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**The Rating Game**

Most manufacturers rate output at absolute maximums, which is not usable under normal riding conditions. Cycle Electric Inc. rates systems output in “usable DC amps”.  We list this at 1000 rpm (idle) and 2500 rpm (cruising).  We encourage you to measure the output of different systems to compare.  Cycle Electric Inc. Systems may look like they put out less on paper but the amp meter will tell you a different story.  
(See the importance of low speed charge and usable DC amps).

**The Importance of Low Speed Charging Rate**

Charging systems do not produce full power at low RPM, some drop off more than others. If your amperage usage exceeds charging system out put at an idle the battery will be discharging at an idle. Ideally the charging system will be able to keep up with demand when the motor is idling but this is not always the case. The amount of discharge at an idle that can be tolerated depends on several factors such as ridding style and size of the battery. If you spend time in stop and go traffic or red lights the battery will see longer periods of discharge. If you only ride on country roads or flowing highway the battery should be charging. A battery with a higher ampere-hour ratting can withstand being discharge and charged better then a battery with a smaller AH rating.  Better low speed charging system output will help keep the battery fully charged which will improve battery and starter motor life.

**Determining which Charging System to use**

1. Determine Amperage Usages.  
2 look at the application chart and find a kitthat fits your bike and puts out at least 4 amps more at 2500 rpm then your bike uses with the best low speed output

**Determining Amperage Usage**

The object of this test is to determine the actual amperage usage of your motorcycles electrical system.

The object of this test is to determine how many amps the electrical system on your bike uses. For this test you will disconnect the charging system. The easiest way to do this is to unplug the regulator from the stator. With the charging system disconnected all of the electrical power will be coming from the battery. Connect a battery charger directly to the battery terminals. The battery charger should be large enough to keep the voltage at the battery to normal operating voltage (13.8 to 14.8 volts). With the charging system disconnected and a battery charger connected directly to the battery terminals all of the electrical current will originate from the battery. You can determine exactly how many amps the motorcycle is using by measuring the current from the battery. The easiest way to do this is by connecting an inductive style ammeter to the negative wire from the battery.

1. Disconnect your charging system. Put a battery charger on the battery to keep the system voltage up.

2. Use a clamp on inductive amp meter on battery negative cable.

3. Start the engine and turn on all normal electrical accessories. Read amp meter. Add 2 amps for battery draw. This is normal usage.

4. Turn on all accessories. Read meter. Add 2 amps for battery draw. This is maximum usage.

Note: Amperage usage should be at least 2 amps lower then charging system output.

**Determining Usable DC Amperage (System Output Test)**

The object is to add electrical load until the voltage drops just below the normal operating voltage. At that time the charging system should be producing maximum amperage to try to keep the voltage up. The amount of extra load you will need depends on the output of your changing system compared to the usage of you motorcycle.

 At Cycle Electric Inc. we define usable amperage as the amount of DC amps the charging system can deliver while maintaining 13.8 volts at the battery. If voltage drops below 13.8 the battery will not fully charge. By the time voltage drops to 12.7, you are drawing amperage out of the battery, so any increase in amperage output after the voltage drops to 13.8 will be considered unusable.

Note: On Cycle Electric Inc. low volt models normal operating voltage is 13.8. It will be necessary to drag the system voltage down below 13.8 to perform this test.

 To test charging system amperage output, you will need a voltmeter, an ammeter that is rated to measure higher amperage then the charging systems can put out and extra electrical load to add to the system.

 To add electrical load you can use power resistors, a battery tester or light bulbs. Light bulbs can make an economical load dump. One H4 bulb with a 100-watt high beam and an 80-watt low beam will draw 15 amps with both filaments lit.

Note: If your system voltage is already low it will not be necessary to add extra load.

 Connect the voltmeter across the battery. Connect the ammeter in series with regulator output (measure amperage in the wire from the regulator to the battery). Start the motor and allow it to warm-up enough to obtain a steady idle. Connect the load dump across battery. (Add light bulbs, resistors or whatever you are using for a load dump) Continue to add load until the voltmeter reads between 13.8 and 13.5. Read the ammeter. This is usable low speed amperage. Now increase RPM to normal cruising speed (usually between 2500 & 3200 RPM depending on your model and riding style) add load to drag the voltage down to 13.8. Read ammeter. This is usable high-speed amperage. On some systems maximum amperage will come at 4500 RPM or higher. Unless you cruise at 95+ DO NOT consider this as usable. **USABLE DC AMPS must exceed amperage usage or the battery will not charge.**

If the charging system is not capable of producing close to full rated out put for that particular system it has a problem. See diagnosing charging systems. That subject is broken into two sections. See diagnosing generators diagnosing alternators.