

# Electric Vehicle Traction and Accessory Battery Chargers

North Bay Chapter of the Electric Auto Association

[www.nbeaa.org](http://www.nbeaa.org)

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Posted at: <http://www.nbeaa.org/presentations/chargers.pdf>

# NBEAA 2009 Technical Series

1. EV Drive Systems
2. EV Batteries
3. EV Charging Systems
4. EV Donor Vehicles

TODAY >>

# Agenda

Charger Block Diagrams

On-Board vs. Off-Board Chargers

Voltage Regulation and Current Limiting

Outlet Power

Power Factor Correction

Isolation

Temperature Compensation

Cooling

Durability

Over-Voltage, -Current and -Temperature Protection

Electro-Magnetic Interference

Traction Battery Charger Comparison

Accessory Battery Charger Comparison

Testimonials, Show-and- Tells, and Test Drives

# Charger Block Diagrams

TBA

# On-Board vs. Off-Board Chargers



Lestronic Off-Board Traction and Accessory Battery Chargers



Zivan On-Board Traction Battery Charger



Iota On-Board Accessory Battery Charger  
– AKA DC-DC, AC-DC Converter

# Voltage Regulation and Current Limiting

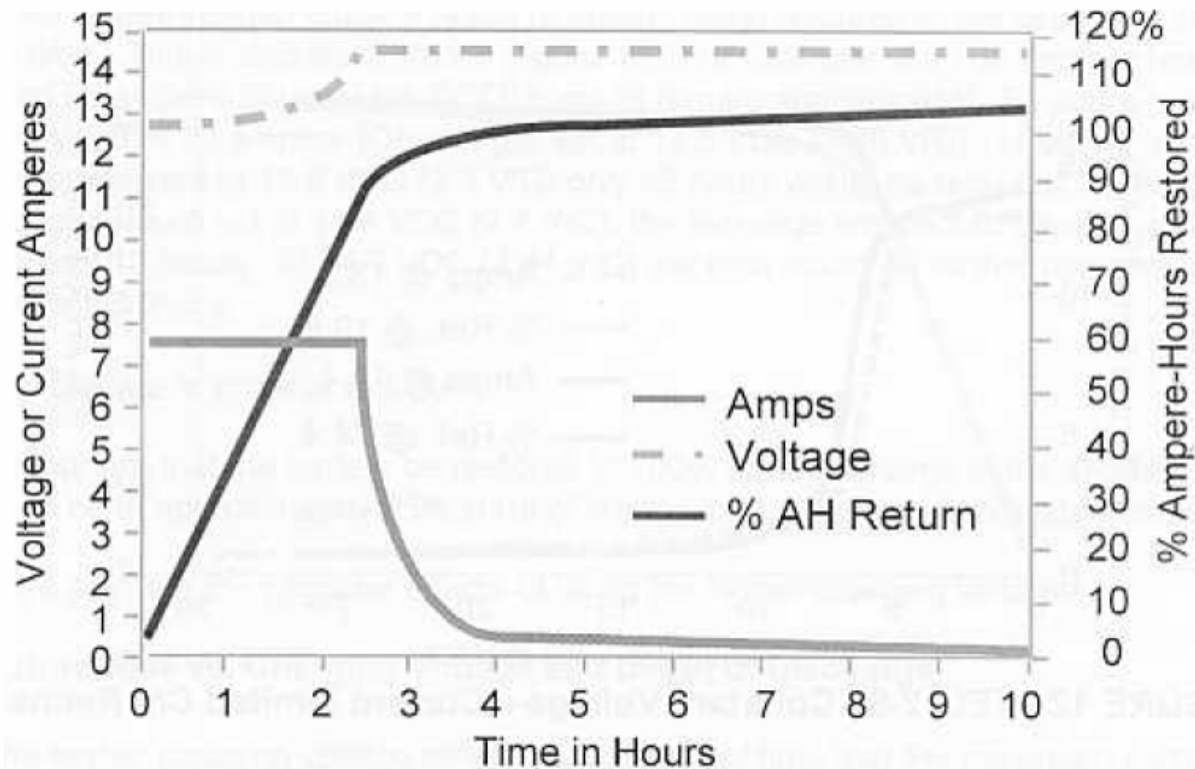


FIGURE 11: Recharge at Constant 14.7 VDC with C/4 Current Limit

Source: Charging Dynasty Valve Regulated Lead Acid Batteries,  
<http://www.cdtechno.com/custserv/pdf/2128.pdf>.

# Outlet Power

<u>Voltage</u>	<u>Amperage</u>	<u>Usable Power, Watts (80%)</u>	<u>Estimated Power Out of Charger (72%)</u>	<u>Equivalent Power Extractable from Batteries (64%)</u>
120	15	1,440	1,296	1,152
	20	1,920	1,728	1,536
	30	2,880	2,592	2,304
	50	4,800	4,320	3,840
240	15	2,880	2,592	2,304
	20	3,840	3,496	3,072
	30	5,760	5,184	4,608
	40	7,680	6,912	6,144
	50	9,600	8,640	7,680
480	250	96,000	86,400	76,800

# Power Factor Correction

See White Board



# Temperature Compensation

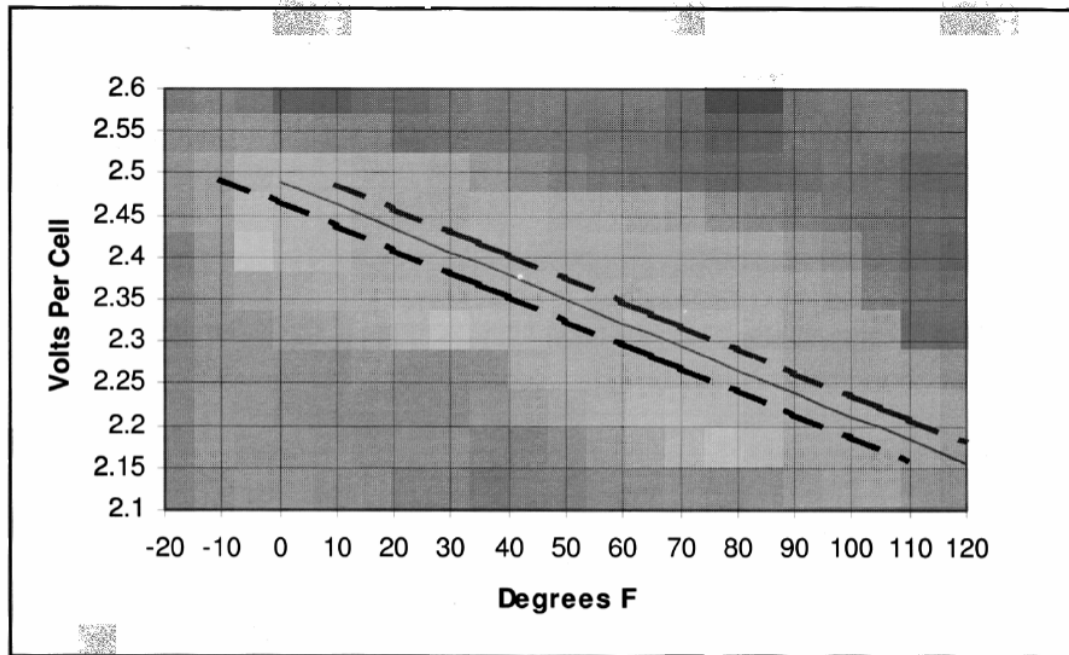


Figure 7 – Recommended Float Voltage vs. Temperature

Source: Thermal Runaway in VRLA Batteries – It's Cause and Prevention,

<http://www.cdtechno.com/custserv/pdf/7944.pdf>.

Isolation

See White Board

Cooling

See White Board

Durability

See White Board

Over-Voltage, -Current and -Temperature Protection

See White Board

# Electro-Magnetic Interference

See White Board

# Traction Battery Charger Comparison

<http://www.nbeaa.org/presentations/chargers.htm>

# Accessory Battery Charger Comparison

[http://www.nbeaa.org/presentations/dcdc\\_converters.htm](http://www.nbeaa.org/presentations/dcdc_converters.htm)



Testimonials, Show-and- Tells, and Test Drives