LA00048   © **LRP electronic GmbH 2010**

pulsar TOUCH COMPETITION

USER GUIDE - #41555

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LRP
BLUE IS BETTER

Dear Customer,

thank you for your trust in this LRP product. By purchasing a *LRP Pulsar Touch*, you have chosen a high-performance product which has the latest technology incorporated including the following High-Tech features:

• Professional Multi-Function System (Charge, Discharge, Cycle, Balance, Motor/ESC/Servo Check)
• up to 12.0A Charge Current   • up to 20.0A discharge current (+ 35A Pulse Discharge)
• LiPo • LiFePo • NiMH • NiCd   • Integrated Balancer for 2S-4S Lixx batteries   •
• Touchscreen Graphics LCD Display   • 5 User Profile Memories
• 25-Year Warranty   • Multi-Protection-System

Please read the following instructions carefully before you start using your charger. This user guide contains important notes for the installation, the safety, the use and the maintenance of this product. Thus protecting yourself and avoid damages of the product.

Proceed according to the user guide in order to understand your charger better. Please take your time as you will have much more joy with your product if you know it exactly.
This user manual shall be kept in a safe place. If another customer is using this product, this manual has to be handed out together with it.

TECHNICAL DATA

Dimensions	[mm]	1585x172x68
Weight	[g]	720
Input Voltage	[DC]	11-15V
Charging Capability	LiPo/LiFePo	1 - 4 cells
	NiMH/NiCd	1 - 10cells
Charge Current	[A]	0.1 - 12.0
Trickle Current	[A]	0 -0.55
Delta Peak	[mV]	1 - 200
Integrated High-Performance Balancer	yes, 2S - 4S	
Storage Charge Mode	yes	
Discharge Current	[A]	0.1 -20.0 (+ 35 Pulse)
Discharge Cut-Off Voltage	LiPo/LiFePo	2.0 - 4.2V/cell
	NiMH/NiCd	0.1- 1.3V/cell

Autostart Timer	yes, 0-99min
Cycle Mode	yes, adjustable
User Profile Memory	5
Graphical Touchscreen LCD	yes, blue backlit
Acoustic Signal Type	Buzzer
Finish Melody	adjustable
Multi-Protection-System	yes
DC Input Connection	4.0mm connector
Output Connection	4.0mm jacket
Brushless Motor Sensor Port	yes
RX Generator (ESC + Servo Check)	yes
Voltage Calibration Mode	yes
USB Connection	yes

Specifications subject to change without notice.

CONNECTIONS

Input Connection *(backside of charger, no picture!):* connect your Pulsar Touch to a suitable DC powersupply with 11-15V output voltage and a minimum of 12.0A output current. *Caution:* Be careful with correct polarity!
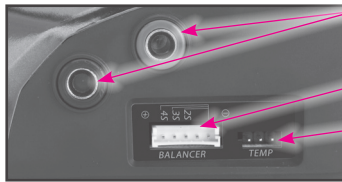
Output Jacket: connect battery to be charged to the 4.0mm jacket, using supplied charge wires.
Caution: Be careful with correct polarity!

Balancer Connector: high-performance integrated Lixx balancer for 2S to 4S packs using EHR balancing connector.

Temperature Sensor *(optional):* connect the optional temperature probe to measure battery temperature.
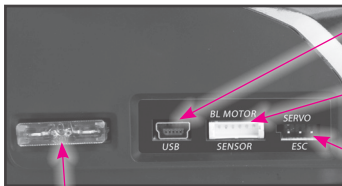
USB Connection: connect to PCB using the supplied USB-cable. To be used for upcoming firmware updates and PC software.

Brushless Motor Sensor Port: a fantastic feature which allows you to check your brushless motors sensors and even measure motor rpm! In combination with the built-in receiver simulator port.

RX Simulator Port: you can even check speed-controls and servo's for correct function!
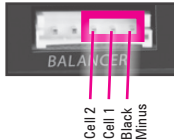
15A Fuse: input fuse for protection, only replace with another 15A fuse (blue colored housing) and no other types as these would not offer protection or correct function!

BALANCER CONNECTION

The *Pulsar Touch* contains an integrated competition balancer for 2S to 4S LiPo- and LiFePo-batteries using EHR balancing connector. Please refer to drawing (also like that on charger) for correct polarity, basically minus (black wire) is always on the far right side of the plug as shown on drawing.
The balancer equalises the cells, during charge- and balance-function, which results in higher performance and higher cycle-life.
Caution: Avoid incorrect connection as in the worst case this may result in damage to the battery and/or charger!

Connection Example 2S: **Connection Example 3S:**   **Connection Example 4S:**

BALANCER   BALANCER   BALANCER

Cell 2 / Cell 1 / Black Minus   Cell 3 / Cell 2 / Cell 1 / Black Minus   Cell 4 / Cell 3 / Cell 2 / Cell 1 / Black Minus

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FACTORY DEFAULTS

The *Pulsar Touch* comes with 5 pre-set user profiles, but you can also alter those and prepare 5 individual user profiles and even name them as you like. This means you can customize 5 personal charge profiles individually and store them for later use. The active profile P1 to P5 and it's name is indicated in the headline of the main menu.

User Profile	P1	P2	P3	P4	P5
CHARGE SETTINGS:					
Chg Mode	LiPo	LiFe	LiPo	LiPo	Linear
Current	6.0A	6.0A	6.0A	2.0A	4.0A
Pack Volt	7.4V / 2S	6.6V / 2S	3.7V / 1S	11.1V / 3S	
D-Peak					20mV
Trickle					Off
Safety Time	120min	120min	120min	180min	90min
	40°C	40°C	40°C	40°C	55°C
DISCHARGE SETTINGS:					
Current	20.0A	20.0A	20.0A	2.0A	10.0A
Pack Volt	7.4V / 2S	6.6V / 2S	3.7V / 1S	11.1V / 3S	
Cutoff Volt	3.2V/C	2.2V/C	3.2V/C	3.2V/C	5.4V
Cut-Temp	60°C	60°C	60°C	60°C	70°C
OTHER SETTINGS:					
Profile Name	2S-LiPo 6A/20A	2S-LiFe 6A/20A	1S-LiPo 6A/20A	3S-LiPo 2A/2A	Linear 4A/10A
Signal Min			1000		
Signal Max			2000		
Button Sound			On		
Finish Sound			15sec		
Finish Melody			1		
LCD Contrast			7		
Temp Scale			°C		

Tip: You can always reset to above factory default settings under „CONFIG" function (see separate box).

TOUCHSCREEN USAGE

As known from LRP, the programme structure is logical and intuitive, therefore most users can familiarise with the usage and functions without even reading the manual, but it is obviously strongly recommended to read this manual in order to achieve maximum performance from the PulsarTouch and make best use of all of it's great features.
You can either use your finger or the included plastic pen to use the touchscreen, make sure you only use very light pressure to activate the functions as too high pressure may damage the display!

Press briefly to jump to next profile (P1 > P2 > P3 > P4 > P5 > P1 ...).
Keep pressed to enter „Profile Name" menu, which allows renaming of the choosen profile (see below).
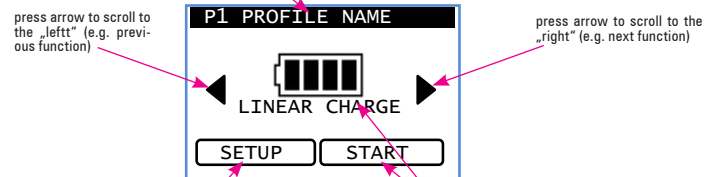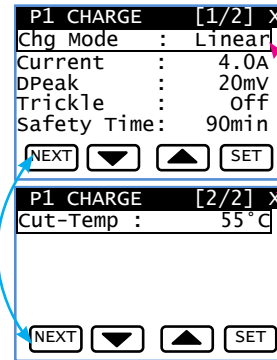
press arrow to scroll to the „leftt" (e.g. previous function)

P1 PROFILE NAME
LINEAR CHARGE
SETUP   START

press arrow to scroll to the „right" (e.g. next function)

press „SETUP" to change the settings of this function (in this case the function is LINEAR CHARGE).

The logo (LINEAR CHARGE in this case) indicates which function is pre-selected.
Press „START" or center symbol to start the function.

Adjusting the settings and hoping through multi-page menu:

P1 CHARGE   [1/2] X
Chg Mode   :   Linear
Current   :   4.0A
DPeak   :   20mV
Trickle   :   off
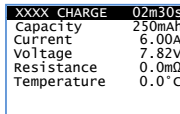**Safety Time: 90min**
NEXT   ▼   ▲   SET

as [1/2] and [2/2] indicate in headline, there is a multi-page menu with more then one screen. You can hop through the pages by pressing „NEXT" button.

P1 CHARGE   [2/2] X
Cut-Temp :   55°C
NEXT   ▼   ▲   SET

after accessing the menu with „SETUP" you can select the value which you may access that value directly by pressing with your finger or pen or by pressing „SET" button.

Once this line is shown inversed (black background), you can then change that value using the up/down arrown keys.

You may leave the „SETUP" menu again at any time, and the current values will be stored, by pressing X in upper/right corner

Hidden buttons and how to make them visible again?

To allow more clean screen and more useful information, the buttons will be hidden during many active functions. Simply touching the screen anywhere will make the buttons visible again. After a short while of no use of the screen, the buttons will hide again automatically.

Buttons Hidden:

XXXX CHARGE   02m30s
Capacity   250mAh
Current   6.00A
Voltage   7.82V
Resistance   0.0mΩ
Temperature   0.0°C

Buttons visible again (after briefly touching screen anywhere):

XXXX CHARGE   02m30s
Capacity   250mAh
Current   6.00A
Voltage   7.82V
Resistance   0.0mΩ
Temperature   0.0°C
NEXT   ▼   ▲   STOP
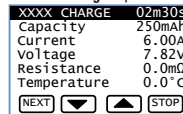
How to adjust the current on the fly?

As known by LRP, the *Pulsar Touch's* current (charge or discharge) can be adjusted during use. Touch the current value on the screen, the characters will become inverse (black background) and then use the up/down arrow keys to adjust the current to your desired value without interrupting the active process.
Important: This change is not saved in memory, the next time you use this function the settings from the memory will be used.

XXXX CHARGE   02m30s
Capacity   250mAh
Current   6.00A
Voltage   7.98V
Resistance   0.0mΩ
Temperature   0.0°C
NEXT   ▼   ▲   STOP
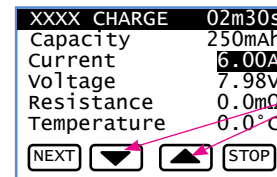
Touch current, characters will become inverse (black background)-
Now use up/down arrow keys to adjust current to your desired value.

How to change the profile names?

Keep headline pressed in main menu, this brings you into the function to alter the active profiles name.

P1 PROFILE NAME
LINEAR CHARGE
SETUP   START
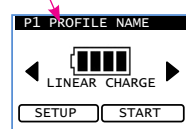
You can change the name in several ways, pick the method you feel most comfortable with.
1. straight indicate/write by touching the characters one after the other.
2. hop through the characters by using the right key and confirm the selected character by using the „√" key.

You confirm and leave this setting by either pressing „X" symbol in upper right corner or by pressing „OK" key.

indicates which character in headline you have selected for changing

P1 PROFILE NAME   X
ABCDEFHIJKLMNOPQR
STUVWXYZabcdefghi
jklmnopqrstuvwxyz
0123456789-._'#+/
DEL   V   ▶   OK
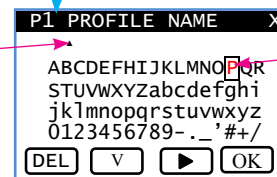
indicates new character you have selected.

PROGRAMME STRUCTURE - SETUP

After powering up your Pulsar Touch you are in the main menu where you can scroll through all functions (Charge / Discharge / Cycle / Balance / View Last Data / Config / Motor-ESC-Servo) and either start the required process by press „START" button or access the particular functions setup by pressing „SETUP". All the functions and our recommendations are explained in detail on next pages.

```
P1 PROFILE NAME          P1 PROFILE NAME          P1 PROFILE NAME          P1 PROFILE NAME          P1 PROFILE NAME          P1 PROFILE NAME          P1 PROFILE NAME

   ◄ LINEAR CHARGE ►      ◄   DISCHARGE   ►        ◄     CYCLE     ►        ◄    BALANCE    ►        ◄  VIEW LAST DATA         ◄    CONFIG     ►        ◄ MOTOR-ESC-SERVO ►
  SETUP    START          SETUP    START          SETUP    START          VIEW    START                     START                 SETUP               SETUP    START
```

```
P1 CHARGE    [1/2] X     P1 DISCHARGE      X     P1    CYCLE       X     P1  BALANCE [1/2] X     P1 DATA VIEW [1/3] X     P1   CONFIG  [1/2] X     MOTOR-ESC-SERVO     X
Chg Mode  :  Linear      Current  :  20.0A       Direction  :  C→D      1s:0.000V             Input    :  0.000V       Button Sound :  ON       Signal Min :   1100
Current   :    4.0A      Pack.Volt 7.4V/2S       Cycles     :    1      ▸2s:0.000V            Output   :  0.000V       Finish Sound :15sec      Signal Max :   1900
DPeak     :   20mV       Cutoff.V. :  3.2V/C     Chg Delay  : 10min      3s:0.000V            Batt.Temp :   0.0°C      Finish Melody:    1
Trickle   :     Off      Cut-Temp  :    50°C     Dischg Delay: 10min    ▸4s:0.000V            Max Temp  :   0.0°C      LCD Contrast :   10
Safety Time:  90min                                                     Gap 0.000V           Resistance :  0.0mΩ      Temp Scale   :    °C
NEXT ▼ ▲ SET             ▼ ▲ SET                  ▼ ▲ SET               NEXT                   NEXT                                             ▼ ▲ SET
```
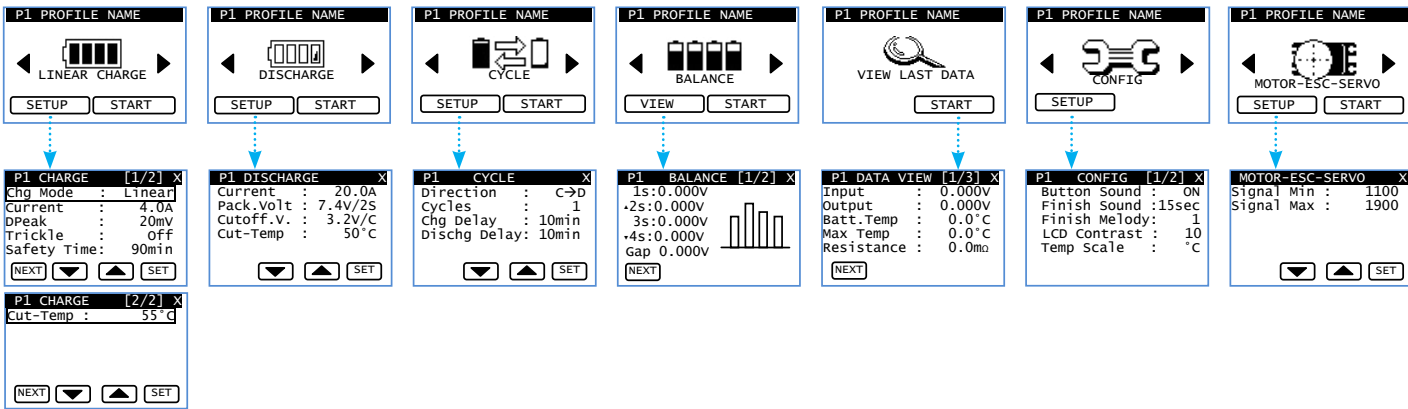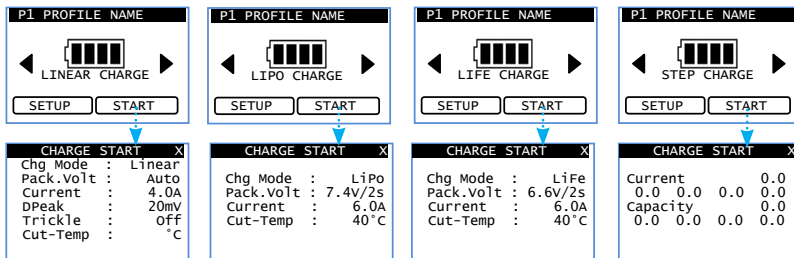
```
P1 CHARGE    [2/2] X
Cut-Temp  :    55°C




NEXT ▼ ▲ SET
```

CHARGE PROCESS

The *Pulsar Touch* can charge LiPo, LiFePo, NiMH and NiCd batteriesand incorporates the designated charge algorithms for each particular cell type for best performance, reliability and safety with up to 12.0A charge current. Please always follow your battery manufacturers recommendations for maximum allowed charge current and make sure you always use the correct „Chg Mode" setting for the battery you want to charge, as wrong setting may result in damage to the battery!

```
P1 PROFILE NAME          P1 PROFILE NAME          P1 PROFILE NAME          P1 PROFILE NAME

◄ LINEAR CHARGE ►        ◄  LIPO CHARGE  ►        ◄  LIFE CHARGE  ►        ◄  STEP CHARGE  ►
SETUP    START           SETUP    START           SETUP    START           SETUP    START
```

```
CHARGE START      X      CHARGE START      X      CHARGE START      X      CHARGE START      X
Chg Mode  :  Linear      Chg Mode  :   LiPo       Chg Mode  :   LiFe       Current          0.0
Pack.Volt :   Auto       Pack.Volt 7.4V/2s        Pack.Volt 6.6V/2s         0.0  0.0  0.0  0.0
Current   :   4.0A       Current   :   6.0A       Current   :   6.0A       Capacity         0.0
DPeak     :   20mV       Cut-Temp  :   40°C       Cut-Temp  :   40°C        0.0  0.0  0.0  0.0
Trickle   :    Off
Cut-Temp  :    °C
```

Depending on which profile you have choosen or if you altered the settings under „SETUP" the designated charge type „LINEAR", „LIPO", „LIFE" or „STEP" will be indicated on the screen.

After starting the operation by pressing „START" button or cell symbol (both works!) the choosen settings will be indicated for you again to avoid incorrect settings for the battery you intend to charge.

You can cancel the operation, and return to main menu, by pressing the „X" symbol in the upper right corner.

```
CHARGE START      X
Autostart  :   0min
Storage Charge
XXXX    :      0.0x

▼ ▲ START
```
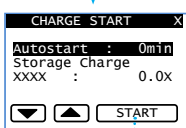
Autostart: This handy feature lets you preselect when you want to start charging your battery with the Pulsar Touch. The Autostart Timer is adjustable from 0 - 99min. If you stay in the „Autostart Display" for longer then 30sec without setting a value, the charging process will start automatically.
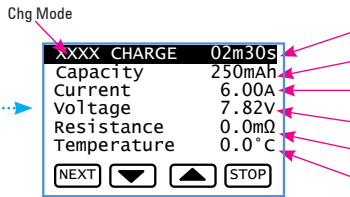
Storage Charge: Never store your batteries completely empty as this will harm them and lower their performance. Due to this fact, the Pulsar Touch features a „Storage charge" mode. With this function, you can set a fixed voltage (vor Lixx batteries) or fixed capacity (for Nixx batteries) value and the battery will be partially charged or discharged (in case of Lixx) exactly to this level. Thus you can always perfectly prepare your battery for storage, if you want to store them over a longer period of time.

Our recommendations: NiMH/NiCd: 50% of nominal capacity *** LiPo: 3.8V/cell *** LiFePo: 3.4V/cell

```
AUTOSTART TIMER
  Time to Start
    00m00s

STOP    START
```
time until charging starts, you can skip and start immediately by pressing „START" or you can return to the main menu by pressing „STOP".

```
CHECK STATUS:

BATTERY......ok
Connection...ok
```
your charger checks if all connections and the battery itself are ok and if charge process can be started.

Chg Mode

```
XXXX CHARGE    02m30s
Capacity       250mAh
Current         6.00A
Voltage         7.82V
Resistance     0.0mΩ
Temperature    0.0°C
NEXT ▼ ▲ STOP
```

Time elapsed since start of charge
Charge capcacity
Charge current (adjustable during charging!)
Actual pack voltage
Internal resistance of your pack during charging
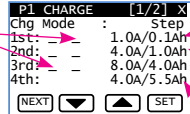Temperature of your pack (optional with sensor)

CHARGE - explanations:

LiPo/LiFe pack voltage: The packs rated voltage for LiPo/LiFePo batteries must be set according to the packs rating.

Linear Charge: the most common method for NiMH/NiCd cells, a constant current from beginning to end of charge process, the easiest method for charging.

Step Charge: should only be used by experienced racers and only for NiMH cells!

You may select special charging methods for 1st to 3rd step (4th step is fixed to linear!):

‒   = Linear charge

∏ = Impulse - charges with 1.5x of selected current for short periods.

∐ = Reflex - charges with short discharge spikes every few seconds.

```
P1 CHARGE    [1/2] X
Chg Mode  :    Step
1st:‒ _     1.0A/0.1Ah
2nd:        4.0A/1.0Ah
3rd:_ _     8.0A/4.0Ah
4th:        4.0A/5.5Ah
NEXT ▼ ▲ SET
```

```
P1 CHARGE    [2/2] X
DPeak      :      15mV
Trickle    :       Off
Safety Time:    120min
Cut-Temp   :      50°C
NEXT ▼ ▲ SET
```
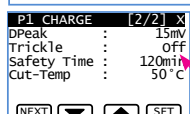
Current and Capacity for 1st step, should be a low value for current and capacity (1.0A and 0.1Ah is our suggestion)

2nd step current can be higher, we suggest to charge for 25% of batteries nominal capacity with 1C charge.

3rd step, this current you can set fairly high (up to 2C charge rate), only charge to 75% of batteries nominal capacity with this rate.

4th step, use lower current again to end of charge for accurate peak detection and best performace. Set capacity for this step to ~110% of nominal capacity.

Same settings on the second screen of „Step Charging" as for normal linear charge of NiMH/NiCd cells!

Charge Algorithms: the *Pulsar Touch* contains high-accuracy charge profiles for each type of battery, make sure you always use the correct „Chg Mode" setting for the battery you want to charge, as wrong setting may result in damage to the battery!

LiPo/LiFePo ➔ **charging using the CC/CV-charging method.** With this charging method, the battery gets charged with a constant current first. As soon as the battery voltage reaches the max. allowed charging voltage per cell (for example, LiPo 4.2V and LiFePo 3.7V), the charger automatically reduces the charging current till the battery is fully charged.

NiMH/NiCd ➔ **charging with constant current (Linear- or Step-Mode!) + delta-peak detection.** This is the most popular charging method for NiMH/NiCd-batteries in competition

Charge Current: The charge current can be set from 0.1 to 12.0A, for racing cells (Sub-C size) in LiPo, LiFe and NiMH technology you can usually use 1.5C charge rate (e.g. 7.5A for a 5000mAh pack) with no problem. However, for lower grade cells and receiver-/transmitter battery packs you should use a lower charge current and should follow your battery manufacturer's recommendations.

Delta Peak: With NiMH/NiCd-batteries, you only obtain the optimum battery performance by slightly „overcharging" the battery. In real terms, it will not be overcharged, but charged to an optimum level. The battery voltage drops at the end of the charging process (delta). The size of the drop (delta peak) is adjustable in the range between 1 - 200mV. The higher the value, the hotter the battery will be at the end of the charge. We recommend to start with the works-default settings.
Note: The adjustable Delta-Peak value applies to the whole battery pack and not to one single cell!

Trickle Charge: This current, which flows after delta peak cutoff, is adjustable from 0.0 - 0.5A to achieve the highest possible voltage for NiCd cells. Set this function to „Off" for NiMH cells. Alternatively you can use the Auto Trickle Function for an automatic Trickle Charge setup.

Connections: make sure you use high-quality wire and connectors for maximum accuracy, a poor connector or poor wire may create heat and affect the accuracy,

Temperature Sensor: there is an optional temperature sensor available, so you can monitor the battery temperature during charging and discharging. As it's normally not required for most users, we didn't include it with the charger as it would have only increased cost for everyone. When no sensor is connected, display will indicate „0.0°C"
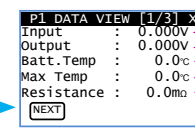
CHARGE - further screens:

During running charge process there is additional information available, by pressing „NEXT" button you may access those. The available screens are (you jump to next by pressing „NEXT" again):
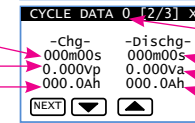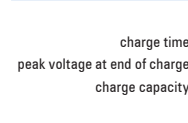- Voltage of each cell in pack (if balancer is used!), for description see section „Balancer".
- Internal resistance of each cell in pack (if balancer is used!), for description see section „Balancer".
- Data View screens, , for description see section „View Last Data".

VIEW LAST DATA

The *Pulsar Touch* allows to view the stored data of the last 11 processes (charge, discharge or cycle). You can access the same data also during any operation (charge, discharge, etc) by pressing the „NEXT" button, this means you can view the stored data from a previous operation during actual use! The last operation is always the memory „0".

```
P1 PROFILE NAME

◄  VIEW LAST DATA

      START
```

```
P1 DATA VIEW [1/3] X
Input    :   0.000V
Output   :   0.000V
Batt.Temp :    0.0c
Max Temp  :    0.0c
Resistance :   0.0mΩ
NEXT
```
Charger's input voltage
Voltage at output socket
Actual battery temperature
Maximum temperature which battery reached
Internal resistance of battery

```
CYCLE DATA 0 [2/3] X

 -Chg-       -Dischg-
 000m00s      000m00s
 0.000vp      0.000va
 000.0Ah      000.0Ah
NEXT ▼ ▲
```
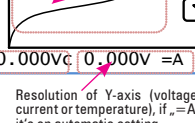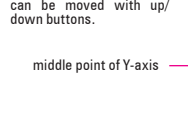charge time
peak voltage at end of charge
charge capacity

using up/down arrow keys allows you to scroll through the stored 11 cycle data's (number is indicated in headline, 0 - 10).
discharge time
average voltage during discharging
discharged capacity

```
GRAPH VIEW [3/3] X
0:00:00  0.00V  Gr=V



0.000vc 0.000V =A   0x
```
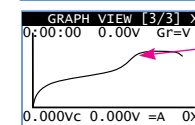
here you can view the charge or discharge curve of the selected data and can even select different curves, zoom into the curve, etc as explained below (this is only useful for experienced users!)

```
DATA VIEW [3/3] X
0:00:00   0.00V  Gr=V




0.000vc  0.000V =A   0x
```
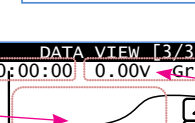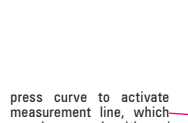
press curve to activate measurement line, which can be moved with up/down buttons.

middle point of Y-axis

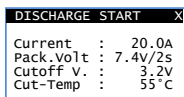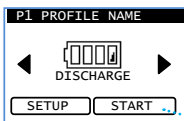you can display three different parameters as a curve and you hop through them by pressing circled area briefly (V = voltage, I = current, T = temperature
increase or decrease the marked (inversed/black background) value.

Zoom Level of X-Axis (Time, horizontal):
   AT   = Automatic Zoom
   1x to 43x = Manual Zoom

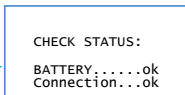Resolution of Y-axis (voltage, current or temperature), if „=A" it's on automatic setting

DISCHARGE

The adjustable high-performance discharge circuit (0.1 to 20.0A + 35A Pulse discharge) can be used for 1-14 cell NiMH/NiCd- and 1-4 cell Lixx-packs. The *Pulsar Touch* informs you about all the data relating to the battery pack, e.g. discharge time, capacity, average voltage and internal resistance.
By discharging your battery pack on the *Pulsar Touch* after use, you obtain vital information about remaining capacity for optimizing your motor or gear ratio for the next run. This also maintains your battery packs in good condition.
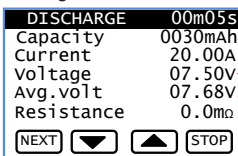
```
┌─────────────────────┐
│ P1 PROFILE NAME     │
│                     │
│   ◀  ▭▭▭▭  ▶        │
│      DISCHARGE      │
│ ┌─────┐  ┌───────┐  │
│ │SETUP│  │START  │  │
│ └─────┘  └───────┘  │
└─────────────────────┘
```

```
┌──────────────────────┐
│ DISCHARGE START    X │
│                      │
│ Current  :   20.0A   │
│ Pack.Volt : 7.4V/2s  │
│ Cutoff V. :   3.2V   │
│ Cut-Temp  :   55°C   │
└──────────────────────┘
```
the choosen settings will be indicated to avoid incorrect settings for the battery you want to discharge.
Cancel the operation by pressing X in upper right corner!

```
┌──────────────────────┐
│                      │
│ CHECK STATUS:        │
│                      │
│ BATTERY......ok      │
│ Connection...ok      │
│                      │
└──────────────────────┘
```
your charger checks if all connections and the battery itself are ok and if discharge process can be started.

Discharge screen:

```
┌──────────────────────────┐
│ DISCHARGE      00m05s    │
│ Capacity      0030mAh    │
│ Current        20.00A    │
│ Voltage        07.50V    │
│ Avg.volt       07.68v    │
│ Resistance      0.0mΩ    │
│ ┌────┐ ┌──┐ ┌──┐ ┌────┐  │
│ │NEXT│ │▼ │ │▲ │ │STOP│  │
│ └────┘ └──┘ └──┘ └────┘  │
└──────────────────────────┘
```

- Time elapsed since start of discharge
- Discharge capcacity
- Discharge current
- Actual pack voltage
- Average voltage of your pack during discharging
- Internal resistance of your pack

DISCHARGE - explanations:

Discharge Current: The discharge current can be set from 0.1 - 20.0A and 35A pulse. If not otherwise specified by the battery manufacturer, the max. discharge current can be set to 20.0A for racing cells (Sub-C size) in LiPo, LiFe and NiMH technology.
However, lower grade cells and receiver-/transmitter battery packs you should use a lower the discharge current and should follow your battery manufacturer's recommmendations.

Cut-Off Voltage: The cut-off voltage can be adjusted for all types and numbers of cells. We recommend a cut-off voltage of 0.9V/cell with NiMH/NiCd-batteries and 3.2V/cell with LiPo-batteries.
As an example: - 5.4V for a 6-cell NiMH/NiCd-pack
              - 6.4V for a 2S LiPo-pack.

Temperature: by using the optional temperature sensor, you can set a maximum temperature which the battery is not allowed to reach during discharging. If battery reaches that temperature, the discharge process will be stopped.

Connections: make sure you use high-quality wire and connectors for maximum accuracy, a poor connector or poor wire may create heat and affect the accuracy,

Discharge Wattage limitation: the discharge wattage is limited to 150W (Watts = Voltage x Current / e.g. for 7.4Vx20A = 148W)), this means packs with higher then 7.4V can not be discharged with 20A but the charger will automatically set the highest possible current by itself during discharging.

DISCHARGE - further screens:

During running discharge process there is additional information available, by pressing „NEXT" button you may access those. The available screens are (you jump to next by pressing „NEXT" again):
- Voltage of each cell in pack (if balancer is used!), for description see section „Balancer".
- Internal resistance of each cell in pack (if balancer is used!), for description see section „Balancer".
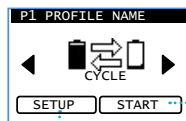- Data View screens, , for description see section „View Last Data".

CYCLE

This fully automatic cycling/matching function allows you to determine the actual performance of your packs. Battery packs change during their life span or different batteries may vary slightly. Use the *Pulsar Touch* to detect the actual quality of your pack,.this prevents nasty surprises.
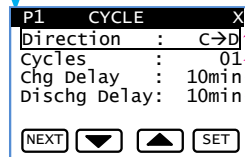The „Cycle" function can of course be used for all types of cells.

The "Cycle" mode uses the charge and discharge values of the currently selected programm, stored under "SETUP" and is of course fully adjustable in regards of sequence and pause/delay times between the different operations of the cycle function as well.
At the end of the process, the packs „performance" will be indicated to you by informing you about:
- Discharge Capacity in mAh
- Discharge Time
- Average Voltage during discharging
- Internal resistance

```
┌─────────────────────┐
│ P1 PROFILE NAME     │
│                     │
│   ◀  ▯⇄▯  ▶         │
│      CYCLE          │
│ ┌─────┐  ┌───────┐  │
│ │SETUP│  │START  │  │
│ └─────┘  └───────┘  │
└─────────────────────┘
```
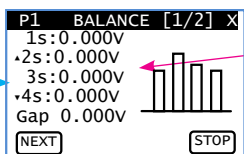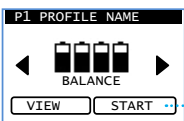
Automatic Cycle. as adjusted in Setup, the screens look identical as during regular charge- or discharge operation but additional text reminds you that you are in „Cycle" mode.
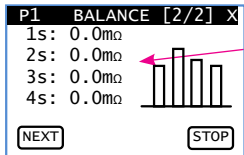
```
┌──────────────────────────┐
│ P1    CYCLE         X    │
│ Direction  :    C→D      │
│ Cycles     :     01      │
│ Chg Delay  :  10min      │
│ Dischg Delay:  10min     │
│ ┌────┐ ┌──┐ ┌──┐ ┌────┐  │
│ │NEXT│ │▼ │ │▲ │ │SET │  │
│ └────┘ └──┘ └──┘ └────┘  │
└──────────────────────────┘
```

Select required sequence:
C⇨D   = Charge, followed by discharging
D⇨C   = Discharge, followed by charging
..D:C⇨C = Initial Discharge, followed by charge/discharge

Number of Cycles (1 to 10)
Pause time before charging, after discharge (1-90min)
Pause time before discharging, after charge (1-90min)

BALANCE

You can simply balance your 2S to 4S LiPo- and LiFePo-batteries using the integrated balancer. The *Pulsar Touch* indicates voltage and internal resistance for each cell in your pack.

```
┌─────────────────────┐
│ P1 PROFILE NAME     │
│                     │
│   ◀  ▮▮▮▮  ▶        │
│      BALANCE        │
│ ┌─────┐  ┌───────┐  │
│ │VIEW │  │START  │  │
│ └─────┘  └───────┘  │
└─────────────────────┘
```

```
┌──────────────────────┐
│ P1   BALANCE [1/2] X │
│  1s:0.000v           │
│ ↟2s:0.000v      ▮    │
│  3s:0.000v    ▮ ▮    │
│ ↡4s:0.000v  ▮ ▮ ▮ ▮  │
│  Gap 0.000v ▮ ▮ ▮ ▮  │
│ ┌────┐        ┌────┐ │
│ │NEXT│        │STOP│ │
│ └────┘        └────┘ │
└──────────────────────┘
```
indication of voltage of each cell, gap between the worst two cells and graphical indication of difference.

```
┌──────────────────────┐
│ P1   BALANCE [2/2] X │
│  1s: 0.0mΩ           │
│  2s: 0.0mΩ      ▮    │
│  3s: 0.0mΩ    ▮ ▮ ▮  │
│  4s: 0.0mΩ  ▮ ▮ ▮ ▮  │
│ ┌────┐        ┌────┐ │
│ │NEXT│        │STOP│ │
│ └────┘        └────┘ │
└──────────────────────┘
```
indication of resistance of each cell and graphical indication of difference.

MOTOR - ESC - SERVO CHECK

The *Pulsar Touch* incorporates, as the first charger, a fantastic feature which allows you to check your brushless motors sensors and even measure motor rpm! In combination with the built-in receiver simulator port you can even check speed-controls for correct function. The receiver simulator port also allows the check of servo's.

Connection - Servo Test:
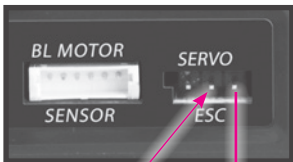
connect servo direct to connector port, be careful with correct polarity (black/minus must be on right side)

Black

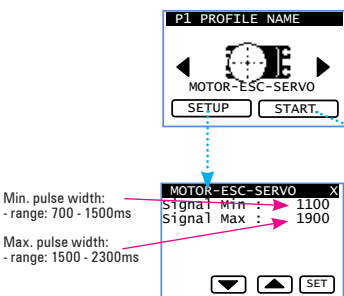### Connection - BL Motor Sensor check:
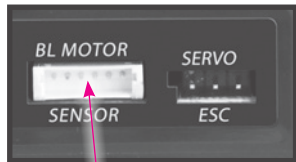
connect a brushless motor direct to the „BL Motor Sensor Port" using a standard brushless motor sensor wire.
The sensor check is simple as the sensors get measured while you rotate the shaft by hand!

Connection - BL Speedo & Motor Check (incl RPM):
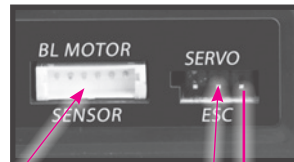
motor RPM measurement can only work by using an optional „hall sensor wire splitter". You can of course connect your motor and speed-control as in normal use to check your speed-controls and motors condition but you simply get no RPM indication.

Black

connect speed-control direct to connector port, be careful with correct polarity (black/minus must be on right side)

```
┌─────────────────────┐
│ P1 PROFILE NAME     │
│                     │
│   ◀  ⊕  ▶           │
│   MOTOR-ESC-SERVO   │
│ ┌─────┐  ┌───────┐  │
│ │SETUP│  │START  │  │
│ └─────┘  └───────┘  │
└─────────────────────┘
```

```
┌──────────────────────────┐
│ MOTOR-ESC-SERVO      X   │
│ Signal Min :   1100      │
│ Signal Max :   1900      │
│                          │
│      ┌──┐ ┌──┐ ┌────┐    │
│      │▼ │ │▲ │ │SET │    │
│      └──┘ └──┘ └────┘    │
└──────────────────────────┘
```

Min. pulse width:
- range: 700 - 1500ms

Max. pulse width:
- range: 1500 - 2300ms

```
┌──────────────────────────┐
│ MOTOR-ESC SERVO       X  │
│ 1100   1500     1900     │
│ �▬▬▬▬▬▬▬▬▬▬▬▬▬▬         │
│                          │
│ Motor Sensors   OK       │
│ Rpm              0       │
└──────────────────────────┘
```

selected pulse width values

„OK" indicates that the hall-sensors inside your connected brushless motor work fine.
After connecting your motor to the sensor port, you can rotate the shaft by hand.

Here the measured RPM, when testing together with a speed-control will be indicated. Very useful to check your motor and/or speed-control for correct operation!

the indicated black box is your „trigger" (throttle or steering), you can drag it left & right with your finger and therefore alter the PWM output of the receiver simulator port which.

MOTOR - ESC - SERVO CHECK - explanations:

Battery Connection: if you want to check full function of your motor and/or speed-control you need to connect your regular battery to the speed-control as the *Pulsar Touch* doesn't provide the high power to the speed-control but only the signals!

Speed Control Setup: you need to make your regular speed-control setup, so the speed-control learns the Pulsar Touch's neutral, full throttle and full brake points, if you want to check your speed-control.
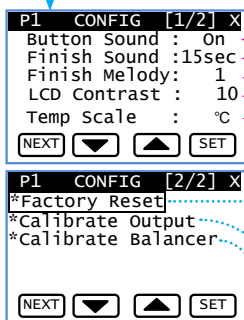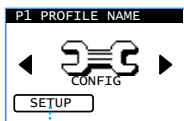
Speed Control On/Off Switch: some speed-controls need to have on/off switch in Off position, when connecting to Pulsar Touch (as it supplies it's own BEC!). So please make sure you test with switch in „OFF" position first and if all works as it should this is fine for your speed-control. If your speed-control is dark when in off position, you should try on „ON" positino.

BL Motor RPM Measurement: motor RPM measurement can only work by using an optional „hall sensor wire splitter".LRP will release such an optional small device. You can of course connect your motor and speed-control as in normal use to check your speed-controls and motors condition but you simply get no RPM indication.

Connections: make sure you use high-quality wire and connectors for maximum accuracy, a poor connector or poor wire may create heat and affect the accuracy,
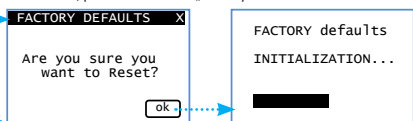
CONFIG

In „Config" the **Pulsar Touch** can be customised to your likes (adj. finish sound, °C or °F, etc), reset the charger to our factory default setting plus it also allows you to calibrate the voltage readings of output jacket and balancer for maximum precision.

All chargers come of course calibrated from the factory, but due to aging of components this calibration can slightly change over time.

Additionally the „Calibration" may be a useful tool at races when LiPo voltage limit is checked and you can therefore adjust your charger to the multimeter used in technical inspection in the best way.
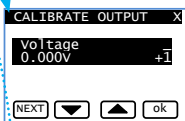
```
P1 PROFILE NAME


◄    ⚙⚙    ►
   CONFIG
[SETUP]
```

```
P1   CONFIG  [1/2] X
  Button Sound :  On      ──► „On" or „Off"
  Finish Sound :15sec     ──► „Off", „5sec", „15sec"
  Finish Melody:   1       ──► 1-5 (different melodies)
  LCD Contrast :   10      ──► depending on light condition, contrast may be altered.
  Temp Scale   :   °C      ──► „°C" or „°F"
[NEXT] [▽] [△] [SET]
```

```
P1   CONFIG  [2/2] X
 *Factory Reset
 *Calibrate Output
 *Calibrate Balancer


[NEXT] [▽] [△] [SET]
```

Reset's your profile settings and profile names to our factory defaults, please see section „Factory Defaults" for values.

```
FACTORY DEFAULTS    X

   Are you sure you
     want to Reset?

           [ok]
```

```
FACTORY defaults

 INITIALIZATION...

 ████████
```
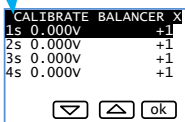
Calibration process:

1. connect a battery to Pulsar Touch.
2. enter „Calibration Mode".
3. connect a separate voltmeter to the connection you would like to calibrate.
4. compare reading in dispay with reading on your voltmeter.
5. adjust voltage on display using up/down arrow keys.
6. done when voltmeter + charger indicate the same value. The press „ok".
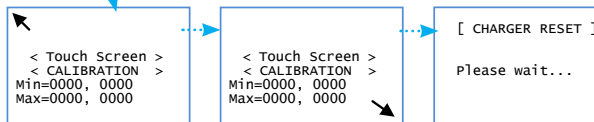
```
CALIBRATE OUTPUT   X
  ┌───────────────┐
  │Voltage        │
  │0.000V      +1 │
  └───────────────┘
[NEXT] [▽] [△] [ok]
```

Calibrate voltage at output jacket.

```
 CALIBRATE BALANCER X
1s 0.000V       +1
2s 0.000V       +1
3s 0.000V       +1
4s 0.000V       +1
       [▽] [△] [ok]
```

Calibrate voltage of each cells balancer.

TROUBLESHOOTING

The **Pulsar Touch** is protected against faults and operator errors by the Multi-Protection-System. Faults/Errors are displayed on the LCD screen and they interrupt the active process to protect the unit and the battery.

Error Messages:

```
⚠  [ERROR]
     INPUT
 Input Failure
 must be 11-15V
```
1. input voltage too low (<11.0V) or too high (>15.0V)?
2. powersupplies current to low for selected charge current?
3. contact/wiring problem?

```
⚠  [ERROR]
     OUTPUT
 No conection
```
1. no battery connected?
2. bad contact on output?
3. defective battery?

```
⚠  [ERROR]
     OUTPUT
 Battery connected
 with wrong polarity
```
1. wrong battery connection!
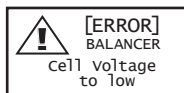
```
⚠  [ERROR]
     OUTPUT
 Short Circuit
```
1. contact/wiring problem?
2. defective battery?

```
⚠  [ERROR]
     OUTPUT
 Loss of
 connection
```
1. contact/wiring problem?
2. defective battery?

```
⚠  [ERROR]
     OUTPUT
 Voltage to high
```
1. wrong setting for battery you connected?

```
⚠  [ERROR]
     OUTPUT
 Voltage to low
```
1. wrong setting for battery you connected?
2. contact/wiring problem?
3. defective battery?

```
⚠  [ERROR]
     INTERNAL
 Temperature
 Overload
```
1.charger to hot, let charger cool down!

```
⚠  [ERROR]
     BALANCER
 Cells connected
 to different
```
1. discharge level of cells within pack to different?
2. bad contact at balancer?
3. defective battery?

```
⚠  [ERROR]
     BALANCER
 Cell voltage
 to high
```
1. wrong setting for battery you connected?

```
⚠  [ERROR]
     BALANCER
 Cell Voltage
 to low
```
1. wrong setting for battery you connected?
2. contact/wiring problem?
3. defective battery?

```
⚠  [ERROR]
     BATTERY
 Temperature
 to low
```
Caution: only if optional temperature sensor is connected!
1. battery to cold?
2. contact/wiring problem?

```
⚠  [ERROR]
     BATTERY
 Temperature
 to high
```
Caution: only if optional temperature sensor is connected!
1. battery to warm?
2. contact/wiring problem?
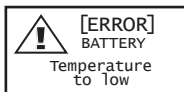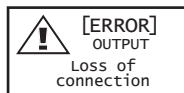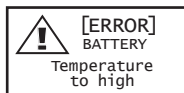
```
⚠  [ERROR]
     SENSOR
 Temperature Sen-
 sor disconnected
```
Caution: only if optional temperature sensor is connected!
1. contact/wiring problem?
2. sensor defective?
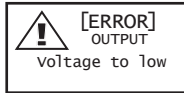
```
⚠  [ERROR]
     INTERNAL
 Calibration
 Data damaged
```
Internal error, re-start your charger and if needed reset to factory defaults and calibrate output/balancer again

15A Fuse: If the display is dark at power-up, you should check for correct wiring first and then should also check the input fuse

input fuse for protection, only replace with another 15A fuse (blue coloured housing) and no other types as these would not offer protection or correct function!

TOUCHSCREEN CALIBRATION

If you should ever recognise a big difference between the LCD display and your actual touch point, you may need to re-calibrate the positioning of the touchscreen!

How to re-calibrate the touchscreen:

1. with no power connected to the charger, keep the touchscreen pressed and then connect the power to the charger.
2. keep the screen pressed, the charger will beep to indicate the charger is connected to power first and if you keep the screen pressed it will make short beeps. At this time, detach your hand from the screen.
3. an arrow will now be displayed in the upper left corner, precisely press the end point of the arrow for 2sec.
4. an arrow will now be displayed in the lower right corner, precisely press the end point of the arrow for 2sec.
5. the new touchscreen calibration is stored and you are done.

```
  ↖
< Touch Screen >
< CALIBRATION   >
Min=0000, 0000
Max=0000, 0000
```

```
< Touch Screen >
< CALIBRATION   >
Min=0000, 0000
Max=0000, 0000
            ↘
```

```
[ CHARGER RESET ]

  Please wait...
```

USEFUL ACCESSORIES

LRP offers a comprehensive line of accessories, as well as particular spare- and optional items. Here you find an overview, for a full picture please visit our website at www.lrp.cc:

#43150	Competition 14A Powersupply
#65821	Charge Wire Harness, LiPo 2S Hardcase
#65822	Charge Wire Harness, LiPo 2S Saddle Hardcase
#65835	4.0mm Silver plated connectors (10pcs)
#65845	LiPo Safe (Safety Bag, 23x30cm),
#81907	3.3mm² Powerwire black (1.0m)
#81908	3.3mm² Powerwire blue (1.0m)

RECOMMENDED CHARGE CURRENTS

Important: always follow the battery manufacturers recommendations first, our own recommendation should only be seen as a guideline for the most common battery packs!

Battery Type	Chg Mode	Pack Volt	Current	DPeak	Trickle
LiPo 2S * 40-50C * 1/10 * ~5500mAh	LiPo	7.4V / 2S	10.0A	--	--
LiPo 1S * 40-50C * 1/12 * ~5200mAh	LiPo	3.7V / 1S	8.0A	--	--
LiPo 2S * Low C * TX Pack * 2500mAh	LiPo	7.4V / 2S	2.5A	--	--
LiPo 3S * Low C * TX Pack * ~2500mAh	LiPo	11.1V / 3S	2.5A	--	--
LiFe 2S * 30-50C * 1/10 * ~4500mAh	LiFe	6.6V / 2S	8.0A	--	--
LiPo 2S * Low C * RX-Pack * ~2000mAh	LiPo	7.4V / 2S	2.0A	--	--
LiFe 2S * Low C * RX-Pack * ~1500mAh	LiFe	6.6V / 2S	1.5A	--	--
LiPo 2S * 20-35C * 1/10 Sub-C size	LiPo	7.4V / 2S	5.0A	--	--
LiPo 3S * 20-35C * 1/10 Sub-C size	LiPo	11.1V / 2S	5.0A	--	--
NiMH 1/10 Sportpack (2000-3800mAh)	Linear	--	4.0A	20mV	Off
NiMH 1/10 Sportpack (>3800mAh)	Linear	--	5.0A	20mV	Off
NiMH AA/Mignon TX-Pack (~2500mAh)	Linear	--	1.0A	30mV	Off
NiMH RX Pack (~1500mAh)	Linear	--	1.5A	15mV	Off

For any other pack, make sure you select correct settings („Chg Mode" and „Pack Volt") and charge with 1C* charge rate.

Leave the settings „Cut Temp" (40°C for LiPo/LiFePo and 55°C for NiMH) and „Safety Timer" untouched.

* C=Nominal capacity of the battery. E.g. with a nominal capacity of 4000mAh (4.0Ah), the battery can be charged with a max. current of 4.0A at 1C.

REPAIR PROCEDURES / LIMITED WARRANTY

All products from LRP electronic GmbH (hereinafter called "LRP") are manufactured according to the highest quality standards. LRP guarantees this product to be free from defects in materials or workmanship for 90 days (non-european countris only) from the original date of purchase verified by sales receipt. This limited warranty doesn't cover defects, which are a result of misuse, improper maintenance, outside interference or mechanical damage.

„This applies among other things on:
* Cut off/changed original input- and/or output-wires
* Mechanical damage of the case, electronic components or PCB
* Humidity/Water inside the case
* Soldered on the PCB"
* Charger disassembly by customer
* Any modification of the charger done by the customer
* Over temperature failures due to blocking the fan or the cooling slots
* Reverse polarity at DC output

To eliminate all other possibilities or improper handling, first check all other components in your model and the trouble shooting guide, if available, before you send in this product for repair. If products are sent in for repair, which do operate perfectly, we have to charge a service fee according to our pricelist.

With sending in this product, the customer has to advise LRP if the product should be repaired in either case. If there is neither a warranty nor guarantee claim, the inspection of the product and the repairs, if necessary, in either case will be charged with a fee at the customers expense according to our price list. A proof of purchase including date of purchase needs to be included. Otherwise, no warranty can be granted. For quick repair- and return service, add your address and detailed description of the malfunction.

If LRP no longer manufactures a returned defective product and we are unable to service it, we shall provide you with a product that has at least the same value from one of the successor series.

The specifications like weight, size and others should be seen as guide values. Due to ongoing technical improvements, which are done in the interest of the product, LRP does not take any responsibility for the accuracy of these specs.

With LRP 25-Years Warranty products, the warranty terms on the LRP 25-Years Warranty card do also apply. The legal warranty claims, which arose originally when the product was purchased, shall remain unaffected.
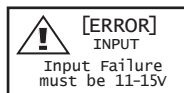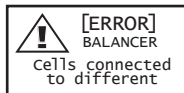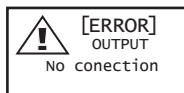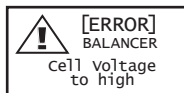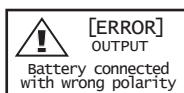
LRP-Distributor-Service:

* Package your product carefully and include sales receipt and detailed description of malfunction.
* Send parcel to your national LRP distributor.
* Distributor repairs or exchanges the product.
* Shipment back to you usually by COD (cash on delivery), but this is subject to your national LRP distributor's general policy.

The crossed-out wheeled bin means that within the European Union the product must be taken to seperate collection at the product end-of-life. Do not dispose of these products as unsorted municipal waste.