Rechargeable Batteries

- List_of_battery_sizes

Important voltages

Important voltages for various battery chemistries (mostly based on wikipedia articles).

Nickel, Lithium

	Ni-MH	Ni-Cd	Li-ion	Li-Po	LiFePO4
nominal (1 cell)	1.2	1.2	3.7 (NMC 3.6)	3.7	3.2
not recharge below!* *	n/a	n/a	2.4-2.9		n/a
discharged	1.0-1.1	0.9-1.0	2.7-3.0	2.7-3.0	2.8
charged OCV	1.41	1.25-1.35			3.3
slow charging above	1.29	1.5		4.2	
stop charging	n/a	1.6	4.2	4.23	3.6
damage/explosion!!!*	1.78	1.71	4.3	4.235	3.8
float?? @20°C * * *			4.1 (4.0-4.2)	3.9-4.05	3.3

- * Some kinds of commonly used batteries are VERY dangerous when shorted, overcharged or punctured. Especially some kinds of lithium batteries.
- * * Lithium battery under this voltage should not be recharged. If you still decide to recharge it, you have to do it carefully at fireproof place and under constant supervision. Once it's back above this voltage, you can proceed as usual.
- * * * Some people do not reccomend float charging bateries other than lead-acid http://www.electronicsweekly.com/news/design/power/float-charging-lithium-ion-cells-2006-02/

Lead-acid

- http://www.bethandevans.com/pdf/Batterydata.pdf
- http://www.ti.com/lit/an/slua055/slua055.pdf (nabíjecí algoritmus)
- http://img.hw.cz/i/Inteligentni-nabijecka-Pb-akumulatoru/nabijec-Pb-aku.pdf
- https://jdparts.deere.com/partsmkt/unsecured/document/english/pmac/46214_WinterBatteryMaintenanceTips.htm

	Sealed Flooded (Freezing point)	Gel	AGM
Nominal voltage (6 cells)	12.00	12.00	12.00
Stop current charging	14.40	14.40	14.40
Float voltage 25 °C	13.40	13.05	13.60
OCV @ SOC 100%	12.70+ (-60°C)	12.85+	12.80+
OCV @ SOC 75%	12.40 (-50°C)	12.65	12.60
OCV @ SOC 50%	12.20 (-36°C)	12.35	12.30
OCV @ SOC 25%	12.00 (-24°C)	2.00	12.00

	Sealed Flooded (Freezing point)	Gel	AGM
OCV @ SOC 0%	11.80 (-10°C)	11.80	11.80
Stop discharge	10.50	10.50	10.50

- Maximum charge current 0.3C = (0.3 * 7Ah = 2.1A)
- Optimal low voltage cutoff depends on the load!
- Compensation of float voltage approximately −3.9 mV (or -5mV) per cell per °C of temperature rise is necessary.
- Typical 12V 7Ah AGM datasheet: (long)
- GWL CMP12 controller specs
  - LVD - Low voltage disconnection 10.5V
  - LVR - Low voltage reconnection 12.6V
  - HVD - High Voltage Disconnection 13.7V

Non-Rechargeable Batteries

- AA/AAA
  - Zinc-carbon (1-3years shelf life, zinc body is consumed by reaction → prone to leak, bad performance in low temperatures)
  - Zinc-chloride (somewhere between zinc-carbon and alkaline)
  - Alkaline (7 years shelf life, less likely to leak, much higher capacity)
  - Lithium (Very long shelf life, expensive)

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