Not Just for Knee Mills Anymore

For a job that required machining of spiral grooves in 2" diameter steel bars 8' to 10' long, a new Centroid 4th axis rotary table was added to this retrofitted Numara horizontal boring mill. The spiral groves were first programmed in the XY plane and then wrapped around the 2" cylinder automatically, a Centroid technique that simplifies rotary programming. "Having the 4th axis has more than doubled what I can do," said Shane.

Founded in 1979 and located in Howard, PA, Centroid started out designing and manufacturing motion control electronics for general-purpose automation. Around 31 years ago, Centroid entered the CNC business by developing CNC retrofit kits for knee mills, and then grew into offering CNC replacement controls for a wide variety of machine tools. The Centroid CNC control is designed for user friendliness in both operation and programming and backed by local support and made in the USA CNC components.

Centroid's new MPU11 CNC control board is at the heart of Centroid's M400 CNC control, which is designed and manufactured in Howard, PA. The MP U11 CNC control board is designed to be a state-of-the-art CNC motion control CPU that uses high performance digital signal processors (DSPs) for smooth closed loop machine tool motion. The MPU11 can control up to 8 axes simultaneously and has the ability to communicate with servo drives digitally via fiber optic cable for increased reliability and performance. The MPU11 based M400 CNC control

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is designed for small and large machine tool retrofits alike, with many simplified advanced CNC features designed to make both the installation and operation of the updated machine tool straightforward. According to the company, many shops have benefited from a Centroid retrofit returning their machine tools back to profit centers.

Increased Production

During the last 22 years Terry Ruppe of Arrow Controls has installed 122 Centroid retrofits in the greater Houston area. Terry has installed five CNC retrofits for T.L. Hiner. Two of them are a pair of Mori Seiki SL-3 turning centers. Terry installed the new Centroid T-400 CNC controls on both of the SL-3s in place, on the shop floor, so there was no need to move the machines for the retrofit. The two machines are arranged for efficiency, facing each other so one operator can keep both machines running parts all day long.

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In addition to a variety of job shop parts, one of the regular high volume jobs at T.L. Hiner is turning compressor valve seats. Mike, the operator at T.L. Hiner, programs both Mori Seiki SL-3s with Centroid's built-in Intercon conversational programming, which prompts the operator for dimensions from the print and automatically creates the G-code to turn the part and displays the results graphically. Mike said he "likes the graphics on the screen so he can see what it is going to do before it does it." The T-400 also accepts G-code from most any CAD/CAM system as well. G-code programs can be transferred to the control via USB memory sticks or through an Ethernet local area network (LAN) connection. Mike commented that even though the control has "a ton of memory" and that he leaves all his programs on the control ready to go, he really likes the USB jump drive and uses it to make backup copies of all his programs in the office computer so there are at least two copies of his work on different computers. Mike also commented on a new feature that he likes which he did not have on the original control system, the Centroid Run-Search feature. "That comes in handy, you can call up to just about anywhere in the program you want and it knows where to start," he said. "That saves a lot time".

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All original SL-3 machine functions, such as chip conveyor, tool turret index, flood, auto lube with low-level warning, chuck in-out, high gear, low gear and quill in/out, are controlled with the new T-400 CNC. In addition to program control (G- and M-codes), these functions have dedicated manual controls located on the operator control panel. The T-400 has 12 customizable function keys that allow the retrofitter to program the action of each, allowing for simplified installation and operation of the machine tool. The T-400 also reads the encoder located on the spindle, which allows for constant surface speed turning and threading capabilities.

After a good experience with four previous Centroid CNC control retrofits, Shane Davison, Shop Floor Manager at T.L. Hiner, bought a used Numara horizontal boring mill with 110" X and 80" of Y travel from a used machinery dealer. "I got it at a good price since the original CNC control did not run," he said. He called in Terry once again to retrofit it with a new Centroid M400 CNC control. He admits that never having a horizontal in the shop before, he was wondering if he

Fadal 3016 retrofitted with a Centroid M400 CNC control.

was going to get enough work to keep it busy. "Now that the machine is up and running, we can keep this machine busy all the time. It stays backlogged," said Shane. After the retrofit of the Numura, a job came in that required machining of spiral grooves in 2" diameter steel bars 8' to 10' long. The part was a lead screw for coil tubing trucks used in the oil industry. In under a week from the time of order, Terry had a new Centroid 4th axis rotary table added to the machine so Shane was able to run the job. Shane created a special rotary support fixture, which was built to accommodate machining of the long rods without giving up table travel. The spiral groves were first programmed in the XY plane and then wrapped around the 2" cylinder automatically, a Centroid technique that simplifies rotary programming. "Having the 4th axis has more than doubled what I can do," said Shane. "By buying good used iron and installing a new Centroid CNC control system, I saved over 60% of the cost of buying new. There is a lot to be said about taking older machines that are still in good mechanical shape and updating them where you can get the life back out of them again."

Improved Processes, Greater Flexibility

Jerald Mittasch, President of Mitco Manufacturing and Machining LLC, also in Houston, TX, specializes in making valves for the oil field. In addition to oil related work, Jerald makes replacement 12" electric arc furnace electrode clamps that handle 20,000 amps of current at 240 volts. Jerald has to reverse engineer the parts using his Fadal 3016, which has been retrofitted with a Centroid M400 CNC control. He said there are no prints provided for the clamps. His customer just sends him the broken original parts to recreate - and he often improves upon them as well.

The Fadal 3016 was originally equipped with DC servo motors. While the DC motors could have been retained, at the time of retrofit the decision was made to replace them with new AC brushless servos. The Centroid M400 can communicate with the new AC servo drives via fiber optic cable, which offers more speed, power, precision and reliability.

Centroid reworked the original Fadal electrical cabinet to have new CNC components installed. Centroid also simplified the CNC control by eliminating cables and connections with made-for-CNC printed circuit boards that handle all the functions of a typical CNC machine tool.

Jerald started into CNC machining with two SuperMax CNC knee mills retrofitted with Centroid CNC controls. "Those machines are now almost 10 years old. They are solid machines and give me the opportunity to do things that nobody else can do," said Jerald.

His first step into a tool changer machine was the Fadal 3016. On some jobs he uses every tool bin in the ATC.

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Reworked original Fadal electrical cabinet with new CNC components installed. At the top are the XYZ AC brushless servo drives. In the middle are the circuit breakers and power distribution. Along the right side are I/O terminal blocks for limit switches, ATC sensors, flood, mist and lube control connections. At the bottom left is the Centroid MPU11 (motion control, encoder, mpg connections) and the GPIO4D (PLC, spindle control and IO) CNC control cards (stacked on top of each other to save space for this install). Centroid simplified the CNC control by eliminating cables and connections with made-for-CNC printed circuit boards that handle all the functions of a typical CNC machine tool.

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Jerald was confident when it came to learning how to use the new tool changer machine since he was already familiar with operating and programming the Centroid control on his two other machines. "There was not that much new to learn going from a knee mill to a new ATC machine," he said. When it comes to taking on new jobs, Jerald said, "I do not make the same thing over and over. With the Centroid I have not yet had a job that I said I could not do."

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