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BATTERY TESTING

Battery Testing Before Troubleshooting The Starter

When the starting system will not turn the engine over, or, the engine is turning over too slowly, the first task to perform is to make sure the battery is fully charged. The battery open circuit voltage should be tested first. The battery must be fully charged before testing the starter.

The battery should also be load tested to assure that the battery plates are in good condition. Testing only the open circuit voltage and ignoring a test of the battery plates will not fully eliminate the battery as a suspect in causing problems in the starting circuit. The battery must also be load tested before testing the starter.

It is often assumed that if a 12-volt battery has an open circuit voltage of 12 volts, or just a little over 12 volts, that this means the battery is charged enough for adequate starting. This is not true.

A conventional battery is 100% charged if it has a minimum of 12.6 volts of charge. However, a voltage drop of 0.4 volts, down to 12.2 volts, represents a huge 50% drop in battery charge. A battery that is virtually dead will read about 12 volts!

A sealed battery is 75% charged at 12.5 volts, and 100% charged at 12.8 volts.

A conventional battery is 75% charged at 12.4 volts, and 100% charged at 12.6 volts.

If a battery is only charged to 75%, it should be fully charged before proceeding with further starting system testing.

A battery load test should be performed at the same time that an initial open circuit voltage test is performed. The true health and reliability of a battery can only be determined by putting the battery under a load and

measuring the voltage output that the battery plates are actually capable of producing when put under a load.

The most common load tester used in the motorcycle industry is a conductance battery tester – also called a digital capacitance tester. The Yausa BTY01 conductance tester is probably the most well-known brand of conductance battery tester.

Conductance testers analyze the condition of the battery plate surfaces, and how well these surfaces are able to conduct current. The internal resistance of the plates can be measured and analyzed regardless of whether the battery is fully charged or completely dead. The capacitance tester puts a small load to the battery and measures the resistance in the plates as an indicator of plate condition.

The lower the internal resistance found in the plates, the more amperage the battery will be able to deliver. The higher the resistance in the plates, the less capacity the plates will have to produce and deliver amperage. The condition of the plates is the main factor in analyzing the condition of the battery.

Once the battery is determined to be healthy and fully charged, testing procedures on various parts of the starting system can determine whether or not these parts are contributing to starting system problems.

In addition to the battery, other items that could contribute to starting problems may be a blown fuse, a loose connection, corrosion around connections, or a bad ground return. Some of these problems may be discovered during voltage drop testing.

If the problem appears to be inside the starter, the problem could be as simple as worn brushes. More serious internal starter problems could be a grounded armature that is short-circuited, or an armature that suffers from an open circuit.

STARTER CURRENT DRAW TESTING

When the battery is fully charged, and the battery plates have been found to be in good condition with a load test, a starter current draw test can then be performed. The draw test measures the amount of amperage the starter circuit is able to draw from the battery in order to turn the starter.

A starter draw test will reveal information about the condition of the starter. The service manual of the motorcycle being tested will provide data on what amperage draw is to be expected.

For example, the starters for small motorcycles up to 500cc will draw 40 to about 80 amps. Starters on bikes with mid-size displacement such as a 750cc bike will draw about 80 to 120 amps. A starter for a bike in the 1,000cc range - such as the starter for a 1340cc Harley motor (1993 and on) - will draw between 160 and 180 amps.

The test can be performed quickly and takes very little time. The draw test requires a current clamp to be clamped over the positive battery cable going from the battery positive terminal to the starter "battery terminal". The current clamp will measure the quantity of amperage flowing from the battery to the starter.

The Fluke brand of multimeters makes a current clamp to go with their meters – the i410 AC/DC current clamp. The i410 measures up to 400 DC amps, and up to 400 AC amps. Automotive current testers can also be used, but they are typically more expensive to purchase.

