

## Battery Super Reviver User Guide

### Overview:

Segway high capacity Li-Ion batteries are complex devices. Complex devices may stop functioning or fail in a wide variety of ways. This DGB International, Battery Super Reviver equipment can revive many ( but not all ) batteries that have failed in either of 2 specific ways.

### Summary of what to do.

#### Failure Mode 1

Some batteries have stopped functioning because the user has omitted to charge them for too long a period.

There are 5 steps to revive batteries like this:

- ❖ Connect your battery to the BSR ①
- ❖ Turn ON the BSR ②
- ❖ Wait while the BSR automatically runs ③
- ❖ Once the success LED pattern shows (and relay clicks) take your revived battery OFF the BSR and immediately fully charge your battery ④
- ❖ Test the revived battery ⑦

This procedure takes from a few minutes up to about 2 hours. ⑤

#### Failure Mode 2

Some batteries have stopped functioning, for no readily apparent reason.

There are 5 steps to revive batteries like this:

- ❖ Connect your battery to the BSR ①
- ❖ Turn ON the BSR ②
- ❖ Wait while the BSR automatically runs ③
- ❖ Once the success LED pattern shows (and relay clicks) take your revived battery OFF the BSR and immediately fully charge your battery ④
- ❖ Test the revived battery ⑦

This procedure takes from a few minutes up to about 1 day. ⑥

See the numbered notes on the following pages for more complete descriptions and details.

### Summary of what NOT to do.

FOLLOW THESE INSTRUCTIONS.

No benefit can be derived by playing with or tampering with the DGB International, Battery Super Reviver.

Using it outside these guidelines may cause personal injury or damage to the Battery Super Reviver and any attached items.

#### **In particular, DO NOT:**

- × **Try and revive any other style of battery. ①**
- × **Connect or disconnect a battery mid-cycle. ②**
- × **Disconnect power mid-cycle. ③**
- × **Attempt to revive already functioning batteries. ④**
- × **Attempt to service this equipment. ⑤**
- × **Attempt to hack into this equipment. ⑥**
- × **Attempt to revive any battery that has sustained physical damage, is damp, or is waterlogged. ⑦**
- × **Plug any foreign items or connectors in to the data port. ⑧**
- × **Over-tighten battery retaining screws. ⑨**

See the numbered notes on the following pages for more complete descriptions and details.

## LED Patterns:

Description:	GREEN	RED	YELLOW	Notes:
Revival Type 1. In progress	Slow Flash	OFF	ON	
Revival Type 1. Completed, waiting for user	Slow Flash	OFF	Slow Flash	SUCCESSFUL REVIVAL Alternating flashes + clicking
Revival Type 2. In progress	ON	OFF	Slow Flash	
Revival Type 2. Recently completed	Slow Flash	OFF	Slow Flash	Alternating flashes
<b>Idle</b> Waiting for user to fit battery	<b>ON</b>	<b>OFF</b>	<b>OFF</b>	
Idle – User just fitted battery (Type 1)	Fast Flash	OFF	OFF	Revival will start soon.
Idle – 5 Seconds after user fitted battery ( Type 1 )	Very Fast Flash	OFF	OFF	Revival will start very soon.
Idle – User just fitted battery ( Type 2 )	OFF	OFF	Fast Flash	Revival will start soon.
Idle – 5 Seconds after user fitted battery ( Type 2 )	OFF	OFF	Very Fast Flash	Revival will start very soon.
Idle – Special	ON	OFF	Fast Flash	BSR may need service.
Idle - Special	ON	OFF	Very Fast Flash	BSR will need service soon.
<b>ERROR – Unsuitable Battery</b>	OFF	Fast Flash	Fast Flash	Sync'd Flashes
<b>ERROR – Unsuccessful Revival</b>	OFF	Fast Flash	Fast Flash	Alternating Flashes
<b>ERROR – Special</b>	OFF	ON	Fast Flash	Unit will NOT function. Needs service.
<b>ERROR – A lot of errors encountered</b>	Slow Flash	Slow Flash	Slow Flash	Sync'd Y+G flashes (not RED). Only displayed if idle.
<b>ERROR – Too many errors</b>	OFF	ON	Slow Flash	Unit will NOT function
<b>ERROR – Temporarily TOO HOT</b>	OFF	Slow Flash	Slow Flash	Alternating Flashes Automatically restarts once cool.
<b>ERROR – Special</b>	OFF	ON	ON	Unit will NOT function. Needs service.
<b>ERROR – Special</b>	Fast Flash	Fast Flash	Fast Flash	Unit will NOT function. Needs service.
<b>ERROR BATTERY WRONG POLARITY</b>	Fast Flash	Fast Flash	Fast Flash	Relay Clicking (Red = Alternating)
Factory Tests / Other Errors	Any other Pattern.			Unit will NOT function. Needs service

Table 1.0 LED Patterns and Descriptions.


	SLOW Flash ( over a ~ 1 second period )
	FAST Flash ( over a ~ 1 second period )
	Very FAST Flash ( over a ~ 1 second period )
	Brief Flash ( over a ~ 1 second period )

Table 2.0 LED pattern LEGEND.

## Detailed descriptions of what to do.

- 1** Connect your battery to the BSR
- \* Place the BSR nearby to your battery.
  - \* Connect the RED and BLACK leads of the BSR to the battery exactly as illustrated.
- If you should inadvertently connect your battery with reverse polarity ( wrong way around ) then the BSR will make a clicking noise and flash all 3 coloured LEDs. Remove and redo correctly !

- 2** Turn ON the BSR
- \* Connect the mains side of the power pack to a power outlet, and turn it ON.
  - \* Connect the Jack ( Plug ) of the power pack into the BSR power inlet, as pictured.

- 3** Wait while the BSR automatically works.
- During the automatic battery revival process, the LEDs will indicate progress.
- Yellow LED and Green LED flashes are OK.
- Any RED LED illumination indicates a problem.

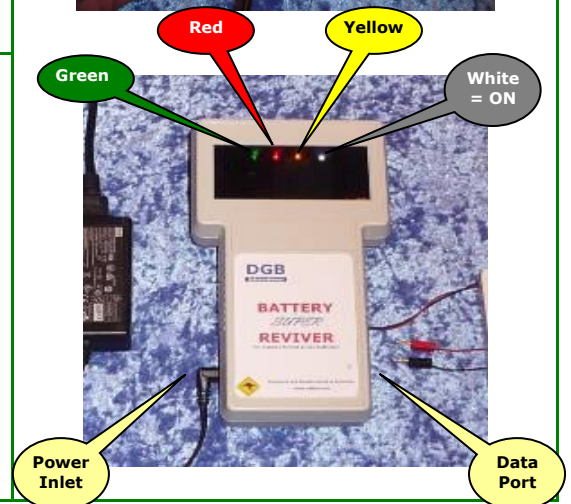
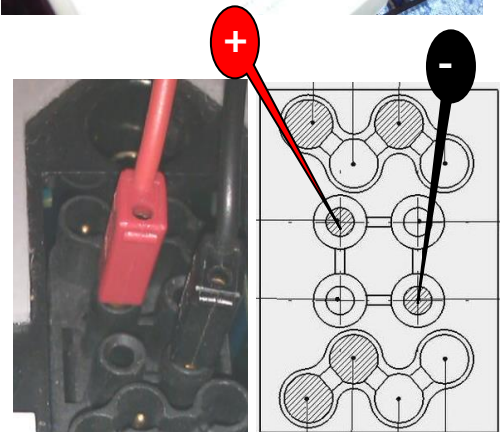
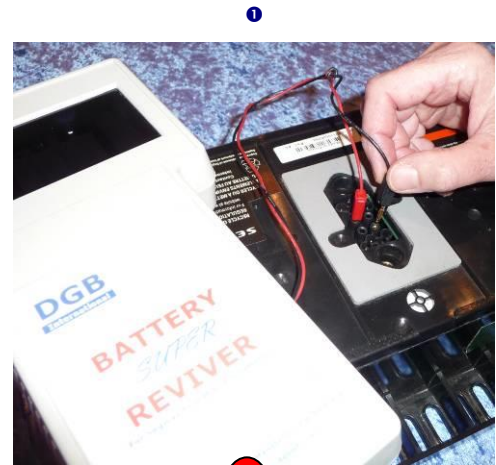
See table 1 for Flash Pattern details.

- 4** Once the success LED pattern shows (and relay clicks) take your revived battery OFF the BSR and immediately fully charge your battery.
- The way Segway designed their batteries, the batteries may lock-up and not take a charge. This revival process unlocks that lock, so that the battery will now take a charge.
- Once unlocked, charge your battery promptly, otherwise it may lock-up again.










- 5** This ( Failure Mode 1 ) procedure takes from a few minutes up to about **2 hours to** complete.
- The BSR will automatically perform the revival process.
- Upon successful completion, a clicking noise will be audible ( to attract your attention ) and the Green and Yellow LEDs will flash slowly (alternating pattern).
- Remove your revived battery and promptly charge it either on a Segway or with an off-board charger.
- Charging may take up to 10 hours.

- 6** This ( Failure Mode 2 ) procedure takes from a few minutes up to about **1 day** to complete
- The BSR will automatically perform the revival process.
- Upon successful completion, a clicking noise will be audible ( to attract your attention ) and the Green and Yellow LEDs will flash slowly (alternating pattern).
- Remove your revived battery and promptly charge it either on a Segway or with an off-board charger.
- Charging may take up to 10 hours.

- 7** Test your battery.
- Once revived ( unlocked ) and then fully charged, your battery can be tested, to ascertain beyond any reasonable doubt that it is safe to use.
- \* Fit the revived and charged battery to your Segway.
  - \* Turn the Segway ON, and leave it in a safe location, idling, leaning securely against a wall.
  - \* Your Segway should run for a long time in idle mode.
    - o Less than 6 hours is unsatisfactory.
    - o 6-12 Hours is acceptable, but imperfect.
    - o 12+ hours indicates a really useful battery
  - \* Charge again.
- Once fully charged, your battery is now ready to use.
- Use it carefully the first few times, just to be cautious.



## Detailed descriptions of what NOT to do.

<p>① DO NOT try and revive any other style of battery.</p> 	<p>All the connectors and electrical ratings of this BSR product are tailored and optimised for use with Segway format Li-Ion batteries. All other batteries will have different mechanical and electrical characteristics. Thus results will be unpredictable at best, or dangerous, at worst.</p>
<p>② DO NOT connect or disconnect a battery mid-cycle</p> 	<p>The BSR equipment carefully monitors and controls the battery revival process. If a user disconnects ( or re-connects ) their battery mid-cycle, then their battery may appear ( falsely ) un-revivable.</p>
<p>③ DO NOT disconnect power mid-cycle</p> 	<p>The BSR equipment carefully monitors and controls the battery revival process. If a user disconnects ( or re-connects ) power mid-cycle, then their battery may appear ( falsely ) un-revivable. If power to the premises is interrupted, then turn the BSR OFF, wait 2 minutes and re-start in the normal manner.</p>
<p>④ DO NOT attempt to revive already functioning batteries</p> 	<p>This BSR product can revive many batteries that have <u>ceased functioning</u> properly. <b>If your batteries are functioning, but are nearly worn out (from normal use) and yielding poor range, this BSR cannot assist.</b></p>
<p>⑤ DO NOT attempt to service this equipment</p> 	<p>This BSR product contains delicate electrical parts. It also uses high voltages and currents, which are dangerous if improperly used or contacted. Do not open or try to service this equipment.</p>
<p>⑥ DO NOT attempt to hack into this equipment</p> 	<p>This BSR product contains delicate electrical parts and proprietary software. This work is copyrighted. Do not attempt to tamper with or copy this product. Such efforts may cause a shut-down and this will be readily identified. No warranty coverage is applicable in these circumstances.</p>
<p>⑦ DO NOT attempt to revive any battery that has sustained physical damage, is damp, or is waterlogged.</p> 	<p>A clearly broken or damaged battery should be disposed of appropriately. A damp or waterlogged battery may be damaged internally and should be disposed of appropriately. It might be dangerous to work with, try to revive or to use such a battery.</p>
<p>⑧ DO NOT plug any foreign items or connectors in to the data port.</p> 	<p>The data port is specially designed and configured for in-factory support &amp; diagnostics. Tampering could re-configure or damage the BSR. There are no user functions available via this port.</p>
<p>⑨ DO NOT Over-tighten battery retaining screws.</p> 	<p>DGB International has provided a T-handled wrench to make your task of fitting or removing batteries easier than with the Segway factory supplied wrench. Take care and gently finger-tighten screws only. Do not use force to tighten firmly.</p>