TURNIGY®
power systems

USER MANUAL

300W 20A

REAKTOR

BALANCE CHARGER/DISCHARGER

BUILT-IN
AC POWER SUPPLY

Index

WARNING! **FIRE HAZARD!**

NEVER USE CHARGER UNSUPERVISED!

Batteries pose a SEVER risk of fire if not propely 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 preoperty or injury.

Thank you for purchasing Turnigy Reaktor charger. Please read the entire Operating Instructions completely and attentively as it contains a wide variety of specific programming and safety information.

Specifcations

Input voltage range:	100--240VAC 10--28.0VDC
Charge current range:	0.1--20.0A
Discharge current range:	0.1--20.0A
Maximum charge power capacity:	300W @ input voltage >18V
Maximum discharge power capacity:	30W
Maximum regenerative discharge power capacity:	300W
Current drain for balancing:	<350mA
Balance accuracy:	<10mV
Lithium (LiPo/Lilo/LiFe/LiHV/LiXX) battery cell count:	1--6 series
NiCd/NiMH/NiZN/ battery cell count:	1--17 series
Pb battery cell count:	1--10 series (2--20V)
Battery setup memories:	8
Weight:	1000g
Dimensions (L X W X D):	168X170X56mm

Special features

High power, high current, high-performance power conversion circuit. The charger uses advanced Synchronous buck-boost DC/DC converter technology with an output conversion efficiency that can reach over 90%. This not only saves power and reduces heat build up but also makes the charger more compact and conveniently mobile.

Input power with 4mm bullet connectors (25A)butt-welded alligator clips and wide input voltage ranges from 10V to 28V. The output power can be adjusted to align with the available input power, thus preventing input current overload and protecting the DC source.

The charger can be used with three types of Lithium batteries-LiPo, Lilo,LiFe,LiHV,LiXX and has a fully integrated cell balancer.

Convenient set of 8 battery profile memories that can be saved and loaded by number.

2X16 backlit LCD screen that provides rich information including active mode, current, voltage, total charge(mAh), charging time and temperature etc.

Various charging/discharging settings and cycles to meet a wide range of customer needs. For Lithium batteries: balance charging, normal charging, fast charging, storage, discharging, and battery monitoring. For NiCd/NiMH/NiZN batteries: charging-auto, charging-manual, discharging, charge/discharge cycling. For Pb batteries: charging and discharging.

Up to 300w unique regenerative discharge capability. Regenerative discharge takes most of the output battery’s energy and puts it back into the input battery, which is not the same with the traditional methods of discharge to deplete that energy in the form of heat across a transistor. That is, when you discharge your LiPo for storage, you will be re-charging your Lead Acid input battery. The amount of current and voltage that your input battery can accept limit the total amount of power that you can achieve, or 300W, whichever is lower.

Perfect protection. The charger has protection for reversed polarity(input or output), low input voltage, battery temperature, charging capacity and time overrun.

Warnings and Safety notes

- Keep the charger away from children and pets at all times.
- Never leave the charger unsupervised when charging or discharging. If you leave, disconnect the battery to prevent any unexpected dangers or damage.
- Ensure the charger program and settings match the battery pack otherwise the battery will be damaged and a dangerous situation may arise, especially for Lithium batteries, which may cause a fire.
- Do not mix batteries of different types, different capacities or from different manufacturers.
- Do not disassemble the charger.
- Do not place the charger or any battery on a flammable surface or near a combustible material wile in use. Do not
- charge or discharge on a carpet, cluttered workbench, paper, plastic, vinyl, leather or wood, inside an R/C model or inside a full-sized automobile.
- Never block the air intake holes and never use in a refrigerated or high temperature environment. If used in such an environment, the internal temperature protection may result in abnormal charging/discharging that could be dangerous.
- Do not allow water, moisture, metal wires or other conductive material into the charger.
  Never charge or discharge any battery having evidence of leaking, expansion/swelling, damaged outer cover or case, color-change or distortion.
- Do not try to charge “non-rechargeable” dry cells.
- Do not exceed the battery manufacturer's suggested maximum charge rates.
- Beware that the external case temperature of the charger will increase during charging/discharging at high power.
- Carefully follow the battery pack manufacturer's recommendations and safety advice.

Recommended connecting way:

1. Connect charger'sinput power supply, and turn on it.

2. Connect Li batteries'balance port.

3. Connect the main charging port's positive pole to cells' positive pole, and then connect negative pole to cells' negative pole(this will avoid striking fire while connecting Li cells).

4. Start charging and discharging...

5. After finishing charging and discharging, pls disconnect the cell and charger, and then turn off the charger's power supply.

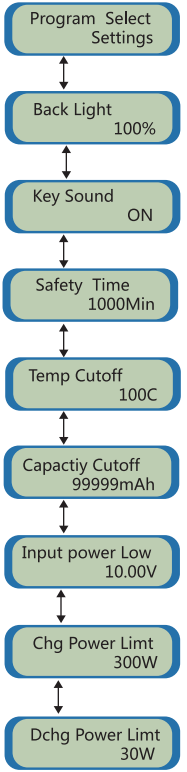
Standard battery parameters

	LiPo	Lilo	LiFe	LiHV	NiCd	NiMH	Pb
Nominal voltage	3.7V/cell	3.6V/cell	3.3V/cell	3.8V/cell	1.20V/cell	1.20V/cell	2.0V/cell
Max.charge voltage	4.2V/cell	4.1V/cell	3.6V/cell	4.35V/cell	1.60V/cell	1.60V/cell	2.36V/cell
Storage voltage	3.85V/cell	3.75V/cell	3.3V/cell	3.9V/cell	n/a	n/a	n/a
Allowable fast charge	≤1C	≤1C	≤4C	≤1C	1C-2C	1C-2C	≤0.4C
Min.discharge voltage cut-off level	≥3.0V/cell	≥2.5V/cell	≥2.0V/cell	≥3.0V/cell	≥0.85V/cell	≥1.0V/cell	≥1.75V/cell

Note: Be very careful to choose the correct voltage for different types of battery otherwise you may cause damage to the batteries. Incorrect settings could cause the cells to vent, burn or explode leading to injury or loss of property.

Parameter setup

Users should check the parameter settings and adjust the parameter values according to the specifications of the pack to be charged or discharged.



User parameter setup initial display.

Back-light control. Adjust the LCD backlight brightness.

Key confirmation and alert tone. If the keyboard sound is ON there will be a beep when you press any key. If the buzzer is ON the charger will generate an alert tone for certain events.
Key Sound: OFF&ON

Charging time upper limit. The charging process will stop immediately if it exceeds the set value.
Range: 1-1000 min

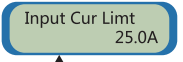
Battery upper temperature limit. The battery temperature can be monitored with the attached temperature sensor. In order to protect the battery from damage due to high temperatures the charger will stop charging or discharging immediately if the temperature exceeds the cut-off setting.

Capacity protection. The charging/discharging process will stop immediately if the calculated charge input/drained exceeds the set value.
Range: 100-99999mAh

Input voltage protection lower limit. The charging/discharging process will stop immediately if the input voltage falls below the set value.
Voltage Range: 10.00-28.00V

CHG: 50-300W

DCHG: 5-30W

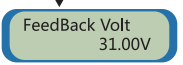


Input current limit protection lower limit. The charging/discharging process will stop immediately if the input voltage falls below the set value.
Current Range: 1.0A-25.0A

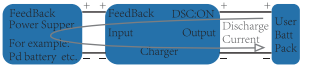
Process completion tone. Controls the tones generated at end of charging or discharging and the cyclic charging/discharging indication.

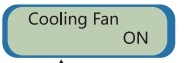
FeedBack discharge is set to ON/OFF

FeedBack Current Range: 1.0A-20.0A

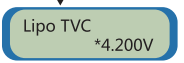


FeedBack Voltage Range: 12V-31V

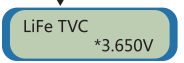




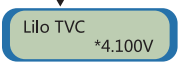
Cooling fan: OFF, ON & AUTO



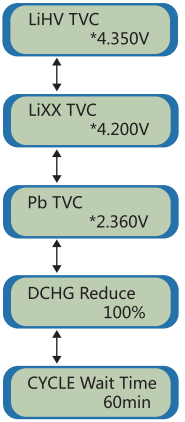
Termination voltage for LiPo. Adjust LiPo’s charge termination voltage. Press Start/Enter for more than 3 seconds to blink the “Voltage” value, then press Dec and Inc to adjust the termination voltage.
Range: 4.10V-4.25V



Termination voltage for LiFe. Adjust LiFe’s charge termination voltage. Press Start/Enter for more than 3 seconds to blink the “Voltage” value, then press Dec and Inc to adjust the termination voltage.
Range: 3.55V-3.72V



Termination voltage for Lilo. Adjust Lilo’s charge termination voltage. Press Start/Enter for more than 3 seconds to blink the “Voltage” value, then press Dec and Inc to adjust the termination voltage.
Range: 4.00V-4.15V



Termination voltage for LiHV. Adjust LiHV’s charge termination voltage. Press Start/Enter for more than 3 seconds to blink the “Voltage” value, then press Dec and Inc to adjust the termination voltage.
Range: 4.25V-4.40V

Termination voltage for LiXX. Adjust LiXX’s charge termination voltage. Press Start/Enter for more than 3 seconds to blink the “Voltage” value, then press Dec and Incto adjust the termination voltage.
Range: 4.20V-4.70V

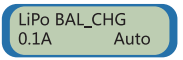
Termination voltage for Pb. Adjust Pb’s charge termination voltage. Press Start/Enter for more than 3 seconds to blink the “Voltage” value, then press Dec and Inc to adjust the termination voltage.
Range: 2.00V-2.45V

Discharge reduce setting.
Range: 5-100%

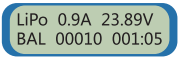
When running a charge/discharge cycle program for a NiMH or NiCd battery the charger will stop for a while before continuing to the next phase. This allows the pack to cool down.
Range: 1-60 min.

Charging Lithium battery in BALANCE mode

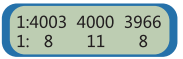
This function is for balancing the voltage of Lithium-polymer battery cells while charging. In the balance mode the battery balance lead must be connected to the balance port on the right side of the charger. The pinout of the balance port is shown in the diagram below. Charging in this mode is different from the normal CHARGE mode because the charger can monitor the voltage of individual cells and adjust the input current fed into each cell to normalize the voltage(for example: LiPo battery within 4.2V).



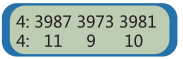
Balance charging mode of Lithium battery. The left side of the first line set the type of battery(LiPo, Lilo, LiFe, LiHV, LiXX). The value on the left side of second line sets the charge current and on the right side of second line, it shows AUTO. The system will check cell count automatically by cell balance port’s voltage.
Charge current: 0.1 -20A, Cell count: 1 -6 series



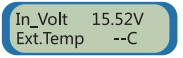
Lithium BALANCE charging mode. The screen shows the status during the charging process.



One minutes after charging, press Inc to display each cells’ voltage(the first line) and internal resistance(the second line).

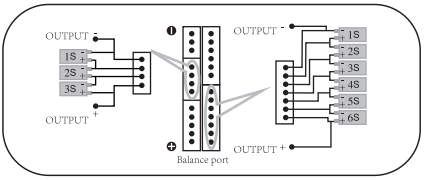


One minutes after charging, press Inc to display each cells’ voltage(the first line) and internal resistance(the second line).

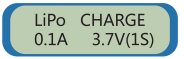


One minutes after charging, press Inc to display input power voltage and external temperature.

Balance port and Individual Cell connection diagram

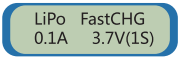


Charging a Lithium battery in normal CHARGE mode



The left side of the first line set the type of battery(LiPo, Lilo, LiFe, LiHV, LiXX). The value on the left side of second line sets the charge current and the value on the right side of second line sets the cell count and voltage of the battery pack. After setting the current and voltage, press Start/Enter for more than 3 seconds to start the next process.
Charge current: 0.1 -20A, Cell count: 1 -6 series

Fast charging a Lithium battery



The left side of the first line set the type of battery(LiPo, Lilo, LiFe, LiHV, LiXX). The value on the left side of second line sets the charge current and the value on the right side of second line sets the cell count and voltage of the battery pack. After setting the current and voltage, press Start/Enter for more than 3 seconds to start the next process.
Charge current: 0.1 -20A, Cell count: 1 -6 series

"Storage" charge/discharge a Lithium battery

This mode is for charging/discharging a Lithium battery that is not to be used for an extended period. The program determines whether to charge or discharge the battery based on the configured target voltage and the measured initial voltage of the battery. The nominal target storage voltage depends on the type of Lithium battery; 3.75V/cell for Lilo, 3.85V/cell for LiPo, 3.3V/cell for LiFe, 3.9V/cell for LiHV. If at the start the battery voltage exceeds the target storage voltage the program will start to discharge rather than charge.

Storage of Lithium battery. The left side of the first line set the type of battery(LiPo, Lilo, LiFe, LiHV, LiXX). The value on the left side of second line sets the charge/discharge current and the value on the right side of second line sets the cell count and voltage of the battery pack. After setting the current and voltage, press Start/Enter for more than 3 seconds to start the next process.
Charge current: 0.1 -20A, Cell count: 1 -6 series

Discharging a Lithium battery

In this mode, you can set the target per-cell voltage and hence the final voltage (final voltage=cell voltage*number of cells). The lowest allowable cell voltage depends on the type of Lithium battery; 2.40V for Lilo, 3.00V for LiPo, 1.80V for LiFe, 3.20V for LiHV per cell. If the battery is connected to the balance port, the charger can monitor the individual cell voltages. The discharge will stop immediately if any cell falls below the configured final voltage.

Discharge of Lithium battery. The left side of the first line set the type of battery (LiPo, Lilo, LiFe, LiHV, LiXX). The value on the left side of second line sets the charge/discharge current and the value on the right side of second line sets the cell count and voltage of the battery pack. After setting the current and voltage, press Start/Enter for more than 3 seconds to start the next process.
Discharge current: 0.1 -20A, Cell count: 1 -6 series

NiCd/NiMH/NiZN battery program

Charging a NiCd/NiMH/NiZN battery

The left side of the first line displays the type of batter(NiCd/NiMH/NiZN) and the second line allows you to set the current limit. The charger offers two charging modes for NiCd/ NiMH/NiZN, 'CHARGE Aut' and 'CHARGE Manual'. Press Start/Enter for more than 3 seconds to start charging.
Current for Aut: 0.1 -20A; Current for Manual: 0.1 -20A

Discharging a NiCd/NiMH/NiZN battery

The left side of the first line shows the type of batter(NiCd/NiMH/NiZN). The value in the second line sets the discharge current on the left and final voltage on the right. Press Start/Enter for more than 3 seconds to start discharging.
Discharge current: 0.1 -20A
Final voltage: 0.1 -25V

Charge-to-Discharge & Discharge-to-Charge cycle mode for a NiCd/NiMH/NiZN battery

The left side of the first line shows the type of battery(NiCd/NiMH/NiZN). The second line shows the cycle direction you selected: (CHG (×××)->DCHG) or DCHG ->CHG (×××)) the right shows the cycle number. The discharge parameters are those set in NiCd/NiMH/NiZN discharge screen. Press Start/Enter for more than 3 seconds to start the cycling.
Cycle number: 1 -8

Pb(lead-acid) battery program

Charging a Pb battery

Charge Pb battery. The left side of the first line shows the type of battery(Pb). The second line shows the charge current and number of cells you selected. After setting the current and voltage press Start/Enter for more than 3 seconds to start the charging.
Charge current: 0.1 -20A
Battery cells: 1 -10P(2 -20V)

Discharging a Pb battery

Discharging Pb battery. The left side of the first line shows the type of battery(Pb). The second line shows the charge current on the left and number of cells on the right. After setting the current and voltage press Start/Enter for more than 3 seconds to start the discharging.
Charge current: 0.1 -20A
Battery cells: 1 -10P(2 -20V)

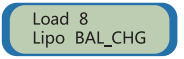
Data save/load program

The charger has a storage and load program for your convenience. This feature can store up to 8 battery datasets by number. Each dataset represent your settings for a particular set of batteries. Datasets can be reloaded for charging or discharging to save having to re-enter all the parameter values again by hand.

Data save program

This screen displays the data save program.

Data load program



This screen displays the data load program.

Battery in monitoring mode

Monitor mode of battery.

Error messages

DISCONNECT	No battery is connected to the charger’s balance port.
CONNECT_ERRO	Cells count or voltage is incorrect.
CONNECT_REVERSE	The output is connected to a battery with incorrect polarity.
BATT_FAULT	The battery detected by the charger is damaged.
BALANCE_FAULT	The connection between battery and the charger balance port is incorrect.
CHECK_IR_FAULT	The IR checking is failed.
CELLSNUM_ERRO	The cell count is incorrect.
INPUT_VOLT_LO	The input voltage is below the limit set in the USER SET menu.
INPUT_VOLT_HI	The input voltage is over the limit.
OUTPUT_VOLT_HI	The output voltage is over the limit.
BATT_VOLT_LOW	The output voltage is below the limit.
BATT_VOLT_HIGH	The battery voltage is over.
OVERTIME	The time is over the limit set in the USER SET.
TEMPCUTOFF	The external temperature sensor detects (battery) temperature above the limit.
CAPCUTOFF	The capacity (mAh) charged or discharged reached the configured protection limit.
INTERTEMPCUTOFF	The internal temperature is over.

Warranty

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 repair or replace without service charge 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.

This symbol means that you must dispose of electrical from the General household waste when it reaches the end of its useful life.

Take your charger to your local waste collection point or recycling centre.

This applies to all countries of the European Union, and to other European countries with a separate waste collection system.

CE FC MADE IN CHINA

TURNIGY® power systems