

SPECIFICATION FOR REFERENCE

CUSTOMER	
CUSTOMER P/N	
MODEL No.	D500VD-B06X200C
PART No.	
DESCRIPTION	<p style="text-align: center;">D500VD Series</p> <p>TYPE: Balance Charger for 6S-21.6V Li-Ion Battery</p> <p>Input: 100-240 VAC 50/60 Hz (C14 Inlet)</p> <p>Output: 25.2V / 20.0A/15.0A/10.0A (Output after detecting battery voltage)</p> <p>Charger : TW90</p> <p>DC connector: Balancer: B7B-XH-A</p> <p>AC Core: Standard AC Cable, 1.2M</p> <p>Firmware: CP11098-V00</p>
REVISION	A0



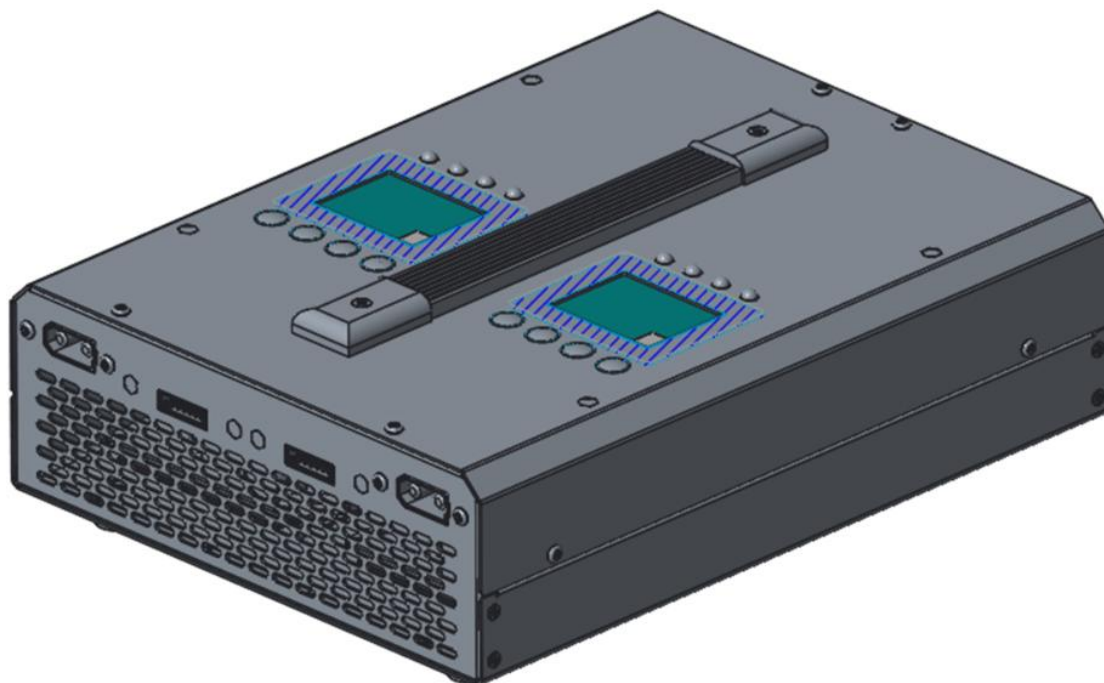
CUSTOMER APPROVED SIGNATURE	
Approval Signature	
Date	

Top-Unum Electronics Co., Ltd.	
Edited by	Tom
Checked by	Yuelin
Approved by	Robert
Date	2025/12/29

Revision History

Revision	DESCRIPTION		
	Before	After	Date
A0	X	Initial release	2025/12/29

Announcement



Troubleshooting

When the red LED is flashing.

Disconnect the AC power, remove the abnormality, and then reconnect the AC power to normal.

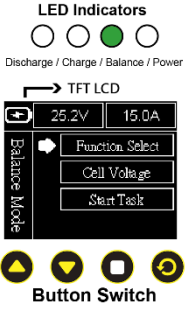
If the fault condition persists, check the battery pack.

SPECIFICATION

characteristics	SPECIFICATION
Max. Charging Voltage	25.2V ± 0.2V (25.4V Max.)
Charging Current	20.0A ± 0.5A Constant Current Mode (Set via TFT LCD Panel)
	15.0A ± 0.5A Constant Current Mode (Set via TFT LCD Panel)
	10.0A ± 0.5A Constant Current Mode (Set via TFT LCD Panel)
AC Input Voltage/Current	100Vac ~ 240Vac, 50/60Hz, 11.0A Max. (Range: 90Vac ~ 264Vac)
Efficiency	88% min. @ 24.7V± 0.5V and 20.0A rated load. (230VAC)
Charging characteristics OUTPUT-1 (20A Max.) OUTPUT-2 (20A Max.) Specifications identical	Standby mode (not connected to battery): Vo: 0V No output when battery is not connected.
	Pre-Charge: 1.0A Constant Current Vo: 15.0V± 1.0V ~ 18.0V ± 1.0V Io= 1.0A ± 0.2A
	C.C. Fast Charge: 20.0A Constant Current Vo: 18.0V± 1.0V ~ 24.7.0V ± 0.5V Io= 20.0A or 15.0A or 10.0A ± 0.5A
	C.V. mode: >24.7V Constant Voltage Vo: > 24.7V ± 0.5V Io : 20.0A or 15.0A or 10.0A→1.0A
	Charge Completed: Battery full; charging stops Vo: > 25.2V ± 0.2V (set via TFT LCD UI)
LED indicator (Charger)	Blue LED: Power indicator <ul style="list-style-type: none"> • Charger not activated: Blue LED OFF • Charger activated: Blue LED ON
	Green & Red LEDs: Charging operation indicators <ul style="list-style-type: none"> • No charging function: Charging LED OFF • Charging function active: Charging LED GREEN • Charging error: Charging LED RED (flashing)
<p>LED Indicators ○ ● ○ ● Discharge / Charge / Balance / Power</p> <p>TFT LCD</p> <p>25.2V 15.0A</p> <p>Balance Mode</p> <p>Cell Voltage Voltage Current Charging</p> <p>Button Switch</p>	Error Conditions
	<ol style="list-style-type: none"> 1. Overvoltage 2. Overcurrent 3. Undervoltage 4. Short circuit 5. Reverse polarity 6. Battery abnormal 7. Charger fan abnormality

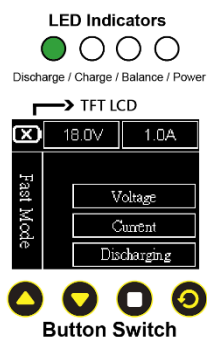
characteristics	SPECIFICATION
Environmental	Operation Temperature: -10 ~ 40°C Storage Temperature: -20 ~ 80°C Operation Humidity: 10% ~ 90% RH Storage Humidity: 10% ~ 90% RH
Over voltage protection	Output Voltage > 25.5V, no output from charger, Red LED flashes.
Under voltage protection	Battery voltage < 15.0V, no output from charger, Red LED flashes.
Over current protection	Charging current > 21A, the charger stops charging and the red LED flashes.
Short circuit protection	When an output short circuit occurs, the charger stops charging and the red LED flashes.
Reverse battery current	Reverse battery current < 1.0 mA
Mechanical Dimensions	Dimensions (L) 272mm* (W) 234mm* (H) 95mm (± 2.0mm)
AC Inlet socket	C14 (IEC60320)
DC Connector	Charger : TW90 Balancer: B7B-XH-A
Insulation resistance	> 50Mohm
Dielectric strength	1800VAC 5mA 1 minute
MTBF	> 50,000 hours MTBF @ 25° C
Environmental	RoHS, REACH

6S Balancer Specifications (Balancing Current: 300mA ± 20mA)

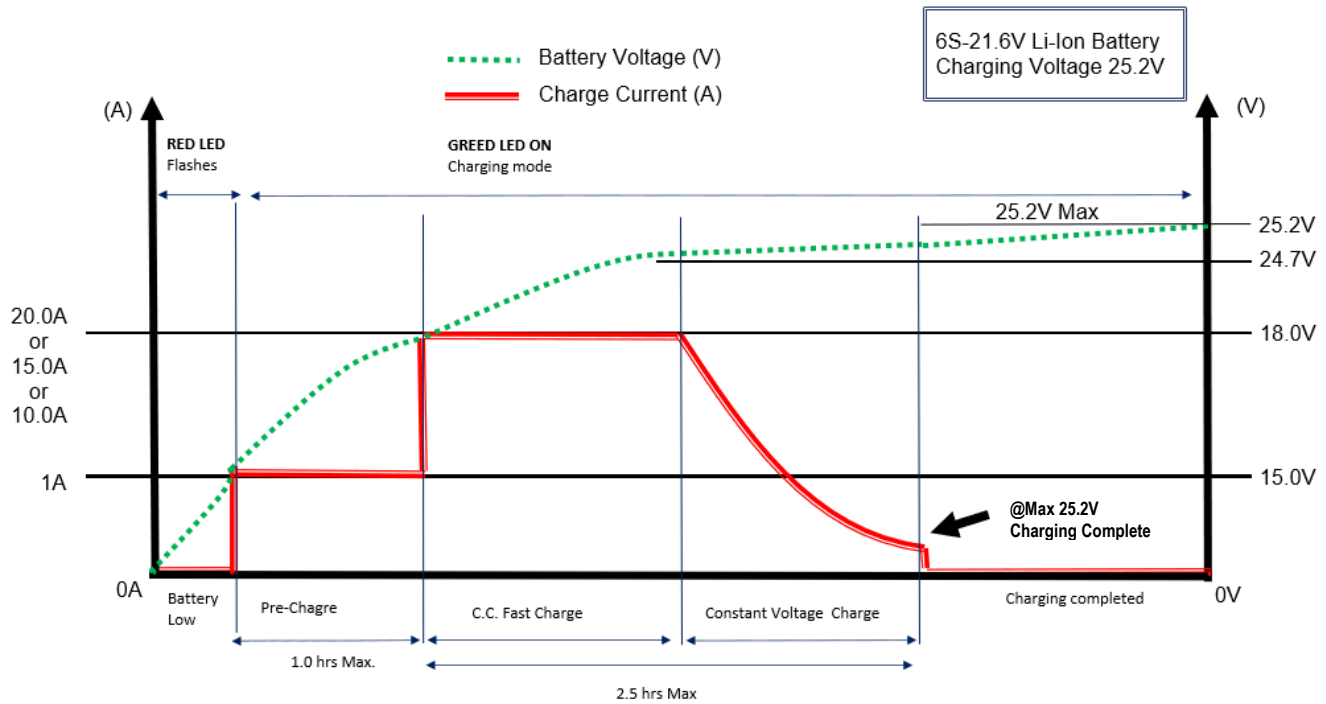
characteristics	SPECIFICATION
<p>Balancer Function Description</p>	<p>1. Balancer cable not connected but charging cable connected (Balancer indicator does not display) Balancer does not function; charger can only operate in fast-charging mode.</p> <p>2. Only the balancer cable is connected (Balancer indicator does not display) The system can detect cell voltages and display balancing status, but charging/discharging cannot occur.</p> <p>3. Balancer cable and charging cable both connected correctly (Balancer indicator displays normally) If any cell voltage < 3.8V, the balancer will not function. The charger follows the set charging mode and performs charging or discharging as needed.</p>
<p>Balancer indicator</p> 	<p>Green & Red LEDs: Balancer Status Indicator</p> <ul style="list-style-type: none"> ● No balancing function: Balancer LED OFF ● Balancing function active: <ul style="list-style-type: none"> ○ Cell voltage normal → Green LED ON ○ Cell voltage abnormal → Red LED flashing <p>Conditions for Balancing Activation</p> <p>1. When any cell voltage > 3.8V</p> <ul style="list-style-type: none"> ● Maximum cell-to-cell voltage difference > 50mV → Balancer begins cell voltage balancing. ● Balancing current: ≈ 20mA ± ● When the minimum cell voltage difference < 30mV, balancing stops. <p>2. When battery is nearly full</p> <ul style="list-style-type: none"> ● Maximum cell-to-cell voltage difference > 100mV ● → Indicates cell imbalance; Red LED flashes ● → System enters low-current fine balancing mode.

Battery Discharger Specifications

characteristics	SPECIFICATION
Min. Charging Voltage	17.0V ± 0.2V (17.0V Max.)
Charging Current	2.0A ± 0.5A (Set via TFT LCD)
	1.5A ± 0.5A (Set via TFT LCD)
	1.0A ± 0.5A (Set via TFT LCD)
	0.5A ± 0.5A (Set via TFT LCD)
LED indicator (Discharger)	<p>Discharger status indicator</p> <ul style="list-style-type: none"> • No discharging function: Discharger LED OFF • Discharging function active: Discharger LED green ON • Discharging error: Discharger LED red flashing



Charging curve



Charging Mode

Mode	Output Voltage	Output Current	status
Battery Low	$< 15.0V \pm 1.0V$	0A	Charging stops
	Battery voltage below 15V → charging stops		
Pre-Charge	$15.0\sim 18V \pm 1.0V$	$1.0A \pm 0.2A$	Constant current charging
	1.0A constant-current charging. Charging time ≥ 1.0 hrs → charging stops.		
C.C. Fast Charge	$18.0\sim 24.7V \pm 0.5V$	$20A/15A/10A \pm 0.5A$	Constant current charging
	20A / 15A / 10A Constant current charging		
C.V. mode	$> 24.7V \pm 0.5V$	$20A \rightarrow 1.0A$	Constant voltage charging
	Charging voltage $> 24.7V \rightarrow$ constant voltage mode		
Full Charged	$> 25.2V \pm 0.2V$	0A	Charging completed
	Battery voltage $> 25.2 \pm 0.2V \rightarrow$ battery full, charging stops		
Standby mode	No output	0A	Battery not connected
	Battery not connected		

Protection characteristics

Timing Protection characteristics

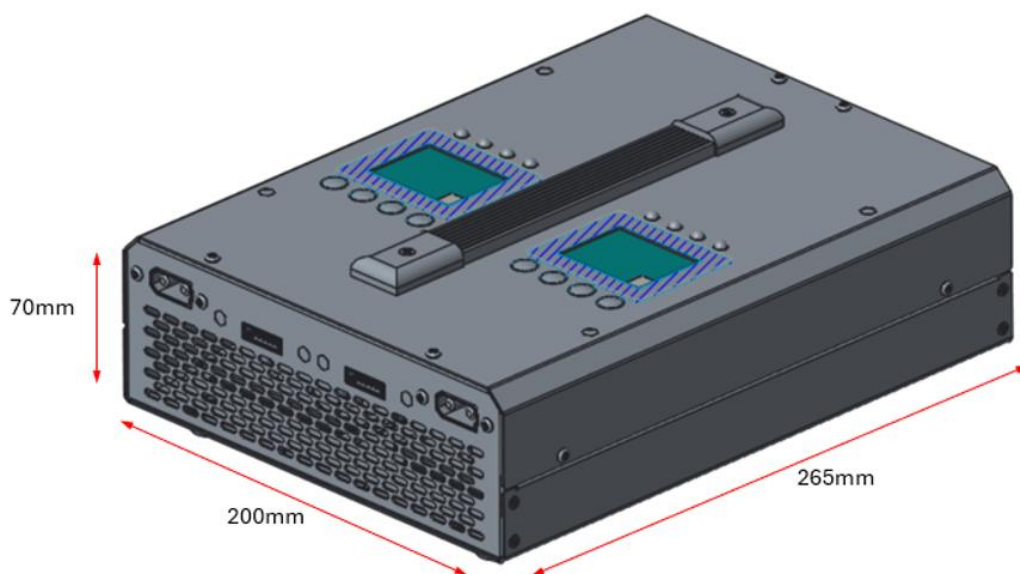
Status	SPEC	Charging Status
1	Pre-Charge Battery voltage 15~18V ± 1.0V	Charging time: 1hrs ± 5 minutes The battery voltage is still lower than 18V · Battery voltage is too low, stop charging, Red LEDs flash.
2	C.C. & C.V. Mode Battery voltage >18± 1.0V	Charging time: 2.5hrs ± 10 minutes If the charger uses constant current fast charge for more than 150 minutes, it means that the battery capacity does not match. Charging will stop and the Red LEDs flash.

Label for reference

The label is rectangular with a width of 119 mm and a height of 44 mm. It features the TUE logo and the product name 'TUE 鋰電池充電器' (TUE Lithium Battery Charger). The model number is D500VD-B06X200C. Input specifications are 100~240V~, 50/60Hz. Output specifications are 25.2V and 20.0A. The label includes two warning sections: one about indoor use and avoiding liquids, and another about using only compatible batteries. It also lists the manufacturer as TUE Electronics Co., Ltd. (236 New Taipei City, Tucheng District, Xinzhou Road, 100th Floor, 10th Floor) and 'MADE IN TAIWAN'. Safety icons include a lightning bolt, a house, a square, a book, and a crossed-out battery. The operating temperature range is -10°C to 40°C. A red box highlights a 40x10 mm area containing the FW (CP11098_V00) and SN (YYWWCCXXXX) numbers, a barcode, and a legend: YY: Year, WW: Week, CC: Customer, XXXX: Serial Number (0001-9999).

CP11098_D500VD-B06X200C_L00

Drawing



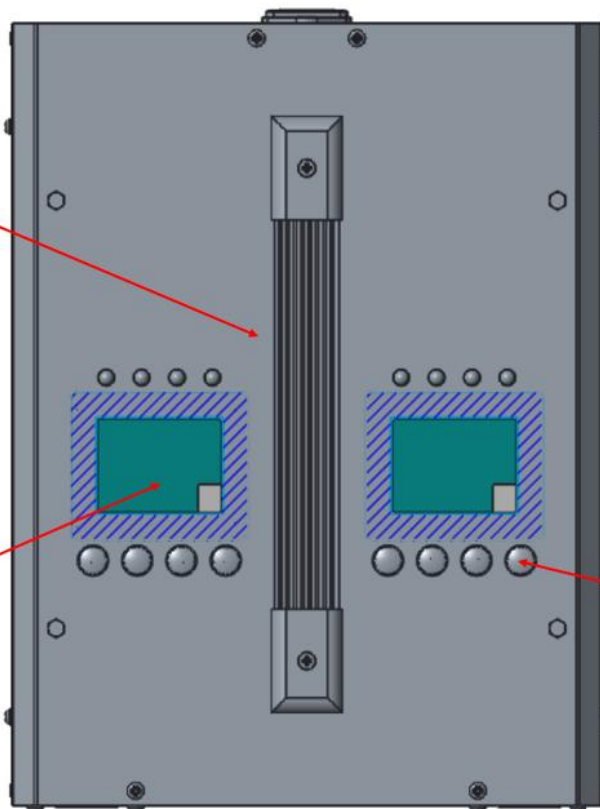
Dimension:265*200*70mm
Color:Black

TOP VIEW

Plastic Soft-Touch Handle

TFT LCD Display
Brand:華凌光電

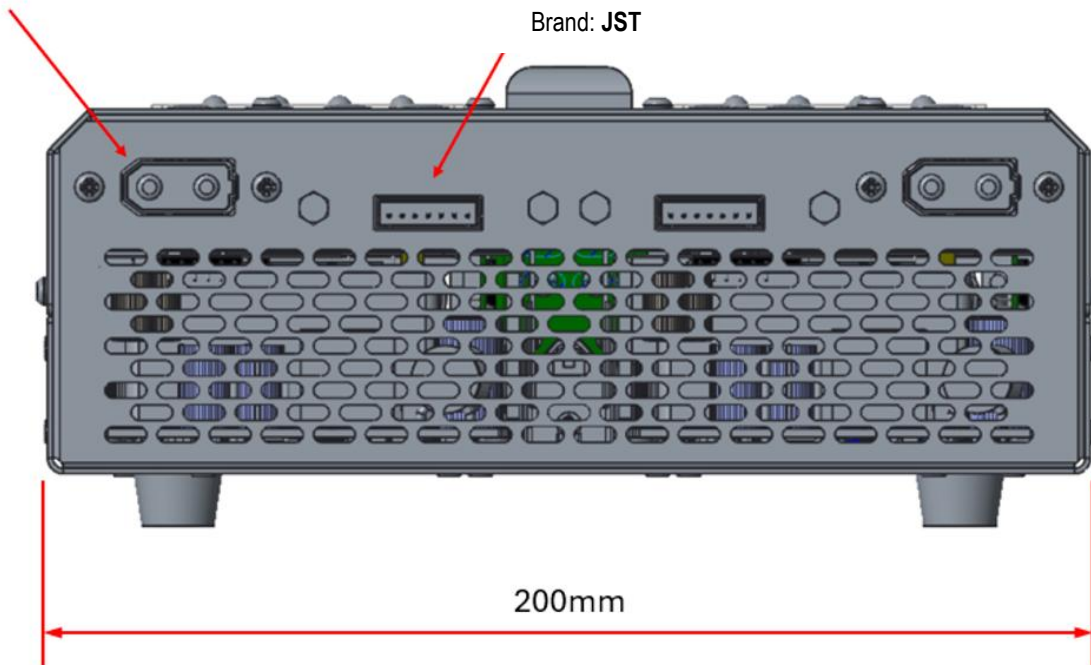
Push-button
Power Switch



Smart Charger

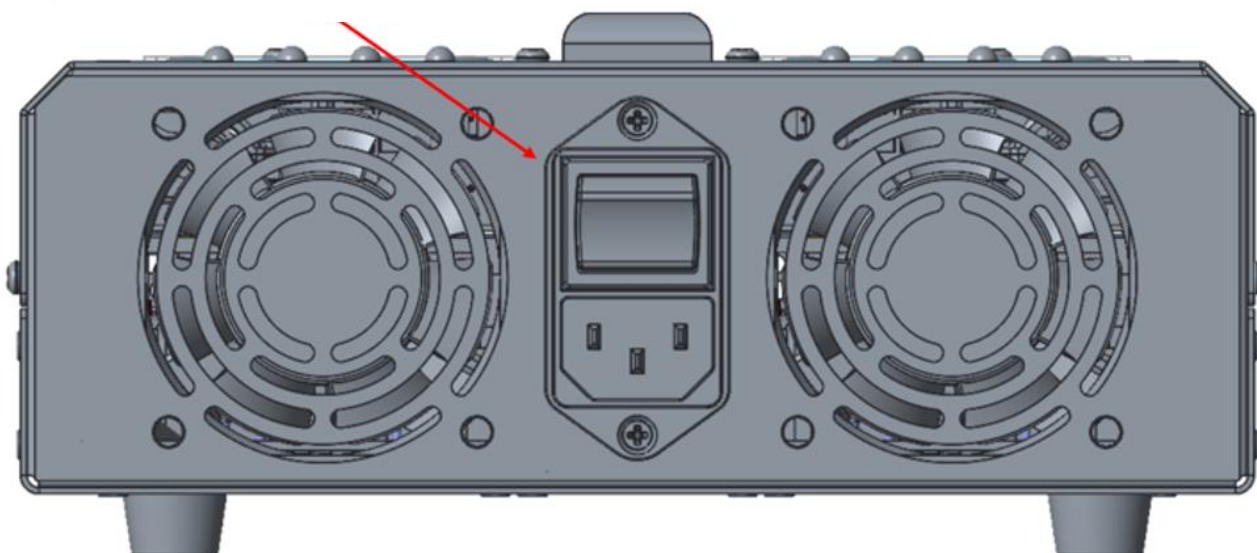
TW90

7-Pin Connector
Model: B7B-XH-A
Brand: JST



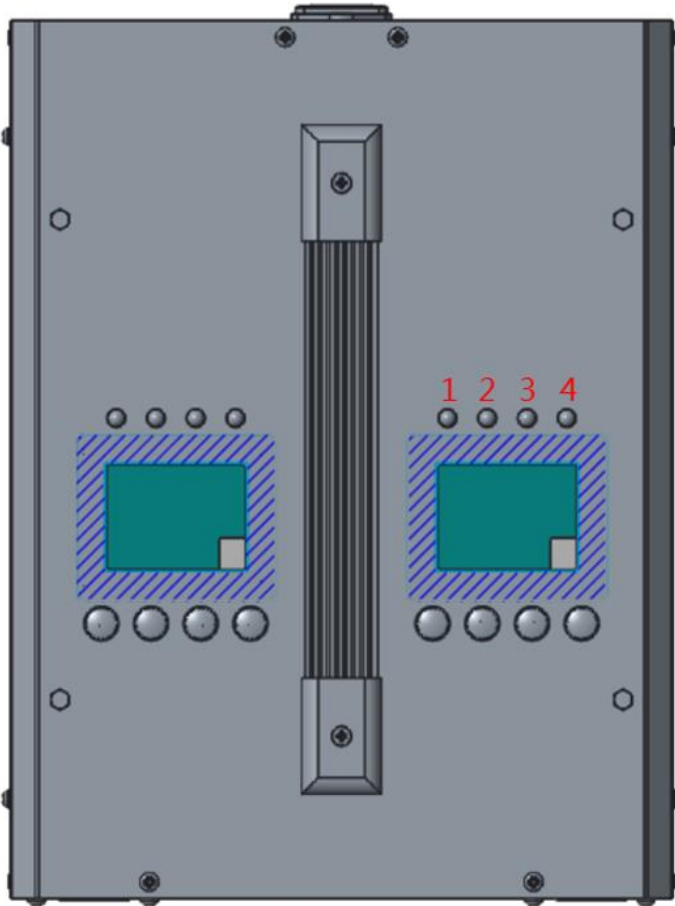
FRONT VIEW

AC Power Switch
Brand: 富灣



REAR VIEW

LED Indicator Description



- 1. Discharge Indicator
- 2. Charge Indicator
- 3. Balancing Operation Indicator
- 4. Power Indicator

1

Discharge Indicator LED	LED Status
Green ON	Discharge mode active
Red Flashing	Discharge mode error
OFF	Discharge mode not active

2

Charge Indicator LED	LED Status
Green ON	Charge mode active
Red Flashing	Charge mode error
OFF	Charge mode not active

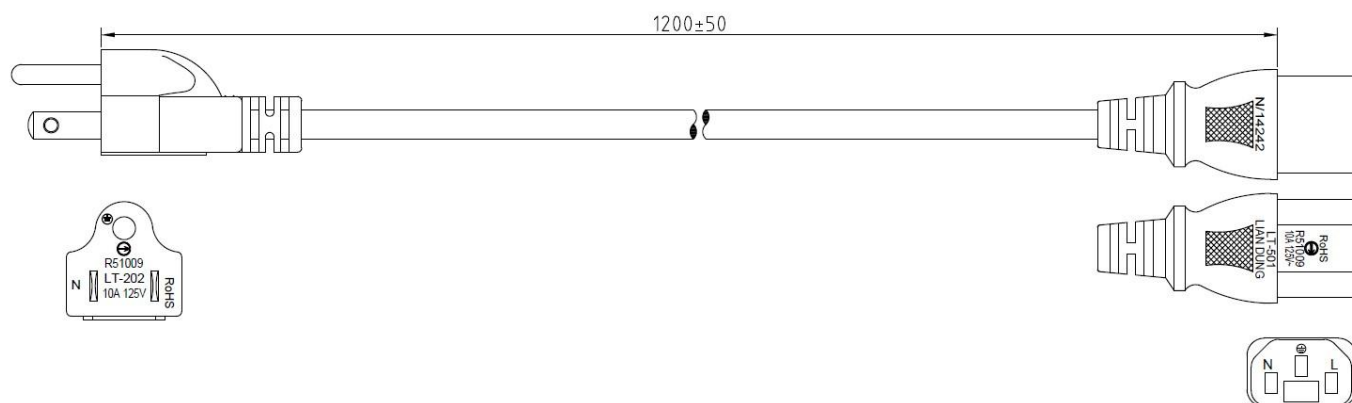
3

Discharge Indicator LED	LED Status
Green ON	Balancing mode active
Red Flashing	Cell aging detected
OFF	Balancing mode not active

4

Charge Indicator LED	LED Status
Blue ON	Power connected
Blue OFF	Power not connected

AC CORD

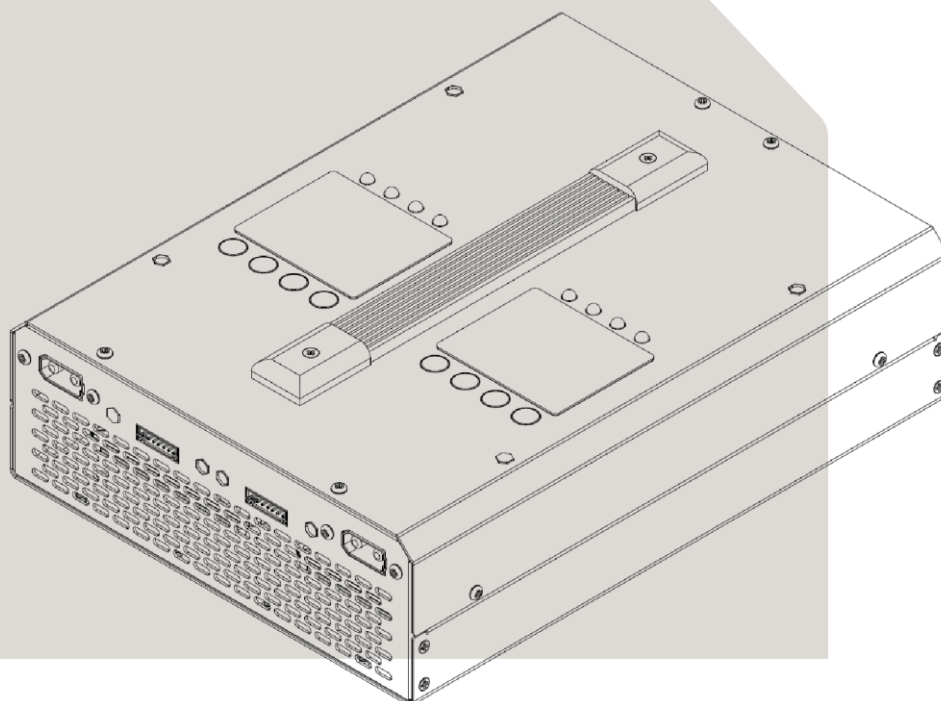


VCTF 3X2.0mm2 BLK 1.2M

User Manual

TUE Top-Unum
Electronics Co., Ltd.

User Manual v1.0



D500VD-B06X200C

Dual Channel Balance Charger
for 6S-21.6V Li-Ion Battery

Product Overview

The D500VD-B06X200C is a dual-channel 6-cell Li-ion battery balance charger capable of charging two 6-cell Li-ion batteries simultaneously. It supports multiple charging modes, including:

- Fast Charging Mode
- Fast Discharging Mode
- Balance Charging Mode
- Balance Discharging Mode
- Battery Storage Mode

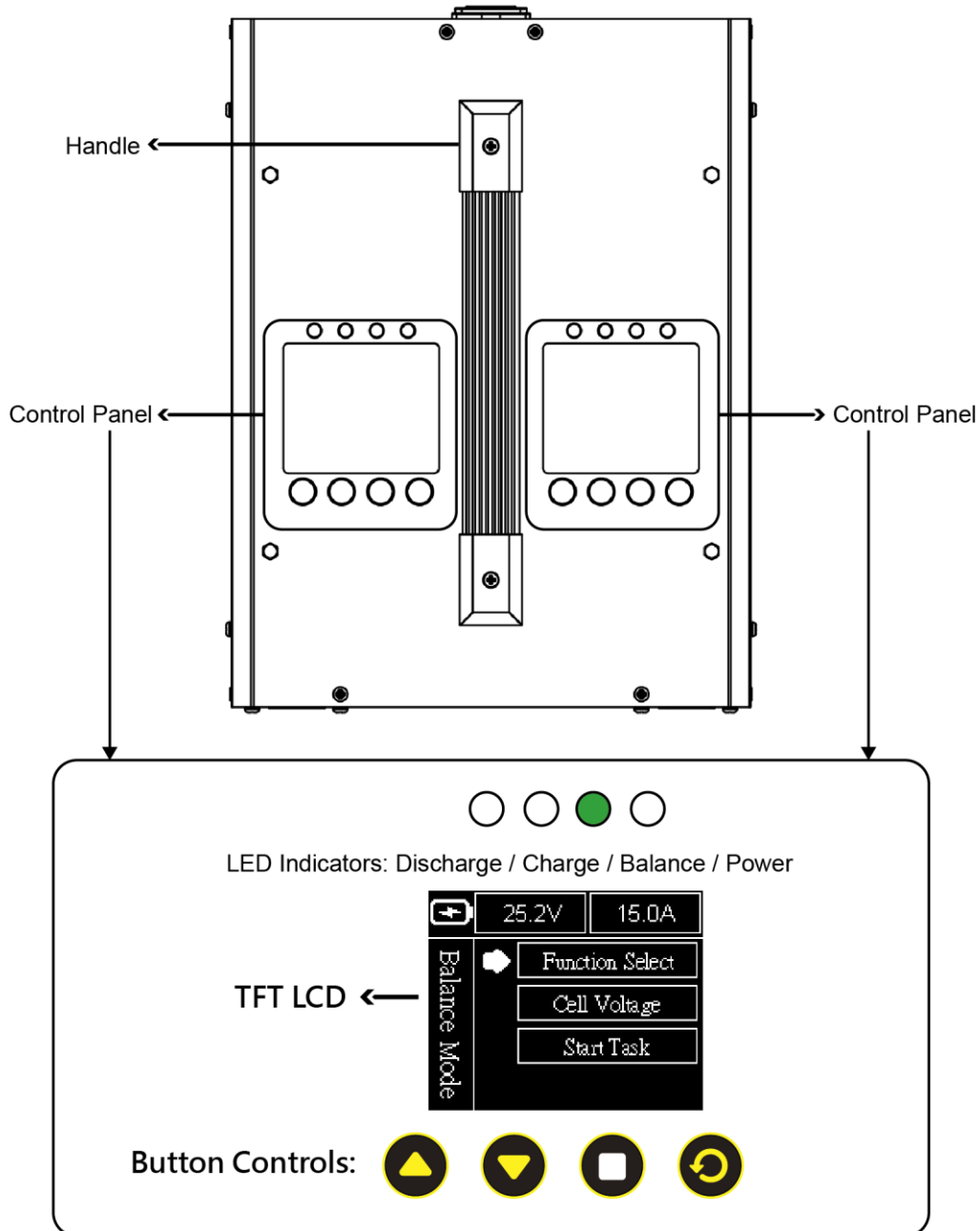
The charger is equipped with multiple safety protections: over-voltage protection, over-current protection, over-charging protection, over-discharging protection, and over-temperature protection, ensuring stable and reliable charging and discharging performance. Before use, please read the operation instructions and safety guidelines carefully.

Product Features

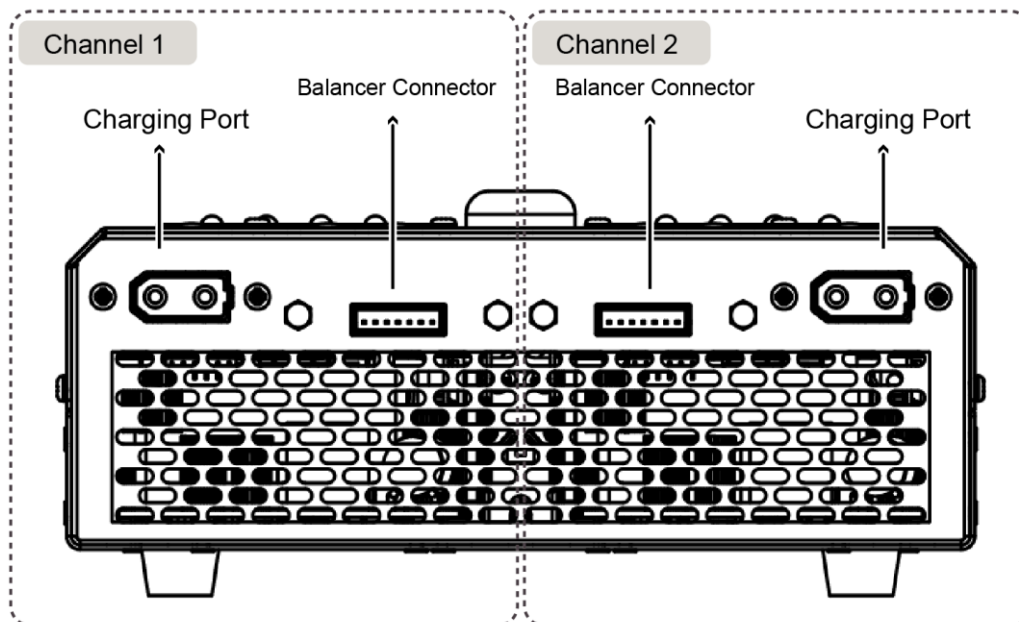
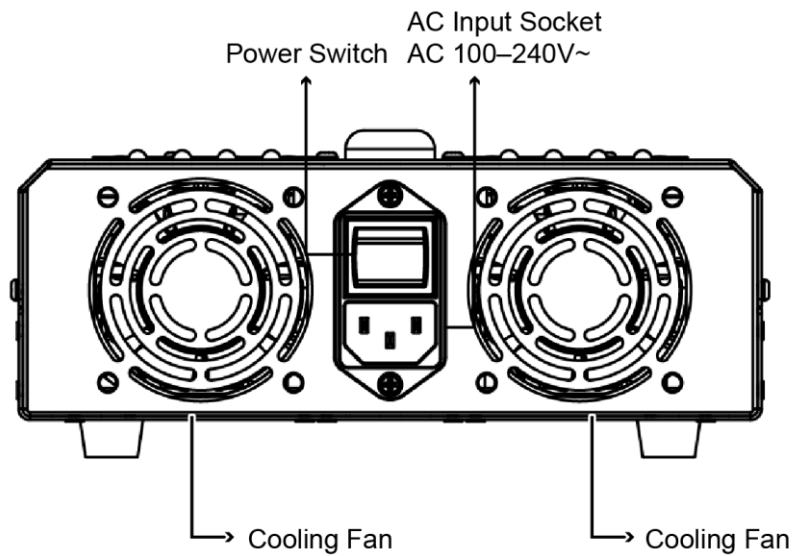
The D500VD-B06X200C offers the following features:

- Supports simultaneous charging of two 6-cell Li-ion batteries
- Remembers the previous charging mode
- Multiple protection features: short-circuit protection, over-charging protection, over-discharging protection, over-temperature protection, etc.
- Adjustable charging current
- Adjustable discharge cut-off voltage
- Supports battery balance monitoring
- Supports battery storage mode

Button & Indicator Description



AC Power Socket Description

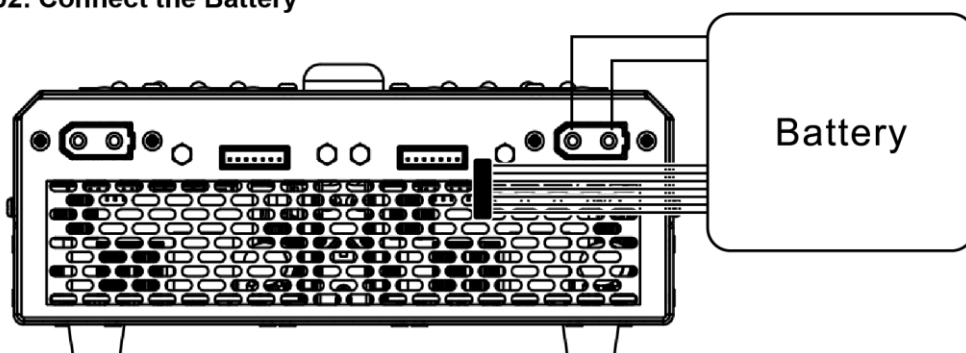


Operating Steps Power On · Connect Battery · Select Mode

01. Power On

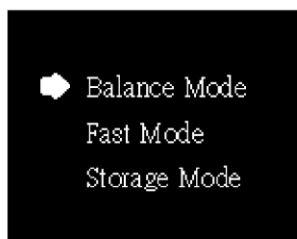
Connect AC power, turn on the power switch, the screen will remain black for a few seconds before entering the mode selection screen.

02. Connect the Battery



03. Mode Selection

Use the Up/Down keys to select "Balance Charge/Discharge Mode" or "Fast Charge/Discharge Mode", then press ENTER to enter the selected mode, as shown below.



(Figure 1)

Operating Steps Balance Charging Mode · Fast Charging Mode · Battery Storage Mode

04. Balance Charging Mode

After selecting Balance Mode, if the balance connector is not connected, the display will show "Balancer connected", as shown in Figure 2.

Once the charger detects the balance board, balance initialization will begin, as shown in Figure 3. After initialization is complete, the charger will enter the confirmation screen, as shown in Figure 4. After confirming, the charger will return to the main screen, as shown in Figure 5.

05. Fast Charging Mode

After selecting Fast Charging Mode, connecting the balance board is not required. Charging will begin after confirmation, as shown in Figure 4, then return to the main screen as shown in Figure 6.

06. Battery Storage Mode

If the battery will not be used for a long period, it is recommended to use Battery Storage Mode, which will adjust the battery voltage to 3.9V per cell to extend battery lifespan. Battery Storage Mode operates as follows:

If the balance connector is not connected, the display will show "Balancer connected", as shown in Figure 2.

Once the balance board is detected, balance initialization begins, as shown in Figure 3. After initialization, the charger enters the confirmation screen, as shown in Figure 4. After confirmation, the charger returns to the main screen, as shown in Figure 7.

- When battery voltage exceeds 3.9V/cell, the charger will discharge the battery.
- When battery voltage is below 3.9V/cell, the charger will charge the battery.



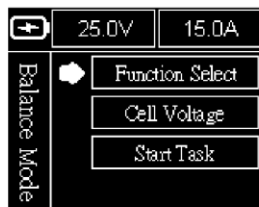
(Figure 2)



(Figure 3)



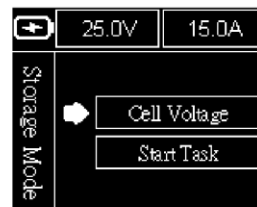
(Figure 4)



(Figure 5)



(Figure 6)



(Figure 7)

Operating Steps

- Set Charging Cutoff Voltage (Balance Mode)
- Set Charging Current (Balance Mode)
- Set Discharging Cutoff Voltage (Balance Mode)
- Set Discharging Current (Balance Mode)

07. Set Charging Cutoff Voltage (Balance Mode)

On the main screen → Function Select → Charging Settings → Charging Voltage Settings
→ Adjustable range: 3.8–4.2V

The upper-left icon  indicates charging mode.

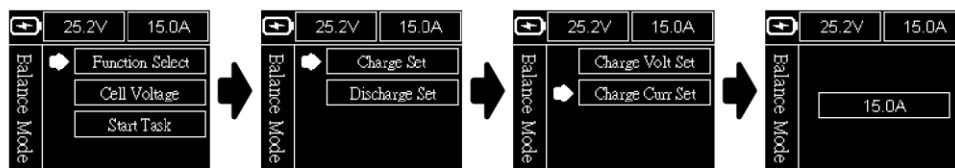
Example: For a 6-cell battery, if the cutoff voltage is set to 4.2V/cell → total cutoff voltage = 25.2V = 4.2V × 6



08. Set Charging Current (Balance Mode)


On the main screen → Function Select → Charging Settings → Charging Current Settings
→ Adjustable range: 10A, 15A, 20A

The upper-left icon  indicates charging mode.

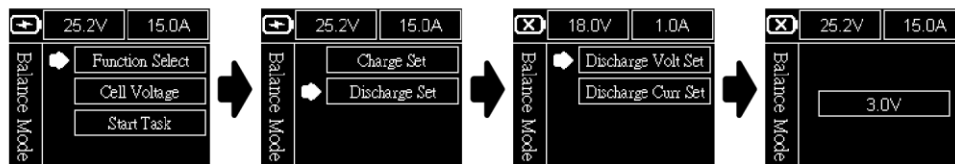


09. Set Discharging Cutoff Voltage (Balance Mode)

On the main screen → Function Select → Discharging Settings → Discharge Voltage Settings
→ Adjustable range: 2.8–3.8V

The upper-left icon  indicates discharging mode.

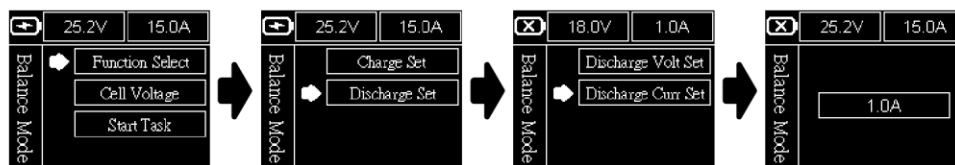
Example: For a 6-cell battery, if cutoff voltage is set to 3.0V/cell → total cutoff voltage = 18.0V = 3.0V × 6



10. Set Discharging Current (Balance Mode)

On the main screen → Function Select → Discharging Settings → Discharge Current Settings
→ Adjustable range: 0.5A, 1.0A, 1.5A, 2.0A

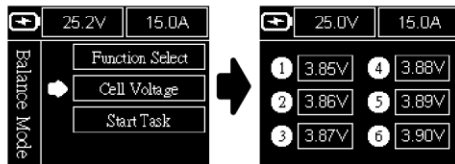
The upper-left icon  indicates discharging mode.



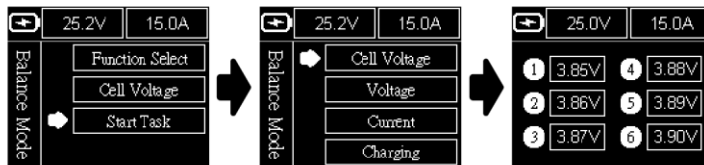
Operating Steps Monitoring Cell Voltages (Balance Mode) Starting a Task (Balance Mode)

11. Monitor Cell Voltages (Balance Mode)

Main Screen → Cell Voltage (before starting a task)



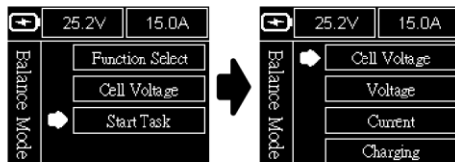
Main Screen → Start Task → Cell Voltage (during task execution)



12. Start Task (Balance Mode)

Main Screen → Start Task

The charger will perform charging or discharging based on the mode selected beforehand.



Operating Steps

- Setting Charge Cutoff Voltage (Fast Mode)
- Setting Charge Current (Fast Mode)
- Setting Discharge Cutoff Voltage (Fast Mode)
- Setting Discharge Current (Fast Mode)

13. Set Charge Cutoff Voltage (Fast Mode)

Main Screen → Function Select → Charge Setting → Charge Voltage Setting
Adjustable Range: 22V – 25V

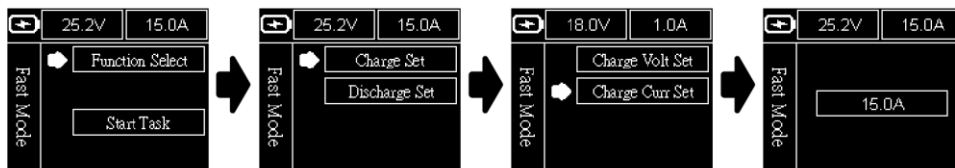
The icon shown at the upper left  represents Fast Charge Mode.



14. Set Charge Current (Fast Mode)

Main Screen → Function Select → Charge Setting → Charge Current Setting
Adjustable Range: 10A, 15A, 20A

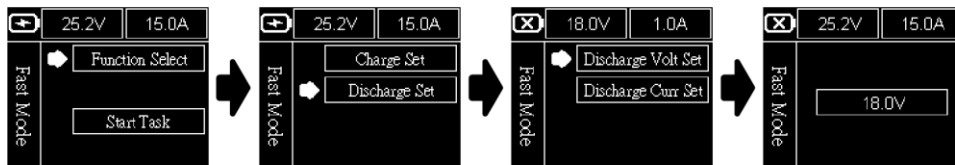
The icon shown at the upper left  represents Fast Charge Mode.



15. Set Discharge Cutoff Voltage (Fast Mode)

Main Screen → Function Select → Discharge Setting → Discharge Voltage Setting
Adjustable Range: 17V – 21V

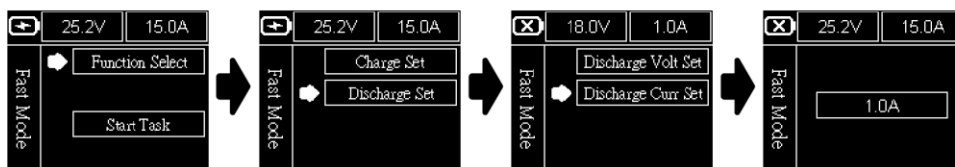
The icon shown at the upper left  represents Fast Discharge Mode.



16. Set Discharge Current (Fast Mode)

Main Screen → Function Select → Discharge Setting → Discharge Current Setting
Adjustable Range: 0.5A, 1.0A, 1.5A, 2.0A

The icon shown at the upper left  represents Fast Discharge Mode.



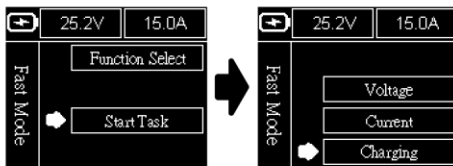
Operating Steps

Starting Task (Fast Mode)
Monitoring Cell Voltages (Storage Mode)
Starting Task (Storage Mode)

17. Start Task (Fast Mode)

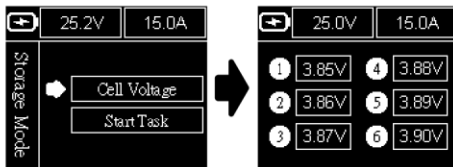
Main Screen → Start Task

The charger will perform charging or discharging based on the previously selected mode.

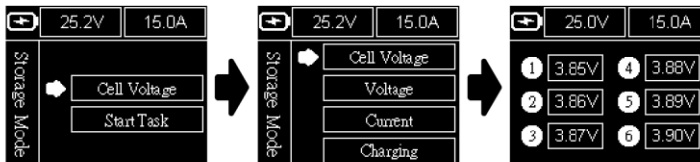


18. Monitor Cell Voltages (Storage Mode)

Main Screen → Cell Voltage (before task execution)



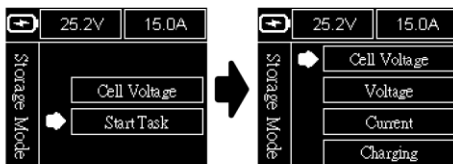
Main Screen → Start Task → Cell Voltage (during task execution)



19. Start Task (Storage Mode)

Main Screen → Start Task

The charger will perform a charge or discharge operation depending on the previously selected mode.



■ Error Message Indicators

Error Type	Error Description
Error Description	Incorrect cell count detected when connecting the balancer.
Excessive Cell Voltage Difference	<ol style="list-style-type: none"> 1. Balancer terminal voltage difference > 200 mV 2. During charging: any cell voltage exceeds cutoff voltage by 150 mV 3. During discharging: any cell voltage is 150 mV lower than cutoff voltage
Connection Interrupted	Battery connection is interrupted during task execution.
Battery Fully Charged	The battery has already reached full charge.
Overcurrent Protection	Charger output current overload.
No Current Detected	No charging/discharging current detected during task execution.
Overtemperature/Overcurrent Protection	Charger internal temperature too high.