

# APC Back-UPS ES 750

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## Overview

Model: Back-UPS ES 750



## Battery Details

| Specification | Detail |
|---------------|--------|
|---------------|--------|

|           |   |
|-----------|---|
| Image     |  |
| Part      | AJC-D7S   |
| Voltage   | 12v   |
| Capacity  | 7Ah   |
| Type      | Sealed Lead Acid (AGM)  |
| Terminals | F2  |
| Length    | 5.94 in / 150.9 mm  |
| Width     | 2.56 in / 65 mm   |
| Height    | 3.7 in / 94 mm  |
| Weight    | 4.5 lbs   |

## Lithium Iron Phosphate Battery Replacement

I ordered this LiFePO4 battery off amazon which is the exact same size as the original.

Cost: \$63 CA plus Taxes.

**NASTIMA 12V 8Ah Rechargeable Lithium Iron Phosphate Battery,Built-in BMS, 4000+ Cycles LiFePO4 Battery Pack, 10A Max Output.**

[https://www.amazon.ca/dp/B0B5WBHDDN?smid=A32QMQUDJWY3FO&ref\\_=chk\\_typ\\_imgToDp&th=1](https://www.amazon.ca/dp/B0B5WBHDDN?smid=A32QMQUDJWY3FO&ref_=chk_typ_imgToDp&th=1)



Tested this battery's capacity pulling 2A. Capacity came up as **8.8Ah**.

**Note: Battery voltage stays at 0v once discharged until voltage is applied. Does not bounce back on it's own.**

I performed a capacity test on the old lead acid battery. The battery had a 3 Ah capacity when drained to 10.5v at 2A.

## Shutdown Problem

I ended up having some quick shutdowns after replacing the battery.

On this UPS I have the following items connected:

| Item                                | Estimated Power Consumption |
|-------------------------------------|-----------------------------|
| QNAP TS251 Network Attached Storage | ~20W (spec: 18.09 W)        |
| HP Compaq Elite 8300 SFF            | ~100W                       |
| Dell PowerEdge T150                 | ~100W                       |
| Raspberry Pi 1                      | ~5W                         |
| Asus RT-AC56U Router                | ~5W                         |
| Smart/RG DSL Modem                  | ~5W                         |

|                         |                          |
|-------------------------|--------------------------|
| Asus Hub                | ~5W                      |
| <b>Total Power</b>      | <b>240W (~ 2A @120V)</b> |
| <b>Battery Amperage</b> | <b>20A@12V</b>           |

Ok, so battery has a 10A max output, which is 1A at 120V.

Lets figure out what are real power usage is....

| Item                                | Actual Power | Amperage              |
|-------------------------------------|--------------|-----------------------|
| QNAP TS251 Network Attached Storage | 20W          | 0.16A                 |
| HP Compaq Elite 8300 SFF            | 76W          | 0.63A                 |
| Dell PowerEdge T150                 | -            | -                     |
| Raspberry Pi 1                      | 24W          | 0.2A                  |
| Asus RT-AC56U Router                |              |                       |
| Smart/RG DSL Modem                  |              |                       |
| Asus Hub                            |              |                       |
| <b>Total</b>                        | <b>120W</b>  | <b>1.0A (10A@12V)</b> |

It looks like this will work if we don't have the Dell PowerEdge on the UPS.

So, 10A is beyond the 1C, so ideally **we should aim for a max of 8A discharge.**

Based on this information, this battery is insufficient for our load.

Testing the battery with a 10A load, the battery quickly dropped to 11.6V which the UPS would consider to be 0% left!

## Solution

Two items were identified:

- I was trying to pull more amperage than the replacement LiFePO4 battery would support. (Max 10A@12V or 1A@120V). Reduced number of protected devices on UPS.
- Battery/UPS could be reset by using the Powerchute software. Marked the battery as replaced and ran a quick battery test.

## Configuring the UPS

List Commands

```
> upscmd -l ups@localhost

Instant commands supported on UPS [ups]:

beeper.disable - Disable the UPS beeper
beeper.enable - Enable the UPS beeper
beeper.mute - Temporarily mute the UPS beeper
beeper.off - Obsolete (use beeper.disable or beeper.mute)
beeper.on - Obsolete (use beeper.enable)
load.off - Turn off the load immediately
load.off.delay - Turn off the load with a delay (seconds)
shutdown.reboot - Shut down the load briefly while rebooting the UPS
shutdown.stop - Stop a shutdown in progress
test.battery.start.deep - Start a deep battery test
test.battery.start.quick - Start a quick battery test
test.battery.stop - Stop the battery test
test.panel.start - Start testing the UPS panel
test.panel.stop - Stop a UPS panel test
```

#### Issue Command

```
>upscmd ups@localhost beeper.disable
Username (root): admin
Password: 123456
OK
```

#### Test

```
>upscmd ups@localhost test.battery.start.quick

>upscmd ups@localhost ups.test.result
```

## Runtime Calibration

*Please make sure that you have charged the batteries for 24 hours before doing this.*

#### *Runtime Calibration:*

- Stop the APC software running on your computer and disconnect the USB cable.
- **Remove all critical loads on your UPS and make sure that you have at least 30% load on it.**
- Unplug the UPS from the power source and let it run On Battery until it discharges completely.
- Once the UPS is completely discharged, reconnect it back to the power source to recharge.
- Reconnect the load and cables back to the UPS and check the APC software for the runtime.

*I just got my problem solved and very excited. Here are the steps i have taken:*

1. Uninstalled APC PowerChute Personal Edition Version 2.2 downloaded from the site.
2. Managed to get hold of my previous APC PowerChute Personal Edition Version 1.3.1 for Windows 98/Me/2000/2003/XP that shipped with the UPS.
3. After the installation, I found the following option under Monitor System>Run Self Test:  
**To Help PowerChute to keep track of battery life, please click [HERE](#) when you replace battery** on clicking it the following popup appeared **Are you sure that you want to update your battery's replacement date now.** On clicking, it instantly reported the estimated battery time as 45 Min!!!!.

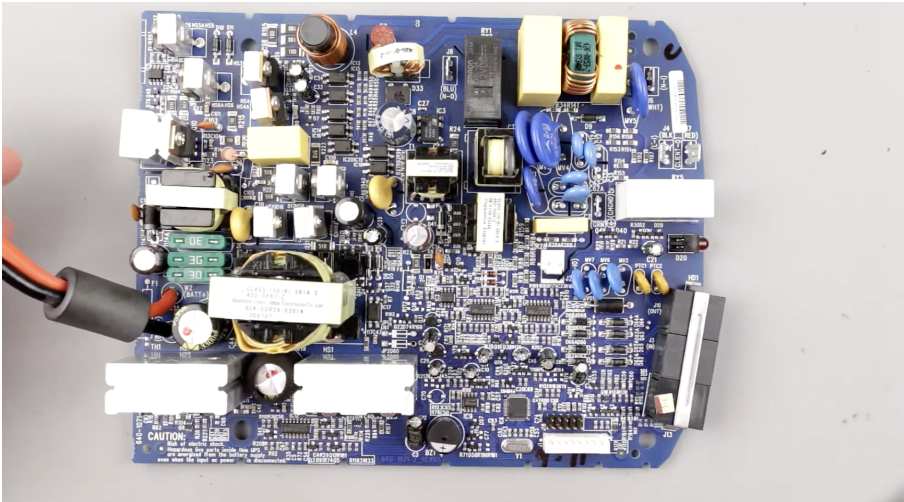
# Reseting

I couldn't find anyway to do this. Marking the battery as replaces and running a quick test seems to be the only way.

# Teardown

<https://www.youtube.com/watch?v=6UerOTuV6R4>

Circuit Board



# References

| Reference   | URL   |
|---|---|
| Manual  | <a href="#">SCON-89HM8Q_R4_EN.pdf</a>   |
| Specifications  | <a href="#">DFAH-8GLQ3H_R0_EN.pdf</a>   |
| DIY Replacement Battery 12V 18650 Li-ion For APC Back-UPS 650 | <a href="https://www.yousun.org/archives/101">https://www.yousun.org/archives/101</a>                 |
| Replace battery   | <a href="https://www.youtube.com/watch?v=_dydIRHFjrc">https://www.youtube.com/watch?v=_dydIRHFjrc</a> |
| Details   | <a href="https://www.yousun.org/archives/660">https://www.yousun.org/archives/660</a>                 |
| Teardown Video  | <a href="https://www.youtube.com/watch?v=6UerOTuV6R4">https://www.youtube.com/watch?v=6UerOTuV6R4</a> |