

MBARI 55-cell Inspired Energy AUV Battery Manual

Rev 1.1

This document describes how to charge the 55-cell Inspired Energy-based battery packs used in the MBARI AUVs. This manual is written assuming the use of the networked TDK-Lambda rackmount power supplies, and the use of telnet/SCPI commands to control the supplies from a remote terminal session.

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Revision History

Revision	Date	Comment
1.0	09-25-19	Initial import from InspBattOPS.txt document and formatting
1.1	10-09-19	Formatting, updating of text for clarity

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Setup

1. Connect Main Vehicle Computer (MVC) tether
2. Connect charge tether to battery ball
3. Switch on MVC power supply unit (“PSU”) and battery charge PSU (**switches on, outputs disabled**)
4. Keeping PSU output disabled, adjust voltage on MVC PSU to 35.5 V and 16 A (press “PREV” button and use knobs and “FINE” button if needed, to adjust voltage and current limits).
5. Open two terminal windows (Cygwin on Windows)
6. Determine IP address of battery charge power supply (press and hold “FOLD” button, use “Voltage” knob to switch between IP-1 through IP-4 to get all 4 octets).

Charging

In the below example, the following IP addresses are assumed. **Note:** these will be different depending on your power supply and battery.

Battery Ball	134.89.32.130
Charge PSU	134.89.33.78

1. Enable output on MVC power supply.
2. In one terminal session, telnet into port 8003 of the battery charge power supply. This telnet session is hereafter referred to as the “**PSU Session**”

```
$ telnet 134.89.32.78 8003
Trying 134.89.32.78...
Connected to 134.89.32.78.
Escape character is '^]'.
```

3. In other terminal session, telnet into **port 10003** of battery to be charged (IP address should be labeled on the ball). This telnet session is hereafter referred to as the “**Battery Session**”

```
$ telnet 134.89.32.138 10003
Trying 134.89.32.138...
Connected to 134.89.32.138.
Escape character is '^]'.
```

```
Connected to battery
battery>
```

4. In the **PSU Session**, check output voltage and current limits.

```
outp:volts?
```

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```
33.65
outp:curr?
45.0
```

5. Adjust battery charge current to 1.5 A, and voltage to 33.65 V (if needed). Confirm settings.

```
outp:curr 1.5
outp:volts 33.65
outp:curr?
1.5
outp:volts?
33.65
```

6. Turn on output of battery charge PSU

```
outp:state on
```

7. In the **Battery Session**, disable the battery charge watchdog timer

```
battery> WDOFF
Charge watchdog disabled.
```

8. Enable the battery charge switch

```
battery> @99AC
Setting batteries to charge ... done
```

9. Confirm battery packs are charging by looking for positive current measurement. See end of this document for details on battery status string.

```
battery> @99RQ
querying battery status ...
#00:1169,0025,31557,2884,002,00C0
...
```

10. If current flow into packs is approximately balanced (charge current within ~25% of one another), and no single pack is receiving greater than 1500 mA, you can double the current in the **PSU Session**:

```
outp:curr 3.0
```

11. Check the battery status again, checking for balanced current and peak current(s)

```
battery> @99RQ
querying battery status ...
```

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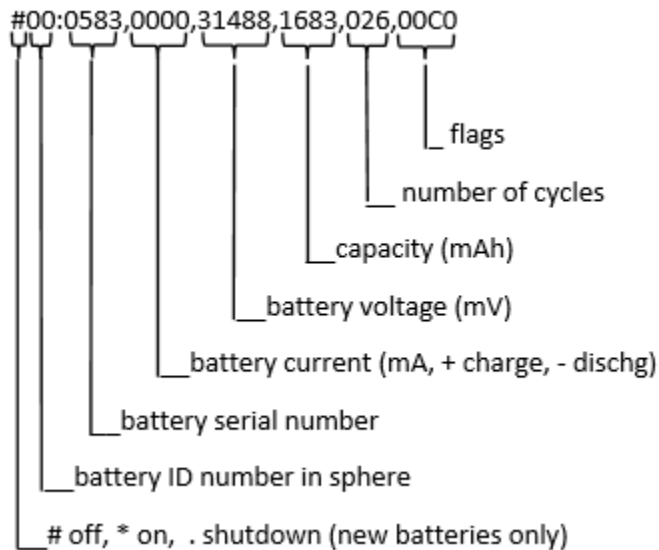
#00:1169,0049,31567,2884,002,00C0

...

12. Again, if current is approximately balanced, and no single pack is consuming excessive current, double the input current again to 6.0 A.
13. Repeat this process until a charge current of 45.0 A is achieved.

Reference

Battery Status string



Battery Commands

@99AF ... Turn off packs, disable all switches
@99AC ... Enable charge switch
@99AD ... Enable discharge switch A (main)
@99BD ... Enable discharge switch B (AUX)
@99BF ... Disable discharge switch B (AUX)
@99CD ... Enable discharge switch C (AUX2)
@99CF ... Disable discharge switch C (AUX2)
@??PF ... Turn off pack ?? (00-54)
@??PN ... Turn on pack ?? (00-54)
@99RQ ... Request status
@??CV ... Get cell voltages for pack ?? (3.4Ah packs only)
@99SH ... Put packs into shutdown mode
WDOFF ... Disable charge watchdog
WDACT ... Enable charge watchdog
WDRST ... Reset watchdog

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