

# Emerson Discovers OpenCNC

**Several Emerson divisions improve performance, increase capacity and save money after retrofitting with OpenCNC® software.**

In an era of tight capital budgets, how do you increase manufacturing capacity, improve productivity, and improve quality? Manufacturing engineers at separate plants of a \$15 billion global manufacturer independently arrived at the same solution.

Whether it was a 25-year-old Motch VTL with good ways and iron that could no longer find home position, a Warner & Swasey lathe that was down more than it was up, or an obsolete Cincinnati Cinturn Big Blue control, finding cost-effective ways to increase capacity by keeping old machines running was a high priority for manufacturing and maintenance engineers at several Emerson plants.

They all found the same solution: OpenCNC® software CNC from MDSI, Ann Arbor, Michigan.

OpenCNC is the unbundled, open-architecture, shrink-wrapped software CNC that, unlike traditional CNCs, uses no proprietary hardware or motion control cards. Because it's unbundled software that runs on off-the-shelf PCs and Microsoft® Windows operating systems, manufacturers are not locked into proprietary arrangements for hardware, control repair, or control upgrades.

## Emerson Power Transmission Center Street, Maysville, Kentucky

At the Emerson Gearing Facility in Maysville, a 20-year-old Gray VTL was down 30-40% of the time with control problems. The ball screw, motors and drives were good, because the crew had replaced those to try to keep the machine running. A big problem, however, according to CNC programmer Brian Spires, was that it was increasingly difficult to find service people to work on the old control. "Service people are losing touch with the older technology," he said.

After retrofitting the Gray with OpenCNC, which was done by MDSI integrator MTC Automation, Inc., Louisville, Kentucky, the gains in performance to the machine were striking, including improvements Spires didn't anticipate.

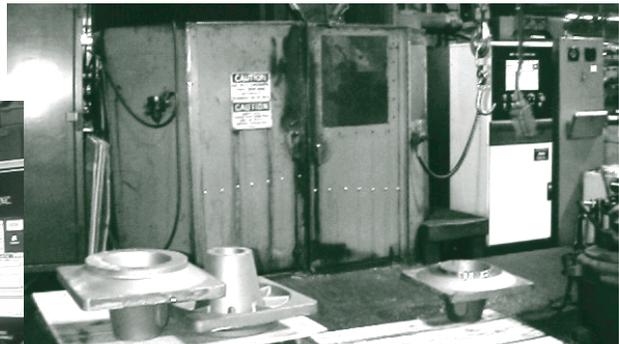
### **Motion control better than the original**

"OpenCNC is actually controlling the axis motion better, so what used to take two cuts on the part now only takes one," Spires said. "We've gone from only getting 3/16ths of an inch on our first cut to 7/16ths of an inch and the cut is holding much better tolerances. And of course we're saving time, too, because we get what we need in one cut. Plus, we've cut cycle times by twenty-five percent."

### **Increased capacity, increased productivity**

What is most amazing to Spires is the fact that the machine is so productive after being brought back from the dead. "We were ready to junk this machine," he said. "Since we put OpenCNC on it, it's been better than ever."

**"With  
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**Cycle times have been cut by 25% on this 20-year-old Gray VTL after it was retrofitted with OpenCNC software CNC from MDSI.**

***“Cost to buy a new machine v  
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was \$100,000. Cost to retrofit***

**U.S Electric Motors  
Philadelphia, Mississippi**

OpenCNC is running four Warner & Swasey lathes and a Motch VTL at the U.S. Electric Motors plant in Philadelphia, Mississippi, where most of the OpenCNC machines make end bells for electric motors, as many as 200-300 parts per day, per machine.

Aubrey Nance, senior manufacturing engineer, and his crew have noticed several improvements in performance with OpenCNC:

***Better finish on the parts.*** “OpenCNC sends a better signal out the drives,” Nance said. “It’s clearer and results in more constant spindle speeds. It makes a better finish.”

***Less downtime on machine.*** “Not only less electrical downtime,” Nance said, “but less mechanical downtime, too. And we’ve kept the original motors and drives.”

***Easy for operators to learn.*** “The PC- basis of the control is so universal,” Nance said, “we can train an operator and he’s up and running in minutes.”

***Convenience of using off-the-shelf hardware, plus no more separate DNC systems.*** “I like having a PC that we can swap out any time,” Nance said. “And we can store a lot of programs in a machine because of the large memory in the PC. We haven’t come close to running out of disk space.”

MDSI integrator Holifield Engineering, Summit, Mississippi, has done the OpenCNC retrofits for the Philadelphia, Mississippi plant. Plans are in place to retrofit another Warner & Swasey lathe with OpenCNC.

“We’ve had excellent luck with OpenCNC,” Nance concluded. “It’s nice to get away from old technology.”

**Emerson Power Transmission  
Clark Street, Maysville, Kentucky**

At the Drives and Components division of EPT in Maysville, a 26-year-old Motch VTL 2-axis lathe had good steel and ways, but the original control was shot. It could not read Home position and constantly lost position from cut to cut.

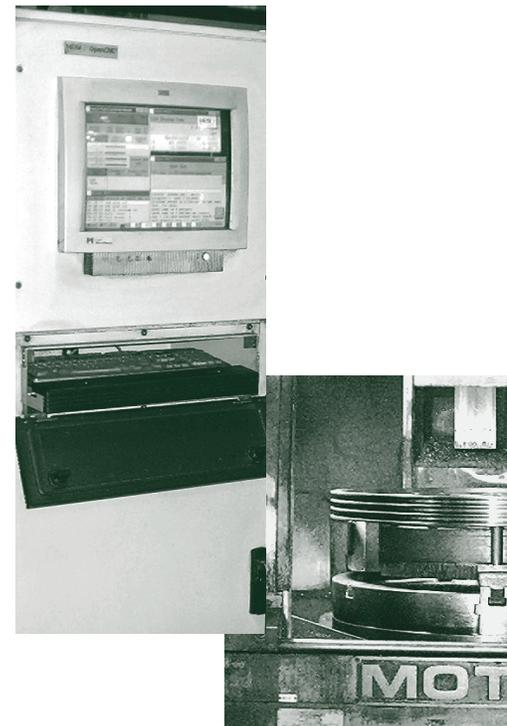
The machine made about 12-15 pulleys per day, cut from castings that cost from \$125 to \$300, each. Control problems were creating a lot of expensive scrap.

***Economically, OpenCNC just made sense***

Once manufacturing engineer Tim Emmons started comparing numbers, the decision to retrofit the old machine with MDSI’s OpenCNC software was easy.

“Cost to buy a new machine was \$325,000,” he said. “Cost to retrofit the old proprietary control with that vendor’s new version was \$100,000. Cost to retrofit with OpenCNC was \$40,000.” Even after they decided

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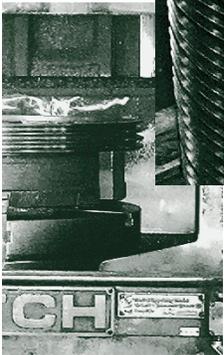
**was \$325,000. Cost to retrofit with that vendor's new version with OpenCNC was \$40,000."**

to convert the old hydraulic drives on the machine to AC brushless motors, the retrofit came in at \$60,000.

"Before retrofitting, that Motch was down 30-40% of the time," Emmons said. "Since we put OpenCNC on it's been running virtually maintenance-free." In addition, setup time has been cut in half. Furthermore, said Emmons, "even people with no PC experience get right on OpenCNC and learn it very fast...faster than they can learn more traditional CNCs."

But the most important thing OpenCNC has done for Emmons is to change the way he thinks about old machines.

"We're not so quick to go out and look for new machines now," he said. "We can instead look for old machine tools in good condition, pull off the old control, and put OpenCNC on."



**CNC, this 26-year-old Motch VTL has been, and setup times have been cut in half.**

**Kop-flex, Inc.**  
**Baltimore, Maryland**

At the Kop-flex facility in Baltimore, manufacturing engineer Charlie Griffin is looking forward to paperless manufacturing. "No paper drawings, no setup sheets, no paper programming sheets," he said. "We'll get everything we need for the machine off the network."

While the plant isn't there yet, Griffin feels he is getting closer after installing OpenCNC on two Cincinnati lathes.

***The value of Windows platforms***

"OpenCNC runs on a Windows platform," he said. "We can bring up setup sheets via Notepad and View. We can download programs, and so on."

The Kop-flex plant makes steel couplings of heavy barstock. The Cincinnati lathes had the first generation "Big Blues," (original Cincinnati controls) that are now obsolete, and the old controls were starting to have problems.

Finally one of the old Cincinnati lathes went down one time too many and it was left down a month while the crew figured out what to do. Although old, the machines were solidly cast, and Griffin felt they were worth salvaging.

He had seen OpenCNC running on machines at the Emerson Browning plant in Maysville, Kentucky and recommended that the manufacturing group give the software a try.

***Saving money by keeping original drives and motors***

One of things Griffin liked right away was that he could save money by keeping the original drives and motors.

"OpenCNC is friendly to a whole host of drives," he said. "It lets you break up the costs, because you don't have to replace the drives right away. We kept the original ones."

***"OpenCNC lets you break up the costs, because you don't have to replace the drives right away."***





# Emerson Electric

## Part changeovers faster by 50% with OpenCNC

Another benefit Griffin noticed was the ease of part changeovers. The Cinturns run parts in small lot sizes, about 5-15 on one machine and 25-100 on the second, so part changeovers are frequent. OpenCNC enables operators to keep a catalogue of offsets at the control.

"Every job is different," Griffin explains. "We program using fixture offsets. OpenCNC allows us to keep a file of those offsets on the control. We can access this library and do a part changeover, while we keep the control running. We estimate that part changeovers are faster by 50% versus the old control."



## Copeland Corporation Rushville, Indiana

At the 130,000 square-foot Copeland plant in Rushville, Indiana, several thousand refrigeration compressors are manufactured annually. When a manufacturing cell made up of five Cincinnati T10s needed control upgrades recently, the manufacturing crew thought their choices were limited to the usual hardware-based proprietary controls. But then they read about OpenCNC in a magazine. They hadn't realized that there was an open software alternative to the usual closed control choices.

"We liked OpenCNC's open-architecture structure," said Bryan M. Komlanc, manager of manufacturing engineering services.

They gave OpenCNC a try on the first machine, liked it, and even before putting the first machine back into production, immediately retrofitted the second Cincinnati with OpenCNC. Now, while still getting used to the unprecedented flexibility and access to machine data that OpenCNC gives them, Komlanc and crew are planning on installing OpenCNC on three more Cincinnati T10s, to complete the cell.

"OpenCNC has been a less expensive retrofit all the way around," Komlanc said. "We are satisfied."



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