H SPEED HSP0017 Herakles Mini AC Charger 60W Instruction Manual

No. HSP0017

developed by racers for racers

INSTRUCTION MANUAL MINI CHARGER

Contents

INTRODUCTION

Thank you for your purchase of the HI-SPEED HERAKLES MINI Charger. This product is a rapid charger with a high-performance microprocessor and specialized operating software.
Please read this entire instruction manual completely and attentively before using this product, as it covers a wide range of information on operation and safety.

WARNINGS AND SAFETY NOTES

PLEASE READ ALL INSTRUCTIONS CAREFULLY BEFORE USING THE PRODUCT!
The following warnings and safety notes are for your protection, please refer to all aspects of this instruction manual to ensure proper operation. FAILURE TO FOLLOW THESE SAFETY PRECAUTIONS MAY
CAUSE FIRE, PROPERTY DAMAGE, AND/OR PERSONAL INJURY!

- **WARNING:**
  To reduce the risk of fire, electrical shock, or injury to persons or property:

– For indoor use.

– Disconnect the supply before making/breaking the connections to the battery.

– Provide adequate ventilation during charging.

- **WARNING:** Against recharging of non-rechargeable batteries. This appliance can be used by children aged 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning the use of the appliance in a safe way and understand the hazards involved. Children shall not play with the appliance. Cleaning and user maintenance shall not be made by children without supervision.

  The charger intends to charge the following battery types: LiPo, LiHV, LiIon, LiFe, NiMH, NiCd, and Pb battery only.

- NEVER leave the battery or charger unattended while in use. In case of any malfunction, discontinue use immediately and refer to this manual for troubleshooting ideas.

- ALWAYS keep your charger away from dust, dirt, moisture, rain, and high temperature. Avoid leaving your charger or battery in direct sunlight or exposing them to intense vibration or shock.

- ALWAYS make certain to observe proper input and output polarity. The HERAKLES MINI operates safely with an input voltage between AC 100-120V.

- ALWAYS place the charger on a heat-resistant, non-flammable surface when in use. Keep flammable materials away from chargers when in use.

- NEVER use the charger while placed on automobile seats, carpeting, or other flammable materials.

- ALWAYS make sure that the vent holes on the bottom of the charger are unobstructed and the cooling fan is in operation.

- ALWAYS fully read all warnings and instructions of both charger and battery prior to use. Be aware of battery safety warnings. Make sure that all charging parameters are correctly set up prior to charging any battery.

- ALWAYS press the roller wheel to terminate the charge completely when the battery is fully charged, and return to the standby screen on the LCD display.

STANDARD BATTERY PARAMETERS

	NiCd/NiMH	Pb	LiFe	LiIon	LiPo	LiHV
Rated Voltage	1.20V	2.0V	3.2V	3.6V	3.7V	3.8V
Full Charge Voltage	1.4V	2.4V	3.6V	4.1V	4.2V	4.35V
Storage Voltage	–	–	3.3V	3.7V	3.8V	3.9V
Discharge Voltage	0.5-1.10V	1.8-2.0V	2.6-2.9V	2.9-3.2V	3.0-3.30V	3.1-3.4V
Pre-charge Voltage	–	2.0V	2.9V	3.1V	3.2V	3.2V
Balance Charge	–	–	✓	✓	✓	✓
Unbalanced Charge	✓	✓	✓	✓	✓	✓
Support Cells	1-16s	1-12s	1-6s	1-6s	1-6s	1-6s
Max Charge Current	16A	16A	16A	16A	16A	16A

Be EXTREMELY careful to choose the correct voltage settings based on the cells and chemistry of the battery being charged. Failure to do so may result in battery damage, explosion, or fire!

PRODUCT PARAMETERS AND CHARACTERISTICS

Specification	
Input voltage:	AC 100-240V
Charge Power:	60W
Discharge Power:	10W
Charge Current:	0.1-6.0A
Discharge Current:	0.1-2.0A
Balance Current:	200mAh/cell
LiPo/LiFe/LiIo/LiHV cell count:	2-4 series
NiCd/NiMH battery cell count:	6-8 cells
Pb battery voltage:	6V-12V (3-6cells)
Battery data memory:	10 Profiles
Dimension:	115x95x50mm
Weight:	320g

SPECIAL FEATURES

Optimized Operating Software
HERAKLES MINI features the AUTO function that sets the feeding current during the process of charging or discharging. Especially lithium batteries can prevent overcharging which may lead to an explosion. It can disconnect the circuit automatically and alarm once detecting any malfunction. All the programs of this product were controlled through two-way linkage and communication to achieve maximum safety and minimize the trouble. All the settings can be configured by users!

Balancing Individual Cells For Battery Discharging
During the process of discharging, HERAKLES MINI can monitor and balance each cell of the battery individually. An error message will be indicated and the process will be ended automatically if the voltage of any single cell is abnormal.

Adaptable to Various Types of Lithium Battery
HERAKLES MINI is adaptable to various types of lithium batteries, such as LiPo, LiHV, LiIon, and LiFe batteries.

Fast and Storage Mode of Lithium Battery
Purposes to charge lithium battery varies, ‚fast' charge reduces the duration of charging, whereas ‚store' state can control the final voltage of your battery, so as to store for a long time and protect the useful time of the battery.

Cyclic Charging/Discharging
1 to 5 cyclic and continuous process of charge>discharge or discharge>charge is operable for battery refreshing and balancing to stimulate the battery's activity.

Re-Peak Mode of NiMH/NiCd Battery
In re-peak charge mode, the charger can peak charge the battery once, twice, or three times in a row automatically. This is good for making certain the battery is fully charged, and for checking how well the battery receives fast charges.

Data Store/Load

The charger can store up to 10 different charge/discharge profiles for your convenience. You can keep the data pertaining to the program setting of the battery for continuous charging or discharging. Users can call out these data at any time without any special program setting.

Terminal Voltage Control (TVC)
The charger allows the user to change the end voltage.

Battery Meter
The user can check the battery's total voltage, the highest voltage, the lowest voltage, and each cell's voltage.

Maximum Safety
Delta-peak sensitivity for NiMH/NiCd battery: The automatic charge termination program is based on the principle of Delta-peak voltage detection. When the battery's voltage exceeds the threshold, the process will be terminated automatically.

Automatic Charging Current Limit
You can set up the upper limit of the charging current when charging your NiMH or NiCd battery, it is useful for the NiMH battery with low impedance and capacity in the „AUTO" charging mode.

Capacity Limit
The charging capacity is always calculated as the charging current multiplied by time. If the charging capacity exceeds the limit, the process will be terminated automatically when you set the maximum value.

Temperature Threshold*
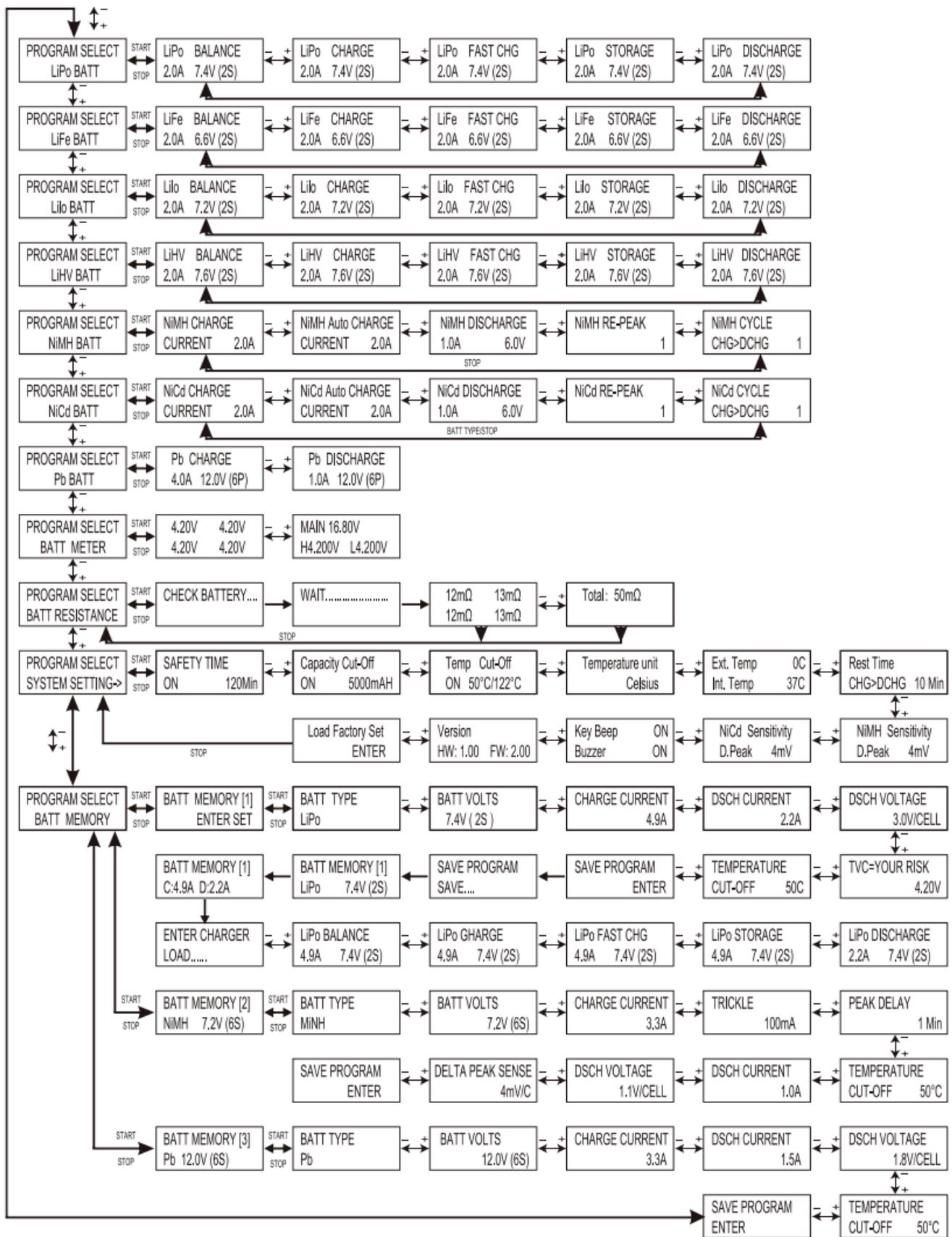The battery's internal chemical reaction will cause the temperature of the battery to rise. If the temperature limit is reached, the process will be terminated.
*This function is available by connecting an optional temperature probe, which is not included in the package.

Processing Time Limit
You can also limit the maximum process time to avoid any possible defect.

PROGRAM FLOW CHART

Menu Flow Diagram

PROGRAM SELECT					
PROGRAM SELECT LiPo BATT	LiPo BALANCE 2.0A 7.4V (2S)	LiPo CHARGE 2.0A 7.4V (2S)	LiPo FAST CHG 2.0A 7.4V (2S)	LiPo STORAGE 2.0A 7.4V (2S)	LiPo DISCHARGE 2.0A 7.4V (2S)
PROGRAM SELECT LiFe BATT	LiFe BALANCE 2.0A 6.6V (2S)	LiFe CHARGE 2.0A 6.6V (2S)	LiFe FAST CHG 2.0A 6.6V (2S)	LiFe STORAGE 2.0A 6.6V (2S)	LiFe DISCHARGE 2.0A 6.6V (2S)
PROGRAM SELECT LiIo BATT	LiIo BALANCE 2.0A 7.2V (2S)	LiIo CHARGE 2.0A 7.2V (2S)	LiIo FAST CHG 2.0A 7.2V (2S)	LiIo STORAGE 2.0A 7.2V (2S)	LiIo DISCHARGE 2.0A 7.2V (2S)
PROGRAM SELECT LiHV BATT	LiHV BALANCE 2.0A 7.6V (2S)	LiHV CHARGE 2.0A 7.6V (2S)	LiHV FAST CHG 2.0A 7.6V (2S)	LiHV STORAGE 2.0A 7.6V (2S)	LiHV DISCHARGE 2.0A 7.6V (2S)
PROGRAM SELECT NiMH BATT	NiMH CHARGE CURRENT 2.0A	NiMH Auto CHARGE CURRENT 2.0A	NiMH DISCHARGE 1.0A 6.0V	NiMH RE-PEAK 1	NiMH CYCLE CHG>DCHG 1
PROGRAM SELECT NiCd BATT	NiCd CHARGE CURRENT 2.0A	NiCd Auto CHARGE CURRENT 2.0A	NiCd DISCHARGE 1.0A 6.0V	NiCd RE-PEAK 1	NiCd CYCLE CHG>DCHG 1
PROGRAM SELECT Pb BATT	Pb CHARGE 4.0A 12.0V (6P)	Pb DISCHARGE 1.0A 12.0V (6P)			
PROGRAM SELECT BATT METER	4.20V 4.20V / 4.20V 4.20V	MAIN 16.80V H4.200V L4.200V			
PROGRAM SELECT BATT RESISTANCE	CHECK BATTERY....	WAIT.............	12mΩ 13mΩ / 12mΩ 13mΩ	Total: 50mΩ	

SYSTEM SETTING

PROGRAM SELECT SYSTEM SETTING->	SAFETY TIME ON 120Min	Capacity Cut-Off ON 5000mAH	Temp Cut-Off ON 50°C/122°C	Temperature unit Celsius	Ext. Temp 0C Int. Temp 37C	Rest Time CHG>DCHG 10 Min
	Load Factory Set ENTER	Version HW: 1.00 FW: 2.00	Key Beep ON Buzzer ON	NiCd Sensitivity D.Peak 4mV	NiMH Sensitivity D.Peak 4mV	

BATT MEMORY

PROGRAM SELECT BATT MEMORY	BATT MEMORY [1] ENTER SET	BATT TYPE LiPo	BATT VOLTS 7.4V (2S)	CHARGE CURRENT 4.9A	DSCH CURRENT 2.2A	DSCH VOLTAGE 3.0V/CELL
	BATT MEMORY [1] C:4.9A D:2.2A	BATT MEMORY [1] LiPo 7.4V (2S)	SAVE PROGRAM SAVE....	SAVE PROGRAM ENTER	TEMPERATURE CUT-OFF 50C	TVC=YOUR RISK 4.20V
	ENTER CHARGER LOAD......	LiPo BALANCE 4.9A 7.4V (2S)	LiPo CHARGE 4.9A 7.4V (2S)	LiPo FAST CHG 4.9A 7.4V (2S)	LiPo STORAGE 4.9A 7.4V (2S)	LiPo DISCHARGE 2.2A 7.4V (2S)
BATT MEMORY [2] NiMH 7.2V (6S)	BATT TYPE NiMH	BATT VOLTS 7.2V (6S)	CHARGE CURRENT 3.3A	TRICKLE 100mA	PEAK DELAY 1 Min	
	SAVE PROGRAM ENTER	DELTA PEAK SENSE 4mV/C	DSCH VOLTAGE 1.1V/CELL	DSCH CURRENT 1.0A	TEMPERATURE CUT-OFF 50°C	
BATT MEMORY [3] Pb 12.0V (6S)	BATT TYPE Pb	BATT VOLTS 12.0V (6S)	CHARGE CURRENT 3.3A	DSCH CURRENT 1.5A	DSCH VOLTAGE 1.8V/CELL	
					SAVE PROGRAM ENTER	TEMPERATURE CUT-OFF 50°C

LITHIUM BATTERY CONNECTION DIAGRAM

PLEASE NOTE:
The charger MUST be powered before you connect a battery to the charger, failure to have the charger powered up before connecting a battery can cause charger failure if any connections are incorrect. The charger must be powered in order to recognize an incorrect connection and warn you of this before you can go too far and cause damage. If you get the warning "Reverse Polarity" you MUST disconnect the battery immediately! Never remove power from the charger first.

1. Connect charge leads to the charger, making sure the polarity of all leads is correct.
2. Turn the charger on and check your settings that they match the battery pack you intend to charge.
3. Connect the main leads of the battery to the main leads of the charger.
4. Connect the balance lead of the battery to the correct balance port on the multi-balance board. If in doubt as to which socket to use please ask your dealer for clarification.
5. Start the charge cycle, wait and watch that the charger starts to charge and shows correct readings on the screen.
6. When charging is finished disconnect the balance lead from the board, then disconnect the battery main leads from the charging lead.

This diagram shows the correct way to connect your battery to the HERAKLES MINI while charging in the balance charge program mode only.

WARNING!

⚠️ Failure to connect will damage this charger.

LITHIUM BATTERY (LiPo/LiFe/LiIon/LiHV) PROGRAM

These programs are only suitable for charging and discharging lithium batteries with a nominal voltage of 3.7V, 3.3V, 3.6V, and 3.8V per cell.
These batteries need to adopt different charge technique which is termed constant voltage(CV) and constant current(CC) method. The charge current varies according to the battery capacity and performance.
The final voltage of the charging process is also very important; it should be precisely matched with the charge voltage of the battery. They are 4.2V for LiPo, 3.6V for LiFe, 4.1V for LiIon, and 4.35V for LiHV. The charge current and nominal voltage as for cell count set on the charging program must always be correct for the battery to be charged.
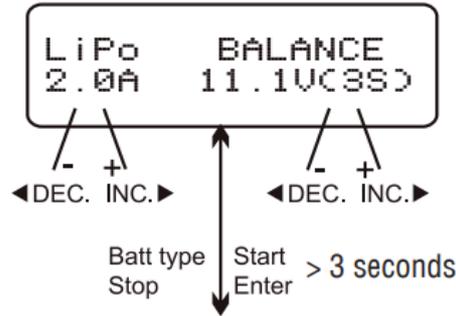
CHARGING LITHIUM BATTERY AT BALANCE MODE

This function is for balancing the voltage of lithium-polymer battery cells while charging.
In the balance mode, the battery needs to connect to the battery's power lead with a balance wire.
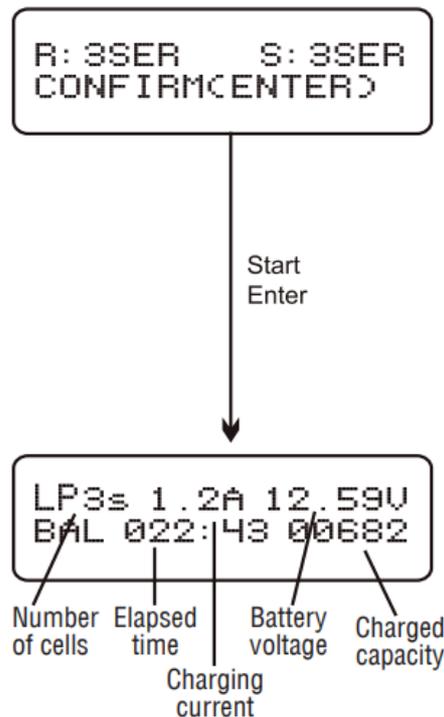
In this mode, the charging process will be different from the ordinary charging mode.
The internal processor of the charger will monitor the voltages of each cell of the battery pack and control the charging current which is feeding to each cell to equalize the voltage.

Note: We recommend charging lithium batteries with a balance wire in the balance mode only.

```
┌─────────────────────┐
│ LiPo    BALANCE     │
│ 2.0A    11.1V(3S)   │
└─────────────────────┘
    /- +\          /- +\
  ◄DEC. INC.►    ◄DEC. INC.►

      Batt type │ Start   > 3 seconds
      Stop      │ Enter
```

The left side of the first line shows the type of battery you choose. The value on the left of the second line of the charger is the current the user sets. After setting the current and voltage, press the START/ENTER button for more than 3 seconds to start the process.
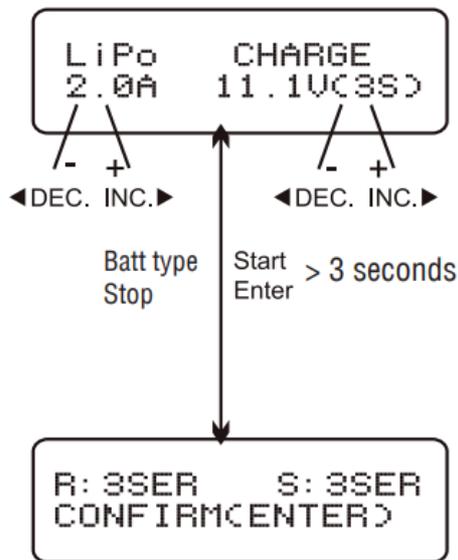
This screen displays the number of cells you set up and the processor detects.
R=Number of cells detected by the charger. S=Number of cells set by you at the previous screen.
If both numbers are identical you can start the charging process. If not, press the BATT TYPE/STOP button to go back to the previous screen to recheck the number of cells of the battery pack before going ahead.
This screen shows the real-time status during the charging process. Press BATT TYPE/STOP button once to stop the charging process.

```
┌─────────────────────┐
│ R:3SER    S:3SER    │
│ CONFIRM(ENTER)      │
└─────────────────────┘

        Start
        Enter

┌─────────────────────┐
│ LP3s 1.2A 12.59V    │
│ BAL 022:43 00682    │
└─────────────────────┘

 Number Elapsed  Battery  Charged
 of cells time    voltage  capacity
          Charging
          current
```

CHARGING OF LITHIUM BATTERY

This charging mode is for charging LiPo/LiFe/LiIon/LiHV battery in normal mode.
Note: We recommend charging lithium batteries with a balance lead in the balance mode only.

```
 LiPo      CHARGE
 2.0A    11.1V(3S)
```
/‾\ /‾\   /‾\ /‾\
 -    +   -   +
◄DEC. INC.►   ◄DEC. INC.►

Batt type | Start > 3 seconds
Stop | Enter
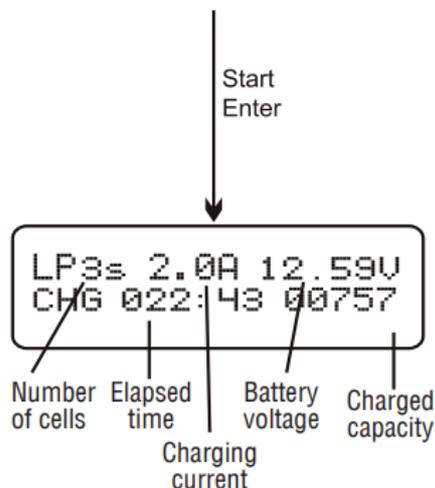
```
R: 3SER     S: 3SER
CONFIRM(ENTER)
```

The left side of the first line shows the type of battery you choose. The value on the left of the second line of the charger is the current the user sets. After setting the current and voltage, press the START/ENTER button for more than 3 seconds to start the process.
This displays the number of cells you set up and the processor detects.
R=Number of cells detected by the charger.
S=Number of cells set by you at the previous screen.

Start
Enter

```
LP3s 2.0A 12.59V
CHG 022:43 00757
```

Number | Elapsed | | Battery | Charged
of cells | time | | voltage | capacity
                   Charging
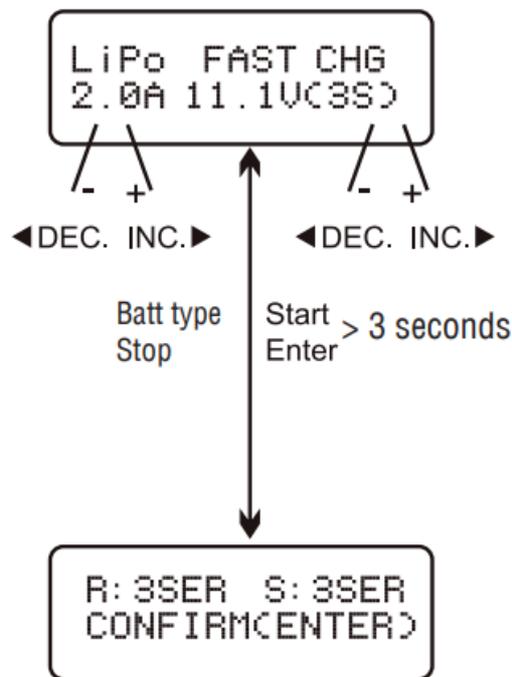   current

If both numbers are identical you can start the charging process. If not, press the BATT TYPE/STOP button to go back to the previous screen to recheck the number of cells of the battery pack before going ahead.
This screen shows the real-time status during the charging process. Press BATT TYPE/STOP button once to stop the charging process.

'FAST' CHARGING OF LITHIUM BATTERY

The charging current will drop towards the end of charging, and a specific CV process is reduced to the charging process earlier. In fact, the charging current reach 1/5 when the charging process comes to 1/10 during the CV period, charging capacity is a little smaller than normal charging but the charging time is shorted accordingly.

```
LiPo  FAST CHG
2.0A 11.1V(3S)
```

◀ DEC. INC. ▶   ◀ DEC. INC. ▶

Batt type | Start > 3 seconds
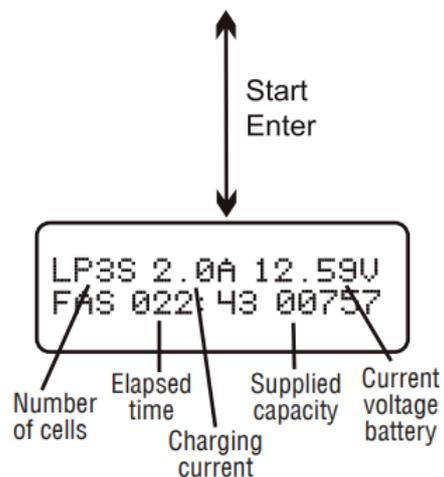Stop | Enter

```
R:3SER  S:3SER
CONFIRM(ENTER)
```

The value on the left side of the second line shows the charge current. The value on the right side of the second line shows the battery pack's voltage. After setting current and voltage, press the START/ENTER button for more than 3 seconds to start the process.
This displays the number of cells you set up and the processor detects.
R=Number of cells detected by the charger.
S=Number of cells set by you at the previous screen.

Start
Enter

```
LP3S 2.0A 12.59V
FAS 022 43 00757
```

Number of cells Elapsed time Charging current Supplied capacity Current voltage battery
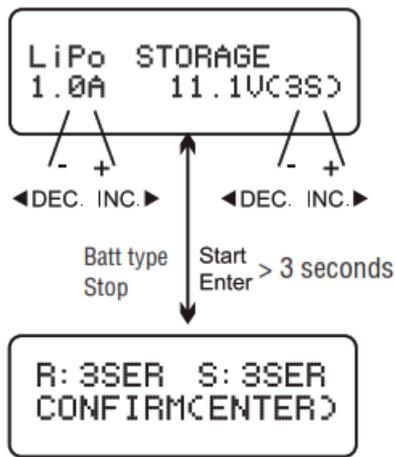
If both numbers are identical you can start the charging process. If not, press the BATT TYPE/STOP button to go back to the previous screen to recheck the number of cells of the battery pack before going ahead.
This screen shows the real-time status during the charging process. Press BATT TYPE/ STOP button once to stop the charging process.

'STORAGE' CONTROL OF LITHIUM BATTERY

This function is for charging/discharging batteries that are not used at once. This program is designed for charging or discharging batteries of a specific original state. They are classified by types: 3.80V LiPo, 3.30V LiFe, 3.70V LiIon, and 3. 90V LiHV. The program will begin to discharge if the original state of the battery exceeds the voltage level of storage.

```
┌─────────────────────┐
│ LiPo  STORAGE       │
│ 1.0A    11.1V(3S)   │
└─────────────────────┘
```

```
  / \    ↑    / \
 - +         - +
◄DEC. INC.►  ◄DEC. INC.►
```

Batt type | Start
Stop | Enter > 3 seconds

↓

```
┌─────────────────────┐
│ R:3SER   S:3SER     │
│ CONFIRM(ENTER)      │
└─────────────────────┘
```
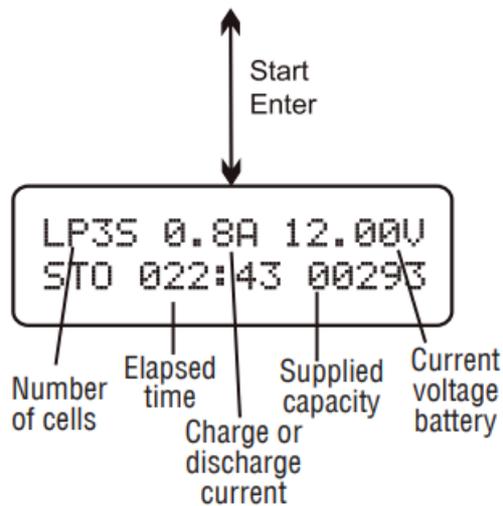
At this screen, you can set up the current and voltage of the battery pack. Charging and discharging will make the batteries come to the voltage level of the storage state.

This screen displays the number of cells you set up and the processor detects.

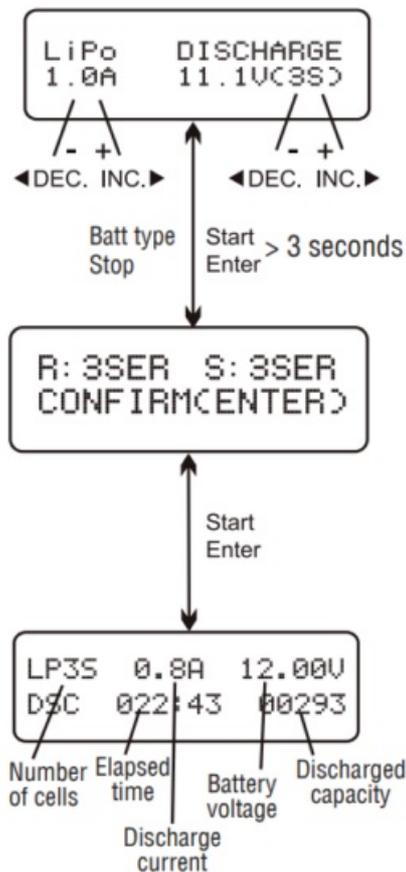R=Number of cells detected by the charger.

S=Number of cells set by you at the previous screen.

If both numbers are identical you can start the charging process by pressing the START/ENTER button. If not, press the BATT TYPE/STOP button to go back to the previous screen to recheck the number of cells of the battery pack before going ahead.

Start
Enter

```
┌─────────────────────────┐
│ LP3S 0.8A 12.00V        │
│ STO 022:43 00293        │
└─────────────────────────┘
```

Number of cells | Elapsed time | Charge or discharge current | Supplied capacity | Current voltage battery

This screen shows the real-time status of charging. Press BATT TYPE/STOP button once to stop the charging process.

DISCHARGING LITHIUM BATTERY

```
LiPo      DISCHARGE
1.0A      11.1V(3S)
```

/- +\   /- +\
◀DEC. INC.▶   ◀DEC. INC.▶

Batt type | Start   > 3 seconds
Stop | Enter

```
R: 3SER   S: 3SER
CONFIRM(ENTER)
```

Start
Enter

```
LP3S   0.8A   12.00V
DSC    022:43  00293
```

Number Elapsed   Discharged
of cells time   Battery capacity
                  voltage
          Discharge
          current

The value of discharge current on the left can not exceed 1C, and the value on the right can not be under the voltage recommended by the manufacturer to avoid over-discharging. press the START/ENTER button for more than 3 seconds to start discharging.

This screen displays the number of cells you set up and the processor detects.

R=Number of cells detected by the charger.

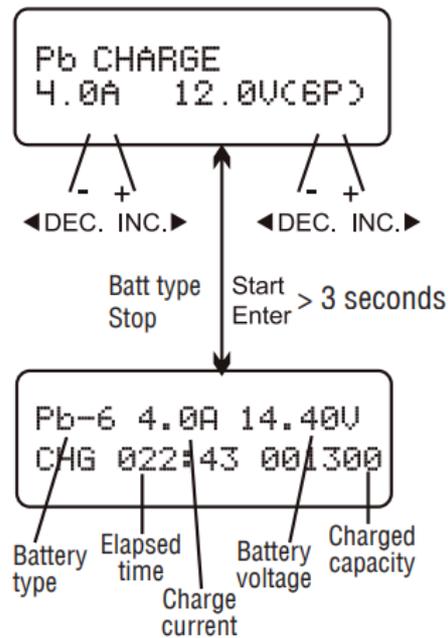S=Number of cells set by you at the previous screen.

If both numbers are identical you can start the charging process. If not, press the BATT TYPE/STOP button to go back to the previous screen to recheck the number of cells of the battery pack before going ahead.

This screen shows the real-time status of discharge, you can press BATT TYPE/STOP button to stop discharging.

PB BATTERY PROGRAM

This program is only suitable for charging Pb lead-acid battery with nominal voltage from 6 to 12V, Pb lead-acid battery is completely different from NiMH/ NiCd battery. These batteries can only deliver a current lower in comparison to their capacity. The same restriction applies to the charging process consequently, the optimum charge current can only be 1/10 of the capacity. Pb battery can not be used for fast charging. Please follow the instructions provided by the battery manufacturer.

CHARGING OF PB BATTERY

```
Pb CHARGE
4.0A   12.0V(6P)
```

- +   - +
◀DEC. INC.▶ ◀DEC. INC.▶

Batt type | Start
Stop | Enter > 3 seconds

```
Pb-6 4.0A 14.40V
CHG 022:43 001300
```

Battery | Elapsed | Battery | Charged
type | time | voltage | capacity
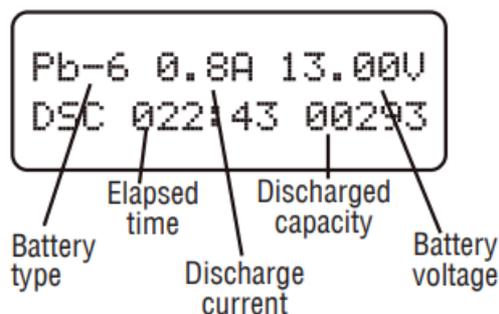 | Charge |
        | current |

Set up the charge current on the left and nominal voltage on the right. Range of current 0.16.0A, the voltage should match the battery being charged. Press
START/ENTER button for more than 3 seconds to start charging.
The screen displays the real-time charging status. Press the START/ENTER button again to store the parameter value you set. Press BATT TYPE/STOP button to end the program.

DISCHARGING OF PB BATTERY

```
Pb DISCHARGE
1.0A     12.0V(6P)
```

- +   - +
◀DEC. INC.▶ ◀DEC. INC.▶

Batt type | Start
Stop | Enter > 3 seconds
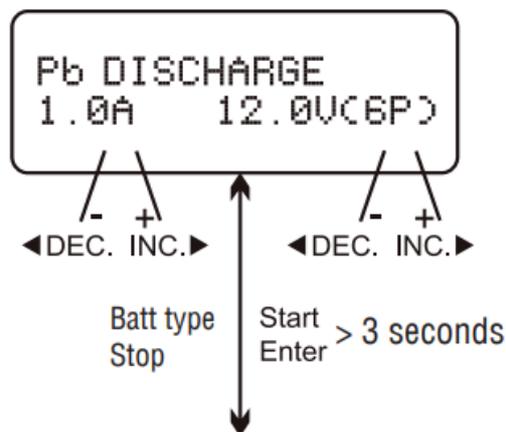
Set up the discharge current on the left and nominal voltage on the right. The range of discharge current is 0.1-2.0A, the voltage should match the battery being discharged. Press ENTER/START button for more than 3 seconds to start discharging.
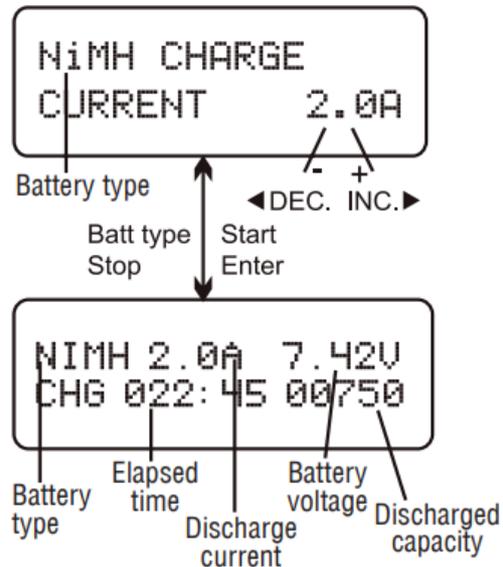
PB BATTERY PROGRAM

```
Pb-6 0.8A 13.00V
DSC 022:43 00293
```

Battery | Elapsed | Discharged | Battery
type | time | capacity | voltage
        | Discharge |
        | current |

The screen displays the real-time discharging status. Press the START/ENTER button to change the discharging value. Press the START/ENTER button again to store the parameter value you set. Press BATT TYPE/STOP button to end the program.

NIMH/NICD BATTERY PROGRAM

CHARGING OF NIMH/NICD BATTERY

```
┌─────────────────────┐
│ NiMH CHARGE         │
│ CURRENT      2.0A   │
└─────────────────────┘
```
Battery type   ◄DEC. INC.►

Batt type │ Start
Stop   │ Enter

```
┌─────────────────────┐
│ NIMH 2.0A  7.42V    │
│ CHG 022:45 00750    │
└─────────────────────┘
```
            Elapsed   Battery
Battery   time   voltage Discharged
type   Discharge   capacity
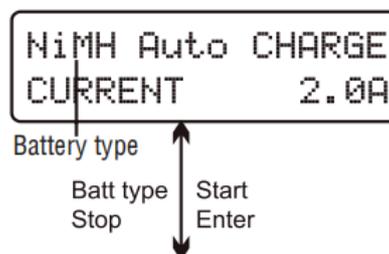   current

This program is for the charging and discharging of NiMH/NiCd batteries associated with R/C model applications. You can press Inc. or Dec. button to change the parameter value, and press the START/ENTER button to store the value.
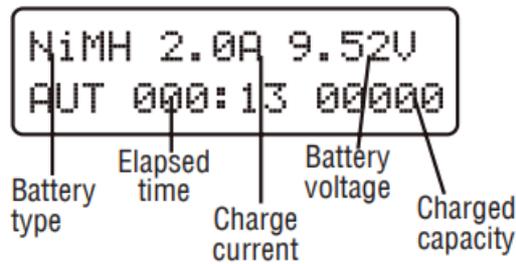The screen displays the real-time charging status. Press BATT TYPE/STOP button to stop the process. The audible sound indicates the end of the process.

CHARGING NIMH/NICD BATTERY IN THE AUTO-CHARGE MODE

In this program, the charger detects the condition of the battery which is connected to the output, and automatically charges the battery. In this mode, you should set up the upper limit of the charge current to avoid damage by excessive feeding current. Some batteries of low resistance and capacity can lead to higher current in the auto charging mode.

```
┌─────────────────────┐
│ NiMH Auto CHARGE    │
│ CURRENT      2.0A   │
└─────────────────────┘
```
Battery type

Batt type │ Start
Stop   │ Enter

The screen displays real-time charging status.
Press BATT TYPE/STOP button to stop the process.
The audible sound indicates the end of the process.

```
NiMH 2.0A 9.52U
AUT 000:13 00000
```

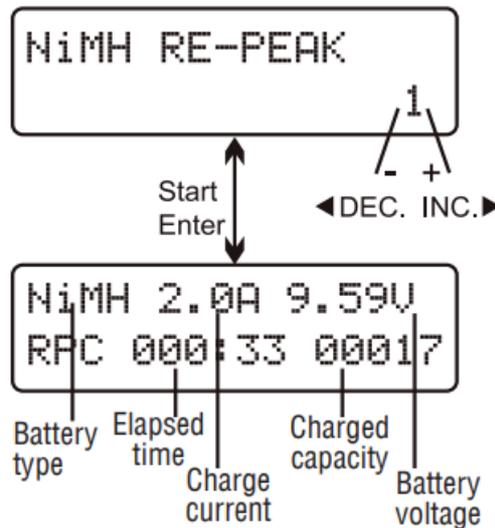Battery type — Elapsed time — Charge current — Battery voltage — Charged capacity

The screen displays real-time charging status.
Press BATT TYPE/STOP button to stop the process.
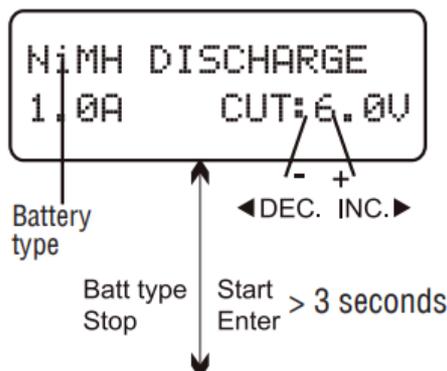The audible sound indicates the end of the process.

CHARGING NIMH/NICD BATTERY IN RE-PEAK CHARGE MODE

Re-peak Charge Mode (NiMH and NiCd batteries only): In re-peak charge mode, the charger can peak charge the battery once, twice, or three times in a row automatically. This is good for confirming the battery is fully charged, and for checking how well the battery receives fast charges. A five minutes cool-off delay occurs after each re-peak charge. Press the START/ENTER button for more than 3 seconds to start the charging.

```
NiMH RE-PEAK
                          1
                        - +
```

Start Enter ◀DEC. INC.▶

```
NiMH 2.0A 9.59U
RPC 000:33 00017
```

Battery type — Elapsed time — Charge current — Charged capacity — Battery voltage

Re-peak cycle number 1 shows on the display. Press the START/ENTER button to make the repeal cycle number blink and press INC. or DEC. button to find the desired number of times to re-peak charge the battery.
Press the START/ENTER button to confirm the selection.

DISCHARGING OF NIMH/NICD BATTERY

```
NiMH DISCHARGE
1.0A     CUT:6.0U
                  - +
```

Battery type ◀DEC. INC.▶

Batt type Stop | Start Enter > 3 seconds

Set discharge current on the left and final voltage on the right.
The range of the discharge current is 0.1-2.0A; the range of final voltage is 0.1-15.0V.

Press the START/ENTER button for more than 3 seconds to start the program.

```
┌─────────────────────┐
│ NiMH   1.0A 7.42V   │
│ DSC 022:45 00379    │
└─────────────────────┘
```
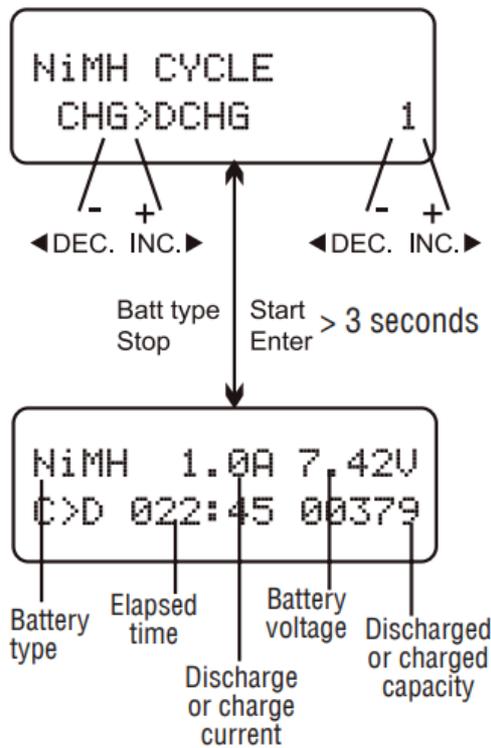
Battery type — Elapsed time — Discharge current — Discharged capacity — Battery voltage
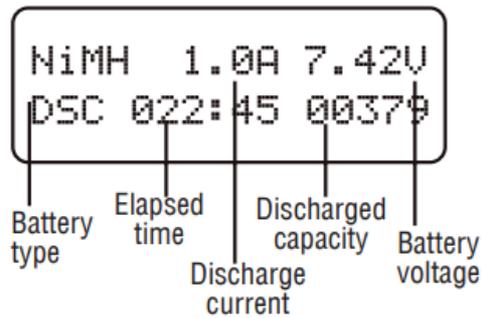
The screen indicates the discharging state. You can press the START/ENTER button to alter the discharge current, Press START/ENTER button again to store the value, and Press BATT TYPE/STOP button to stop discharging. The emitted sound alerts the end of discharge.

CHARGE/DISCHARGE & DISCHARGE/CHARGE CYCLE OF NIMH/NICD BATTERY

```
┌─────────────────────┐
│ NiMH CYCLE          │
│  CHG>DCHG         1 │
└─────────────────────┘
```

− +   − +
◄DEC. INC.►   ◄DEC. INC.►

Batt type | Start
Stop | Enter   > 3 seconds

```
┌─────────────────────┐
│ NiMH   1.0A 7.42V   │
│ C>D 022:45 00379    │
└─────────────────────┘
```

Battery type — Elapsed time — Discharge or charge current — Battery voltage — Discharged or charged capacity

You can set up the sequence on the left and the number of cycles on the right. The range of the cycle number is 1-5.
Press BATT TYPE/STOP button to stop the program, you can press INC. or DEC. button to alter the charge current, and the sound indicates the end of the program.

BATTERY MEMORY SET

```
┌─────────────────────┐
│  BATT MEMORY 【1】   │
│  ENTER SET          │
└─────────────────────┘
        ↕  Start
           Enter
┌─────────────────────┐
│  BATT TYPE          │
│  LiPo               │
└─────────────────────┘
     ─  ↕
     +
┌─────────────────────┐
│  BATT VOLTS         │
│          7.4V(2S)   │
└─────────────────────┘
     ─  ↕  ─    +
     +     ◄DEC. INC.►
┌─────────────────────┐
│  CHARGE CURRENT     │
│             4.9A    │
└─────────────────────┘
     ─  ↕  ─    +
     +     ◄DEC. INC.►
┌─────────────────────┐
│  DSCH CURRENT       │
│             1.0A    │
└─────────────────────┘
     ─  ↕  ─    +
     +     ◄DEC. INC.►
┌─────────────────────┐
│  DSCH VOLTAGE       │
│          3.0V/CELL  │
└─────────────────────┘
     ─  ↕  ─    +
     +     ◄DEC. INC.►
```
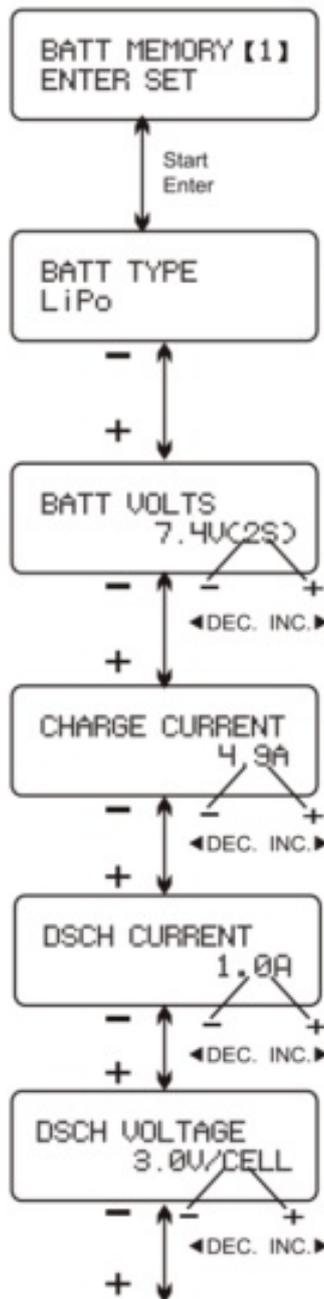
For your convenience HERAKLES MINI has a data storage and load program, it can store 10 different battery data representing the respective specifications of batteries, you can call back the data when charging/discharging without setting up the program again, press the START/ENTER button to make it blink and use INC. or DEC. to set up the parameter.
An example is a LiPo battery pack (2S/7.4V).
Set the voltage and number of cells along with the normal voltage (2S-4S).
Set the charge current, it can be adjusted (0.16.0A).
Set the discharge current, it can be adjusted (0.1-2.0A).
Set the discharge voltage, it can be adjusted (3.0-3.3V/Cell).

```
┌─────────────────┐
│ TUC=YOUR RISK   │
│          4.20U  │
└─────────────────┘
```
   ─   ─   +
   ┃   ◄DEC. INC.►
   +
```
┌─────────────────┐
│ SAVE PROGRAM    │
│           ENTER │
└─────────────────┘
```
          Enter
```
┌─────────────────┐
│ SAVE PROGRAM    │
│ SAVE......      │
└─────────────────┘
```
```
┌─────────────────┐
│ BATT MEMORY[1]  │
│ LiPo  7.4U(2S)  │
└─────────────────┘
```
          Next flash
```
┌─────────────────┐
│ BATT MEMORY[1]  │
│ C:4.9A  D:1.0A  │
└─────────────────┘
```
          Enter
```
┌─────────────────┐
│ ENTER CHARGER   │
│ LOAD......      │
└─────────────────┘
```

Set the terminal voltage, it can be adjusted (4.18-4.25V)
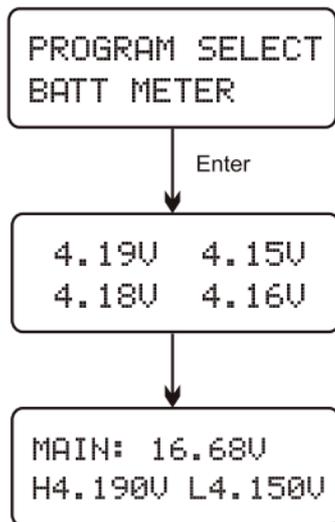This screen indicates the saved profile.
This program is to load the data stored in the "save data" program.
Press the START/ENTER button for more than 3 seconds to load a memory, otherwise, you only enter the setting mode.
Loading the data.

BATTERY METER

The user can check the battery's total voltage, the highest voltage, the lowest voltage, and each cell's voltage. Please connect the battery to the charger with the main battery lead and balance wires to the balance socket.

```
┌─────────────────────┐
│ PROGRAM SELECT      │
│ BATT METER          │
└─────────────────────┘
          │ Enter
          ▼
┌─────────────────────┐
│  4.19V    4.15V     │
│  4.18V    4.16V     │
└─────────────────────┘
          │
          ▼
┌─────────────────────┐
│ MAIN: 16.68V        │
│ H4.190V L4.150V     │
└─────────────────────┘
```

Press the START/ENTER button to enter the Battery Meter program.

The screen indicates each cell's voltage.

The screen indicates the total voltage, the highest voltage, and the lowest voltage.

BATTERY INTERNAL RESISTANCE

The user can check the battery's internal resistance, including the battery pack's total internal resistance and each cell's internal resistance.
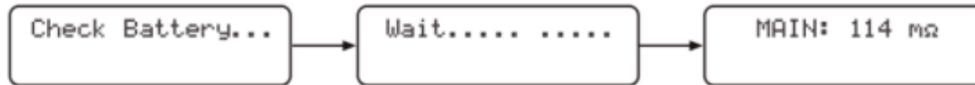
```
┌─────────────────────┐
│ PROGRAM   SELECT    │
│ BATT RESISTANCE     │
└─────────────────────┘
```

Enter into the page, then press the „START/ENTER" button, and the charger will go into the internal resistance program.

1. Check the battery pack's total internal resistance: Only need to connect the battery to the main port of the charger. If you do not connect the battery to the charger or the battery is defective, the below message will appear:
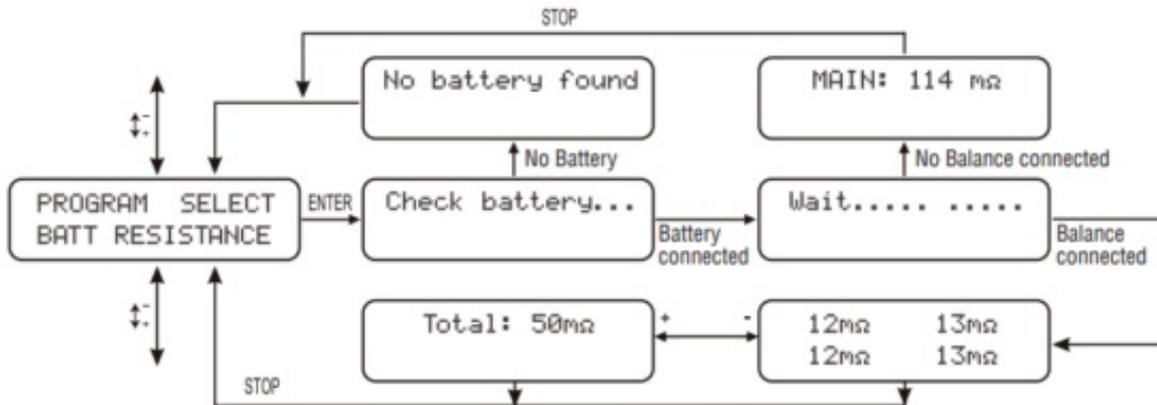
```
┌─────────────────────┐      ┌─────────────────────┐
│  Check Battery...   │ ───→ │  No battery found   │
└─────────────────────┘      └─────────────────────┘
```
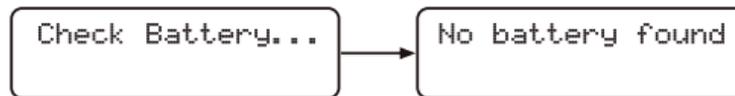
Otherwise, normally, the below message will appear:

```
┌──────────────────┐    ┌──────────────────┐    ┌──────────────────┐
│ Check Battery... │ ─→ │ Wait..... ..... │ ─→ │  MAIN: 114 mΩ   │
└──────────────────┘    └──────────────────┘    └──────────────────┘
```
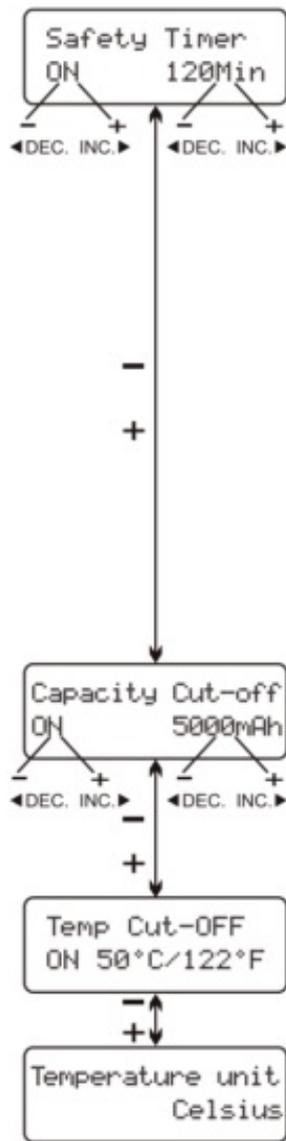
2. Check the battery and each cell's internal resistance: connect the battery to both the balance socket and the main port of the charger, normally, the below message will appear:

```
┌──────────────┐  ┌──────────────┐  ┌──────────────┐    ┌──────────────┐
│Check Battery.│─→│Wait..... ....│─→│ 12mΩ   13mΩ  │-  +│ Total: 52mΩ │
└──────────────┘  └──────────────┘  │ 12mΩ   13mΩ  │←───└──────────────┘
                                      └──────────────┘
```

The fully flow chart is as below:

SYSTEM SET UP

```
┌─────────────────┐
│ Safety Timer    │
│ ON       120Min │
└─────────────────┘
    −   +   −   +
   ◄DEC. INC.► ◄DEC. INC.►

        −
        +

┌─────────────────┐
│ Capacity Cut-off│
│ ON      5000mAh │
└─────────────────┘
    −   +   −   +
   ◄DEC. INC.► ◄DEC. INC.►
        −
        +
┌─────────────────┐
│ Temp Cut-OFF    │
│ ON 50°C/122°F   │
└─────────────────┘
        −
        +
┌─────────────────┐
│ Temperature unit│
│          Celsius│
└─────────────────┘
```

When you start a charging process, the integral safety time automatically starts running at the same time. This is programmed to prevent overcharging the battery if it proves to be faulty, or if the termination circuit cannot fully detect the battery. The value for the safety time should be generous enough to allow a full charge of the battery.

Safe time Calculation
When charging NiMH or NiCd batteries, divide the capacity by current, then divide the result by 11.9, and set this number as the value for the safety time setting. If the charger stopped at this threshold, about 140% of the capacity will have been fed into the battery.

For example:

Capacity	Current	Safety Time
2000mAh	2.0A	(2000/2.0=1000)/11.9=84 minutes
3300mAh	3.0A	(3300/3.0=1100)/11.9=92 minutes
1000mAh	1.2A	(1000/1.2=833)/11.9=70 minutes

This program sets the maximum charge capacity that will be supplied to the battery during charge. If the delta pack voltage is not detected nor the safety time expired for any reason, this feature will automatically stop the process at the selected capacity value.
The battery's internal chemical reaction will cause the temperature of the battery to rise. If the temperature limit is

reached, the process will be terminated.

You can choose the temperature displayed by Celsius or Fahrenheit as you like.
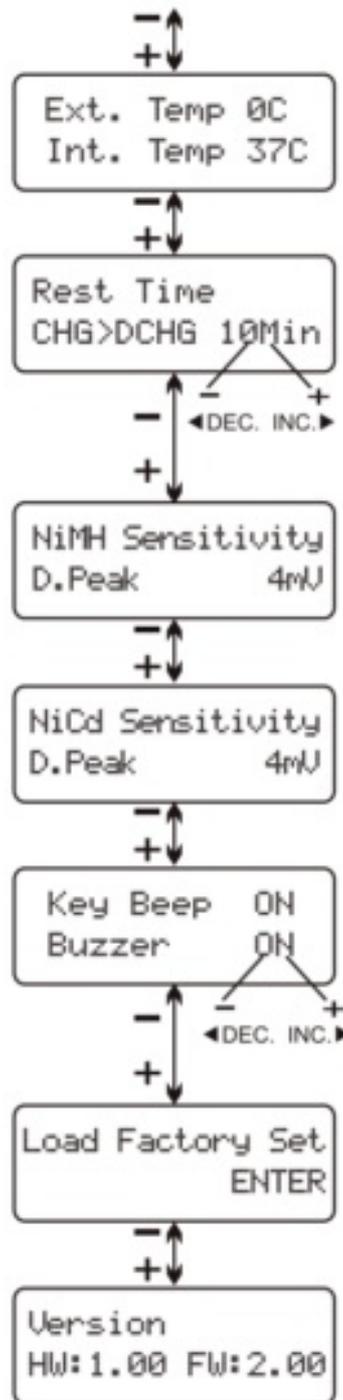
This screen shows the external and internal temperature.

The battery is on the cyclic process of charge and discharge can often become warm after the charge or discharge period. The program can insert a time delay to occur after each charge and discharge process to allow the battery adequate time to cool down before being subjected to the next process. The value ranges from 1 to 60 minutes.

This program is for NiMH/NiCd batteries only. When the charger detects the delta peak value reaches the value you set, the charger will say the battery is fully charged.

The beep sounds every time pressing the buttons to confirm your action. The beep or melody sounded at various times during the operation to alert different mode changes.

These audible sounds can be on or off.

Press the START/ENTER button for 3 more seconds to load the factory settings.

This screen shows the version.

VARIOUS INFORMATION DURING THE PROCESS

You can inquire about various information on the LCD screen during the charging or discharging process. When you press the Dec. button, the screen will display the user's settings.
And you can also monitor the voltage of individual cells by pressing the Inc. button when the individual connection cable is linked to the Lithium battery being processed.

End Voltage 16.8V(4S)	It comes to the final voltage when the program ended.
	This screen shows the internal temperature.
Ext. Temp 0C Int. Temp 26C	Displayed safety time is turned on and the duration of time in minutes.
	The displayed capacity cut-off function is turned on and the setting value of capacity.
Safety Timer ON 200min	The battery is connected with a balance lead, you can check the voltage of each cell in the battery pack.
Capacity Cut-Off ON 5000mAh	
4.19V 4.15V 4.18V 4.16V	

WARNING AND ERROR MESSAGE

It incorporates a variety of functions for the systems to verify processes and the state of the electronics. In case of an error, the screen will display the cause of the error and emit an audible sound.

REVERSE POLARITY	Incorrect polarity connected.
	The battery is interrupted.
CONNECTION BAEAK	The battery connection is wrong.
	The balance connect is wrong.
CONNECT ERROR CHECK MAIN PORT	The internal temperature of the unit is too high.
	The external temperature of the unit is too high.
BALANCE CONNECT ERROR	The battery capacity is more than the maximum capacity the user sets.
	The charging time is longer than the maximum charging time the user sets.
INT.TEMP.TOO HI	
EXT.TEMP.TOO HI	
OVER CHARGE CAPACITY LIMIT	
OVER TIME LIMIT	
BATTERY WAS FULL	The battery voltage is higher than the maximum voltage the user sets when charging in balance mode.

WARRANTY AND SERVICE

HOECO Handels GmbH complies with the mandatory warranty laws.
This limited warranty does not cover defects that are a result of normal wear, misuse, or improper maintenance. Because we are not able to control the correct installation or operation of this product, we can't accept any liability for any damages resulting from using this product. Any operation of this product is at your own risk. By installing or operating this product the user accepts all resulting liability.

CONFORMITY DECLARATION

Hereby Ultrapower Technology Limited declares, that the charger HERAKLES MINI Model No. HSP0017 complies with directive 2014/35/EU as well as directive 2014/30/EU.
The full document can be found under: https://www.hoeco.at/download/Doc-from-Ultra-Power.pdf

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Manufactured by
Ultra Power Technology Limited
Made in China

Documents / Resources

H SPEED HSP0017 Herakles Mini AC Charger 60W [pdf] Instruction Manual
HSP0017, Herakles Mini AC Charger 60W, Herakles Mini

References

- **Aktuelles - H-SPEED**
- **Aktuelles - HOECO Handels GmbH**