Service the Electrical System

Overview:
With 40+ years of age, the wiring harness, terminals, connectors, and switches deteriorate visibly and invisibly.

Is it Baked?
Sometimes a copper wire has been subjected to overloading, possibly caused by corrosion. The wire can become brittle or cooked to a "blackened" or "orange" or "pink" color, blocking the flow of electricity. Overheated wire is worthless on our bikes, so inspect carefully. Does that copper still shine under the insulation?

How it was Built:
The factory metal terminals are brass plated. After 40 years that brass will tarnish and corrode, reducing power flowing to some areas of the electrical system. In some instances corrosion may severely limit proper electrical flow. Resistance to the flow of electricity can develop between the wire stands and the terminal crimp area.

Often the nylon connector shells and protective vinyl are loaded with old corrosion, rust, grease, crud, or have been mangled or smashed. Connectors often loosen with time. Metal fatigue can prevent terminals from having enough spring to maintain good connection, even after you bend the terminal to tighten it.

As the handlebars pivot back and forth, wires bending there are subject to eventual breakage inside the insulation. On the CT90, a White wire here carries extra charging power to accommodate the headlight. A Yellow wire returns this power to the rectifier. The Green ground wire is particularly heavily loaded. On a CT110, the Green provides earth/ground for low Voltage AC (headlight), high Voltage AC (ignition kill) and DC (other lighting and horn). These wires may be transmitting power through only a few of the original strands of copper wire, with many strands broken.

The headlight switch on the CT90 is actually two separate switches in one. Half the switch telegraphs DC power to the headlight bulb. The other half of the switch invisibly boosts extra AC power to the rectifier anytime the headlight is on.

The headlight, ignition, and blinker switches were assembled with special grease. Dirt mixes with the aging grease, forming an insulating, cakey abrasive crud that blocks electrical flow. This crud acts like grinding paste, wearing the precious metal switch contacts. The engine block is grounded to the sheet metal chassis of the bike, at the engine mounting bolts. A bad connection here usually causes poor running in the CT90 models, because the ignition points depend on this connection. The points plate is also grounded to the engine block, another possible source of poor running.

The battery is grounded to the chassis, along with the rectifier. A poor rectifier ground connection blocks power produced in the rectifier from reaching the battery. That Red/White wire telegraphs DC power from the rectifier into the battery, but so does the ground connection between chassis, rectifier, and battery.
Symptoms:
Dim headlight, slow or no blinkers, horn that barely works if at all, poor to no battery charging, and poor running caused by weak spark.
Bad connections can also raise Voltage to areas with good connections, possibly damaging parts or blowing bulbs.
Intermittent lighting and running problems may plague the riding experience.

Cure:
Often without using a Voltmeter or anything high tech, you can solve many electrical problems with mostly a labor of love.
If problems beyond wiring system service do exist, eliminate the wiring system as a problem by performing these service procedures.
If everything works electrically but lights are dim, bulbs blow, or battery charging is deficient, service the wiring system.

Minimal Tools and Materials:
WD-40, Q-tips, silicon dielectric grease, small round nylon bristle brush, and tiny needle nose pliers.

Master Level Tools and Materials:
Caig's DeOxit D, Q-Tips, silicon dielectric grease, small round nylon bristle brush, tiny needle nose pliers, Lubriplate DS-ES switch grease, assorted 3.5mm Vintage Terminals, connector shells, vinyl boots, crimp tool, 16 gauge wire, heatshrink tubing, 30 Watt soldering iron, 60/40 rosin core solder, and a multimeter.

What to Do:
Go through the bike's electrical system, take apart each connector one by one.
Clean terminals and connectors with WD-40 or DeOxit.
Swab the female connectors with a Q-Tip. Brush all connectors and terminals with cleaner and the bristle brush.
Inspect the wiring and connectors.
Replace or repair badly corroded or damaged wiring or connectors.
Tighten female connectors as needed, using the tiny needle nose pliers. Do not squeeze the connectors through the vinyl boots, because that may damage the boot.
Reach up inside the boot with the tiny pliers, then bend the connector metal.
Reassemble all connections with a dab of silicon dielectric grease to prevent future corrosion.
Coat the metal parts.
If needed for poor running, drop the engine enough to clean the mounting bolt bosses, frame contact points, and the area under the bolt heads, nuts and washers. Thinly coat bare metal with silicon dielectric grease.
Remove the rectifier ground wire, shine the frame under it, protect with silicon dielectric grease, and tighten securely.
If needed, add a ground wire from the battery ground bolt to the engine block, headlight bucket, and tail light area.

Elbow Grease:
This effort takes a while, especially the wires in the headlight bucket.
Its a menial task, but no special electrical knowledge is needed. Take your time, do a neat job.
Master Level What to Do:
Everything above plus dismantle the switches, clean the parts and housings, resolder anything corroded or discolored, lubricate fairly heavily with Lubriplate DS-ES switch grease, and reassemble.
Check steering head wire for breakage using an Ohmmeter, then load test using Ammeter to verify all strands are intact.
Replace defective wire by splicing in new wire, packing silicon dielectric grease on the wire before heat shrinking tube over it.
Cut out modified wiring with mismatched or taped connections.
Replace missing wires with splice, solder, and heat shrink detail.

Worth Mentioning:
Connectors that appear absolutely clean with a nice clear vinyl protective boot and shiny brass plating, can hide corrosion on those inner surfaces.
Don't be fooled into thinking "it looks fine" - take it apart, clean it up, add dielectric grease, and reassemble.
Often corrosion forms where a terminal is crimped to the wire. This can be verified with a resistance test. If in doubt, replace the terminal.
Consider adding a new, additional ground wire between the rectifier ground, and battery negative terminal.

Service Philosophy:
Any connector that is missing brass, badly corroded, mangled, mashed, squashed, trashed, thrashed, abused, modified, melted, incorrect, rusted or unserviceable... is replaced.
All wire is inspected for cuts or missing insulation. Bad wire gets replaced, either splice it in with solder and heat shrink, or replace the entire wire.
If its wrong, right it.
Pull those engine bolts. Do it right, clean and lubricate.
Anything grounded is unbolted, the metal involved in making the ground connection is cleaned and shined to the bare metal, and a thin film of silicon dielectric grease is applied before bolting things back together.

Final Note:
Last but not least polish the fuse connector.
Pull the fuse, polish the brass with WD-40 or DeOxit and a Q-Tip. Make sure the fuse is clean and shiny, too.

Jon Pardue