

BATTERY CHARGING CASE & POWER BANK CONVERTER

for XS Batteries **Instructions**



Jurwheer

Introduction

The Intelligent Battery Charging Case and Power Bank Converter (hereinafter referred to as "battery case") is designed to store, charge, and discharge two XS batteries rapidly, accurately, and safely. By inserting a battery, pressing the push button once or tapping the lid, users can quickly access the battery charge level (State of Charge, hereinafter referred to as "SOC"), cycle counts, and other key information.

The battery case features two high-accuracy charging management chips from Texas Instruments, which ensure that your batteries are neither overcharged nor undercharged. When the case, with batteries inserted, is connected to a power adapter, it will begin charging the batteries. The case can identify the optimal charging strategy based on the power adapter's capabilities. If the connected power adapter provides less than the required power, an intelligent algorithm dynamically distributes power between the charging channels, maintaining the total charging time.

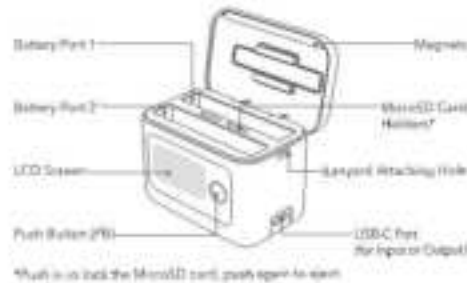
When an external device is connected via the USB-C port, the case can be used as a power bank. The battery with the lower SOC will be discharged first, followed by the other battery in sequence.

The battery case offers two advanced modes: Accumulation Mode and Even Out Mode. Accumulation Mode allows for the combination of two partially charged batteries into a fully charged battery, when feasible, alleviating the need for battery replacement mid-use. In Even Out Mode, the battery case balances the charge levels of the batteries within a preset range by transferring energy from the battery with a higher SOC to the one with a lower SOC. This extends the life of both batteries for storage purposes.

The LCD screen displays key information such as SOC, charging power,

voltage, current, cycle counts, temperature, source (Power adapter, expedition, and USB-C voltage). Designed for both ease of use and customization, the battery case offers plug-and-play functionality for regular users while providing a detailed settings menu that allows advanced users to customize over ten parameters to meet their specific requirements.

Battery Case Diagram



Push in or lock the MicroSD card; push again to eject.

Push Button Operation Principles



Check Battery Info

- Inserting a battery, pressing the Push Button, or tapping the lid will wake up the battery case, provided it contains batteries. Once woken up, the LCD screen will display the SOC (charge level) of each battery.

- Press the Push Button (hereinafter referred to as "PB") to switch the displayed battery info.



By default, the battery case is set to power off automatically after 10 seconds of inactivity, specifically if there is no button press or power source plugged in. The timer can be adjusted in the settings menu.

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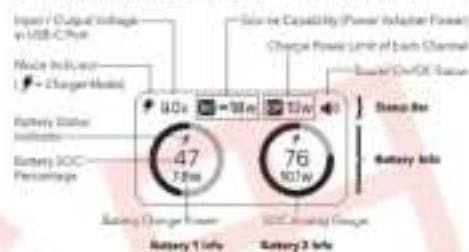
When the battery case is not connected to a power source and is outside the charging mode, it will power off if the PB is pressed and held for four seconds.

Charge Batteries

- Insert a battery.
- Connect the USB-C port to a power adapter with a USB-C cable.

- Charge with a 30W+ PD power adapter and USB-C to USB-C cable for full power performance.
- If a USB-A to USB-C cable is used, the max power the battery case can get is limited to 15W.

Charger Mode (CHG) Screen View Introduction



Battery Status Legends



Switching Modes

- Upon pressing on the battery case, press and hold the PB for two seconds, then release. The Mode Indicator should then start flashing.

- Subsequent presses of the PB will cycle through the available modes.



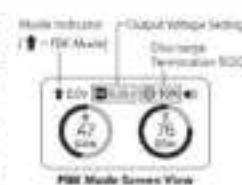
- Press and hold the PB to confirm the mode change. You will then see the selected mode screen view. The image on the right shows the Power Bank Mode screen view.

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Power Bank Mode (PBK) Introduction

Before switching to Power Bank Mode, please ensure the USB-C port is disconnected from any power source (such as a power adapter or another power bank).

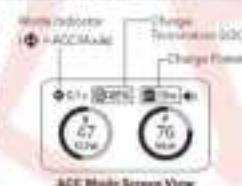
Once the battery case is in Power Bank Mode, you can connect the usable device you wish to charge. The battery with the lower SOC will be discharged first, followed by the other battery.



Accumulation Mode (ACC) Introduction

Accumulation Mode enables the combination of two partially charged batteries into a fully charged one, when possible. This alleviates the need to replace batteries mid-use. The accumulation process will end as soon as either of these conditions is met:

- The battery being charged reaches the preset termination SOC (default 95%).
 - The battery being discharged reaches 5% SOC, or the cell voltage becomes too low.
- Please note that ACC mode is designed to work independently. Plugging in the USB-C port will not affect ACC mode operation.



Even Out Mode (EVO) Introduction

In Even Out Mode, the algorithm works to equalize the SOC across the batteries, aiming to keep them within a specific range. It does this by transferring energy from the battery with a higher SOC to the one with a lower one. This process can extend the lifespan of both batteries for storage.

Please note that EVO mode is designed to work independently. Plugging in the USB-C port will not affect EVO mode operation.

Settings Menu Description

To navigate the settings menu:

- Press the PB to advance to the next menu item.
- Press & hold the PB to enter the adjustment mode for the selected item.
- In adjustment mode, press the PB to switch between available options.
- To exit adjustment mode, press & hold the PB again.



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Exit Settings

This setting includes Save, Cancel, and Reset options.

- Save: Pressing & holding "Save" saves all settings and exits to Charger Mode.
- Cancel: This aborts any changes and exits.
- Reset: This restores all settings to the factory default and exits.

Beginner (Beginner) Assist

The battery case includes a beginner assist feature that restores factory default settings after each power cycle (power off and on). The algorithm tracks the number of times a user saves their settings. To allow users to save settings for future use, the default values will no longer be restored once the user has saved settings more than 15 times.

The number of remaining save processes required to disable the beginner assist is displayed on the right.

Please note that the algorithm only counts valid save processes. Aborted save attempts (due to timeout or power interruption during adjustment) are not included in the count.

Buzzer Control

This setting controls whether the buzzer is activated. When enabled, the buzzer will beep to indicate the completion of battery charging or discharging.

LCD Life Timer, Brightness Norm (Normal) and Brightness Idle

These settings determine how the LCD backlight brightness changes. The LCD life timer setting specifies how long the LCD stays at normal brightness before switching to idle brightness when no user activity is detected. For example, using the default settings of 30 seconds, 70% (normal brightness) and 20% (idle brightness), the LCD will decrease from 70% to 20% brightness after 30 seconds of inactivity. When user activity is detected, the brightness will immediately return to 70%.

Auto Off Timer

This setting determines how quickly the battery case will automatically power off in PBK, ACC, and EVO modes when there is no power or user activity.

CHG A-Off Trer (Charger Mode Auto Off Timer)

This setting determines how quickly the battery case will automatically power off in CHG mode when there is no power or user activity.

CHG Chrg Pwr (Charger Mode Charge Power)

This setting allows you to adjust the charging power of each channel when in Charger Mode. Keep in mind that the total charging power across all channels is capped at 27W. For example, if you set to 15W and both channels are charging simultaneously, the channel connected to the battery with a higher SOC will receive the full 15W, while the other channel will be limited to 12W (27W total output minus the 15W being used by the first channel).

CHG Term SOC (Charger Mode Charge Termination SOC)

If the termination SOC is set to a value other than 100%, the charging process will stop when the battery SOC reaches or exceeds the set termination SOC. However, if this value is set to 100% (default), the charger will only terminate the charge once a full charge is determined based on a comprehensive list of conditions. As a result, the battery may continue to charge for an extended period, even when the display indicates 100% SOC.

PBK Out Vols (Power Bank Mode Output Voltage)

This setting allows you to configure the output voltage when the device is in Power Bank Mode. We've included this option because some aftermarket batteries may not be able to consistently support a 5V output. In such cases, reducing the output voltage allows the load to draw less power, making the power bank function compatible with a wider range of batteries, including aftermarket, weak or aged batteries.

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PBK Term SOC (Power Bank Mode Discharge Termination SOC)

The discharge process will stop as soon as the battery's SOC reaches or falls below the specified termination SOC.

ACC Chrg Pwr (Accumulation Mode Charge Power)

This setting configures the charge power in Accumulation Mode.

ACC Term SOC (Accumulation Mode Charge Termination SOC)

The Accumulation process will end when the battery being charged reaches or exceeds the termination SOC. The termination SOC of the battery being discharged is internally set to 3% and cannot be modified. Note that if the battery is weak, discharge can be terminated earlier if the cell voltage falls below the termination voltage threshold.

EVO Chrg Pwr (Even Out Mode Charge Power)

This setting configures the charge power in Even Out Mode.

EVO SOC Range (Even Out Mode Target SOC Range)

This setting defines the target range for the Even Out mode. For instance, with a set range of 30-50 and two batteries inserted at 40% and 20% SOC, the battery case will transfer energy from the 40% battery to the 20% battery. Once the SOC of the 40% battery is reduced to 30%, the Even Out process will stop, potentially leaving the previously 20% battery at, for example, 27%. Consequently, both batteries' SOC will fall within the defined 30-50 range.

Trouble Shooting and Recommendations

- The battery case displays a comprehensive range of data which may be overwhelming. Please remember that the information is for general reference only. When interpreting the data, consider the inherent limitations of battery technology and the tolerances of electronic components and measurements. Please do not use this information for battery warranty claims.
- It's normal for the battery case to continue charging for up to 30 minutes after the battery indicates a 100% state of charge (SOC). This occurs because the battery fuel gauge may require calibration after the charging cycle ends. You can use the battery case if it reaches 100% SOC or wait until charging is complete, without causing harm to the battery.
- Due to potential fuel gauge inaccuracies, the battery SOC might remain near 100% (between 95% and 99%) for a prolonged period before suddenly reaching 100%.
- Some aftermarket batteries cannot accept 15W or higher charge power. Adjust the charge power to 5W for successful charging.
- The battery case will stop charging if the battery temperature is outside the range of 0°C to 60°C (32°F to 140°F). Charging speed will be reduced when the battery temperature is below 10°C (50°F) or above 45°C (113°F). For high-speed charging in hotter environments, forced air cooling is recommended.

Specifications

Operating Temperature	0°C to 40°C (32°F to 104°F)
Charger Mode USB-C Input	3A 5V, 3A 27W Max
Charge Power Limit (Each Channel)	Up to 15W Adjustable
Power Bank Mode USB-C Output	Up to 10.5W (5V 2.1A)

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