



LW001-BG PRO

APP Guide

Version 1.1

MOKO TECHNOLOGY LTD.

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1 About this Manual

The purpose of this manual is to outline how to use MKLoRa APP for LW001-BG PRO.

2 MKLoRa APP

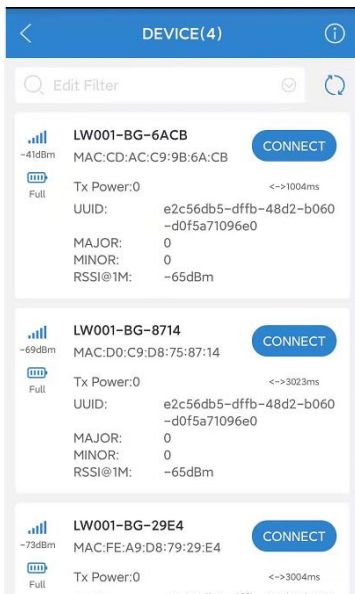
For the detailed operation of the MKLoRa app to configure and read device information, please refer to the following instructions:

2.1 Install MKLoRa APP

User can get the APP download link by search “MKLoRa” in your phone APP store: Please allow Bluetooth to be enabled during the installation process. This APP communicates with the device via Bluetooth, and it only supports above android 4.4 and IOS 9.0 system.

Note: After the successful installation of the APP, the APP will request some mobile phone permissions, such as Bluetooth access permissions. Please click "OK", otherwise the APP will not work well.

2.2 Connect to LW001-BG PRO



After the device is turned on, the device Bluetooth will start broadcasting. Open the MKLoRa APP and choose LW001-BG PRO, then you can search the LW001-BG PRO device by click the refresh icon. The default broadcast name of the device: LW001-BG PRO-XXXX.

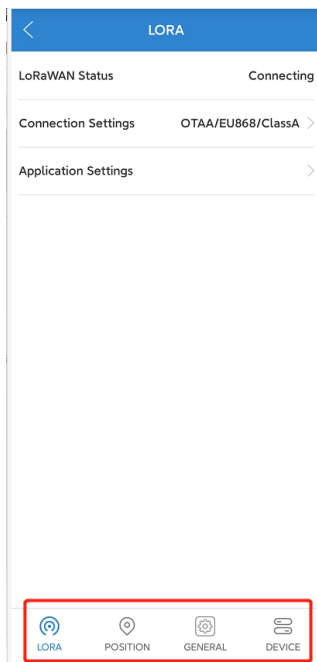
Then click “Connect” button, the default login password is Moko4321.

The Edit Filter at the top can help user filter the keywords and RSSI. RSSI ranges from -100dBm to 0dBm;

Note: If a password is not entered within one minute, the login box will disappear, you should click “CONNECT” again.

Note: If there is no action within 3 minutes after login, the system will automatically login out.

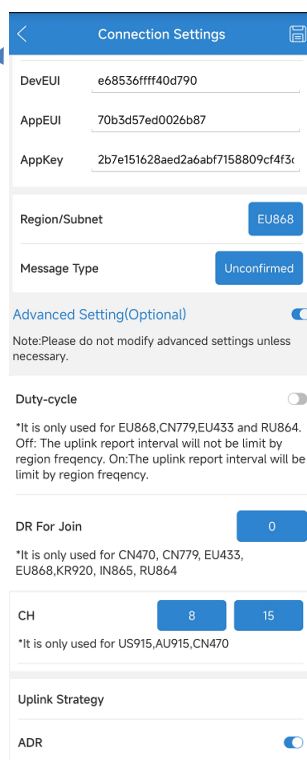
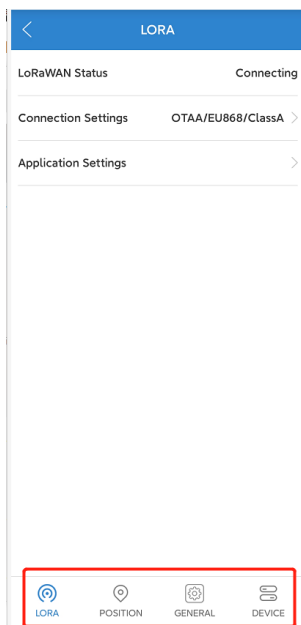
2.3 Configure LW001-BG PRO Parameters



When you log into the device successfully, you will enter the main page. There are four parts of the parameter configuration: LORA, POSITION, GENERAL and DEVICE.

2.3.1 LORA Parameters

In this page, you can configure parameter for LoRa Part:



In the connection settings page, we can get and configure the LoRaWAN Mode, DevEUI, AppEUI, AppKey, DevAddr, AppSKey, NwksKey, Region/Subnet, Message Type.

Click the Advanced Setting (Optional) button, you can set some advanced parameters:

CH: Channel Setting, Generally, the default value is fine. It is only used for US915, AU915 and CN470

Duty-Cycle: It is only used for EU868, CN779, EU433 and RU864. The default is off.

DR for join: It is only used for CN470, CN779, EU433, EU868, KR920, IN865 and RU864. DR selection for Join Request of OTAA mode. The default is DR 0.

Uplink Strategy:

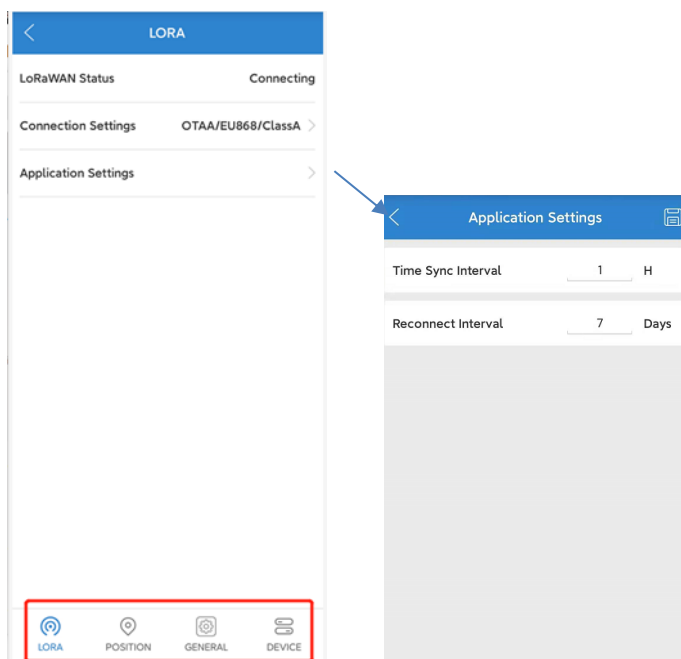
Option1: ADR on, ADR mechanism following the standard protocol stack.

Option2: ADR off, if the Transmissions are 2, device will use the two set DRs to send payload once each, If the two DRs are the same, the data is sent twice with this DR.

Option3: ADR off, if the Transmission is 1. The device will choose the DR to send the payload within the set DR range, and will try to ensure that the time taken to send the payload is the same every time.

Note: If the data length of the current payload exceeds the transmission capacity of the selected DR, it will automatically make the DR plus one.

Note: Please don't modify advanced settings unless necessary.



Time Sync interval: It is used to sync the device time via mac command.

The default value is 1, means that the device's time will be synchronized every 1 hour via LoRaWAN MAC commands.

0 means disable.

The value ranges from 0 -254H.

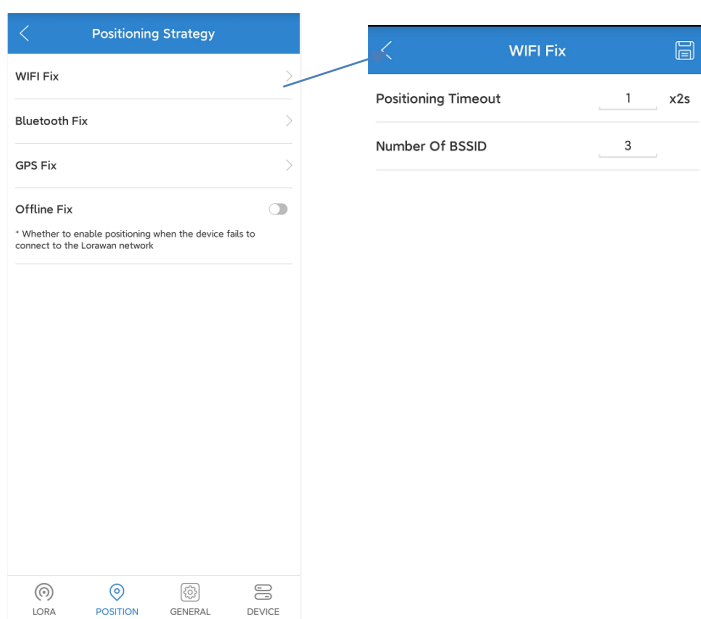
Reconnect interval: The device will periodically reconnect to the network.

The value ranges from 0 -30 days, 0 means disable.

2.3.2 POSITION Parameters

In this page, you can configure parameter for POSITION Part:

2.3.2.1 WIFI Fix



Positioning Timeout:

WIFI positioning maximum scan time.

The value ranges from 1 -5, that is 2s - 10s.

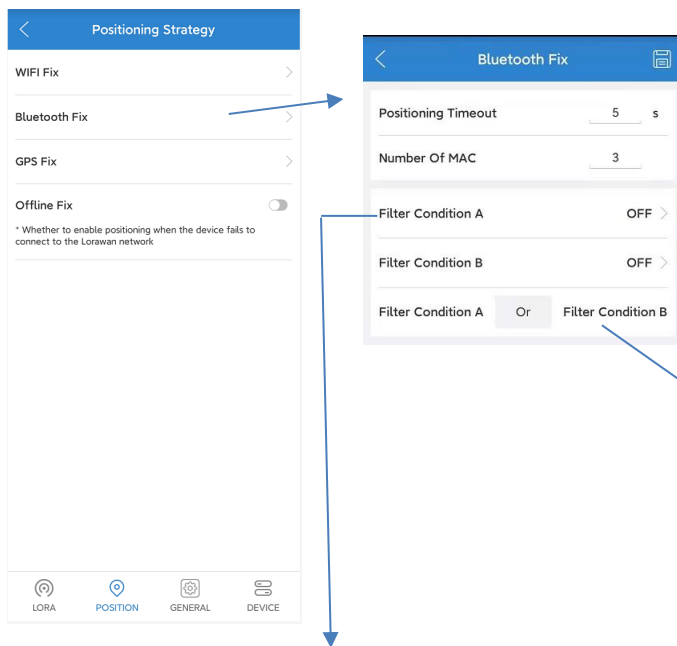
The default is 2s.

Number of BSSID: Number of devices required for successful WIFI positioning.

The value ranges from 1 -5.

The default is 3.

2.3.2.2 Bluetooth Fix



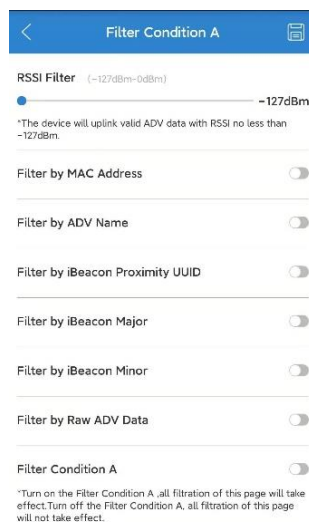
Positioning Timeout:

Bluetooth positioning maximum scan time.
The value ranges from 1s -10s.
The default is 5s.

Number of MAC:

Number of devices required for successful Bluetooth positioning.
The value ranges from 1 -5.
The default is 3.

The relationship between Location Beacon Filter Condition A and Location Beacon Filter Condition B can be set OR or AND.



RSSI Filter: The default value is -127 dBm, the range of this value is from -127dBm to 0 dBm. For example, if user set this value to -100dBm, the device will store valid ADV data which's RSSI is bigger than -100dBm.

Whitelist: Checking this box means reverse filter.

Filter by MAC Address: The default status is off. When we click the button on the right, the status will be on and user can edit the Keyword that include part or all of MAC Address. The device will store valid ADV data that meets the filter content. For example, the Filter content is AA BB and whitelist is open. Suppose there is a beacon whose MAC is CC AA BB DD EE FF, then it does not meet the filter content and will not be saved and uploaded

Filter by ADV Name: The default status is off. When we click the button on the right, the status will be on and user can edit the Keyword that include part or all of ADV name. The device will store valid ADV data that meets the filter content.

Filter by iBeacon Proximity UUID: The default status is off. When we click the button on the right, the status will be on and user can edit the Keyword that include part or all of UUID. The device will store valid ADV data that meets the filter conditions.

Filter by iBeacon major: The default status is off. When we click the button on the right, the status will be on and user can set the min value and max value of iBeacon Major. Both of these values range from 0-65535, and the max value must be no less on the min value. The device will store valid ADV data whose major value meets the scope requirements.

Filter by iBeacon minor: The default status is off. When we click the button on the right, the status will be on and user can set the min value and max value of iBeacon Minor. Both of these values range from 0-65535, and the max value must be no less on the min value. The device will store valid ADV data whose minor value meets the scope requirements.

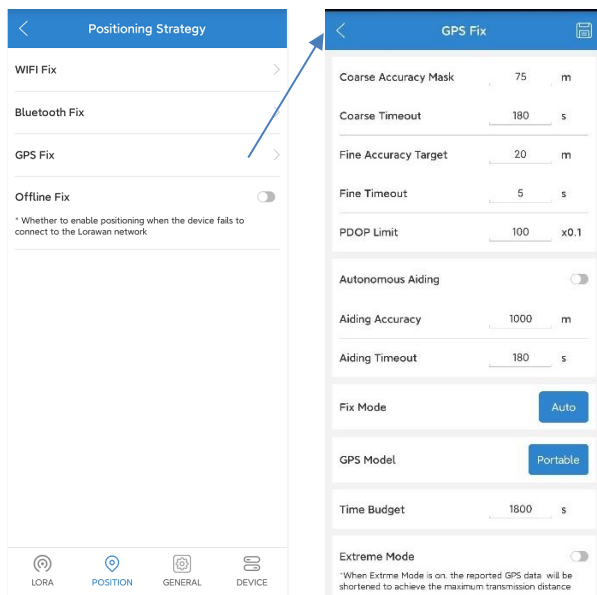
Filter by Raw ADV Data: The default status is off. When we click the button on the right, the status will be on, and it can add five different filter data types in total when click "+", each with a length of 5 to 33 bytes.

Data Type: 1byte, the data type value should meet Bluetooth Generic Access Profile. Data type definitions please refer to <https://www.bluetooth.com/specifications/assigned-numbers/generic-access-profile/>.

Byte: the byte range under the data type, the max value is 62 bytes, the maximum byte range difference is 26.

Raw data field: the length should match with the byte range.

2.3.2.3 GPS Fix



Coarse Accuracy Mask: This is the required position accuracy for a position fix to be considered valid. It provides a lower bound on accuracy. Please note that it works on the estimated accuracy, and it is not uncommon for position fix errors to occasionally be two or three times larger than the mask. Also note that values lower than 20 will be difficult to achieve in practice. The value ranges from 5m -100m. The default is 75 meters.

Coarse Timeout: The maximum time to spend waiting for the GPS to get a coarse position fix, per attempt. This limits the battery drain if there is no GPS signal. Values lower than 60 are likely to be problematic in practice, with 35 being an absolute minimum in very good signal. This setting is augmented by the GPS signal validator described in GPS Detect Time below. Note that the first fix attempt after battery insertion will always try for at least 10 minutes, regardless of any configured limits. If a fix times out the fix failed flag will be set and a message with the last known coordinates will be sent. The value ranges from 1s - 7620s. The default is 180s.

Fine Accuracy Target: This is the target accuracy for the GPS Fine Timeout setting. Note that values lower than about 6 are not reliably achievable with consumer GPS technology, and will lead to the full GPS Fine Timeout elapsing on each fix attempt. The value ranges from 5m -100m. The default is 20 meters.

Fine Timeout: The maximum time to spend waiting for the GPS accuracy to improve, after a coarse fix is achieved. Once the GPS manages to get a fix satisfying the minimum accuracy targets (Pos Acc Mask below), it waits up to GPS Acc Timeout for the accuracy to improve to GPS Acc Target. This allows you to set an opportunistic accuracy goal, and fall back to a lower accuracy if the goal can't be met. Zero disables the feature. The value ranges from 0s -7620s. The default is 5 seconds.

PDOP Limit: The PDOP is a measure of how imprecise a GPS fix is, due to the satellites used being too close together to triangulate effectively. This parameter sets an upper bound on the imprecision, for a fix to be considered valid. You can safely use the default value, and specify the Coarse Accuracy Mask instead. The value ranges from 2.5 -10. The default is 10.

Autonomous Aiding: This enables a GPS feature that predicts future satellite movements, so that position fixes can proceed without listening for all of the satellite information the next time the satellite is in view. It can help fixes succeed in low signal levels, but greatly decreases the accuracy of the fixes. The default is off.

Aiding Accuracy: This provides a rough limit on positioning accuracy of Autonomous Aiding function. This accuracy can't be detected by the GPS module, so it can't be filtered out by the coarse accuracy. If this value is set below 50, autonomous aiding function is unlikely to be of any use. The default is 100 meters.

The actual accuracy may be several times the set value of aiding accuracy.

Aiding Timeout: The maximum time to spend waiting for the GPS to get a coarse position fix via Autonomous Aiding, per attempt. The value ranges from 1s -7620s. The default is 180s.

Fix Mode: GPS positioning mode selection. It can set to 2D, 3D or Auto. The default is Auto.

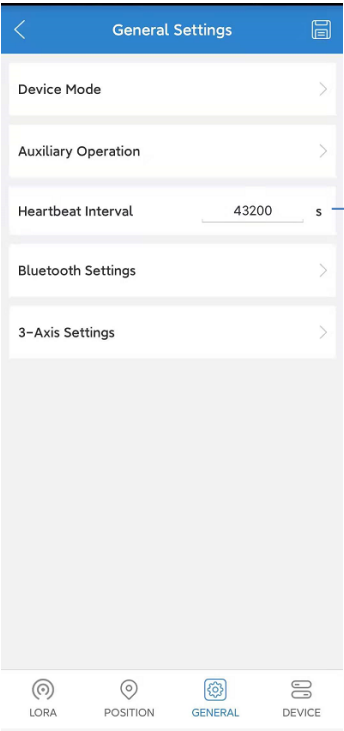
GPS Model: This informs the GPS module of what sort of motion to expect from the asset, allowing it to make better estimates when moving. The Automotive setting is a safe default, but the Pedestrian and Stationary settings may be useful as well. Setting the model appropriately allows the GPS to filter out noise more effectively. The default is Portable.

Time Budget: This setting allows you to set a daily GPS on-time budget. When non-zero, the device will refuse to spend more than this number of total seconds per day trying to get GPS fixes. This prevents the battery being run down if a lot of unforeseen movement occurs. Once the budget for the day is expended, further GPS fixes and LoRaWAN transmissions are skipped. The value ranges from 0s -76200s. The default is 28800s.

Extreme Mode: When Extreme Mode is on, the reported GPS data will be shortened to achieve the maximum transmission distance. The default is off.

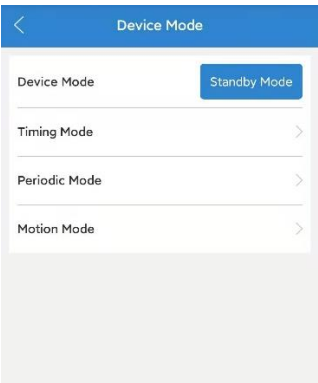
2.3.3 GENERAL Settings

In this page, you can configure parameter for general settings:

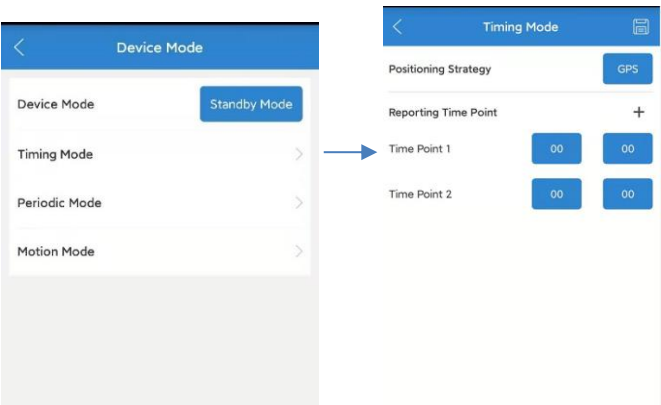


Heartbeat Interval: The Report interval of heartbeat payload. The value ranges from 300s -86400s. The default is 43200s.

2.3.3.1 Device Mode Settings



Device Mode: Users can choose different working modes according to different application scenarios. It can be set to standby mode, periodic mode, timing mode or motion mode. The default is periodic mode.

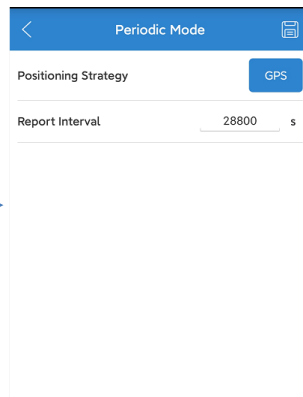
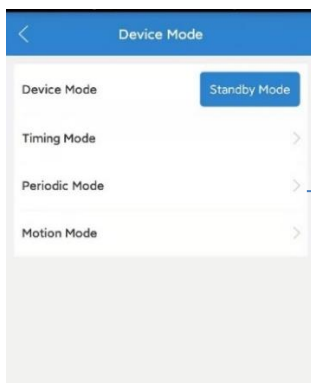


Positioning Strategy: Position strategy selection in Timing mode, the default is GPS.

Report Time Point: Reporting time point setting, up to 10 groups can be set, every 15 minutes for a time point.

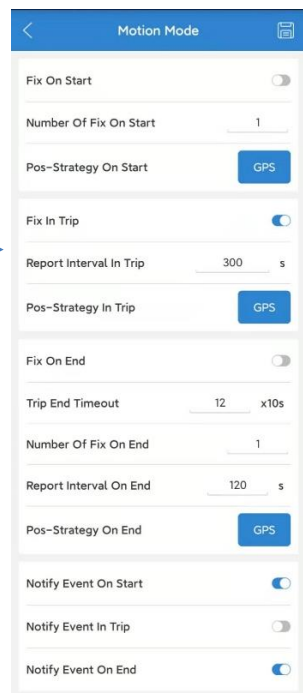
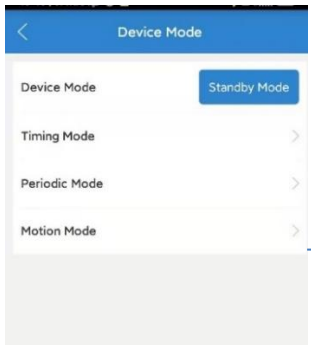
Click on the + sign to add a set of time points.

Swipe your finger left to right on the mobile screen to delete a group of time points.



Positioning Strategy: Position strategy selection in periodic mode, the default is GPS.

Report Interval: Location payload reporting interval in periodic mode. The value ranges from 300s -86400s. The default is 600s.



Fix on start: Whether the beginning of the movement requires positioning. The default is off.

Number of fix on start: Number of times positioning data is reported at the start of the movement. The value ranges from 1 -255. The default is 1.

Pos-Strategy on start: Position strategy selection during the start of the movement. The default is GPS.

Fix in trip: Whether in the movement requires positioning. The default is off.

Report interval in trip: Location payload reporting interval in the movement. The value ranges from 10s - 86400s. The default is 300s.

Pos-Strategy in trip: Position strategy selection in the movement. The default is GPS.

Fix on end: Whether the end of the movement requires positioning. The default is off.

Trip end timeout: The time threshold for judging the motion stop, when the device does not move in N seconds continuously, the device is considered to enter the end of movement. The value ranges from 3 -180, the unit is 10s. The default is 120s.

Number of fix on end: Number of positioning at the end of movement state. The value ranges from 1 -255. The default is 1.

Report interval on end: Location payload reporting interval at the end of movement state. The value ranges from 10s -300s. The default is 120s.

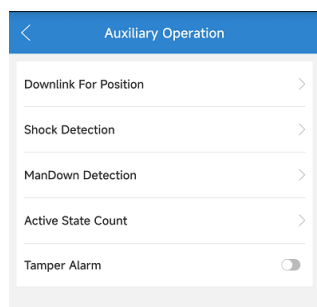
Pos-Strategy on end: Position strategy selection at the end of movement state. The default is GPS.

Notify event on start: Event message can be sent when the preset moving trigger condition (Motion Threshold & Motion Duration) is reached. The default is on.

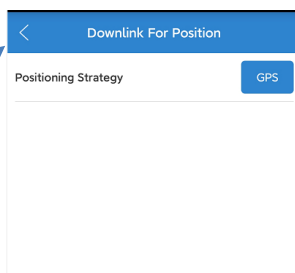
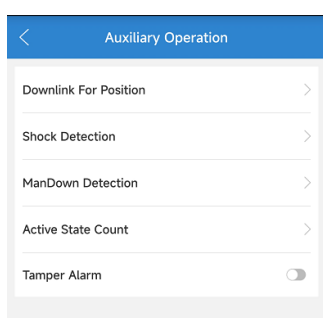
Notify event in trip: When the device is in movement, Event messages can be sent whenever the device starts positioning. The default is off.

Notify event on end: Event message can be sent when the device come into End of movement state. The default is on.

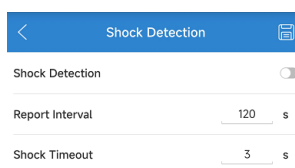
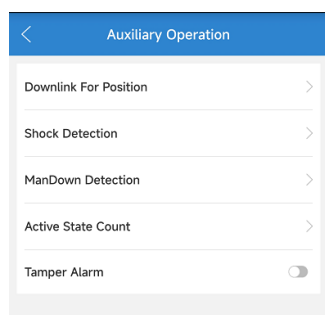
2.3.3.2 Auxiliary Operation Settings



Tamper Alarm: The switch for the Tamper alarm function. The default is off.



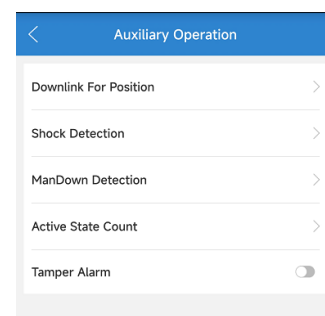
Positioning Strategy: Position strategy selection in *Downlink For Position* function, the default is GPS.



Shock Detection: The switch for the vibration detection function. The default is off.

Report Interval: Reporting interval of Shock payloads. The value ranges from 3s -255s. The default is 120s.

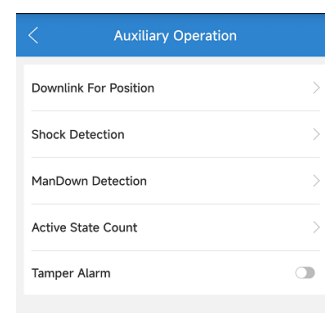
Shock Timeout: The number of shock timeout time, if the device is in continuous shock, each N second is counted as one shock. The value ranges from 1s -20s. The default is 3s.



Man Down Detection: The switch for the Man Down detection function. The default is off.

Idle Detection Timeout: If the duration of the stationary time exceeds idle detection timeout, the device will be considered to enter the idle state. The value ranges from 1H -8760H. The default is 168H.

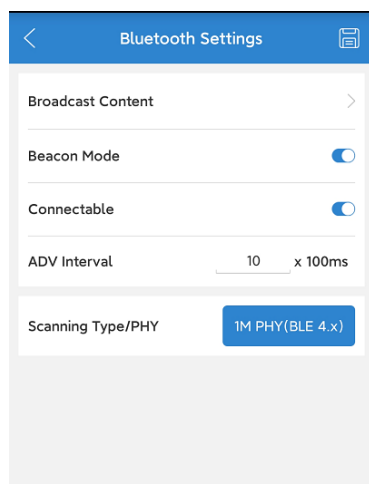
Idle Status: Users can reset the idle status through the APP.



Active State Count: The switch for the active state count function. The default is off.

Active State Timeout: Whenever the state of the LW001-BG PRO changes stationary to motion, the activity count will be increased by one. One or more moves within Activity State Timeout will be judged as one activity, and Activity State Timeout can be set according to different application scenarios.

2.3.3.3 Bluetooth Settings

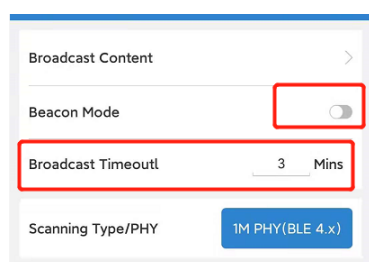


Beacon Mode: The device can be set to beacon mode or configuration mode. The default is off.

Connectable: When the device is in beacon mode, the user can select the connectable state or the unconnectable state.

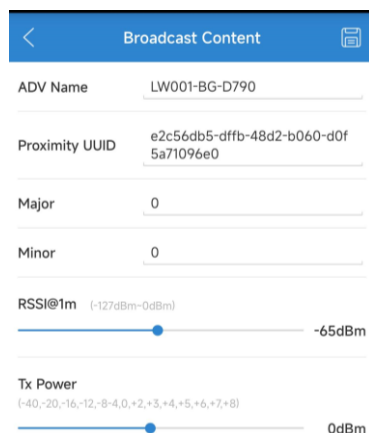
ADV interval: When the device is in beacon mode, user can set Bluetooth broadcast interval. The value ranges from 1 -100. The default is 10, the unit is 100ms.

Scanning Type/PHY: It can be set 1M PHY (BLE 4.X), 1M PHY (BLE 5), 1M PHY (BLE 4.X + BLE 5) or Coded PHY (BLE 5). The default is 1M PHY (BLE 4.X).



Broadcast Timeout: When the device is in configuration mode, the time of each broadcast. The value ranges from 1min - 50 mins. The default is 3 mins.

2.3.3.3.1 Bluetooth Broadcast Content



ADV Name: The ADV name of LW001-BG PRO, can be set to 13 characters at most.

UUID: The default Value is E2 C5 6D B5 DF FB 48 D2 B0 60 D0 F5 A7 10 96 E0. User can set the UUID values that meet the requirements of the standard field in the input box(16bytes).

Major&Minor: The default value is 0. User writes decimal digits to configure Major and Minor. The value ranges from 0 to 65535.

RSSI@1m: It refers to Receiver device receives the signal strength in 1 meter (For iBeacon). This value shall be based on the actual environment test results and is usually set by the customer. The default is -65dBm.

Tx Power: The default value is 0 dBm and Tx Power can be configured as one of the following data: -40dBm, -20dBm, -16dBm, -12dBm, -8dBm, -4dBm, 0dBm, 2dBm, 3dBm, 4dBm, 5dBm, 6dBm, 7dBm, 8dBm.

2.3.3.4 3-Axis Settings

Setting	Value	Unit
Wakeup Threshold	3	x16mg
Wakeup Duration	2	x10ms
Motion Threshold	18	x2mg
Motion Duration	15	x5ms
Shock Thresholds	200	x10mg

Wakeup Threshold: The device will wake up when the motion reaches the wake-up threshold and lasts for a period of time (wakeup duration). The value ranges from 1 - 2, the unit is 16mg. The default is 48mg.

Wakeup Duration: The device will wake up when the motion reaches the wake-up threshold and lasts for a period of time. The value ranges from 1 - 10, the unit is 10ms. The default is 20ms.

Motion Threshold: Judgment threshold for device motion. The value ranges from 10 - 250, the unit is 2mg. The default is 36mg.

Motion Duration: When the device motion reaches the motion threshold and lasts for a period of time, the device is considered to be in motion. The value ranges from 1 - 50, the unit is 5ms. The default is 75ms.

Shock Threshold: When the shock amplitude of the device reaches this value, the device is considered to be in vibration. The default is 2000mg.

2.3.4 DEVICE Settings

Setting	Value
Local Data Sync	>
Indicator Settings	>
Current Time Zone	UTC
Shutdown Payload	On
Low-power Payload	Off
On/Off	>
Low Power Prompt	10%
*When the battery is less than or equal to 10%, the green LED will flash once every 10 seconds.	
Device Information	>
Factory Reset	>
Change Password	>
Power Off	Off

Current Time Zone: Selection of the time zone in which the current device is located. The value ranges from UTC-12 to UTC+12. The default time zone is UTC.

Shutdown Payload: Whether to report shutdown payload when the device turns off. The default is on.

Low-power Payload: Whether to report heartbeat payload when the battery level is low. The default is off.

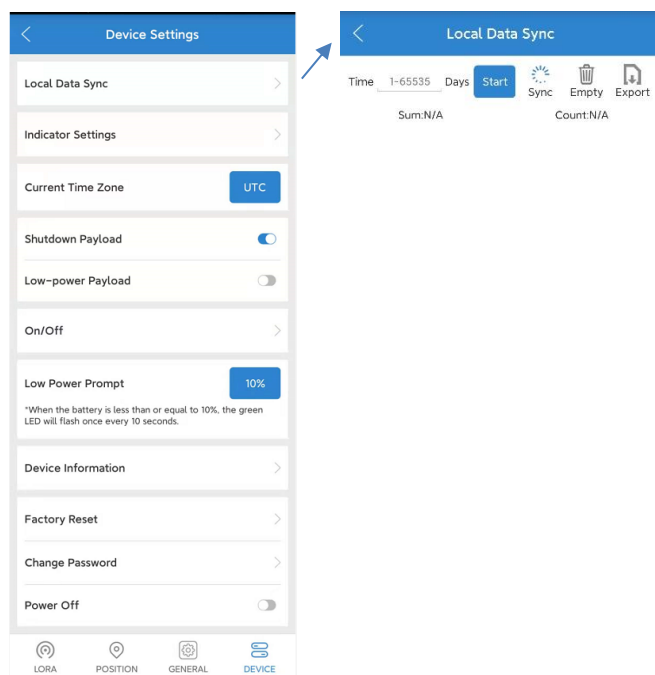
Low Power Prompt: The default is 10%. It can be set 5% or 10%.

Factory Reset: User can use the APP to reset the device.

Change password: User can change the login password of MKLoRa APP. The default is Moko4321.

Power off: User can use the APP to shut down the device.

2.3.4.1 Local Data Sync

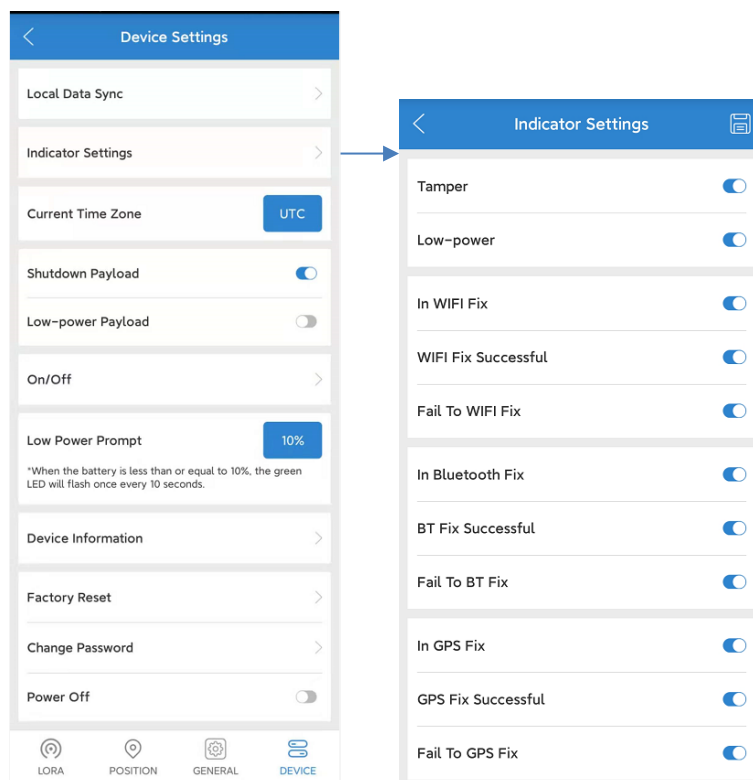


Local Data Sync: Users can read the last 1 to 65,536 days of stored data.

After selecting the number of days, click Start, and the device will automatically read the data, and the Sync icon will rotate continuously. Users must manually click the Sync icon to stop data synchronization, and when the value of sum appear, it means that the data is synchronized completely.

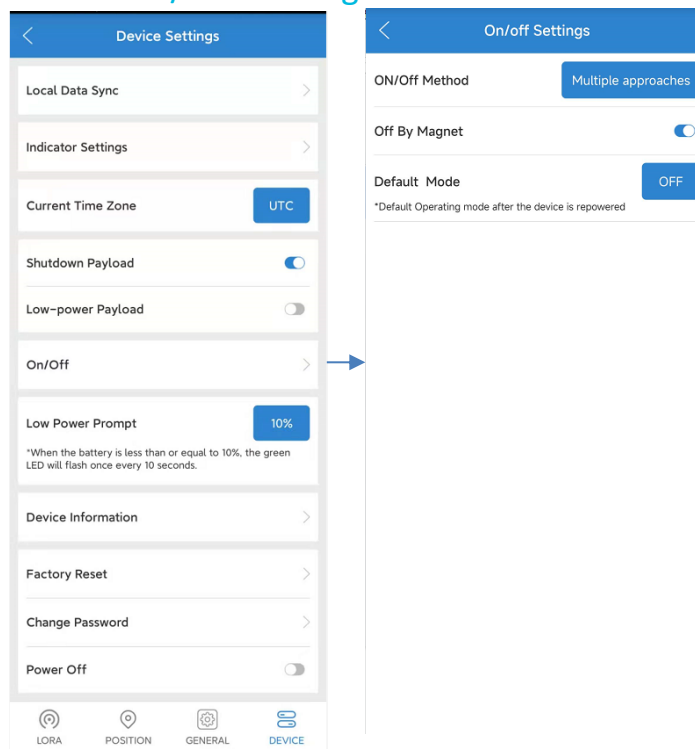
After the data is synchronized completely and click the Sync icon to stop data synchronization, the user can delete and export the data.

2.3.4.2 Indicator Settings



Indicator settings: LED indicator switches for various device statuses, user can choose to turn off and on. The default is both on.

2.3.4.3 ON/OFF Settings



ON/OFF Method: User can choose multiple approaches or continuous approaches for magnetic ON/OFF Method. The default is multiple approaches.

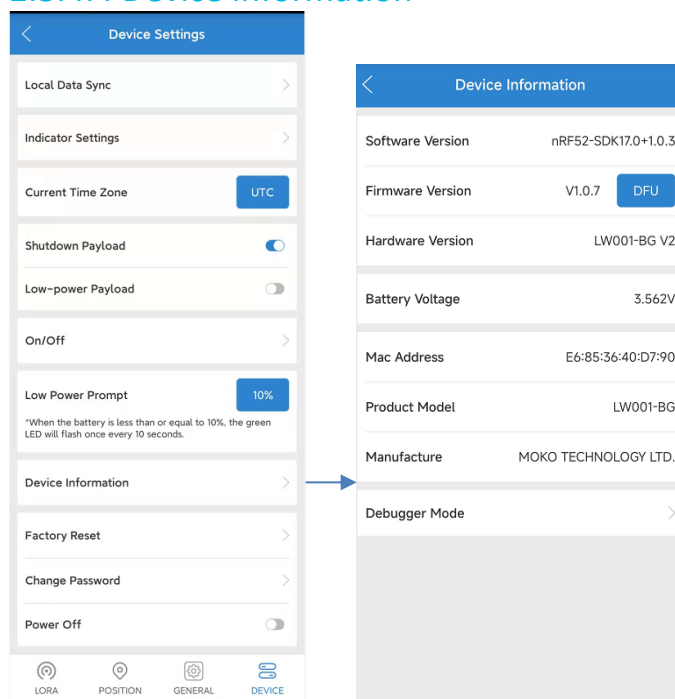
Off by magnet: Whether the device can be turned off by a magnet. The default is on.

Default Mode: Which mode the device is in after the battery is replaced.

- OFF: Configure LW001-BG PRO to turn off, after the battery is replaced.
- Revert to last mode: Configure LW001-BG PRO to return to last working mode it was in, after the battery is replaced.

The default is "OFF".

2.3.4.4 Device Information




Update Firmware (DFU): To update the firmware via the DFU should use the upgrade package that MOKO provides with ZIP format. If you use an android phone, place the ZIP file of firmware upgrade package into the phone folder, select the upgrade package file from the OTA page of the APP, and click to upgrade.

IOS phones need to share the upgrade package file with MKLoRa via computers and iTunes tools. and then select the upgrade package file from the OTA page of the APP, and click to upgrade.

3 Revision History

Version	Description	Editor	Date
1.0	Suitable for firmware version V1.0.1&V1.0.6	Allen	2021-09-08
1.1	Suitable for firmware version V1.0.7	Allen	2022-06-27

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