

Example: Press number 1 (all LED's will blink WHITE for 1 second and Beep is heard), press number 2 (all LED's will blink WHITE for 1 second and Beep is heard), etc.

2.1.1.1 Claim a locker

- User approaches **available** locker (Battery lock is available when the point of the knob is rotated to either 9 o'clock or 3 o'clock. A graphical icon of an open lock is shown).
- User stores his/her belongings in locker
- User closes the lockerdoor
- User fills in 4 digit pincode (1st time), and presses confirmation button(3. Is there a password length requirement? 4 to 8 digits or a fixed number of 4 digit) For users lets keep a fixed of 4 numbers, for admin it can be 6
After confirmation button, all LED's will blink GREEN 1 time.
- User fills in 4 digit pincode (2nd time), and presses confirmation button
After confirmation button, all LED's will blink GREEN 2 times.
- After 2nd time of pincode, lock can be operated (move to closed position). User has 4 seconds to move knob to closed position.

2.1.1.2 Open locker

- User approaches **claimed** locker (position of the knob is at 12 o'clock (closed position))
- User fills in 4 digit pincode and presses confirmation button. After confirmation, all LED's will blink GREEN 2 times
- After pincode, lock can be operated (move to open position). User has 4 seconds to move knob to open position.
- *(If wrong pincode is filled in, all LED's will blink RED 2 times, and beep is heard 2 times. If wrong pincode is filled in for 3 times in a row, battery lock will be blocked for 1 minute)*
- After opening, 4 digit pincode will be automatically reset (de-assigned)

2.1.2 RFID

2.1.2.1 Claim a locker:

- User approaches **available** locker (Battery lock is available when the point of the knob is rotated to either 9 o'clock or 3 o'clock. A graphical icon of an open lock is shown).

- User stores his/her belongings in locker
- User closes the lockerdoor
- User scans RFID badge, the battery lock LED indication will blink GREEN 2 times.
- After scanning, lock can be operated (move to closed position). User has 4 seconds to move knob to closed position.

2.1.2.2 Open locker

- User approaches **claimed** locker (position of the knob is at 12 o'clock)
- User scans RFID badge, the battery lock LED indication will blink GREEN 2 times
- After scanning, lock can be operated (move to open position). User has 4 seconds to move knob to open position.
- *(If wrong badge is scanned, all LED's will blink RED 2 times and beep is heard 2 times. If wrong badge is scanned for 3 times in a row, battery lock will be blocked for 1 minute)*
- After opening, RFID UID/Safety key will be automatically reset (de-assigned)

2.2 Flex use (given time):(4.Is the only difference between 2.22.1 and 2.2 just that: One has a time limit and one has no time limit?) That is correct, I guess you mean 2.1 and 2.2.

In this scenario a user will be able to claim an **available** locker, store belongings and then close the locker. The claimed locker will be available for the user for the given time (set in portal) and can open and close the locker for as many times as he/she wants. When given time is passed, the locker is again free to claim/use for everyone. (5.What mode are you in? This is Flex use mode, but instead of 1 time use, the battery lock can be operated until the 'set time' has passed. Only admin can switch between modes, and is able to set the time

Whether the mode does not change, but can be used for several times in this period, with a time limit. The cabinet can be reused during this time period).

(The administrator switches the mode through Bluetooth, and the user cannot switch, right? Correct, only admin can switch between modes Is this mode can only be switched and used by APP and set the time? Yes admin can adjust the time via the app.

) Can you provide the usage scenario of this mold as before? See 4.3

2.2.1 Pincode

2.2.1.1 Claim a locker

- User approaches **available** locker (Battery lock is available when the point of the knob is rotated to either 9 o'clock or 3 o'clock. A graphical icon of an open lock is shown).
- User stores his/her belongings in locker
- User closes the lockerdoor
- User fills in 4 digit pincode (1st time), and presses confirmation button
After confirmation button, all LED's will blink GREEN 1 time.
- User fills in 4 digit pincode (2nd time), and presses confirmation button
After confirmation button, all LED's will blink GREEN 2 times.
- After 2nd time of pincode, lock can be operated (move to closed position). User has 4 seconds to move knob to closed position.

2.2.1.2 Open locker

- User approaches **claimed** locker (position of the knob is at 12 o'clock (closed position))

- User fills in 4 digit pincode and presses confirmation button. After confirmation, all LED's will blink GREEN 2 times
- After pincode, lock can be operated (move to open position). User has 4 seconds to move knob to open position.
- *(If wrong pincode is filled in, all LED's will blink RED 2 times, and beep is heard 2 times. If wrong pincode is filled in for 3 times in a row, battery lock will be blocked for 1 minute)*

2.2.1.3 Close locker

- User closes the lockerdoor
- User fills in 4 digit pincode and presses confirmation button. After confirmation all LED's will blink GREEN 2 times
- Lock can be operated (move to closed position). User has 4 seconds to move knob to closed position.
- *(If wrong pincode is filled in, all LED's will blink RED 2 times and beep is heard 2 times)*

Process can be repeated within the given time (set in mobile app)

2.2.2 RFID

2.2.2.1 Claim a locker:

- User approaches **available** locker (Battery lock is available when the point of the knob is rotated to either 9 o'clock or 3 o'clock. A graphical icon of an open lock is shown).
- User stores his/her belongings in locker
- User closes the lockerdoor
- User scans RFID badge, the battery lock LED indication will blink GREEN 2 times
- After scanning, lock can be operated (move to closed position). User has 4 seconds to move knob to closed position.

2.2.2.2 Open locker

- User approaches **claimed** locker (position of the knob is at 12 o'clock)
- User scans RFID badge, the battery lock LED indication will blink GREEN 2 times
- After scanning, lock can be operated (move to open position). User has 4 seconds to move knob to open position.
- *(If wrong badge is scanned, all LED's will blink RED 2 times and beep is heard 2 times. If wrong badge is scanned for 3 times in a row, battery lock will be blocked for 1 minute)*

2.2.2.3 Close locker

- User closes the lockerdoor
- User scans RFID badge, the battery lock LED indication will blink GREEN 2 times
- After scanning, lock can be operated (move to closed position). User has 4 seconds to move knob to closed position.

Process can be repeated within the given time (set in mobile app)

2.3 Assigned use

In this scenario the user can **only** be assigned by the admin via the mobile app. (see mobile app functionality about assignment process)

When the user is assigned to a battery lock, it can be operated (opened/closed) in the same way as described for Flex use (given time) for both pincode and RFID models, until it gets de-assigned by the admin.(6.Can you provide the usage scenario of this mold as before?) See 4.4

3 Hardcoded functionalities

3.1 Override

In this mode, the admin uses 'master code' to override the assigned or flex use scenario to open the battery lock. The battery lock can **always** be opened with this code. Override function can also be achieved by mobile app (see chapter 4). (7. Is there a default management password? How to modify management password, via APP only? Or the keyboard on the lock?) Default Master code is given (280291) Master code can be adjusted in app

3.1.1 Pincode

- Admin approaches **claimed** locker (position of the knob is at 12 o'clock (closed position))
- Admin fills in 6 digit 'master code' and presses confirmation button. After confirmation, all LED's will blink GREEN 2 times
- After 'master code', lock can be operated (move to open position). Admin has 4 seconds to move knob to open position.
- *(If wrong 'master code' is filled in, all LED's will blink RED 2 times, and beep is heard 2 times. If wrong 'master code' is filled in for 3 times in a row, battery lock will be blocked for 1 minute)*

3.1.2 RFID

- Admin approaches **claimed** locker (position of the knob is at 12 o'clock)
- Admin scans 'Master badge', the battery lock LED indication will blink GREEN 2 times

8.- How is the management card configured?

Does the lock body need a card matching function key?

Or is kerong prepared in advance?

Or any PDA device?

Or APP? If it is an App, the app needs to have the function of issuing cards, which is a bit complicated)

Master badge with serial number (UID) is created in portal. Portal communicates with mobile app. To 'install' UID number on the battery lock, the admin has to connect to the battery lock and update/refresh. Then the UID is stored.

- After scanning, lock can be operated (move to open position). User has 4 seconds to move knob to open position.
- *(If wrong badge is scanned, all LED's will blink RED 2 times and beep is heard 2 times. If wrong badge is scanned for 3 times in a row, battery lock will be blocked for 1 minute)*

3.2 Last resort use

When the battery is dead, the battery lock can still be operated by an external power source (powerbank) with USB-C cable. The USB-C connector can be found on the top of the battery lock (from the front) by unscrewing 2 screws on the lid. After unscrewing the lid, the USB-C cable can be connected to the USB-C connector. This will enable the user/admin to use the battery lock as they desire.

4 Mobile app

All of the battery locks are equipped with Bluetooth. The mobile app enables an admin or user to connect with any battery lock via Bluetooth.

4.1 User

Login screen

- User account is created by admin
- User logs in on the mobile app

Start screen -> buttons: "Connect"

- See assigned lock number (assigned to the user by admin) and see a button to 'Connect' -> click to connect (via Bluetooth). When connected to the battery lock, the Bluetooth LED indication on the battery lock will blink BLUE 3 times.

Battery lock screen -> buttons: "Operate lock", "Locate", "Pincode*"

- After connection, battery status visible (percentage).
- "Operate lock" button; The battery lock can be operated (move to open or closed position). User has 4 seconds to move knob to open or closed position.
- By tapping "Locate", all LED's of the battery lock will **blink** WHITE for 5 seconds.
- By tapping "Pincode" the user is able to change the pincode (by default it is set to 0000)

* Only available in Pincode battery lock

4.2 Admin

Login screen

- Admin account is provided by partner
- Admin logs in on the mobile app

Start screen -> buttons: "Scan", "Operate lock", "Connect"

- By tapping "Scan", the admin can see all the available Battery Locks in the area
- The available locks will be seen directly with following information:
 - o Lockernumber (visible, no button)
 - o Battery status (visible, no button)
 - o Auto-unlock On/Off (visible, no button)
 - o "Operate lock" button (Override function)
 - o "Connect" button

Battery lock screen -> buttons: "Operate lock", "Choose scenario", "De-assign", "Auto-unlock", Bluetooth battery saving", Locate"

- When connected to a battery lock, the screen will show the following:
 - o Battery status (visible, no button)
 - o Last time use (visible, no button)
 - o Status in use (visible, no button) [Available/In Use , if In Use, scenario type is also visible]

- “Operate lock” button; The battery lock can be operated (move to open or closed position). Admin has 4 seconds to move knob to open or closed position.
- “Choose scenario” button [Assigned/Flex use (one time)/Flex use (given time)]; If chosen for assigned use, screen opens to select/invite user (see 4.3 and 4.4)
- “De-assign” button; The battery lock will forget the user and will be available for everyone again (Flex use, default scenario)
- “Locate” button; All LED’s of the battery lock will blink WHITE for 5 seconds.
- “Settings” button; This button opens some additional features for the admin:
 - “Auto-unlock” button; When in flex use, auto-unlock can be enabled to remove the flex use pincode after a set period of time.
 - Pop-up opens, to select sequential day and time to enable auto-unlock mod
 - “Bluetooth battery saving” button; this button allows the admin to adjust the time of hibernation mode (9.What does the hibernation mode mean?)
Hibernation mode means the time in which BLE is not actively responding/ looking for available devices. So you can say ‘offline status’ in order to save the battery of the BLE functionality.
 - Pop-up opens to select the sequential amount of seconds in which ‘hibernation’ mode should be active and the sequential amount in which the ‘active’ mode should be active.
 - “Update firmware” button; this button allows the admin to update the firmware of the battery lock
 - “Master code” button; this button allows the admin to adjust the master code (UID or Pincode) that is used on the battery lock.

4.3 Admin Flex use given time setup:

- Admin opens mobile app
- Admin signs in as admin
- Admin taps “Scan” button
- Admin can see an overview of battery locks in the area
- Admin taps “Connect” button, to connect to a battery lock
- Admin taps “Choose scenario” button
- New window will pop up with buttons: Assigned use, Flex use (given time) and Flex use (one time)
- Admin taps on Flex use (given time)
- New window will pop up to set the given time
- After time is set, admin taps “Update” button, this allows the admin to install the adjustments to the battery lock
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4.4 Admin Assigned use setup:

- Admin opens mobile app
- Admin signs in as admin
- Admin taps “Scan” button
- Admin can see an overview of battery locks in the area

- Admin taps "Connect" button, to connect to a battery lock
- Admin taps "Choose scenario" button
- New window will pop up with buttons: Assigned use, Flex use (given time) and Flex use (one time)
- Admin taps on Assigned use
- New window will pop up: Assign from cloud, Assign new
- With Assign from cloud, user in Keynius cloud can be connected to the Battery lock, Assign new will allow the admin to fill new credentials
- After credentials are filled in (email address, password, **Pincode or RFID UID** (WhatsApp invitation can be send to user?)) admin taps "Update" button to install the assignment in the battery lock.
- User then can log in to the app with credentials and connect to assigned battery lock (see 4.1 for user scenario)

FCC Warning:

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

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Caution: Any changes or modifications to this device not explicitly approved by manufacturer could void your authority to operate this equipment.

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 complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator and your body.