



A New Wood/ Ethanol  
Conversion Microsystem  
Powered by  
Wainbee Expertise



 Wainbee

# Alchemy – Turning Wood Into Ethanol with EM Drive and Control Systems

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At Wainbee, we're always proud to share our customer success stories, and give potential clients insights into our process, and how we solve complex issues by breaking them down into simple steps and using high-grade EM drive and control systems to achieve great results.

Today, we're sharing a story about one of our customers, a large industrial biotechnology company, and how we helped them develop a complex piece of machinery to help them process wood and turn it into ethanol.

Interested? Read on!

## **The Project – Engineering A New Wood/Ethanol Conversion Microsystem**

We were asked us to create a new control system to operate a complex piece of equipment, which they called a "Microsystem." This system is used to convert wood chips into ethanol.

To understand the project, you'll need to understand the process by which wood chips can be turned into ethanol. Here's how it works.

1. Wood chips are combined and pressed into a solid plug and moved outside the sealed opening of a steam-filled vessel.
2. The steam-filled vessel is opened very quickly. When this happens, the steam interacts with the dense plug of wood chips, essentially causing it to "explode."
3. After the wood chips have exploded, the cellulose – an insoluble substance that consists of organic fibers – is separated from the wood fibre.
4. The wood fibre and cellulose are separated, and the cellulose drops into a hydrolyzer. Then, it is broken down into a special type of sugar.
5. Finally, this sugar is processed and distilled, resulting in high-quality ethanol which is used as a fuel additive.

Our customer needed a new, high-quality, and reliable system by which the initial process – the compaction and explosion of wood chips – could be accomplished. And this is precisely what we provided.

# Wainbee Solution

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## A Reliable, Electric-Powered Interface and Drive System

The Microsystems control solution we built consisted of the following components:

- An industrial-grade Parker-CTC touchscreen, for operator interaction and setup
- A powerful Parker-890 common bus AC drive system
- A Parker-Compax C3F motion controller
- An Allen-Bradley Programmable Logic Controller (PLC) for the operation and automation of the system

Using the Parker-CTC touchscreen, we created a simplified interface, unifying the PLC and the drive system, to provide granular, sophisticated controls for the entire process.

The final system consisted of a specialized wood auger, turned by an AC drive system, which is used to move the wood chips towards the opening of the steam vessel. Then using the C3F motion controller, two hydraulic cylinders are

synchronized, packing the wood chips into the sealed orifice tightly, and creating the requisite wood plug.

Finally, after the explosion has taken place and the cellulose was separated from the wood pulp and fibre, the sugars are moved to another collection point, using another AC drive, where the process of distillation will begin.

The result of our project was a highly-sophisticated, flexible, and modifiable system that provides consistent results, and is very reliable, with minimal maintenance required, and easily field-swappable components.

By working together, and using the specifications provided by our client, our AC and drive teams were able to provide stellar results – and a reliable piece of equipment which will remain functional for years and decades to come, with proper care and maintenance.



# Let Wainbee help you develop a Custom-Engineered Solution for your business!

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At Wainbee, we handle a huge variety of custom projects for customers in all industries – from aviation, to marine companies, manufacturing, heavy industry, and more. No matter what industry you're in, we're here to help with custom-engineered solutions.

Ready to get started, or interested in learning more about what we do? Please feel free to browse our website and get more details, or contact our support team right away.

We're always taking on new clients, and we would be happy to learn more about your needs – and how we can solve your problems with our advanced, custom-engineered equipment.



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