LITHIUM BATTERY SYSTEM · TOUCHSCREEN

L6 TOUCH

MBMU

The touchscreen of the L6 master cabinet: monitoring, records, health management and configuration of the L6 lithium battery system.



User Manual

Installation · Operation · Maintenance

L6-CAB-10x50LI | L6-CAB-20x50LI | L6-MOD-50LI | 40 Ah module | 100 Ah module

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AEC-UM-L6T-EMEA · Rev. A · November 2026. Rev. A is the first EMEA edition of the touchscreen manual: the L6 system with 40, 50 and 100 Ah modules for the AEC IST6 modular UPS, with the AEC EMEA contacts.

BEFORE YOU START

About this manual

Thank you for choosing the AEC L6 lithium battery system. This manual describes the touchscreen of the L6 master cabinet (MBMU): how the monitoring system is built, every page of the touchscreen, and the settings to make before the system is started for the first time. Installation, wiring and maintenance of the cabinet are in the L6 Lithium Battery Cabinet User Manual (AEC-UM-L6-EMEA). Read both before you start, and keep them near the equipment.

MODELS COVERED

The touchscreen (MBMU) of the L6 master cabinet, with L6 cabinets (L6-CAB-10×50LI, L6-CAB-20×50LI) and 50 Ah LiFePO4 modules (L6-MOD-50LI), and with the 40 Ah and 100 Ah versions, single-cabinet and multi-cabinet systems, for the AEC IST6 modular UPS. Ordering codes: L6 Lithium Battery Cabinet User Manual.

WHO THIS MANUAL IS FOR

Operators read the pages of the touchscreen with the guest login. Settings are changed only by AEC service or by trained personnel working with AEC service: the administrator login is reserved to AEC service.

Safety messages

Safety messages in this manual use four signal words. The signal word tells how serious the hazard is:

DANGER	A hazardous situation which, if not avoided, **will** result in death or serious injury.
WARNING	A hazardous situation which, if not avoided, **could** result in death or serious injury.
CAUTION	A hazardous situation which, if not avoided, could result in minor or moderate injury.
NOTICE	Information about practices that could damage the equipment, lose data, reduce performance or give unexpected results — not related to injury.

Other conventions

i NOTE Additional information that stresses or completes the text.

✓ TIP A hint that helps you solve a problem or save time.

Keys are shown like [ON]; menus like **Settings › Battery**. Numbers in red circles on a picture are explained in the list under it. Cross-references in red are links in the PDF.

QUICK START

First set-up in four steps

The short version — each step points to the full instructions. Read the safety chapter first.

1. **Power the master cabinet** and wait for the login page. Operators use **Guest login**; settings need the administrator login, reserved to AEC service. Section 2.2, page 9.
2. **Configure before the first start** (AEC service): time, module quantity, charge current and midline, and for several cabinets the SBMU addresses. Section 3.2, page 39, Section 3.3, page 40.
3. **Link the battery to the UPS:** northbound RTU on, serial port COM4, RTU address 48. Section 3.4, page 42.
4. **Watch the home page and the alarms** every day; read the records in Report mgt. Section 2.3, page 10, Section 2.5, page 17.

3 levels
PBMU in each module, SBMU in each cabinet, MBMU for the system

20 · 12
modules per cabinet at most: 40 / 50 Ah · 100 Ah

Guest
view-only login for operators

4 colors
blue normal, yellow alarm, red protected, gray not connected

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01

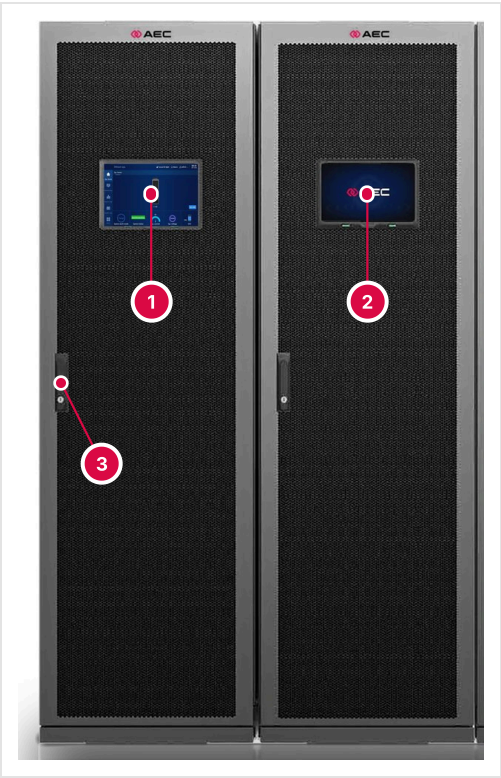
CHAPTER 1

Product overview

Where the touchscreen is, which AEC systems it serves, and how the three-level battery management system (PBMU, SBMU, MBMU) is connected.

1.1 The L6 touchscreen (MBMU)

The L6 lithium battery system is made of a master cabinet and, when more energy is needed, one or more slave cabinets. Each cabinet holds up to 20 LiFePO4 battery modules of 40 Ah or 50 Ah, or up to 12 modules of 100 Ah. The master cabinet carries the 10-inch touchscreen on its door: the **MBMU** (master battery management unit). It shows and sets the whole battery system. A slave cabinet has an indicator panel instead of a touchscreen.



1. Touchscreen (MBMU) on the door of the master cabinet
2. Indicator panel of the slave cabinet
3. Door handle and lock of the master cabinet

FIGURE 1-1 L6 master cabinet with the touchscreen, and a slave cabinet

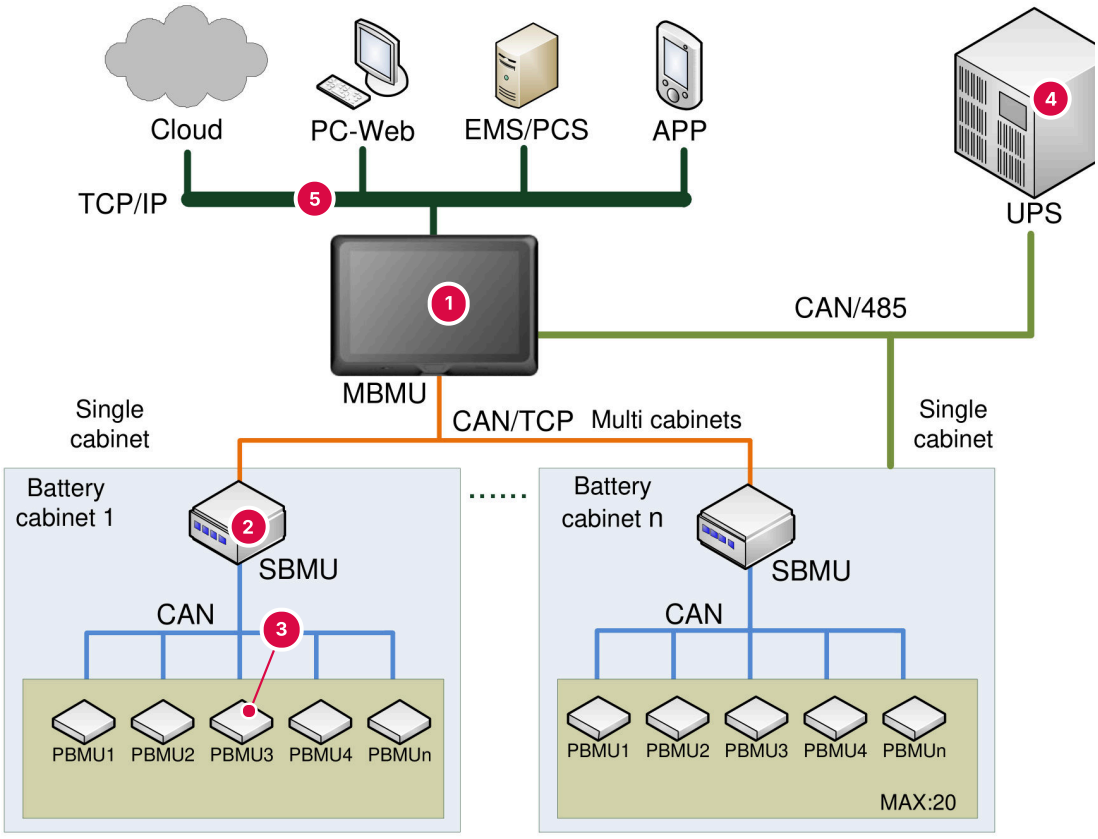
The L6 system feeds the battery input of the **AEC IST6** modular UPS. For any other UPS, ask AEC before you connect it. The touchscreen talks to the UPS over the RS485 port of the master cabinet (Section 3.4).

> **i NOTE** This manual covers the touchscreen only. Installation, cabinet and module wiring, breakers, the communication module ports, EPO and maintenance of the cabinet are in the **L6 Lithium Battery Cabinet User Manual (AEC-UM-L6-EMEA)**. Read its safety chapter before you open a cabinet.

The values on the screen pictures of this manual are examples. Your screens show the values of your system.

1.2 Topology of the monitoring system

The battery management system of the L6 has three levels. Every module has its own controller (PBMU). Every cabinet has a cabinet controller (SBMU) that collects the data of its modules. The touchscreen (MBMU) collects the data of every cabinet and reports to the UPS and to the network.



1. MBMU — the touchscreen of the master cabinet
2. SBMU — the controller of each battery cabinet
3. PBMU — the controller inside each battery module, up to 20 per cabinet (12 with 100 Ah modules)
4. UPS, linked to the MBMU over RS485
5. Network: cloud, PC web, EMS/PCS and app, over TCP/IP

FIGURE 1-2 Topology of the monitoring system

TABLE 1-1 The three levels of the battery management system

Level	Where	What it does
PBMU	In every battery module (up to 20 per cabinet; 12 with 100 Ah modules)	Measures the voltage and temperature of every cell of its module, controls the module and reports to the SBMU over CAN.
SBMU	In every battery cabinet	Collects the data of the modules of its cabinet and reports to the MBMU over the network (TCP). Factory address 192.168.0.101 (master) and 192.168.0.102 (slaves).
MBMU	The touchscreen on the master cabinet	Shows and records the data of the whole system, holds the settings, and communicates with the UPS (RS485) and the network (TCP/IP).

1.3 Connections used by the touchscreen

The ports are on the communication module of each cabinet. Their position and pin-out are in the L6 Lithium Battery Cabinet User Manual.

TABLE 1-2 Connections of the touchscreen

Connection	Port	Setting on the touchscreen
UPS	RS485 port (RJ45) of the master cabinet	Northbound RTU on, serial port COM4, RTU address 48 — Section 2.7.2
SBMU of every cabinet	LAN ports, cabinet to cabinet; network port 1 of the touchscreen	Device management, TCP/Modbus, port 502 — Section 2.7.5
External network (PC, building management)	Network port 2 of the touchscreen	Net setting, port 2 — Section 2.7.3
Auxiliary supply of the touchscreen	AC IN / AC OUT terminals of the communication module (160–300 V AC; AC OUT carries the supply to the next cabinet)	—

CHAPTER 2

02 Touchscreen operation

The pages of the color touchscreen: login, home page, monitoring, records, health and every setting under More.

i NOTE The values in the screen pictures of this chapter are examples. Your touchscreen shows the values of your system.

2.1 Menu hierarchy

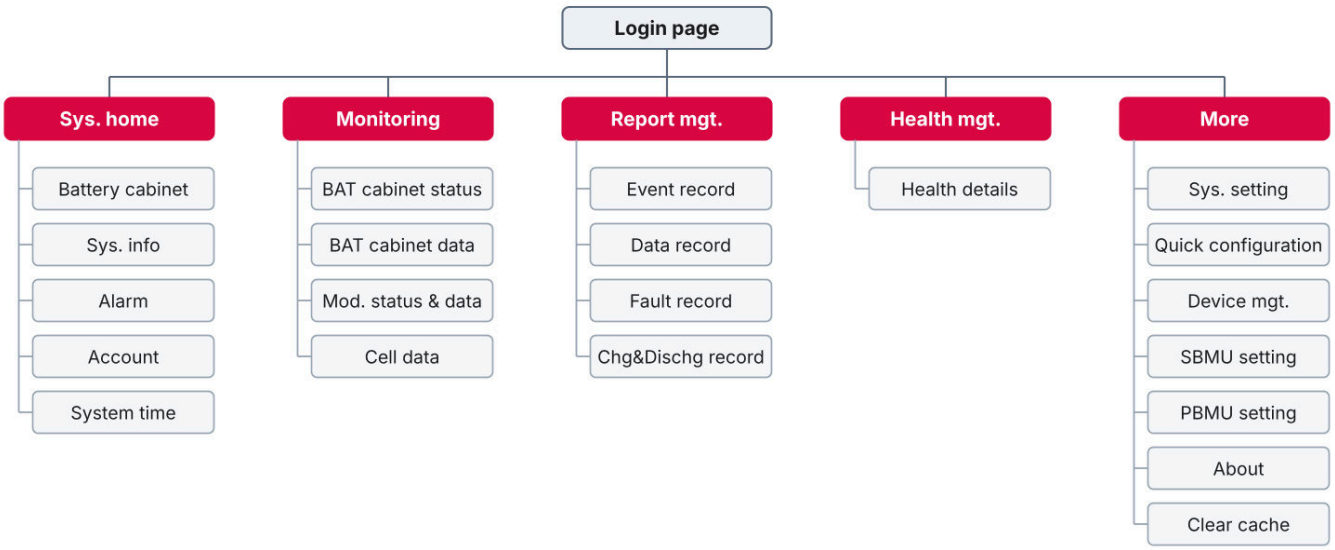


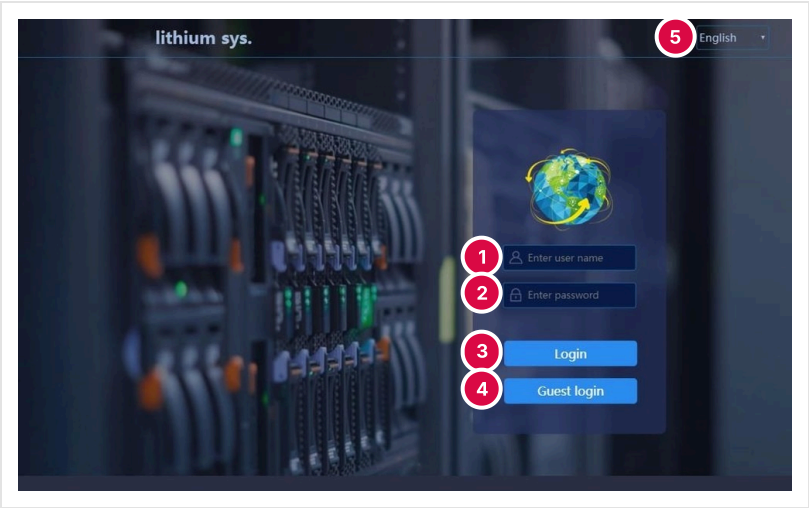
FIGURE 2-1 Menu hierarchy of the touchscreen

⚠ WARNING

The touchscreen holds parameters that control how the battery system runs. Only AEC service, or trained personnel working with AEC service, may change them. Do not change a setting whose meaning is not clear: call AEC service at +39 393 080 5211.

2.2 Login

After power-on the touchscreen shows the login page.



1. User name field
2. Password field
3. Login: logs in with the user name and password typed
4. Guest login: view only, no password
5. Display language

FIGURE 2-2 Login page

TABLE 2-1 Accounts

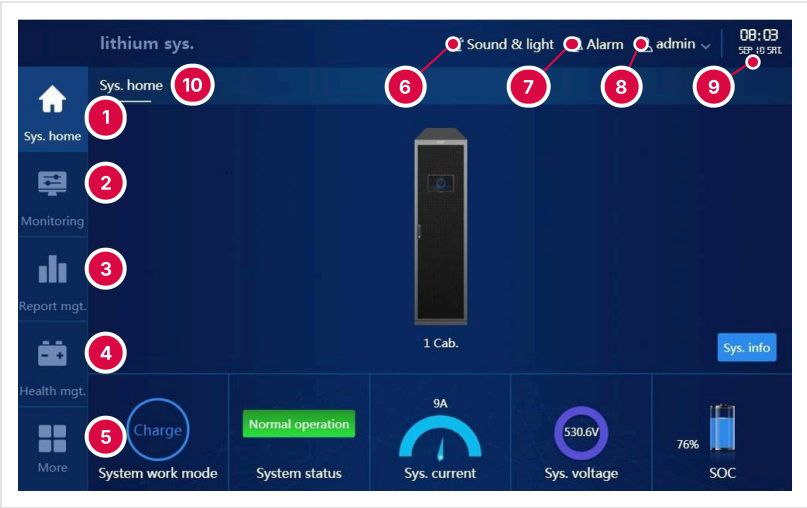
Account	How to log in	What it can do
Guest	Tap **Guest login** (Figure 2-2, 4).	Views every page: home, monitoring, records, health. Cannot change a setting.
Administrator	Reserved to AEC service.	Views and changes the system parameters: every page under **More**.

i NOTE The administrator login is reserved to AEC service. For a setting, call AEC service at +39 393 080 5211: an AEC engineer makes it, or guides you through it.

To change account, tap the account name at the top right of any page (Figure 2-3, 8) and log out. The touchscreen returns to the login page.

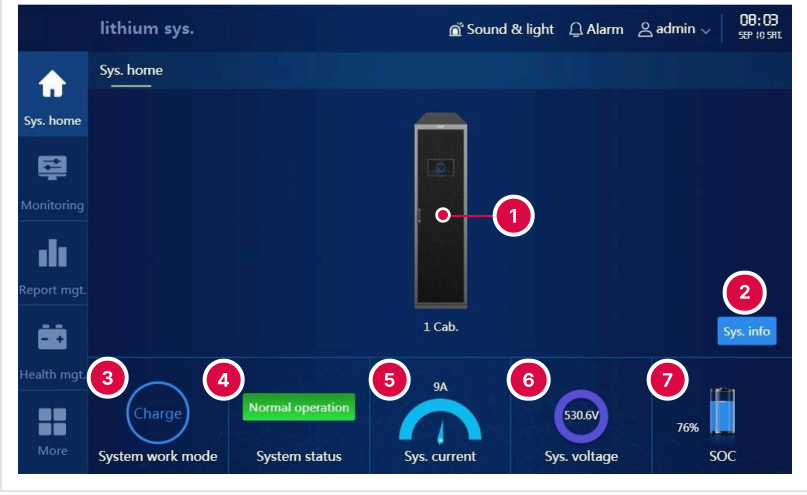
2.3 Screen layout and home page

After login the touchscreen shows the home page. Every page has the same frame: the menu bar on the left and the top bar.



1. Sys. home: back to the home page from any page
2. Monitoring: cabinet, module and cell data
3. Report mgt.: event, data, fault and charge/discharge records
4. Health mgt.: health of every module and cell
5. More: settings, About, Clear cache
6. Sound & light
7. Alarm: the number on the bell is the alarm count; tap it for the alarm list
8. Account: shows who is logged in; tap it to log out
9. System date and time
10. Name of the page shown

FIGURE 2-3 Screen frame — menu bar and top bar, the same on every page

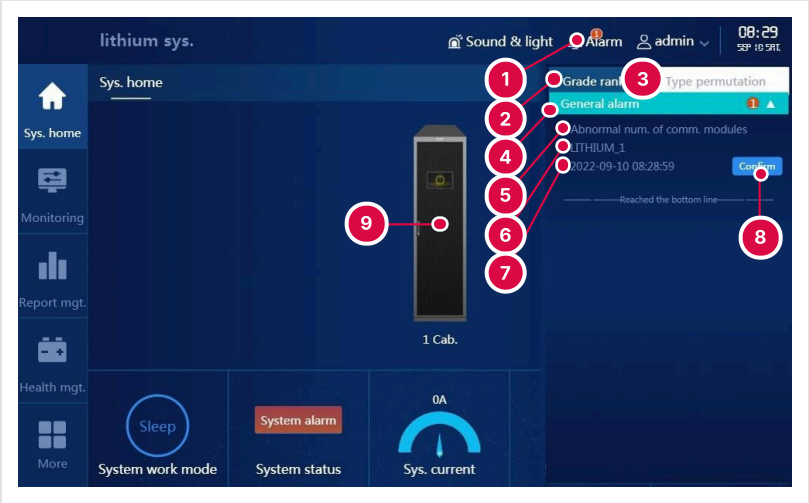


1. System cabinets: quantity and battery status — blue normal, yellow alarm, red protected, gray not connected; tap a cabinet for its monitoring pages
2. Sys. info: configuration and highest and lowest cell values
3. System work mode: charge, discharge or sleep
4. System status: normal operation, alarm, protection
5. Sys. current: total current of the system (A)
6. Sys. voltage: total voltage of the system (V)
7. SOC: total state of charge of the system (%)

FIGURE 2-4 Home page readings

2.3.1 Alarm list

Tap **Alarm** in the top bar (Figure 2-3, 7). The present alarms open on the right of the home page.



1	Alarm, with the number of present alarms
2	Grade rank: alarms sorted by level
3	Type permutation: alarms sorted by device type
4	Alarm level and number of alarms of that level; tap to expand
5	Alarm description
6	Device with the alarm
7	Date and time of the alarm
8	Confirm: marks the alarm as seen
9	Cabinet in alarm (yellow) or protected (red)

FIGURE 2-5 Alarm list

- **Grade rank** (Figure 2-5, 2) sorts the alarms by severity: prompting information, general alarm, serious alarm, critical alarm. The number beside each level is the number of alarms of that level.
- **Type permutation** (Figure 2-5, 3) sorts the alarms by device type, with the number of alarms of each type.
- Tap the arrow of a level to show its alarms at the top. Tap **Confirm** (Figure 2-5, 8) to confirm an alarm; you can type a description. The confirmed alarm goes to **Report mgt. › Event record** with the confirm time, the user and the description (Section 2.5.1).

> ⚠ ***CAUTION***
>
> Confirming an alarm is only for record keeping. It does not clear the alarm: the cause must still be found and fixed.

2.3.2 System info

Tap **Sys. info** on the home page (Figure 2-4, 2). Tap outside the window to close it.



1. System rated watt-hours (kWh)
2. Rated output voltage (V)
3. Parallel quantity: cabinets in the system
4. Module quantity
5. Highest cell voltage and where it is: cabinet and module
6. Lowest cell voltage and where it is
7. Highest cell temperature (°C) and where it is
8. Lowest cell temperature (°C) and where it is

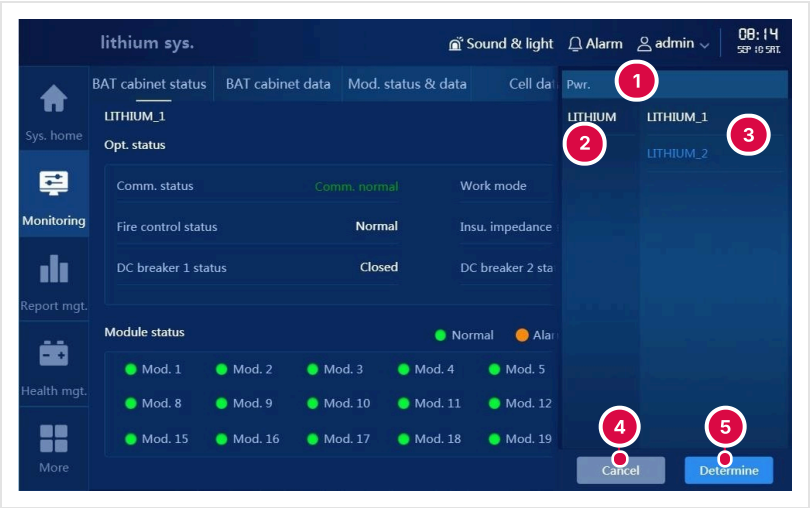
FIGURE 2-6 System info window

2.4 Monitoring

Tap **Monitoring** in the menu bar (Figure 2-3, 2), or a cabinet on the home page. The Monitoring pages show the status and data of one cabinet, its modules and its cells. They have four tabs: **BAT cabinet status**, **BAT cabinet data**, **Mod. status & data** and **Cell data**.

2.4.1 Choosing the cabinet

In a system with several cabinets, the Monitoring pages show one cabinet at a time. To show another one, tap **Switch device** on the right edge of the page (Figure 2-8, 11).



1. Device group (Pwr.)
2. Device type: LITHIUM
3. Cabinets: LITHIUM_1 is the master, LITHIUM_2 is slave 1, and so on; tap one to select it
4. Cancel
5. Determine: shows the selected cabinet

FIGURE 2-7 Switch device

2.4.2 BAT cabinet status



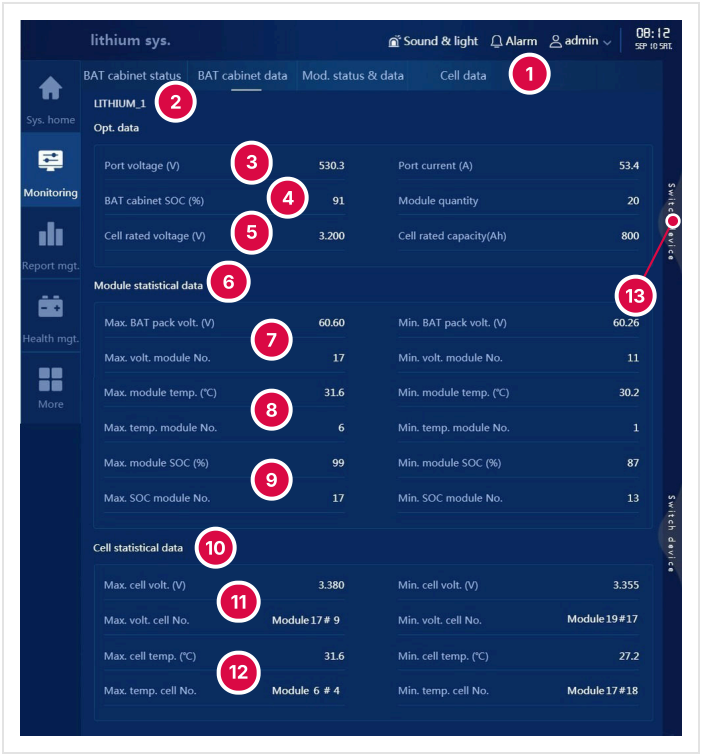
1. Monitoring tabs
2. Cabinet shown
3. Comm. status: communication with the cabinet
4. Work mode: charge, discharge or sleep
5. Fire control status
6. Insulation impedance status
7. DC breaker 1 status: closed or open
8. DC breaker 2 status: closed or open
9. Color code of the module status: normal, alarm, protection, unknown
10. Status of every module of the cabinet
11. Switch device: show another cabinet

FIGURE 2-8 BAT cabinet status

A full cabinet has 20 modules (12 in a 100 Ah cabinet). A module that is not fitted shows as unknown (gray).

2.4.3 BAT cabinet data

Tap **BAT cabinet data**. The page shows the running data of the cabinet and the statistics of its modules and cells. Scroll down to see the whole page; Figure 2-9 shows it in one piece.

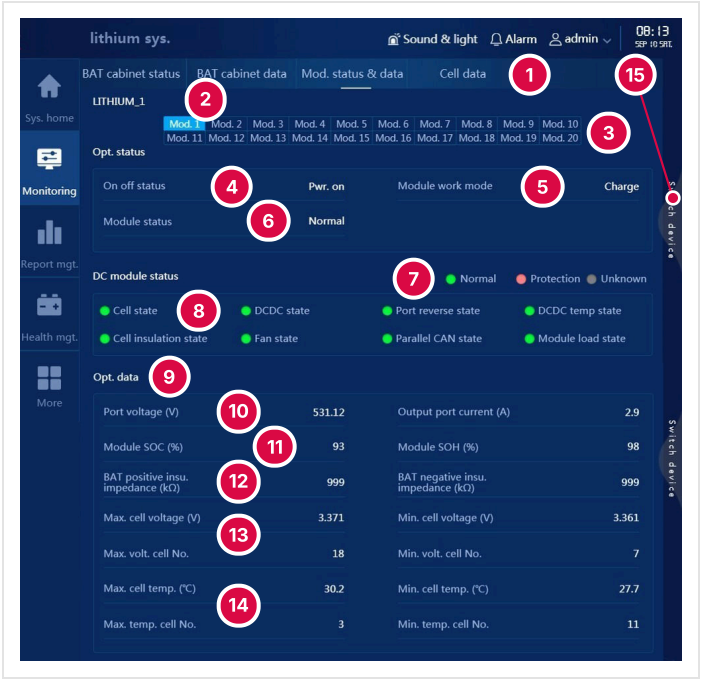


1. Monitoring tabs
2. Cabinet shown
3. Port voltage (V) and port current (A) of the cabinet
4. Cabinet SOC (%) and module quantity
5. Rated cell voltage (V) and rated cell capacity (Ah)
6. Module statistics
7. Highest and lowest module voltage (V), and the module numbers
8. Highest and lowest module temperature (°C), and the module numbers
9. Highest and lowest module SOC (%), and the module numbers
10. Cell statistics
11. Highest and lowest cell voltage (V), and where they are: Module 17 # 9 means module 17, cell 9
12. Highest and lowest cell temperature (°C), and where they are
13. Switch device

FIGURE 2-9 BAT cabinet data, the whole page scrolled

2.4.4 Module status and data

Tap **Mod. status & data**. Tap a module number to show that module. The module shown has a blue background; a module that is not configured has a gray background. Scroll down to see the whole page; Figure 2-10 shows it in one piece.



1. Monitoring tabs
2. Cabinet shown
3. Module selector: Mod. 1 to Mod. 20
4. On off status of the module
5. Module work mode: charge, discharge or sleep
6. Module status: normal, alarm, protection
7. Color code of the DC module status
8. DC module status: cell, cell insulation, DCDC, fan, port reverse, parallel CAN, DCDC temperature and module load
9. Running data of the module
10. Port voltage (V) and output port current (A)
11. Module SOC (%) and SOH, state of health (%)
12. Insulation impedance of the battery positive and negative (kΩ)
13. Highest and lowest cell voltage (V), and their cell numbers
14. Highest and lowest cell temperature (°C), and their cell numbers
15. Switch device

FIGURE 2-10 Module status and data, the whole page scrolled

2.4.5 Cell data

Tap **Cell data**. The page shows the voltage of every cell of the selected module as bars and in a table. Tap **Temp.** for the cell temperatures and **Volt.** to return.



1. Monitoring tabs
2. Module selector
3. Volt. / Temp.: voltage or temperature view
4. Voltage of every cell of the module, #1 to #18 (V)
5. Table: cell number, voltage (V), temperature (°C)
6. Switch device

FIGURE 2-11 Cell data — voltage



1. Monitoring tabs
2. Module selector
3. Volt. / Temp.: voltage or temperature view
4. Temperature of every cell of the module, #1 to #18 (°C)
5. Table: cell number, voltage (V), temperature (°C)
6. Switch device

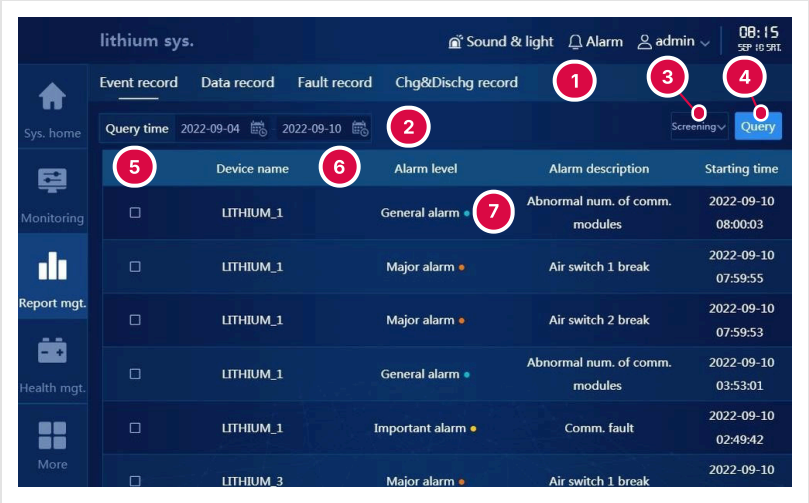
FIGURE 2-12 Cell data — temperature

2.5 Report management

Tap **Report mgt.** in the menu bar (Figure 2-3, 3). Four tabs hold the records: **Event record**, **Data record**, **Fault record** and **Chg&Dischg record**. On every tab, **Query** lists the records of the time window you set.

2.5.1 Event record

The event record lists the history of the alarms: device name, alarm level, alarm description and starting time.



1. Report tabs
2. Query time: start and end date
3. Screening: opens the filters
4. Query: lists the records
5. Tick boxes: select records
6. Columns: device name, alarm level, alarm description, starting time
7. Alarm level, with its color dot

FIGURE 2-13 Event record

Tap **Screening** (Figure 2-13, 3) to filter the list (Figure 2-14).



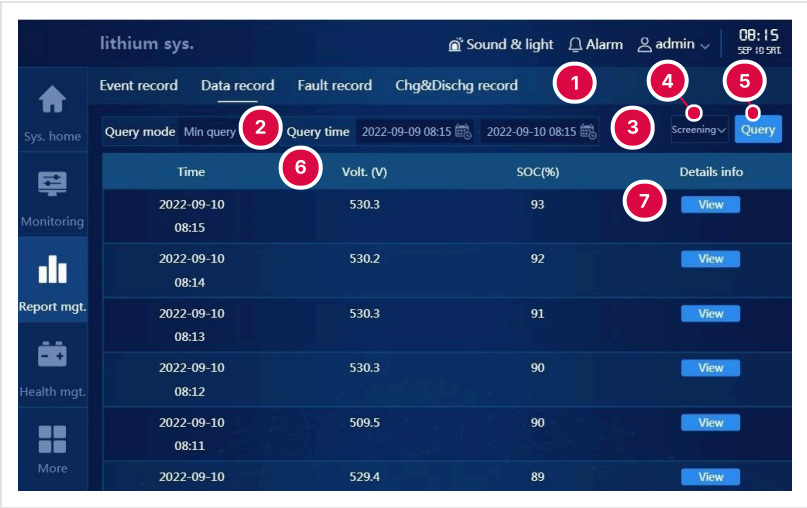
1. Report tabs
2. Query time
3. Screening: closes the filters
4. Query
5. Device type
6. Device name
7. Alarm level: prompt message, general, important, major, emergency alarm
8. Whether to restore: not recovered, recovered, other
9. Confirm status: unconfirmed, confirmed
10. Records that match the filters
11. Tick boxes

FIGURE 2-14 Event record — filters open

- Tap **Confirm** (below the list) to confirm the selected alarm. It does not clear an alarm that has not recovered.
- Tap **Delete** (below the list) to delete the selected records. A deleted record cannot be recovered. **Delete** works the same way on every tab of Report management.

2.5.2 Data record

The data record holds the stored values of the system by minute, hour, day or month.



1. Report tabs
2. Query mode: by minute, hour, day or month
3. Query time: start and end
4. Screening: opens the filters
5. Query
6. Columns: time, voltage (V), SOC (%)
7. View: the details of that record

FIGURE 2-15 Data record

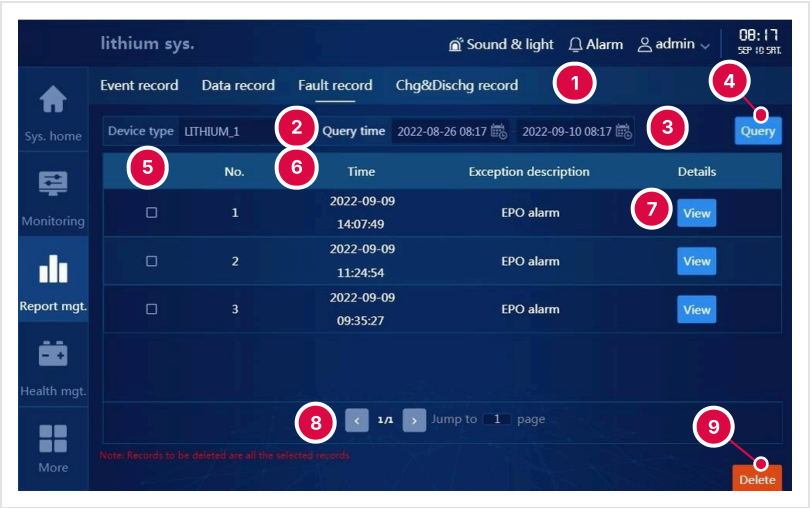


1. Report tabs
2. Query mode
3. Query time
4. Screening: closes the filters
5. Query
6. Device type
7. Device name
8. Data group, for example cluster data
9. Columns: time, voltage (V), SOC (%)
10. View: the details of that record

FIGURE 2-16 Data record — filters open

2.5.3 Fault record

The fault record keeps the data recorded around each fault.



1. Report tabs
2. Device type
3. Query time
4. Query
5. Tick boxes
6. Columns: number, time, exception description
7. View: the curves recorded around that fault
8. Pages: previous, next, jump to page
9. Delete: deletes the ticked records

FIGURE 2-17 Fault record — list of faults

Tap **View** (Figure 2-17, 7) to see the data at the time of the fault. Pick the values to plot in the **Select point** menus.



1. Report tabs
2. Select point (three menus): the values to plot
3. Back: to the list of faults
4. Legend: cluster total voltage (V), charge/discharge current (A), cluster SOC (%)
5. Scales: % (SOC), A (current), V (voltage)
6. Time axis
7. Scroll bar: moves along the time axis

FIGURE 2-18 Fault record — curves around the fault

2.5.4 Charge and discharge record

The charge and discharge record lists every charge and every discharge of the system. Pick the device and the time window.



1	Report tabs
2	Selection device
3	Query time: start and end
4	Query
5	Tick boxes
6	Columns: type (charge or discharge), starting time, end time, duration, average current (A; negative = discharge)
7	View: the curve of that record
8	Pages
9	Delete: deletes the ticked records

FIGURE 2-19 Charge and discharge record

Tap **View** (Figure 2-19, 7) to see the voltage, current and SOC curves of the record. Under **Curve type**, choose **Cluster curve** (the values of the cabinet) or **Extreme curve** (the extreme cell values).

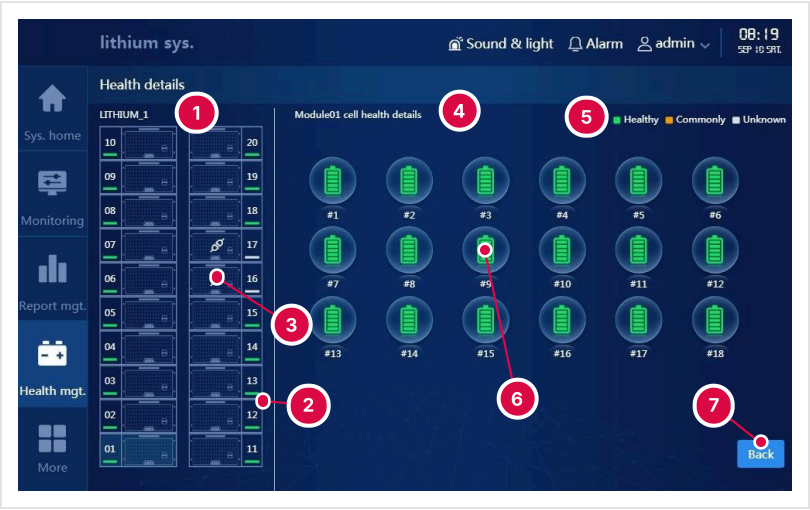


1	Report tabs
2	Curve type: cluster curve or extreme curve
3	Back: to the record list
4	Legend: cluster total voltage (V), charge/discharge current (A), cluster SOC (%)
5	Scales: % (SOC), A (current), V (voltage)
6	Time axis
7	Scroll bar

FIGURE 2-20 Charge and discharge curve

2.6 Health management

Tap **Health mgt.** in the menu bar (Figure 2-3, 4). The page shows the health of every module and every cell of the selected cabinet. Tap a module to see the health of its cells.

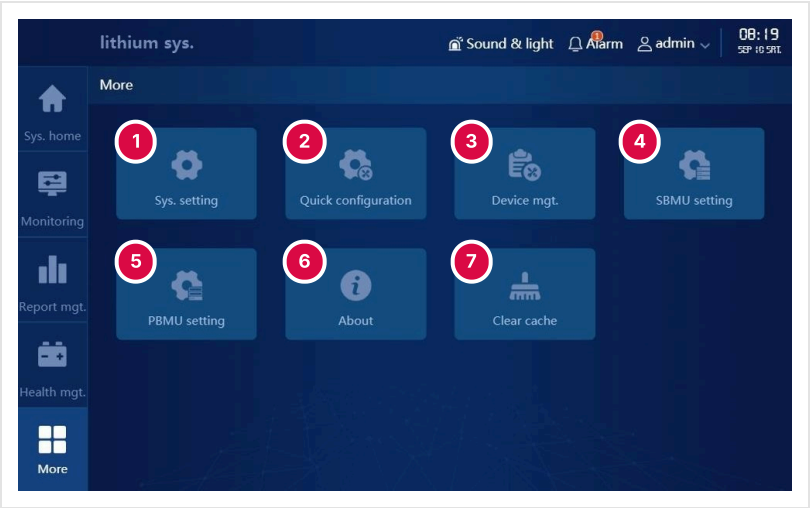


1	Cabinet shown	4	Cells of the selected module
2	Modules 01 to 20 of the cabinet; tap one to select it	5	Color code: green healthy, orange commonly (fair), white unknown
3	Broken-link symbol: the module is not connected, or is connected wrongly	6	Health of each cell, #1 to #18
		7	Back

FIGURE 2-21 Health details

2.7 More

Tap **More** in the menu bar (Figure 2-3, 5). Every page under More except **About** needs the administrator login, reserved to AEC service (Section 2.2).

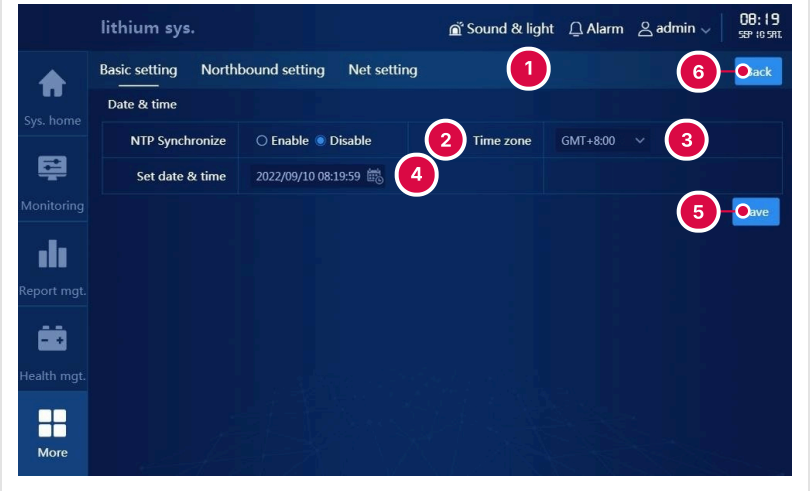


1. Sys. setting: date and time, link to the UPS, network
2. Quick configuration: connects the SBMU in five steps
3. Device mgt.: adds, modifies and deletes cabinets
4. SBMU setting: module quantity, network of each cabinet
5. PBMU setting: charge current, midline, module commands, group test
6. About: product information
7. Clear cache: frees running space

FIGURE 2-22 More

Sys. setting has three tabs: **Basic setting**, **Northbound setting** and **Net setting**.

2.7.1 System setting: date and time

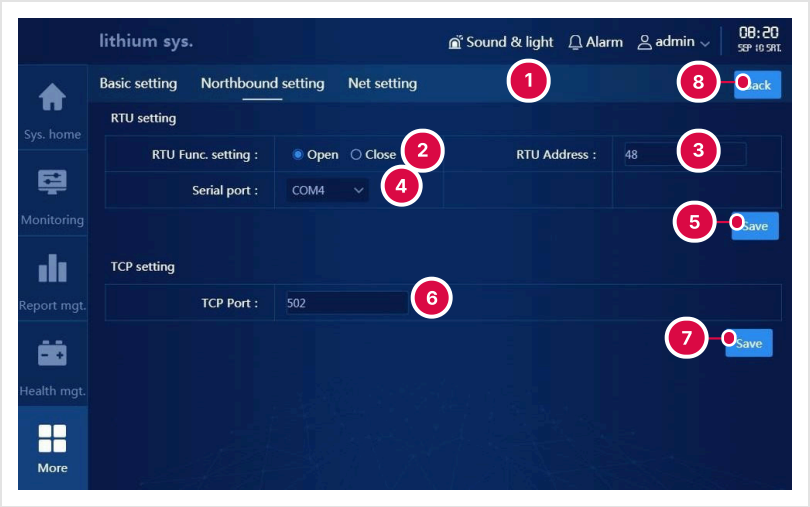


1. System setting tabs
2. NTP Synchronize: enable or disable
3. Time zone
4. Set date & time: tap the calendar icon
5. Save
6. Back: to More

FIGURE 2-23 System setting — Basic setting

NTP (network time protocol) keeps the clock right automatically. To use it, the touchscreen must be connected to a network: enable **NTP Synchronize** and set a valid time server; the clock then syncs from the server at intervals. With NTP disabled, set the date and time by hand.

2.7.2 System setting: link to the UPS



1	System setting tabs
2	RTU Func. setting: open or close
3	RTU Address
4	Serial port
5	Save (RTU setting)
6	TCP Port (northbound Modbus TCP)
7	Save (TCP setting)
8	Back

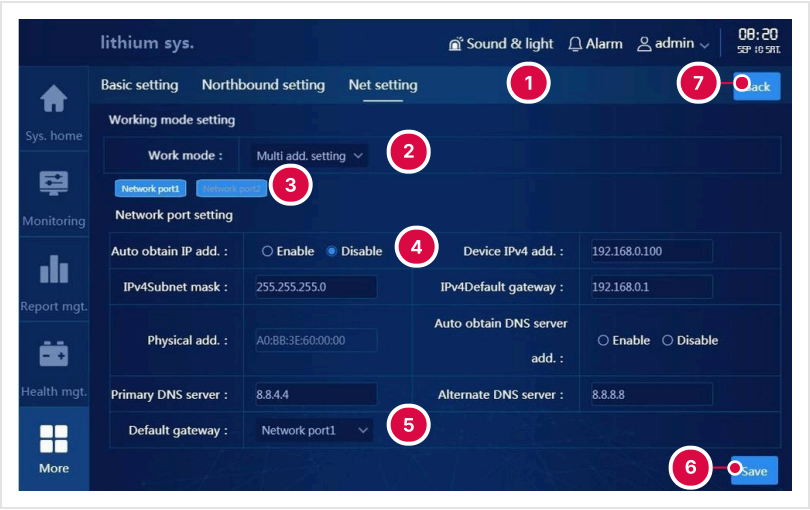
FIGURE 2-24 System setting — Northbound setting

To communicate with the UPS, set **RTU Func. setting** to **Open**, the **Serial port** to **COM4** and the **RTU Address** to **48**, then tap **Save** (Figure 2-24, 5). The procedure is in Section 3.4.

2.7.3 System setting: network ports

The touchscreen has two network ports. **Work mode** sets how they work together:

- **Multi add. setting** (recommended): the two ports are independent. Each has its own IP address, subnet mask and other parameters, in different network segments.
- **Single NIC**: one port is an extension of the other. They share one IP address and subnet mask, and one port backs up the other. Do not use this mode on the L6.



1. System setting tabs
2. Work mode: Multi add. setting or Single NIC
3. Network port 1 / Network port 2: the port being set
4. Port settings: auto IP, IPv4 address, subnet mask, default gateway, physical (MAC) address, DNS servers
5. Default gateway: the port used as gateway
6. Save
7. Back

FIGURE 2-25 System setting — Net setting

CAUTION

Network port 1 is connected to the SBMU. Do not change it. Set network port 2 only to connect the touchscreen to an external device.

TABLE 2-2 Default settings of network port 2

Setting	Default value
Auto obtain IP address	Disable
Device IPv4 address	192.168.69.100
IPv4 subnet mask	255.255.255.0
IPv4 default gateway	192.168.69.1

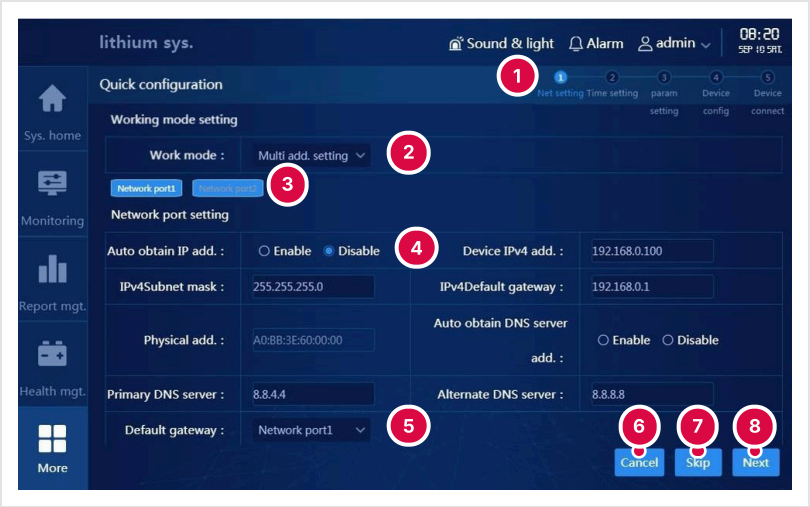
2.7.4 Quick configuration

Quick configuration connects the SBMU of a single cabinet or of several cabinets in five steps. A step indicator at the top right shows where you are. **Cancel** leaves without saving; **Back** returns one step.

1. **Network setting.** Nothing to set: tap **Next** (Figure 2-26, 8).
2. **Time setting.** Nothing to set: tap **Next** (Figure 2-27, 8).
3. **Parameter setting.** Set the **BAT cabinet quantity**. Leave **SBMU comm. type** at its default (TCP/Modbus). Select the **Comm. protocol** of the battery modules fitted. Tap **Next** (Figure 2-28).
4. **Device configuration.** Check the settings of each SBMU. Tap **Edit** to set the device name, communication protocol, IP address and location number. Tap **Next** (Figure 2-29).

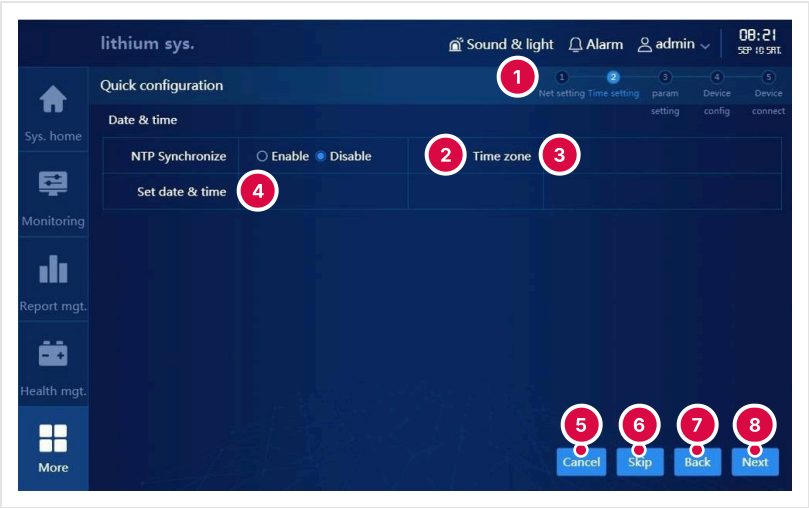
5 **Device connection.** The touchscreen connects to the configured SBMU. **Comm. status** shows **Comm. normal** when it works. Tap **complete**. If the SBMU cannot be connected, tap **Skip** to end the configuration (Figure 2-30).

> ⚠ ***CAUTION***
>
> In a system with several cabinets, every SBMU must have a different IP address in the same network segment (Section 3.3).



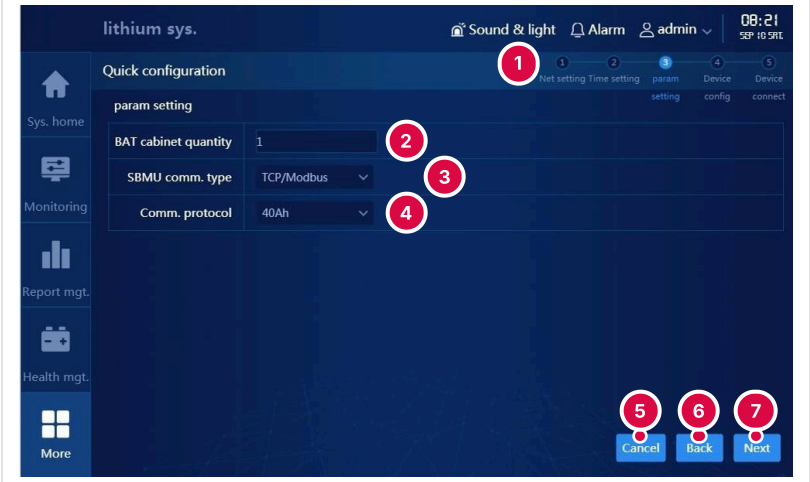
1	Step indicator: 1 network, 2 time, 3 parameters, 4 device configuration, 5 device connection
2	Work mode
3	Network port 1 / port 2
4	Port settings: IP address, subnet mask, gateway, physical address, DNS
5	Default gateway
6	Cancel
7	Skip
8	Next

FIGURE 2-26 Quick configuration, step 1 — network setting



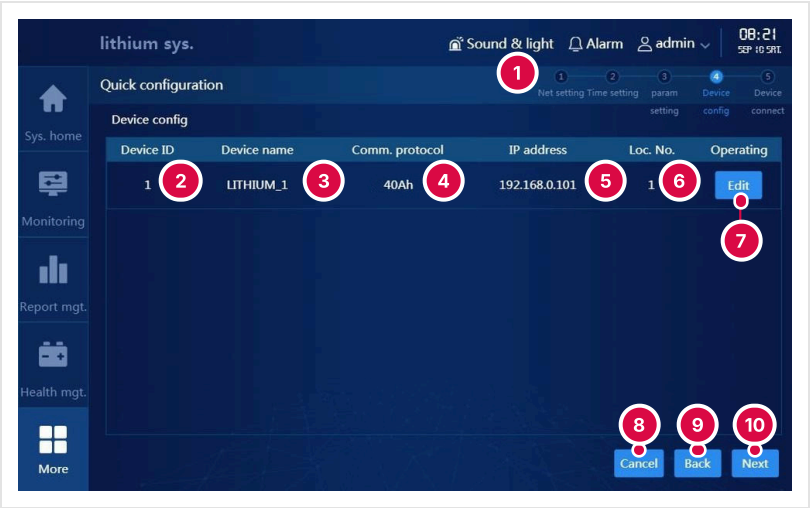
1	Step indicator	5	Cancel
2	NTP Synchronize	6	Skip
3	Time zone	7	Back
4	Set date & time	8	Next

FIGURE 2-27 Quick configuration, step 2 — time setting



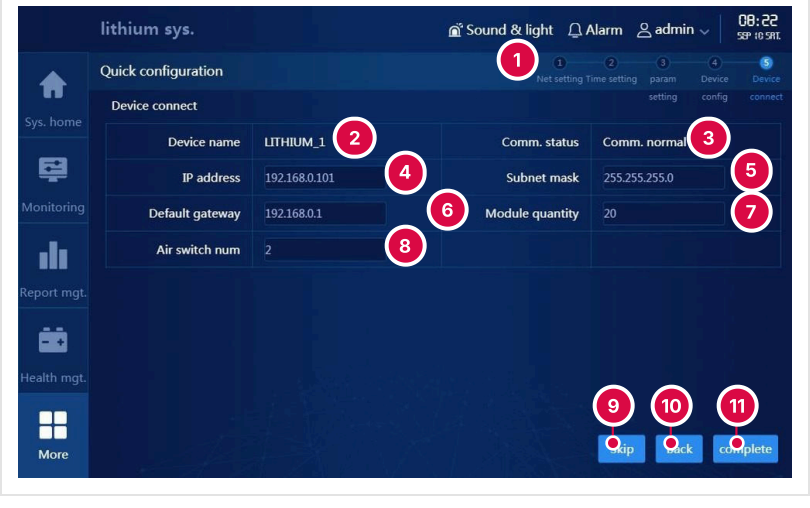
1	Step indicator	4	Comm. protocol: the protocol of the battery modules fitted
2	BAT cabinet quantity	5	Cancel
3	SBMU comm. type: leave TCP/Modbus	6	Back
		7	Next

FIGURE 2-28 Quick configuration, step 3 — parameter setting



1. Step indicator
2. Device ID
3. Device name
4. Comm. protocol
5. IP address of the SBMU
6. Location number
7. Edit: change the settings of this SBMU
8. Cancel
9. Back
10. Next

FIGURE 2-29 Quick configuration, step 4 — device configuration

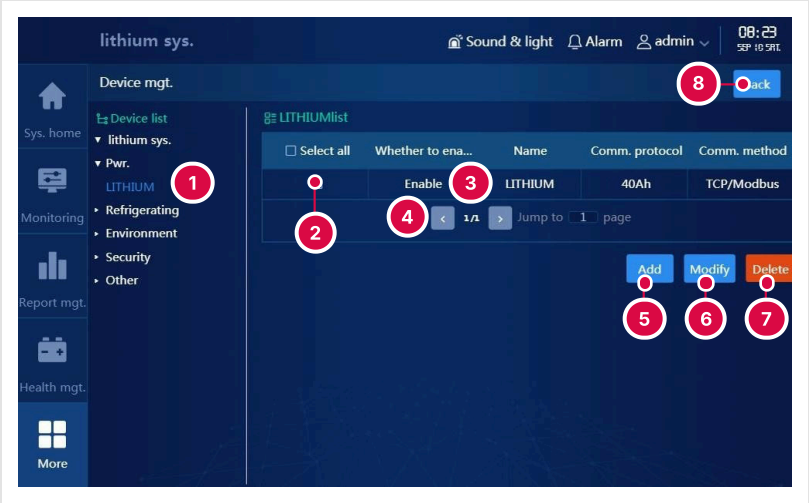


1. Step indicator
2. Device name
3. Comm. status: Comm. normal when connected
4. IP address
5. Subnet mask
6. Default gateway
7. Module quantity
8. Air switch num: number of DC breakers
9. Skip: ends without connecting
10. Back
11. complete: ends the configuration

FIGURE 2-30 Quick configuration, step 5 — device connection

2.7.5 Device management

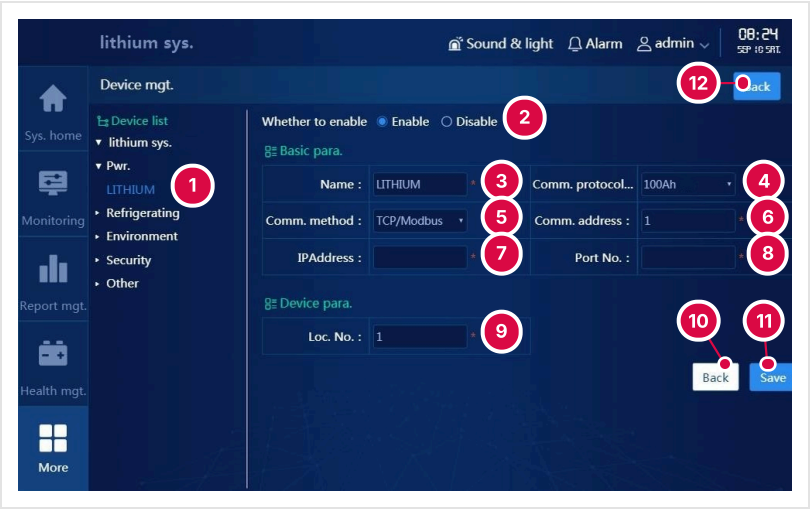
Tap **Device mgt.**, then **Pwr. › LITHIUM** in the device list. The page lists the battery cabinets the touchscreen talks to. Here you add, modify and delete cabinets.



1	Device list: Pwr. › LITHIUM shows the battery cabinets
2	Tick box: selects a cabinet for Modify or Delete
3	Cabinet: enabled or not, name, communication protocol, communication method
4	Pages
5	Add: adds a cabinet
6	Modify: changes the ticked cabinet
7	Delete: deletes the ticked cabinet
8	Back

FIGURE 2-31 Device management — list of cabinets

- **Add** adds a new battery cabinet. It can also replace the quick configuration for the first device.
- **Modify** changes the ticked cabinet: enable or disable it, change its name, IP address, communication protocol or location number.
- **Delete** deletes the ticked cabinet from the list.

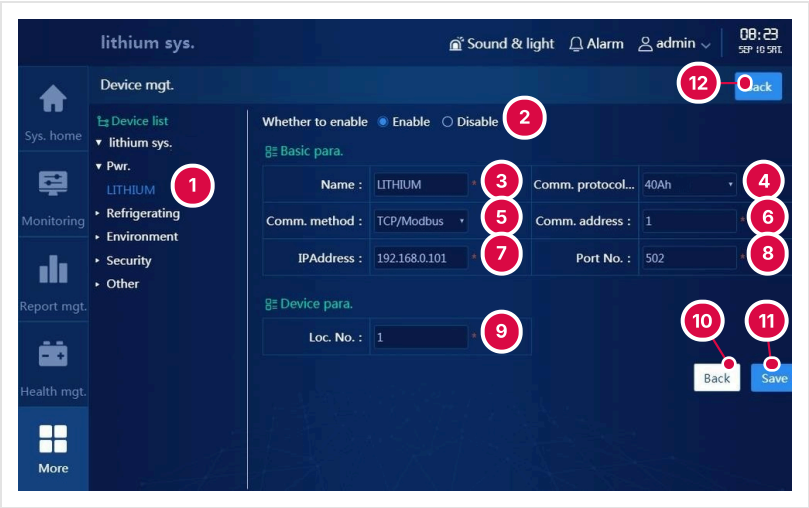


1. Device list
2. Whether to enable: enable or disable the cabinet
3. Name
4. Comm. protocol
5. Comm. method
6. Comm. address
7. IPAddress: the address of the SBMU
8. Port No.
9. Loc. No.: location number of the cabinet
10. Back: leaves without saving
11. Save
12. Back: to More

FIGURE 2-32 Device management — adding a cabinet

TABLE 2-3 Default settings of a new cabinet

Setting	Value
Name	As you choose (for example LITHIUM_2)
Communication method	TCP/Modbus (default)
IP address	The address of the SBMU of that cabinet. Factory address of the master SBMU: 192.168.0.101
Communication protocol	The protocol of the battery modules fitted
Communication address	1 (default)
Port No.	502 (default)



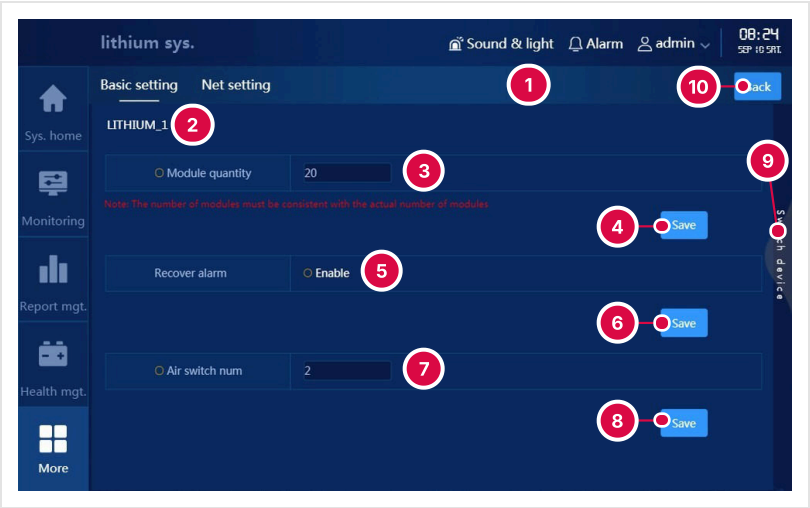
1	Device list	7	IPAddress
2	Whether to enable	8	Port No.
3	Name	9	Loc. No.
4	Comm. protocol	10	Back
5	Comm. method	11	Save
6	Comm. address	12	Back: to More

FIGURE 2-33 Device management — modifying a cabinet

SBMU setting has two tabs: **Basic setting** and **Net setting**. They apply to the SBMU of the cabinet named at the top left. Tap **Switch device** on the right edge to choose another cabinet (Section 2.4.1).

2.7.6 SBMU setting: module quantity

Each value has its own **Save** button.



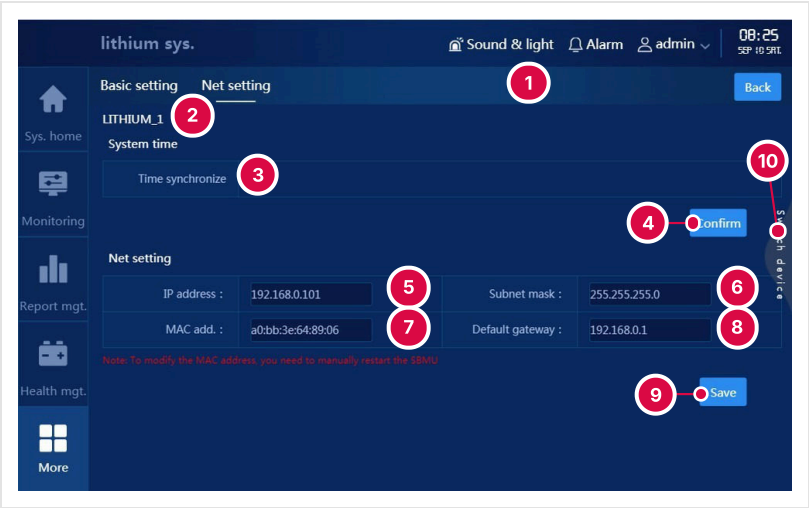
1 SBMU setting tabs	6 Save (recover alarm)
2 Cabinet being set	7 Air switch num: number of DC breakers
3 Module quantity: the modules fitted in this cabinet	8 Save (air switch num)
4 Save (module quantity)	9 Switch device
5 Recover alarm	10 Back

FIGURE 2-34 SBMU setting — Basic setting

> **⚠ CAUTION**
>
> The module quantity must equal the number of modules really fitted. Each time modules are added or removed, set the new quantity.

2.7.7 SBMU setting: SBMU address

The **Net setting** tab sets the network address of the SBMU and sends the time to it (**Time synchronize › Confirm**).



1. SBMU setting tabs
2. Cabinet being set
3. Time synchronize
4. Confirm: sends the time to the SBMU
5. IP address of the SBMU
6. Subnet mask
7. MAC address
8. Default gateway
9. Save
10. Switch device

FIGURE 2-35 SBMU setting — Net setting

⚠ WARNING

A wrong network setting cuts the SBMU off from the touchscreen. Only AEC service, or trained personnel working with AEC service, may change it.

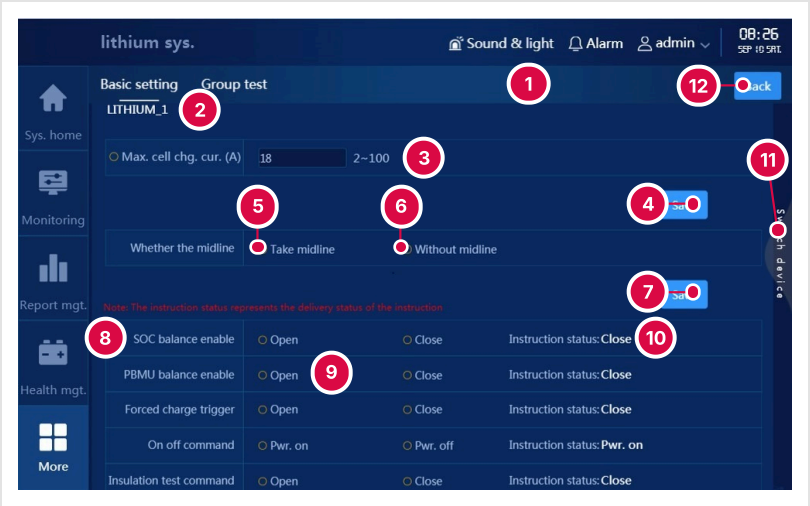
⚠ CAUTION

In a system with several cabinets, set the SBMU addresses one cabinet at a time, all in the 192.168.0.X network segment, then reconnect all the SBMU. Follow Section 3.3.

Do not change the MAC address unless AEC service asks you to. After a change of the MAC address, switch the SBMU off and on again.

PBMU setting has two tabs: **Basic setting** and **Group test**. They apply to the modules of the cabinet named at the top left; **Switch device** chooses another cabinet.

2.7.8 PBMU setting: charge current, midline, commands



1	PBMU setting tabs
2	Cabinet being set
3	Max. cell chg. cur. (A): maximum charge current, 2 to 100 A
4	Save (charge current)
5	Take midline
6	Without midline
7	Save (midline)
8	Commands: SOC balance, PBMU balance, forced charge trigger, on/off, insulation test
9	Open / Close (Pwr. on / Pwr. off): the command to send
10	Instruction status: whether the command was delivered
11	Switch device
12	Back

FIGURE 2-36 PBMU setting — Basic setting

- **Max. cell chg. cur.** — the charge current limit of the modules. Work it out as in Section 3.1.
- **Whether the midline** — **Take midline** if the DC input of the UPS has a midline, **Without midline** if it has none.
- **SOC balance enable**, **PBMU balance enable**, **Forced charge trigger**, **On off command** and **Insulation test command** send a command to the modules of the cabinet. **Instruction status** shows whether the command was delivered.

2.7.9 PBMU setting: group test

The group test runs a capacity test on the modules you select.



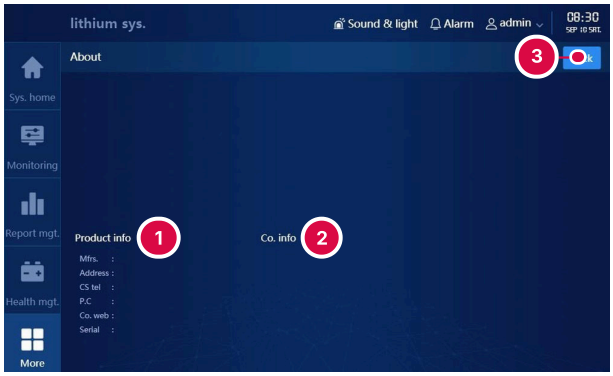
1	PBMU setting tabs	6	Set up: starts the test
2	Cabinet being set	7	Test table: period, status, end time
3	Period 1 / Period 2	8	Switch device
4	Select all	9	Back
5	Tick the modules to test		

FIGURE 2-37 PBMU setting — Group test

> **⚠ CAUTION**
>
> The group test needs the communication with the UPS (Section 3.4). It runs only when every module of the system is in sleep mode.

2.7.10 About

About shows the product information and the company information.



1	Product information
2	Company information
3	Back

FIGURE 2-38 About

2.7.11 Clear cache

On the **More** page, tap **Clear cache** (Figure 2-22, 7). The touchscreen deletes its cache files and frees running space.

CHAPTER 3

03 Configuration before the first start

The settings to make on the touchscreen before the L6 lithium battery system is started for the first time: single cabinet, several cabinets, and the link to the UPS.

These settings need the administrator login, reserved to AEC service (Section 2.2). AEC service makes them at commissioning, or guides you through them: call +39 393 080 5211.

Before you start, install and wire the cabinets as described in the L6 Lithium Battery Cabinet User Manual, and power the communication module of every cabinet.

3.1 Working out the charge current

The maximum charge current of the modules (**Max. cell chg. cur.**, Figure 2-36, 3) depends on the maximum charge current of the UPS and on the number of modules of the whole system:

$$\mathbf{I} = (530 \times I_{UPS} \times 92\ \%) \div (N \times 61) \approx \mathbf{8 \times I_{UPS} \div N}$$

- **I** — the value to set in **Max. cell chg. cur.** (A), the same in every cabinet. It is a per-module value: 20 A by default, 40 A maximum. The field accepts 2 to 100 A, but never set it above 40 A: if the formula gives more, set 40 A.
- I_{UPS} — the maximum charge current of the UPS (A).
- **N** — the number of modules of the whole system: all the cabinets together, not one cabinet.

TABLE 3-1 Examples of the charge current setting

UPS	Max. charge current of the UPS	Modules in the system	Setting
Example: a UPS with a 40 A charger, one cabinet	40 A	16	8 × 40 ÷ 16 = 20 A
Example: a UPS with an 80 A charger, two cabinets	80 A	40	8 × 80 ÷ 40 = 16 A

i NOTE Take the maximum charge current from the user manual of your UPS. For an AEC IST6, ask AEC service for the value of your UPS before you set it.

3.2 Single cabinet

The SBMU of a single cabinet is configured at the factory. Make these settings on the touchscreen of the cabinet.

3.2.1 Set the cabinet

1. Tap **More › Sys. setting**. The **Basic setting** tab opens (Figure 2-23).
2. Set the date and time (Figure 2-23, 4), or enable **NTP Synchronize** if the touchscreen is on a network with a time server (Figure 2-23, 2).
3. Tap **Save** (Figure 2-23, 5), then **Back**.
4. Tap **More › SBMU setting** (Figure 2-34).
5. In **Module quantity**, type the number of modules fitted in the cabinet (Figure 2-34, 3).

6. Tap the **Save** beside it (Figure 2-34, 4), then **Back**.

3.2.2 Set the modules

1. Tap **More › PBMU setting** (Figure 2-36).
2. In **Max. cell chg. cur.**, type the charge current worked out in Section 3.1 (Figure 2-36, 3).
3. Tap the **Save** beside it (Figure 2-36, 4).
4. Under **Whether the midline**, tap **Take midline** if the DC input of the UPS has a midline, or **Without midline** if it has none (Figure 2-36, 5 and 6).
5. Tap the second **Save**, beside the midline (Figure 2-36, 7).
6. Set the link to the UPS (Section 3.4).

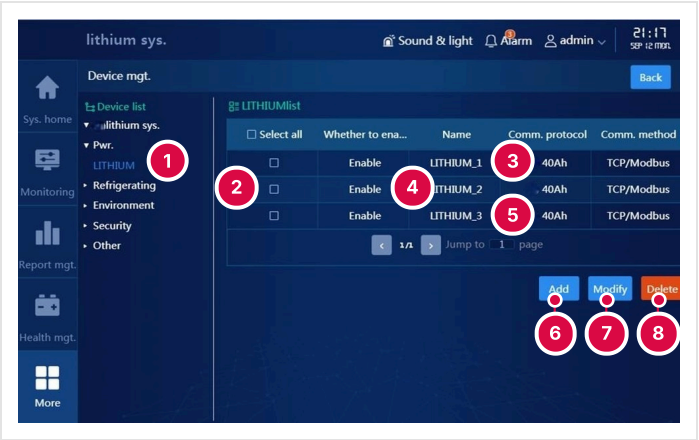
3.3 Several cabinets

The factory address of the master SBMU is 192.168.0.101. Every slave SBMU leaves the factory with the same address, 192.168.0.102. For the master to see every slave, each slave from the second one on needs its own address. Slave 1 (the second cabinet) keeps 192.168.0.102; give slave 2 the address 192.168.0.103, slave 3 the address 192.168.0.104, and so on.

3.3.1 Add the cabinets

1. Tap **More › Device mgt.** The list shows one device, the master cabinet (Figure 2-31).
2. Tap **Add** (Figure 2-31, 5).
3. Fill in the new cabinet (Figure 2-32, Table 2-3): name, communication method TCP/Modbus, the communication protocol of the modules, communication address 1, port 502 and the location number. As IP address, type 192.168.0.102 for slave 1, 192.168.0.103 for slave 2, and so on in order.
4. Tap **Save** (Figure 2-32, 11).
5. Repeat steps 2 to 4 for every slave cabinet.

Figure 3-1 shows a three-cabinet system: the factory list has one device, and two devices were added.



1	Device list: Pwr. › LITHIUM	5	LITHIUM_3: slave 2, added
2	Tick boxes	6	Add
3	LITHIUM_1: master cabinet (factory device)	7	Modify
4	LITHIUM_2: slave 1, added	8	Delete

FIGURE 3-1 Device management — a three-cabinet system

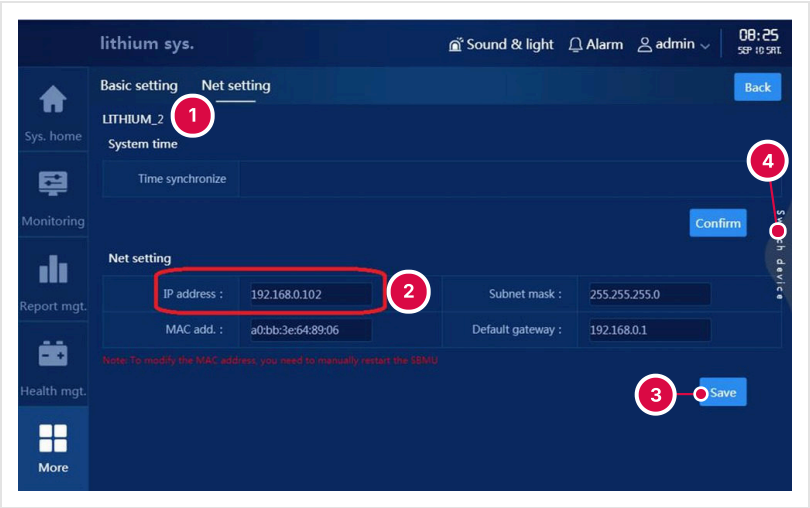
3.3.2 Give each slave its own address

With two cabinets, skip this section: slave 1 keeps its factory address, 192.168.0.102.

With three cabinets or more, set the slaves one at a time, starting from the third cabinet (slave 2). While a slave is set, it must be the only slave connected to the network: it answers at the factory address 192.168.0.102, which is the address of the **slave 1** page.

1. Power the communication module of the master cabinet and of every slave (AC IN terminals, Table 1-2). The touchscreen and the indicators light up. Log in as administrator.
2. Disconnect the network cable (LAN) of every slave cabinet except the slave you set now — the first time, the third cabinet (slave 2).
3. Tap **More › SBMU setting**, then **Switch device**, and select **slave 1** (LITHIUM_2) (Figure 2-7).
4. Tap **Net setting**. The IP address field shows 192.168.0.102, the factory address of the connected slave (Figure 3-2, 2).
5. Type the address of the slave you set, for example 192.168.0.103 for slave 2, and tap **Save** (Figure 3-2, 3).
6. Wait for the home page. About 10 seconds later, the area of that slave turns from gray to yellow or red: the slave is set.
7. Disconnect the slave you just set. Connect only the next slave (slave 3, then slave 4…) and repeat steps 3 to 6 with the next address (192.168.0.104, 192.168.0.105…). Always select **slave 1** in step 3.
8. When every slave is set, connect the network cables of all the slave cabinets again. About 10 seconds later, the areas of all the slaves on the home page turn from gray to yellow or red.

> ⚠ ***CAUTION***
>
> For each setting, only one slave cabinet may be connected to the master cabinet, and the new address is always set on the **slave 1** page.



1. Slave 1 (LITHIUM_2) selected with Switch device
2. IP address: 192.168.0.102 (factory); type the new address of the connected slave
3. Save
4. Switch device

FIGURE 3-2 SBMU Net setting with slave 1 selected — the factory address of the connected slave

3.3.3 Set the cabinets

1. Tap **More › Sys. setting** and set the date and time of the system, or enable NTP (Figure 2-23, 2 and 4). Tap **Save**.
2. Tap **More › SBMU setting**. In **Module quantity**, type the number of modules fitted in the cabinet shown (Figure 2-34, 3), and tap the **Save** beside it.
3. Tap **Switch device** (Figure 2-34, 9), select the next cabinet and repeat step 2. Do this for every cabinet.

3.3.4 Set the modules

1. Tap **More › PBMU setting** (Figure 2-36).
2. In **Max. cell chg. cur.**, type the charge current worked out in Section 3.1 — with N the number of modules of all the cabinets together — and tap the **Save** beside it.
3. Set the midline (Figure 2-36, 5 and 6) and tap the second **Save**.
4. Tap **Switch device**, select the next cabinet and repeat steps 2 and 3. Every cabinet gets the same charge current.
5. Set the link to the UPS (Section 3.4).

3.4 Link to the UPS

The touchscreen sends the battery data to the UPS over the RS485 port of the master cabinet. Connect that port to the battery communication port of the UPS as shown in the L6 Lithium Battery Cabinet User Manual and in the manual of the UPS (on the AEC IST6, the BMS port of the optional BMS expansion card).

1. Tap **More › Sys. setting**, then the **Northbound setting** tab (Figure 2-24).
2. Set **RTU Func. setting** to **Open** (Figure 2-24, 2).
3. Set the **Serial port** to **COM4** (Figure 2-24, 4).
4. Set the **RTU Address** to **48** (Figure 2-24, 3).

5. Tap **Save** (Figure 2-24, 5).
6. On the UPS, enable the communication with the lithium battery as its manual describes.

A

APPENDIX A

Colors and alarm levels

What the colors and the alarm levels on the touchscreen mean.

TABLE A-1 Colors and alarm levels

Shown	Where	Meaning
Blue cabinet	Home page	Normal
Yellow cabinet	Home page	Alarm
Red cabinet	Home page	Protected
Gray cabinet	Home page	Not connected (in a multi-cabinet system, also a slave whose address is not set yet)
Prompting information, general alarm, serious alarm, critical alarm	Alarm list, Grade rank	Alarm levels, from the least to the most severe
Prompt message, general, important, major, emergency alarm	Event record, Screening	Alarm levels used by the event record filter
Normal / alarm / protection / unknown	Monitoring, module status	Green / orange / red / gray dot of each module
Healthy / commonly / unknown	Health mgt.	Green / orange / white mark of each cell
Charge / discharge / sleep	Home page and Monitoring	Work mode: charging, feeding the UPS, or at rest (sleep is needed for a group test)

APPENDIX B

B Acronyms and abbreviations

The abbreviations used in this manual and on the touchscreen.

TABLE B-1 Acronyms and abbreviations

Term	Meaning
BAT	Battery
CAN	Controller area network, the bus between the modules and the SBMU
DCDC	DC-to-DC converter inside each module
EMS / PCS	Energy management system / power conversion system
LiFePO4	Lithium iron phosphate, the cell chemistry of the L6 modules
MBMU	Master battery management unit: the touchscreen of the master cabinet
NIC	Network interface card (network port)
NTP	Network time protocol
PBMU	Pack battery management unit: the controller inside each module
RTU	Remote terminal unit (Modbus RTU over RS485)
SBMU	Slave battery management unit: the controller of each cabinet
SOC	State of charge (%)
SOH	State of health (%)

Service and support

AEC technical support is available 24 hours a day, 7 days a week. For help with installation, start-up, alarms, settings, spare parts, warranty claims and service visits, contact us by WhatsApp, phone or e-mail.

TECHNICAL SUPPORT · 24/7	**+39 393 080 5211**	WhatsApp and phone — always available
SERVICE E-MAIL	**service@aecups.com**	Technical questions, service requests, warranty claims
SALES	**sales@aecups.com**	
OFFICE	**+39 02 9415 8991**	
ADDRESS	**AEC International Srl**	Via Nerviano 55, 20045 Lainate (MI), Italy
WEB	**aecups.com**	

When you contact us, have ready: the cabinet ordering codes and serial numbers, the UPS model, the number of cabinets and modules, the alarm shown on the touchscreen — a photo of the screen speeds things up on WhatsApp.