

Creating electrical and electronic components to turn wood waste into new usable materials

Application Note



Testing Functions
Case Study



“I’m responsible for the electrical side”

When a devastating hurricane or tornado blows through an area, one of the many problems—after addressing human needs—is how to get rid of all the trees and wood construction debris left behind. In many cases a great deal of the wood waste is ground up and transformed into new usable materials.



One company that builds the equipment to achieve that transformation is Continental Biomass Industries (CBI), based in Newton, New Hampshire.

For two decades, CBI has engineered some of the most productive grinding, chipping, and shredding solutions for companies all over the world. Its mobile wood grinders and wood chippers turn logs, forestry debris, and wood waste into biofuel, mulch, and other usable products. The company also designs and manufactures

custom-built stationary systems to recycle construction and demolition waste and produce refuse-derived fuel. CBI’s optimized grinding, chipping, shredding, and flailing technologies make recovering, processing, and recycling biomass material both environmentally responsible and profitable.

Tools: Fluke 117 Digital Multimeter and 322 Clamp Meter

Operator: Continental Biomass Industries (CBI) technician

Applications: Troubleshooting electrical problems; electrical testing during commissioning



A CBI technician double-checks with his Fluke 117 Digital Multimeter to ensure the proper signals are reading correctly as he commissions a new system.

Meeting each customer's requirements

CBI offers several base models of its equipment, which are typically customized to each customer's needs. Crucial to each design are the AutoCAD electrical drawings that guide the panel builder in creating the electrical and electronic components. The CBI technician creates many of those drawings and oversees production of both mobile and stationary components and onsite installations. "I'm responsible for the electrical side of our machines, from design and specifications, to programming and troubleshooting," says the technician. "I also need to ensure that each machine works with whatever other equipment is already on-site, such as bailers, sorters, filtering systems, coloring machines, and other third-party auxiliary components."

All CBI equipment is assembled in the company's plant in New Hampshire. At the same time, the CBI controls engineer develops the equipment's control program.

When the mechanical assembly is finished, technicians mount the control panel and complete all point-to-point wiring. Once all the wires are connected, the team runs a preliminary check to test all components and make sure they are functioning as planned.

"All the modules on the network are managed by the master controller, which communicates with all the peripheral components by polling each to confirm that they are online and in a ready state," says the CBI technician. The automated test can also detect whether there is under voltage, over voltage, or broken wires; however it can't tell technicians where exactly those problems are.

Tracking down problems

"On the electrical side, if there's a problem, usually you have to either change wiring or make sure you have the right currents going out to the valves," says the CBI technician. "The control system gives you a code and then you have to trace the wire and make sure that it is not broken, that you have contact on both ends, and that the voltages are correct. That's when Fluke tools are used."

The technician uses a Fluke 117 Digital Multimeter (DMM) and a Fluke 322 Clamp Meter to trace down those problems. He has used Fluke tools for several years, starting when he was in college. "I use Fluke because I trust it and because it does the job right. Fluke is a major player in measurement systems and I

like having major players on my team," he adds. "I chose the 117 because it's small enough to get into some of the tight spaces on our equipment and it has all the features that I really need. Plus, it's very affordable."

When he researched the 117 online he saw that he could get both the 117 DMM and the 322 Clamp Meter together in the Fluke 117/322 Electrician's Multimeter Combo Kit. "I mentioned to my wife that I really wanted to get my hands on that kit," says the CBI technician. "My birthday was approaching, so she surprised me with the kit as a gift."

The tool combination covers virtually all of his electrical testing and troubleshooting needs. "Mostly I use the 117 for the stationary group in the plant, to run continuity tests on wiring harness sections, and to test ac or dc voltage," he says. He also uses the auto-calibration feature on the 117 to calibrate valve control boards and uses the signal auto-scaling function to help set correct current outputs. He uses the 322 Clamp Meter mostly for current draws on various circuit sections on mobile and stationary equipment in the field. Its compact size works well for accessing wires in hard to reach areas of the CBI machines.

Fine-tuning each system

Some of the most common installation problems the CBI technician runs into are wires that are not pulled correctly, or functions that don't work exactly as envisioned on paper once the machine is assembled. "When we have the physical assembly up and running and see that a component is not doing what we had planned, we have to start troubleshooting and making any necessary wiring or program adaptations to ensure we have everything performing as expected."

When all the wiring is complete, he calibrates the boards that control the pump valves. "I connect my 117 to the board and measure the current and compare the readings to those on the spec sheet for that component to make sure they match," says the technician. "If the measurements are out of spec then I calibrate it using the 117. I also use the 117 to verify that the correct voltages are going out to each component."

Working in harsh conditions

While the machines require mechanical maintenance—such as cleaning sawdust from the components and greasing the bearings at the end of each work day—the electrical components are virtually maintenance free. "Our equipment is designed to operate under heavy-duty conditions. We only use components rated for the extreme conditions our equipment will see, from the panel enclosure to the control system. The wires and cables are all rated to withstand the diverse environments," the technician says. "Those same heavy-duty requirements apply to our test tools, which is another reason we use Fluke."

Once the equipment is installed and running, CBI electricians typically only have to deal with a few issues, such as a damaged connection plug, a plug that isn't placed correctly and allows water infiltration causing corrosion, or conductor continuity problems due to cut or ripped wires.

Multitasking is a must

As might be expected there are no typical days in the CBI technician's job, and no two days alike. The work environment is very dynamic; on-the-fly adaptation and multitasking are imperative. "We are constantly striving to make our machines better, more competitive, and more reliable, to keep our customers up and running."

To help improve his efficiency, the technician recently added the Fluke CNX 3000 Industrial System wireless measurement system to his tool bag. That way he'll be able to truly multitask, measuring current and voltage simultaneously from a safe distance.



The motor control center is the backbone of the grinding system. Nothing happens at the grinder, 150 feet (45.7 meters) away, unless the power is balanced and running as designed. Although these systems are almost bulletproof, fine-tuning is needed as the CBI technician goes through the commissioning of any new system. He dons his personal protective gear and uses his Fluke 117 Electrician's Digital Multimeter and Fluke 322 Digital AC Clamp Meter to take measurements.

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