

Intelligent Balance Charger

For LiPo/LiFe/LiHv/Lilon/NiMH/NiCd/Pb batteries

B6mini



- Charge Power 300W
- Charge Current MAX.12A

Thank you for purchasing the balance charger. This is a rapid charger/ discharger with built in balancer, computerised with microprocessor and specialised operating software. Please read this entire operating manual completely and attentively before using.

G.T.POWER[®]

Contents

1.Specifications	1
2.Features	1
3.The exterior appearance of the unit	3
4.Warnings and safety notes	4
5.program flow chart	6
6.Charging current setting	7
7.Lithium battery (LiIon/LiPo/LiFe/LiHv) program	7
7.1 Charging Lithium Battery	7
7.2 Charging Lithium battery at balance mode	8
7.3 'FAST' charging Lithium battery	8
7.4 Discharging Lithium battery	9
7.5 Storage mode for Lithium battery	9
8.NiMH/NiCd battery program	10
8.1 Charging Nicd/NiMH battery	10
8.2 Discharging NiCd/NiMH battery	10
8.3 Cycling NiMH & NiCd batteries	11
8.4 NiMH/NiCd batteries recharging	11
9.PB battery program	11
9.1 Charging Pb battery	12
9.2 Discharging Pb battery	12
10.Data save program	12
11.Data load program	13
12. Cell meter test program	13
13. IR test	14
14. User settings	14
15. Warning and error messages	16
16.Warranty and service	17

1. Specifications

Input Voltage	DC.10-26V
Charge Current	0.1-12A
Discharge Current	0.1-3A
Charge Power	max.300W
Discharge Power	max.5W
Balance Current	max.1A
Balance Tolerance	±0.01V
Charging Capability	LiXX:1-6 cells NiXX:1-16 cells
Pb Battery Voltage	2-20V
Weight	94.7g
Dimensions	87.5*48.5*30mm

2. Features

Small size, large power

This charger with small size but its charge current can reach to 12A and charge power can up to 300W. It can largely reduce the charge time and improve the charging efficiency.

Newly added memory mode function

The charger can save setting data of each program, it can save up to 5 groups data for each kind of battery, including the cells of the battery, charge current and so on. Players no need to set the data again when they use the batteries which have been memorized. It is easy to operate.

Optimized operating software

This unit can automatically adjust current according to the change of the charging time and battery voltage when charging or discharging.

High Power and High Performance Circuits

This charger's maximum output power is 300W, maximum charging current is 12A, maximum discharging current is 3A. And its high efficiency cooling system can guarantee the normal operation of the processor under such a big power.

Individual voltage balancing for lithium battery packs

The charger has a unique balancing function for lithium batteries inside, so no need extra balancer to balance the voltage when charging for LiIon/LiPo/LiFe/LiHv batteries.

Monitor and balancing individual cell voltage when discharging

It can monitor and balancing individual cell voltage when discharging. It will stop discharge when the battery voltage is abnormal.

Lithium battery Fast charge and Storage mode.

Fast charge reducing the charging time and storage mode can keep the rated voltage of lithium batteries stored for a long time

Maximum safety

Delta-peak sensitivity: It is a automatic charge termination program. Its working principle is to turn off the charging current to complete charging when the battery voltage rises to the highest point and starts to fall back.

Charging capacity limit: Charging capacity is calculated through charging current multiply by charging time. When the maximum charging capacity is set, the charging program will be forced to end when charging capacity exceed the setting value.

Temperature limit: The inner temperature will rise when charging. When a maximum temperature is set, the charging program will be forced to end when charging temperature exceed the setting value.

Charge time limit: You can through restrain the charge time to prevent any possible over charge/discharge.

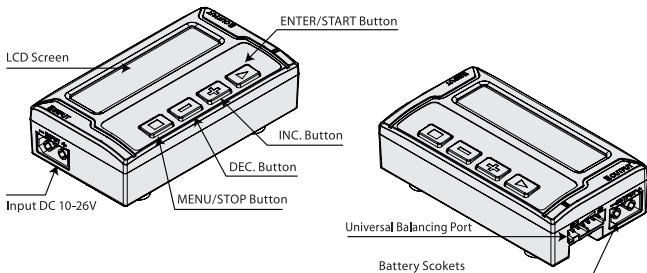
Input voltage checking: To protect battery or power, program will automatically shut down the charging current when the voltage decreased to the lowest.

Automatic cooling fan: The cooling system will run automatically when the internal temperature raised and intelligently adjust speed according to temperature.

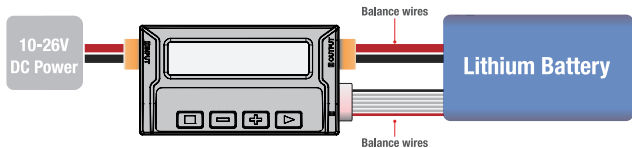
Cyclic charging/discharging

Perform 1-4 charging/discharging cycles continually to refresh and activate long-term unused NiCd/NiMH battery.

3.The exterior appearance of the unit



Wiring Diagram :



4. Warnings and safety notes

- Never leave the charger unsupervised when it is connected to power. If any malfunction happens, terminate the program immediately and refer to the operation manual for the right operation.
- Keep the unit away from dust, damp, rain, heat, direct sunshine and vibration. Do not drop it.
- The circuit of the unit is designed to be powered by a 10-26V DC only.
- The charger and the battery to be charged should be set up on a heat-resistant, non-flammable and non-conductive surface. Please ensure that the fan and vents of the charger are not blocked by the surface that it is placed on.
- Make sure you understand the correct settings to use for the battery to be charged or discharged. Use of incorrect settings may cause severe damage to the battery, including possible fire of explosion.
- To avoid short circuit between the charge leads, always ensure the

NiCd/ NiMH	voltage level: allowable fast charge current: discharge voltage cut off level:	1.2V/cell 1C~2C depends on the performance of cell 0.85V/cell(NiCd), 1.0V/cell(NiMH)
Lilon	voltage level: max.charge voltage: allowable fast charge current: min.discharge voltage cut off level:	3.6V/cell 4.1V/cell 1C or less 2.5V/cell or higher
LiPo	voltage level: max.charge voltage: allowable fast charge current: discharge voltage cut off level:	3.7V/cell 4.2V/cell 1C or less 3.0V/cell or higher
LiFe	voltage level: max.charge voltage: allowable fast charge current: discharge voltage cut off level:	3.3V/cell 3.6V/cell 4C or less(e.g. A123M1) 2.0V/cell or higher
LiHV	voltage level: max.charge voltage: allowable fast charge current: min.discharge voltage cut off level:	3.8V/cell 4.35V/cell 1C or less 3.0V/cell or higher
Pb (Lead- acid)	voltage level: max.charge voltage: allowable fast charge current: discharge voltage cut off level:	2.0V/cell(Lead-acid) 2.46V/cell 0.4C or less 1.50V/cell or higher

leads are connected to the charger first and only then plugged into the battery. Always make sure that no batteries are connected to leads before disconnecting them from the charger.

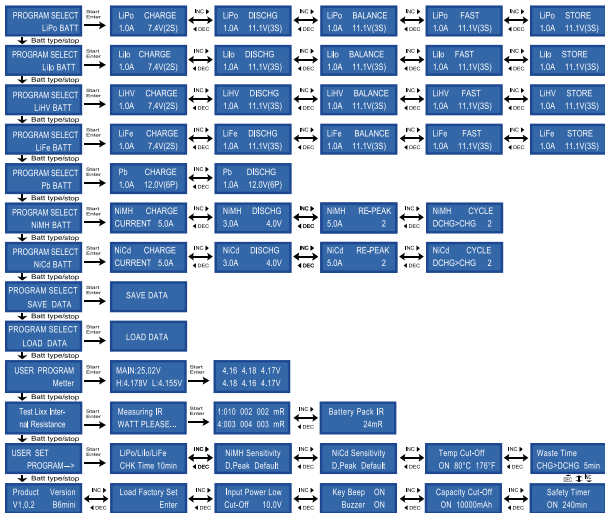
- You have to pay attention to verify the capacity and the voltage of the Lithium battery pack. It may be composed of parallel and series connection mixed. In parallel link the capacity of the battery pack is multiplied by the number of cells but the voltage remains the same. That kind of voltage imbalance may cause a fire or explosion during charge process. We recommend you compose the Lithium battery pack in series only.

Discharge

- The typical purpose of discharge is to determine the residual capacity of the battery, or to lower the voltage of battery to a defined level. When you discharge the battery you also have to pay attention on the process same as charging. To avoid the battery becoming deep-discharged, set the final discharge voltage correctly. Lithium batteries should not be deep-discharged to lower than the minimum voltage, as this will lead to a rapid loss of capacity or a total failure. Generally, you do not need to discharge Lithium battery voluntarily.
- Some rechargeable batteries are said to have a memory effect. If they are partly used and recharged before the whole charge is drawn out, they 'remember' this and next time will only use that part of capacity. This is a 'memory effect'. NiCd and NiMH batteries are both have this 'memory effect'. They prefer complete cycles, fully charge then use until capacity empty. NiMH batteries have less memory effect than NiCd.
- The Lithium battery prefers a partial rather than a full discharge. Frequent full discharges should be avoided if possible. Instead, charge the battery more often or retain normal voltage.
- The brand-new NiCd battery pack is partially useful with its capacity until it has been subjected to 10 or more charge cycles in any case. The cyclic process of charge and discharge will lead to optimise the capacity of battery pack.

Those warnings and safety notes are particularly important. Please follow the instructions for a maximum safety; otherwise the charger and the battery can be damaged violently. And also it can cause a fire to injure a human body or to lose the property.

5. Program flow chart



6. Charging current setting

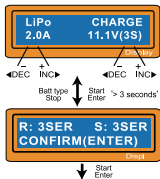
You have to know the battery **allowable** maximum charging current before charging. Charging current exceeds the **allowable** maximum charging current may cause damage to battery and it possible to lead the fire and explosion of battery when charging.

We usually use C value to mark battery charging/discharging capability. The battery **allowable** maximum charging current is calculated by multiply C value by battery capacity . For example, if battery is 1000mAh, 5C, then the **allowable** maximum charging current is $1000 * 5 = 5000\text{mA}$, that is the battery maximum **allowable** charging current is 5A.

To Lithium batteries, if you can't confirm battery's C value, for your safety, please set charging current no more than 1C. The relationship between C value and charging time is, charging time $\geq 60\text{minutes}/\text{C value}$, for example, charging with 1C, charging finish time need 60-70 minutes. This time may be extended due to different battery performance.

7. Lithium battery(LiIon/LiPo/LiFe/LiHv) program

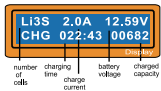
These programs **only** suit for charging/discharging a lithium(LiIon/LiPo/LiFe/LiHv) battery pack with a nominal voltage of 3.3V,3.6v,3.7v,3.8v per cell.These batteries have CV and CC two charging modes, charging current **will** vary with battery capacity and performance.The ending voltage during charging is **also** very important as it varies for all four battery types:LiFe:3.6V LiIon:4.1V,LiPo:4.2V, LiHV: 4.35V. You have to set the right charging current and rated voltage before charging according to each battery's capacity and performance.



7.1 Charging Lithium Battery

Choose normal charging mode, press 'Start' key to set charging current,then, you can through press **INC** and **DEC** key to change the current value (0.1-12A). The same operation method to set battery voltage and cells(1-6S). After setting the current and voltage, press **START/ENTER** key for 3 seconds to start the process, back by press **STOP** key.

This shows the number of cells you set and the processor detected. 'R' shows the number of cells found by the charger and 'S' shows the number of cells

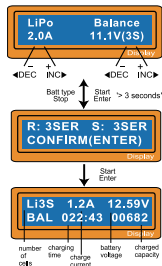


you selected at previous menu. If both numbers are the same, you can start charging by press **Start/Enter** button. If not, press **Stop** key to go back to the last menu to double check battery pack cell number and charge again.

The screen shows the present situation during charge process.

7.2 Charging Lithium battery at balance mode

This is for balancing the voltages of Lithium batteries of the battery pack to be charged. Inner system will monitor each cell's voltage and restraint each cell's current to fulfill balance charging. You need to connect the battery to the charger's output plug as well as the balance port when charging.



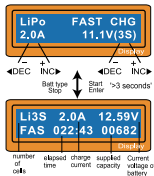
Choose balancing charging mode, press '**Start**' key to set charging current, then, you can through press **INC** and **DEC** key to change the current value (0.1-12A). The same operation method to set battery voltage and cells (1-6S). After setting the current and voltage, press **START/ENTER** key for 3 seconds to start the process, back by press **STOP** key.

This shows the number of cells you set and the processor detected. 'R' shows the number of cells found by the charger and 'S' shows the number of cells you selected at previous menu. If both numbers are the same, you can start charging by press **Start/Enter** button. If not, press **Stop** key to go back to the last menu to double check battery pack cell number and charge again.

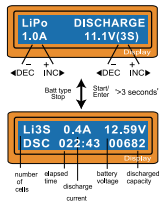
The screen shows the present situation during charge process.

7.3 'FAST' charging Lithium battery

The charging current is getting smaller as the charging process goes to the end. To finish charging process earlier, this program eliminated certain CV process and balancing process. The fact is when the charging current goes down to 1/5 of the initial value can finish charging process. This situation the charging capacity may smaller than the charging capacity under normal charging, but reduced the charging time.



7.4 Discharging Lithium battery



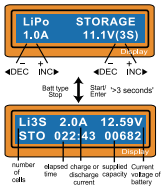
7.5 Storage mode for Lithium battery

Lithium battery storage mode is to adjust each kind of battery voltage to a certain level (LiPo:3.85V, LiIon:3.75V, LiFe:3.3V, LiHV: 3.85V, this will make lithium batteries suitable for long-term storage. If the voltage of the battery at its initial stage is higher than the rated voltage, the program will start to discharge. If lower than the rated voltage, will start to charging.

Choose 'FAST' charging mode, press 'Start' key to set charging current, then, you can through press INC and DEC key to change the current value (0.1-12A). The same operation method to set battery voltage and cells(1-6S). After setting the current and voltage, press START/ENTER key for 3 seconds to start the process, back by press STOP key.

The aim of discharging is to check the battery remaining capacity or to check the health status of battery. To avoid deep discharging, you need to set a right rated discharging voltage when discharging. Lithium battery voltage should not lower than its rated voltage in case causing any fast loss of battery capacity. In normal case no need to discharging Lithium battery. For your safety, charger's discharging current should not exceed the maximum discharging current specified by the battery manufacturer, rated voltage should not lower than the lowest discharging voltage specified by the battery manufacturer to avoid deep discharging.

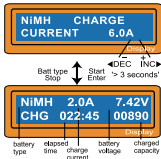
Choose discharging mode, press 'Start' key to set charging current, then, you can through press INC and DEC key to change the current value (0.1-12A). The same operation method to set battery voltage and cells(1-6S). After setting the current and voltage, press START/ENTER key for 3 seconds to start the process, back by press STOP key.



Choose storage mode, press '**Start**' key to set charging current, then, you can through press **INC** and **DEC** key to change the current value (0.1-3A). The same operation method to set battery voltage and cells (1-6S). After setting the current and voltage, press **START/ENTER** key for 3 seconds to start the process, back by press **STOP** key.

8. NiMH/NiCd battery program

These programs are for charging or discharging NiMH/NiCd batteries. Due to different battery performance, you have to choose the right charging/discharging mode.



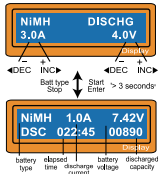
8.1 Charging Nicd/NiMH battery

Choose Nicd/NiMH battery charging mode, press '**Start**' key to set charging current, then, you can through press **INC** and **DEC** key to change the current value (0.1-12A). The same operation method to set battery voltage and cells (1-16S). After setting the current and voltage, press **START/ENTER** key for 3 seconds to start the process, back by press **STOP** key.

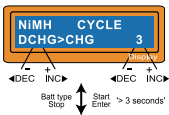
8.2 Discharging NiCd/NiMH battery

Discharge current and discharge termination voltage should be set before discharge, and when discharge voltage reaches the setting voltage value, discharge ends.

Choose Nicd/NiMH battery discharging mode, press '**Start**' key to set charging current, then, you can through press **INC** and **DEC** key to change the current value (0.1-3A). The same operation method to set battery voltage. After setting the current and voltage, press **START/ENTER** key for 3 seconds to start the process, back or stop charging by press **STOP** key.

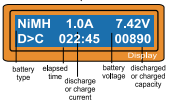


8.3 Cycling NiMH & NiCd batteries

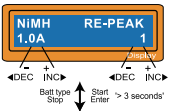


This program used to refreshing or balancing battery, can set the sequence of discharging and the number of cycles. To avoid over heat causing damage to battery, there is a interval for cooling between each cycle,you can set it in the main program.

Choose NiMH/NiCd batteries cycling mode, press 'START' key to choose charge/discharge of discharge/charge mode, cycling times (1-5 times). Cycling current and discharge voltage should be set up first in charging or discharging procedure. Press **START/ENTER** key for 3 seconds to start the process, back or stop charging by press **STOP** key.

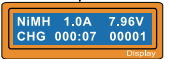


8.4 NiMH/NiCd batteries recharging



This charger newly added recharging program for long- term non-used batteries , used batteries and batteries that primary charging not reaching its maximum voltage.In these case, using this mode can make NiMH/NiCd batteries voltage to the rated value and batteries can be used for a longer time.

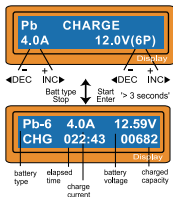
left side indicate current setting and right side indicate recharging times. Press **START/ENTER** key for 3 seconds to start the process, back or stop charging/discharging by press **STOP** key.You can change discharge/charge current by press **START/ENTER** key during this process.



9. Pb battery program

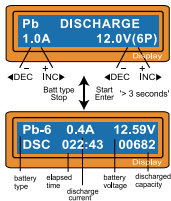
This program is used for charging/discharging Pb batteries, rated voltage from 2 to 20V.Pb batteries are different from NiMH/NiCd batteries,Pb battery has a lower battery capacity than NiMH/NiCd battery, they can only pass relatively lower current,as well as have some current restraints during charging process.Pb battery's current is 1/10 of its battery capacity, it can't fast charging, you have to refer to the specifications of the battery manufactures when charging.

9.1 Charging Pb battery



9.2 Discharging Pb battery

Choose Pb battery discharging mode, press **'Start'** key to set discharging current, then, you can through press **INC** and **DEC** key to change the current value (0.1-12A). The same operation method to set battery voltage (2-20V) / battery cells. After setting the current and voltage, press **START/ENTER** key for 3 seconds to start the process, back or stop charging by press **STOP** key.

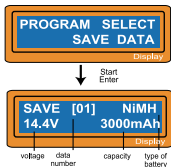


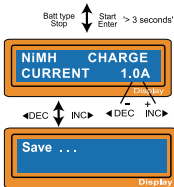
10. Data save program

It has a data storage and load program, can store up to 5 battery data by number that represent the individual specification of the batteries you are using. They can be called back for charging/discharging process without setting the program again.

Press **Start/Enter** key to set up the parameter value, and you can change the value with **INC** and **DEC** key.

The parameter value setting up in this screen does not affect charge or discharge process. They only represent the specification of the battery. The following screens will automatically be displayed exactly matched battery type you set up. The example shows the battery pack of NiMH, 12 cells and 3000mAh of capacity.

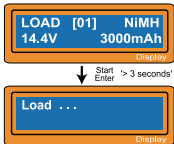




Setting charging current, you can change the value with **INC** and **DEC** key.

Long press **ENTER** key to save data.

11. Data load program



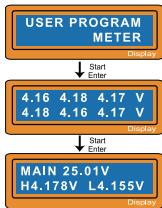
This program calls back the data that was stored at 'Save Data' program. To load the data, press **Start/Enter** key once to blink the data number field and select the number using **INC** or **DEC** key then press **Start/Enter** key for more than 3 seconds. As indicated, choose [01] NIMH, will show corresponded value 4.4V3000MA

12. Cell Meter test program

This charger with built-in high-bit micro-processor, can be used as a cell meter. It can show the voltage of each cells, the total battery pack voltage and the highest/lowest voltage.

Choose the cell meter program interface, press **START** to enter, will show 1-6 cells voltage.

Press **START** key to show the highest/lowest voltage of the single cell and the total voltage of the battery pack.

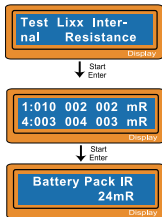


13. IR Test

Lithium battery internal resistance is one of the important index of battery discharge capability and efficiency. We can know battery performance and the matching of each battery by getting the battery IR value. The value more smaller the higher matching degree between the batteries. The charger detected battery IR value is its relative value not absolute value. It is the relative value under current testing voltage. But it can also know the battery performance and matching rate through this relative value. If you want more battery performance comparison, you had better put them under the same voltage to detect. For example, to compare two 3-cells batteries, you should ensure that the total voltage is consistent. Testing in the single voltage of 4.20V.

Choose IR test program, press **START** enter into the interface to show 1-6S IR value.

Press **START** key to check the total IR value of battery pack



14. User settings



◀DEC ↓

To avoid setting wrong, it can detect the Lithium battery capacity automatically when start to charge or discharge. But the battery capacity might be identified incorrectly when it is deep discharged. To prevent the wrongness, users can set a time to verify the battery capacity by the processor. Normally, 10 minutes is enough to check the battery capacity correctly. For larger capacity battery, you can through extend the set time to get it. But if you set the time too long for the battery with small battery capacity, then the charge or discharge process can be finished within the setting time, this will cause serious fault. If the processor identifies the cells incorrectly at the beginning of charge or discharge, users can extend the time. Otherwise, keep the default value is the best.



←DEC ↓



←DEC ↓



←DEC ↓



←DEC ↓



←DEC ↓



←DEC ↓



←DEC ↓



←DEC ↓

If you turn on safety timer when charging, safety timer will start timing too. If system fault or system can't identify battery capacity already full, this set safety time can stop battery being over charged. The safety time should not shorter than the time battery fully charged.

Capacity cut-off program set the maximum charging capacity. If safety timer stopped work or system can't detect the peak voltage, this program will stop charging/discharging automatically if you've set the maximum charging capacity.

Temp cut-off program is used to protect charger being damaged, will trigger stop charge/discharge when in extreme or high temperature environment.

Battery cycling charging/discharging waste time setting. Battery temperature will rise when charging or discharging. You can through set Battery cycling charging/discharging waste time (can be 1-60 minutes) to let battery have enough time to cooling between each cycling.

The automatic charging trigger voltage program is a kind of program that can automatically turn off the charging current during charging. The working principle is that after the battery voltage increased to the Maximum value and start to decreasing then the charge current will turn off and finish the charge. If the trigger voltage set too high, there is a possible danger of over-charging. If the trigger voltage set too low, may stop charging prematurely. Please refer to the specification of the battery (NiCd default voltage: 12mv, NiMH default voltage: 7mv).

Beep sound on/off; Buzzer sound on/off.

DC input power is 10-26V, the program set the lowest cut-off input voltage value is 10-20V. If the voltage lower than the set voltage level, procedure will be forced to end to protect input power.

Load Factory Set
Enter

Display

Resume to default setting

15. Warning and error messages

It combines a variety of protection functions and monitoring systems to identify its electronic functions and status. Screen will automatically display the error reason with a prompt tone if any error happens.

REVERSE POLARITY

Display

Battery output Polarity connection

CONNECTION BREAK

Display

Interruption of battery and output, or the charger wire was not been connected well when operate the charge or discharge output.

OUTPUT SHORT CIRCUIT

Display

Short-circuit of the output terminal. Please check the charger wire

INPUT VOLTAGE ERROR

Display

The voltage of the input terminal is lower or higher than the setting limit

BATTERY LOW VOLTAGE

Display

The voltage is lower than which is set. Please check the number of cells in the battery pack.

BATTERY HIGH VOLTAGE

Display

The voltage is higher than which is set. Please check the number of cells in the battery pack.

CELL LOW VOLTAGE

Display

Voltage of one cell in the battery pack is too low, please check the voltage of each cell.

CELL HIGH VOLTAGE

Display

Voltage of one cell in the battery pack is too high; please check the voltage of each cell

CELL Voltage ERROR

Display

Wrong connection of the connector detected; please check the connector and cable.

TEMP OVER ERR

Display

The internal temperature of the unit goes too high. Cool down the unit

16. Warranty and service

We warrant this product for a period of one year(12 months) from the date of purchase. The guarantee applies only to such material or operational defects, which are present at the time of purchasing the product. During that period, we will replace without service charge for any product deemed defective due to those causes. You will be required to present proof of purchase(invoice or receipt). This warranty does not cover the damage due to wear, overloading, incompetent handling or using of incorrect accessories.



WARNING!



FIRE HAZARD!

NEVER USE CHARGER UNSUPERVISED!

- Batteries pose a SEVERE risk of fire if not properly handled.
- Read Entire operation manual before using charger.
- This unit may emit heat during use.
- Only operate this device in a cool ventilated area away from flammable objects.
- Failure to observe safety procedures may cause damages to property or injury.

G.T.POWER[®]

