

Operating instruction manual TP-1010C Li-polymer Charger/Discharger

LI-POLYMER CHARGER/DISCHARGER USER'S MANUAL TP-1010C



**THUNDER
POWER**

Thunder Power USA

1. System Features:

- Hi-efficiency digital power system
- Specially designed for safe Li-polymer charge algorithm
- Backlit LCD
- Balance charge capability(TP balancer required)
- Individual cell over charge protection capability
- Data port for communicates to balancer
- Automatic FAN control
- 10 programmable Memory charge parameter settings
- Programmable charge settings (Fast Charge /Full charge/storage charge and Li-on battery)
- Selectable discharge cut-off voltage
- Fast charge algorithm

2. General Specifications:

- Input power capacity: 11V-15V DC 25Amp at maximum charge rating
- Charge battery type: Lion or Li-polymer
- Charge voltage: up to 10cell / 42V
- Charge current: 0.25A to 10Amp
- Charge Type :CC and CV
- Charge termination: 5 types selectable
- Over charge cutoff voltage:4.235V
- Auto-balance charge current:300mA or adjustable up to 1C
- Imbalance cut-off:0.2V
- Auto-imbalance-current control active voltage:0.12V at CC and 0.06V at CC charge phase.
- Auto-current control reset imbalance voltage:0.03V
- Discharge voltage: up to 10Cell / 42V
- Discharge power capability: up to 22 Watt
- Capacity display:0----99999mAh
- Timer display:0----10 hour
- Display tolerance:+/- 0.25%
- Display type: Backlit 2 x16 dot LCD
- Charge power capability: up to 210Watt

**Important Note (Data Link Cable):

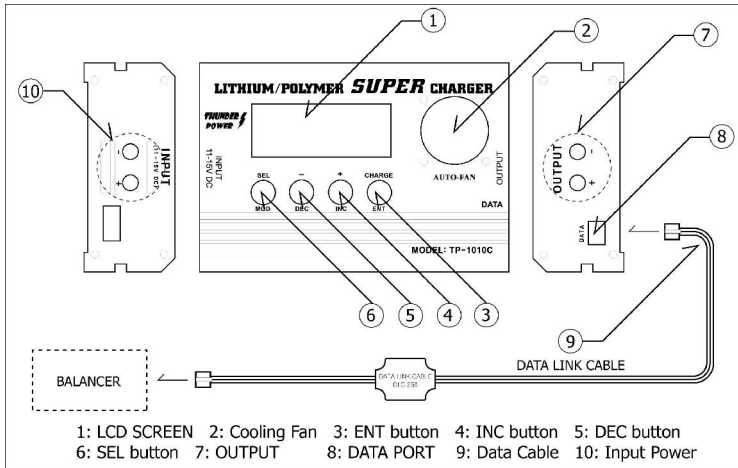
The data cable (#DL-250) included is internally optical coupled to isolate connection between charger and balancer.

Do not make a direct connection by using any other cables. It may make a common ground and harmful hazards.

Cautions:

- Do not charge in a vehicle
- Use Auto-vehicle 12VDC battery or good quality power supply.
- Do not charge in direct sun light
- Do not charge when ambient temperature is extremely high.
- Use and store the charger in a dry environment.
- Charge in an isolated area away from flammables
- Do not attempt to charge when Li-poly battery pack is hot.
- Do not charge unattended.

TP1010C charger face panel assignments



LCD display abbreviations:

- CC: Constant current
- CV: Constant voltage
- CHG: Charge mode
- DCH :Discharge mode
- Cx: Higher voltage
- Cy: Lower voltage
- C1 -- C10: cell #1 -- cell #10

1, Charger Option settings

Note: You can verify the charge or discharge option setting while charger is running. Press [SEL] button less than 1second.

1st line: Display option settings

2ND line: Display Input power voltage

Charge or discharge option
Input Voltage:12.00V

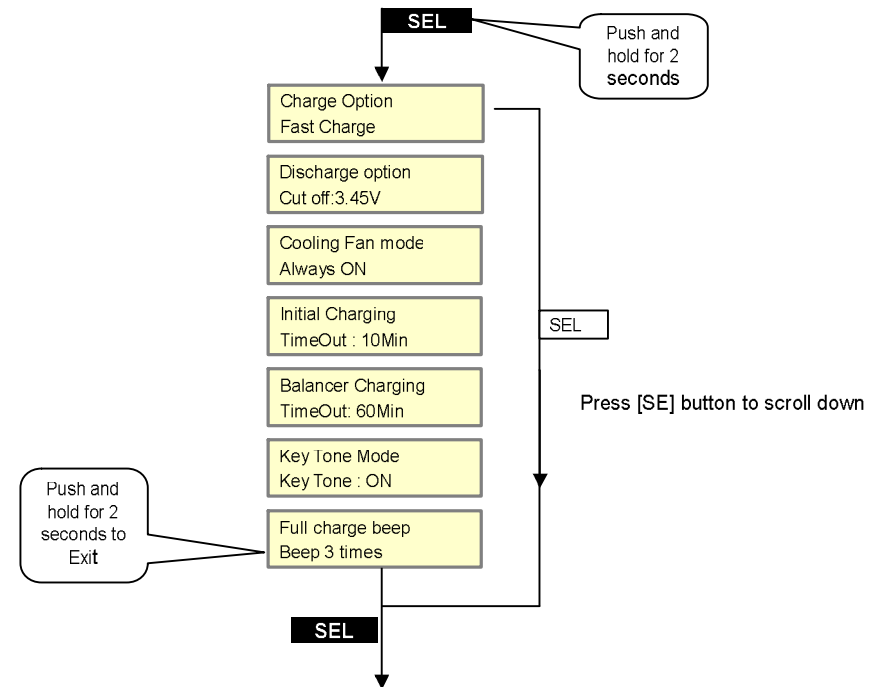
This display only shows during CC or CV phase while in charge and discharge mode.

Push and Hold [SEL] button for 2seconds the screen appearing as below. Press

Press [SEL] button to scroll down.

LCD Display	Function descriptions
<p>CHARGE OPTION Fast Charge</p>	<p>-Charge option settings (V1.90) Press INC or DEC:</p> <ul style="list-style-type: none"> ● Full charge 100%(1C) ● Storage charge (3.85V top-off) ● Charge to 95%(1C) ● Lion 4.1V charge <p>* 3C high rate charging: set to full charge for 97% charged * 3C high rate charging: set to fast charge for fastest charging to 95%</p>

<p>Discharge Option Cut-Off: 3.3V(default)</p>	<p>Discharge cut-off voltage setting(V1.90):</p> <ul style="list-style-type: none"> ● 3.0V—3.3V-3.45V—3.85V ● 3.85V(for storage discharge)
<p>Cooling Fan Mode Auto(default)</p>	<p>Cooling FAN operating mode:</p> <ul style="list-style-type: none"> ● Auto or Always ON ● Auto mode: temperature or total power FAN control
<p>Initial Charging TimeOut: 5 min (default)</p>	<p>Initial charge timeout timer setting Press INC or DEC to desired time setting. 5 to 15 minutes</p>
<p>Balancer safety current timeout: 60min (default)</p>	<p>Balancer safety current reduction timeout settings When balancer detected imbalance over 0.12V, charge current will automatically reduced to 0.3A. This timer allow time settings of: 30min, 60min, 90min, 120min to correct imbalance(If imbalance could not be corrected to 0.03V within timeout setting, charging will be interrupted)</p>
<p>Key Tone Mode KetTone ON(default)</p>	<p>Key Tone On/OFF</p>
<p>Full charge Beep Beep 3times(default)</p>	<p>Full charge beep option Press INC or DEC to select full charge beep for 3time or 5minutes.</p>

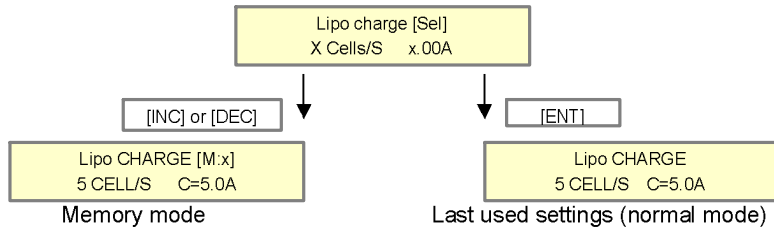


2, Charge

The charge setting mode can be selected in either memory mode or normal mode.

Memory setting mode: Most frequently used 10 charge settings can be stored to M:0 to M:9.

Normal setting mode: The charge setting displays the last used settings. If charge is completed or interrupted, the "SEL" flashes. Press "INC" or "DEC" for memory mode or ENT key charge to the last used settings.



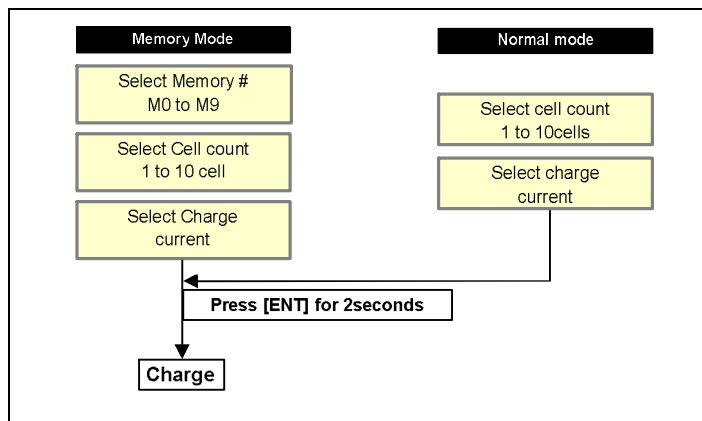
Modify charge settings;

You can change the charge settings in either **memory** mode or **normal** mode.

Press [ENT] button, the present variable setting begins flashing.

Press [INC] or [DEC] to change desired charge parameters, while flashing.

Please see the screen as shown below.



Note1: The changes are automatically updated to the present memory #0-to 9 when **MEMORY** mode selected.

Once the charge process begins, see detail functions below.

1, Cell count reconfirm: If balancer is not connected, you absolutely need a cell count reconfirm for the safety. This will occur when the voltage is out of the proper voltage range. **Press [INC] button if cell count is correct. (The display shown below)



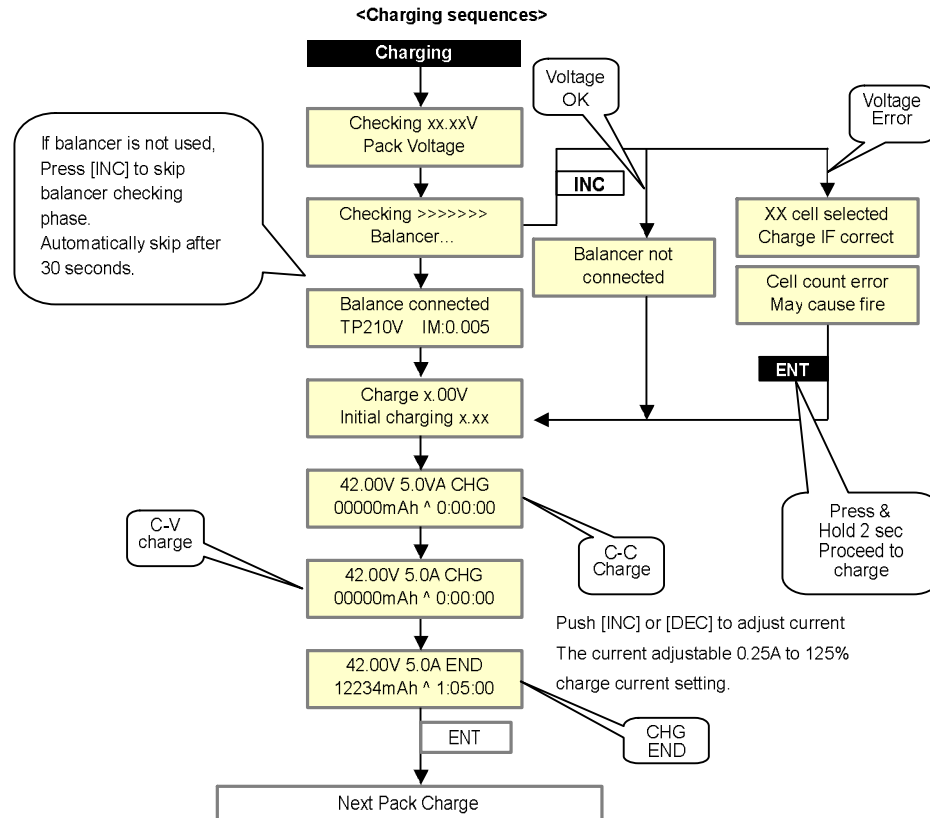
2, when not using balancer: If screen shows "Balancer Checking" press [INC] to skip balancer checking mode. If not pressed the button automatically proceeds to next charge step after 30 seconds.

3, Initial charge: This charge mode limits current until the pack voltage is equal or higher than 3.7V/cell. The initial charge time limit is selectable from 5 to 15 min(default:5 min). An error will message occur during initial timeout.

4. During CC charge (Constant current): At this charging stage, the charge current can be adjustable down to 0.25A or up to +125% of the original set charge current.

5, CV charge (Constant voltage): At this phase the charge voltage should be locked and only the current should be ramped-down to the termination current (See option charge settings)

6, Charge complete: Beep alters 3 times or 5 minutes (See option charger settings)

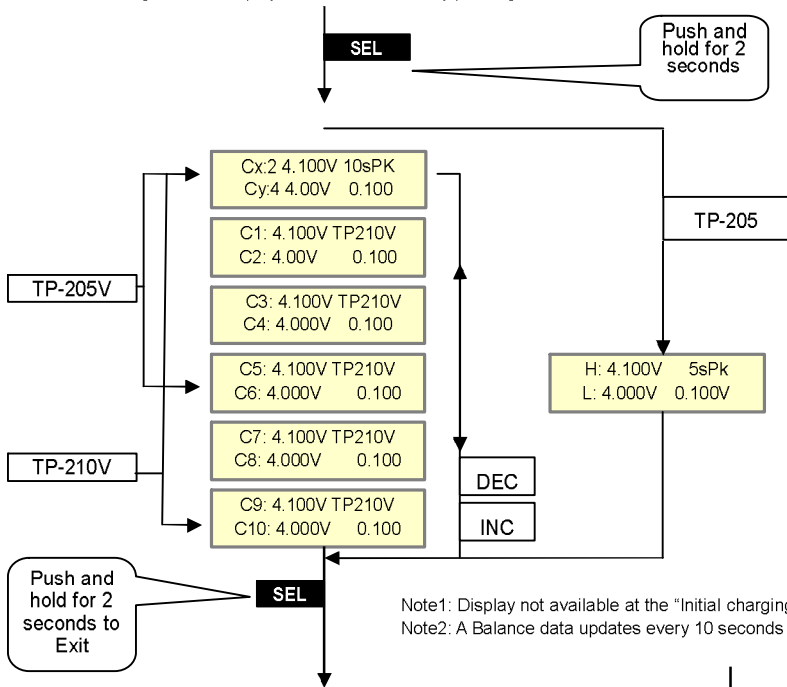


Safety functions if balancer is connected while charging

- 1, Over charge protection:** When any cell in the pack is over charged to 4.235V, charging will be interrupted and an error message occurs.
- 2, Imbalance charge current control:** At CC phase: If the pack imbalance voltage reaches to 0.12V, the charge rate is reduced to 0.3A (It'll only activate at the higher cell voltage reaches 3.85V and adjustable to the original setting). If the imbalance voltage is not better than 0.03 for given the time setting (see option), a timeout error message occurs. At CV phase: Imbalance over 0.06V the charge current will be reduced to 300mA and back to normal current if the imbalance voltage less than 0.03V. (Current can not be adjustable)
- 3, Over Imbalance voltage protection:** When the imbalance voltage is greater than 0.2V, the charge will be interrupted, and an error message displays (please do self balance if low cell voltage is still higher than 3.6V)
- 4, Cell count comparing with balancer data:** The charger cell count will be compared with the balancer data information. If the cell count does not match, an error message occurs while charging. (Check cell count setting and pack condition before charging again)

5, Balancer data display: When pressing [SEL] button for longer than two seconds while charging, the LCD will display the highest voltage cell, imbalance voltage and balancer identity symbol for 5 seconds

All individual cell voltage can be displayed as shown below by pushing INC or DEC within 5 seconds



Note1: Display not available at the "Initial charging."
Note2: A Balance data updates every 10 seconds

3, Discharge

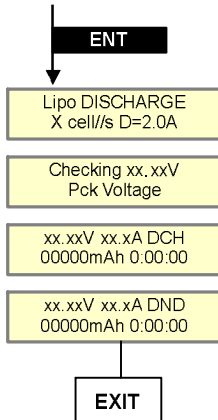
1. Press [SEL] button, enter to discharge-mode.
2. Press [ENT], the present cell count variable will begin flashing.
3. Press INC or DEC to select cell counts.
Press [ENT] again, the current variable will begin flashing.
Press Inc or DEC to select desired current.
Press [ENT] for 2seconds to start discharge.
Note1: Be sure correct cell count.
Note2: Discharge function works only with cell voltage higher than 3.85V/cell.

4, Data Link display

If the balancer data link is successfully established, the [^] symbol will appear as shown. It also will re-flash every 10 seconds, when the balancer data is updated.

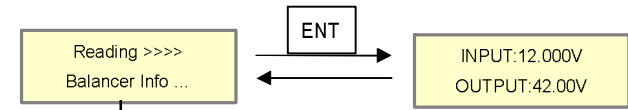
Note: This sign will display while charging and discharging.
The [^] symbol will not display at the "INITIAL CHARGING" mode

42.00V 5.0A CHG
00000mAh ^ 0:00:00



5, Reading Balancer data and other info.

1. Reading balancer data: This function allows the charger to display data from the balancer data-link (updated every 10 seconds interval time period)
2. Reading **INPUT** power source voltage and **OUTPUT** pack total voltage:
Pressing by [ENT] button alternately display as shown below.



Note: See balancer data display

6, Error message

Code	Error Message	Description	Observations
#1	[1] Voltage Error OR Wrong Polarity	OUTPUT voltage error or wrong polarity	Check pack polarity and cell count.
#2	[2] Initial Charging Time out	Initial charging timeout (see option settings)	Check pack voltage and cell count. If correct, charge again
#3	[3] Wrong Cell with Balancer	Cell count not equal with balancer	Check charge cell count setting
#4	[4] Balancer See OverCharg to 4.235V	One or more cell overcharged to 4.235V	Do 0.3A balance charge or reduce charge current setting.
#5	[5] Balancer See LowVoltage 3.3V	One or more cell over discharged	Do Cell balance.
#6	[6] Charging Incompleted!	Balancer charge timeout.	The charge is not completed. Do auto-self balance the pack and charge again.
#7	[7]Failure InputPower	Input power voltage or capacity error	Be sure check voltage 11-15V while charging. The capacity required 25Amp source at 210W charge rating
#8	[8]Wrong Cell - Count	Wrong Cell count	Check cell count setting
#9	[9]Failure Output circuit	Output wire short or connection problems	Check output connections.
#10	[10]Imbalance Over 0.2V	Pack imbalance voltage is over 0.2V	Check individual cell voltage. Do 300mA balance-charge.

