

power will allow an OPTIMA battery to replace larger capacity conventional batteries. Additionally, you should consider what kind of cycling the battery will undergo. Any application where the battery is repeatedly deep discharged and recharged will require a Deep Cycle battery. This includes applications such as car audio systems, trolling motors, recreational vehicles, electric lift gates, emergency vehicles, and photovoltaic systems. Since OPTIMA Deep Cycle batteries also have high power, they can also be used in starting applications for vehicles with heavy accessory loads.

A deeper average discharge on a battery will result in fewer cycles over the battery's life.

**Suggestions for Various Applications:**

- **Yellow Top Deep Cycle Batteries:**  
Racing vehicles without a charging system (alternator or regulator)  
Diesel powered vehicles  
Car audio applications  
Electric vehicles  
Recreational vehicles with accessories (lighting, refrigerators, etc.)  
Heavy equipment with hydraulics or other similar accessories
- **Red Top Starting Batteries:**  
Automotive starting  
Recreational vehicles for under hood starting applications  
Heavy equipment where starting is primary application
- **Blue Top Marine Batteries (Deep Cycle, Starting Batteries):**  
Trolling motors and various marine applications with heavy accessories should use a Deep Cycle Blue Top  
Marine equipment where starting is primary application should use Starting Blue Top battery

**Connecting Multiple Batteries in Parallel:**

If your battery application requires more starting power or reserve capacity than one OPTIMA battery can provide, then you can install multiple batteries in parallel by connecting the "like" terminals together (POSITIVE TO POSITIVE / NEGATIVE TO NEGATIVE). Each time you add a battery in parallel you increase the CCA and Reserve Capacity while voltage remains the same. See the chart following for model 34 example:

Number of Batteries In Parallel	CCA	Minutes of Reserve Capacity
1	750	104 minutes
2	1500	208 minutes
3	2250	312 minutes

**Suggestions for connecting batteries in parallel:**

- Use batteries of identical make, model, and age.
- Make sure cable gauge is sufficient to handle the higher current flow.
- Prevent cables from shorting.
- Use only high quality connectors and clean all contacts prior to installation.
- Periodically check all connections to ensure snugness.
- Contact your automotive service center if you are unsure of how to handle these procedures.

**Battery Installation Tips:**

- Check mounting surface for objects or protrusions that could cause damage or wear into the case or cover.
- Ensure that the battery is properly secured in the vehicle or equipment to prevent movement or vibration wear. Do not overtighten the hold down bracket, this can damage the plastic case and cover.
- Use top terminals for accessory and vehicle starting applications. Only use battery side terminals for automobile starting applications.

- Replace any cables and connectors that have corrosion, rust, or other damage.
- Do not lift or handle batteries by the terminals.
- Do not overtighten terminal bolts; the following values are recommended:

Top bar or top frame hold down:	30-50 inch-lb.
Bottom recess hold down:	60-80 inch-lb.
Bottom ledge hold down:	70-90 inch-lb.
SAE automotive terminal:	50-70 inch-lb.
Side terminal (3/8" nut):	70-90 inch-lb.
Threaded stud terminal:	120-180 inch-lb.

**Charging:**

For maximum battery life, the following charging methods are recommended: *(Always use a voltage regulated charger, with voltage limits set as described below.)*

**Models:** 34-1050, 34/78-1050, 34R-1050, 34M-1050, 6V-1050, D34-950, D34/78-950, D34M-950, D6V-950, 75/35-925, D31-1400\*

**Recommended charging information:**

- Alternator:  
13.8 to 15.0 volts.
- Battery charger:  
13.8 to 15.0 volts, 10 amps.
- Float charge:  
13.2 to 13.8 volts, 1 amp maximum current.
- Rapid Recharge: (Constant Voltage charger)  
Maximum voltage 15.0 volts.  
No current limit as long as battery temperature remains below 125°F.  
Charge until current drops below 1 amp.
- Recharge time: *(example assuming 100% discharge or 10.5 volts)*

Current	Approx. time to 90% charge
100 amps	35 minutes
50 amps	70 minutes
25 amps	140 minutes
10 amps	350 minutes

**Deep cycle models only**

**Cyclic application or series string applications:**

- Constant voltage with Constant Current finish.  
14.7 volts, temperature <125°F, no current limits.  
When current falls below 1 amp, finish with 2 amp (use 3 amps for GR 31) constant current for 1 hour (no voltage limit).

Recharge time will vary according to temperature and charger characteristics. When using Constant Voltage chargers, amperage will taper down as the battery becomes recharged. When amperage drops below 1 amp, the battery will be close to a full state of charge.

To charge an OPTIMA six volt battery, divide the voltage setting in half.

All limits must be strictly adhered to. If battery becomes hot to touch or makes a hissing sound, disconnect immediately.

**Charging voltage compensation:**

These charging recommendations assume an average temperature of 77°F. When charging at temperatures significantly higher than this, we suggest that you reduce the charging voltage approximately 0.05 volts for each 5°F increase in temperature.

Always use a voltage regulated battery charger with limits set

\*PLEASE CALL MANUFACTURER WITH CHARGING QUESTIONS.