



Weeke Router Control Retrofit

System Integrator: MasterControls Inc., L.L.C. (MCI)

MCI was contacted by an end user in the wood industry. This user manufactures various types of wood panels and door products. They purchased a used Weeke BP-10 router from an auction. This router had an older NUM 750 control that had lost its memory due to a low battery. The customer looked at various options and decided to retrofit the machine. At this point they contacted MCI for a possible retrofit solution.

Weeke uses the NUM systems on their routers to present day. They had developed customer macros and interfaces for the wood industry. The 750 system was capable of machining complex shapes, but had various limitations.

- Setup time was quite lengthy and difficult
- Operator training was quite hard
- CNC system was aged and out dated
- Replacement parts are hard to come by and expensive
- Customer was unable to add custom application components- clamping, fixtures, etc.
- Part setup was limited to screen entry fields
- Memory size was limited
- Networking ability was limited
- Documentation was limited

Based on the system limitations MCI set out to provide the customer with a solution that would address all the shortcomings of the Weeke control system. MCI's solution consisted of a turnkey retrofit using an up to date NUM 1040W CNC system. This retrofit allowed MCI to reuse the customer's existing Indramat servo drives and the original control cabinet. The NUM CNC system allowed MCI to provide a high end CNC solution that boasted the following enhancements:

- Short setup times
- Minimal operator training
- New panel and IO components
- The addition of a portable handpulse generator pendant for manual positioning and machining
- RS274 programming standard (G-Code) allowing for no limitation to programming flexibility
- Smooth and high speed machine operation
- The addition of an operator's panel on a pendant arm close to work envelope
- Machine customization such as fixturing control, custom Mcodes, and special machine functions
- A higher level of safety in two sided operation
- Full system documentation with new prints developed for system retrofit
- Unlimited program storage & drip feed
- Easily networkable through PC front end. Industrial PC front end with Flash memory
- Custom macros to meet customer requirements



All of the control engineering and sub-panel build was done off site. When the retrofit package was complete, a time convenient for the installation was set. The retrofit package was delivered to the customer site and the installation started. Installing the new subpanel, CNC Control, Operator’s Panel, Pendant arm, and the wiring in the magnetics cabinet took about two days. When this work was completed we began powering up the machine and checking it for functionality. We worked with customer personnel during this phase of the project so they would become familiar with the new control and become comfortable operating the machine from the new panel. Additionally, MCI supplied part program training during the integration phase.

MCI develops solutions with the future in mind. We develop machine logic and machine functions in a way that can be reused on new applications. This helps us complete our projects on time. We also go to our customers with code which has been tested for reliability over and over. Our approach is what sets us apart from other system integrators. Additionally, having a vendor like NUM willing to partner with us on complex applications makes us comfortable taking on these types of projects.

Please see the following pages for photos of the installation and a quick overview of the specific project tasks performed by MCI.

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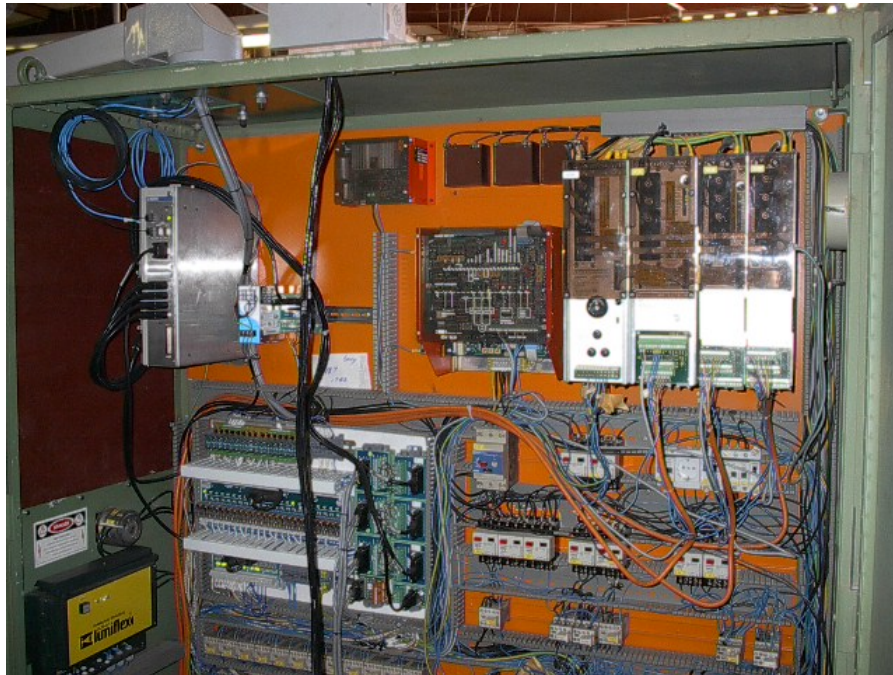
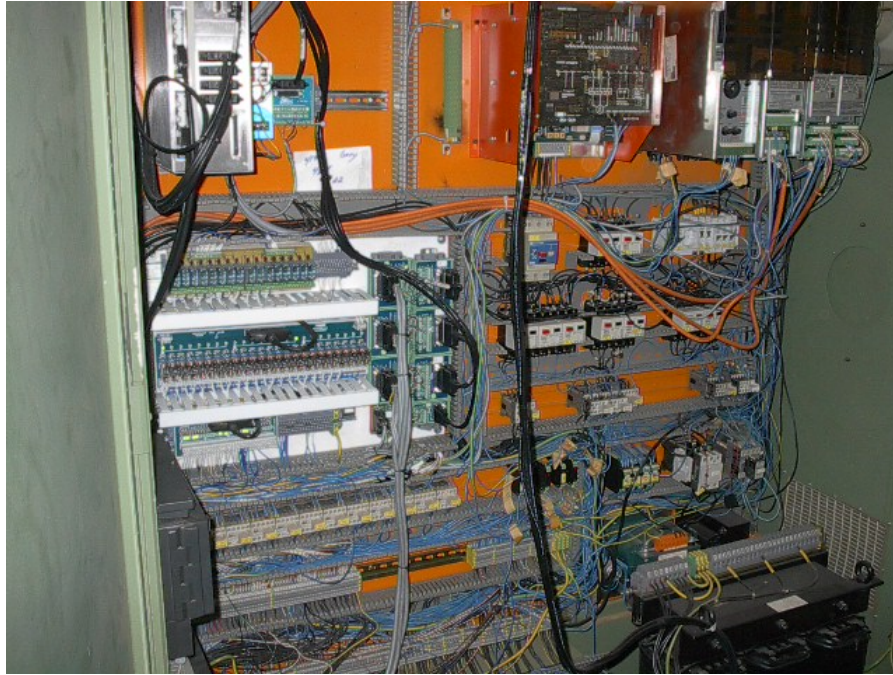
Application Pictures:



Operator pendant on arm



Inside Main Enclosure- New control wiring to left side





Quick Project Overview:

CNC

MCI replaced the existing 750 CNC control with a new NUM 1040W CNC control. The new control represents the state-of-the-art in modern CNC controls allowing for standardized RS274 programming. The control has an intuitive operator interface. This intuitive interface enables the operators to perform quick set-ups and adjustments. Programs can be written at the machine or transferred via network or USB stick.

Operator Panel and Pendant

A new Operator Pendant was installed on the machine in place of the old monitor which was mounted in the side of the control enclosure far away from machining. The operator panel includes a 15" Monitor with full membrane keyboard, Machine Tool Builders panel, and MPG pendant. This panel allows the operator to select modes, modify offsets, edit/modify programs, and accomplish support functions.

Drives

The MCI reused the original Indramat drives. The NUM CNC is equipped to control a very wide variety of Analog and Digital Drives.

Magnetics

The magnetics in the cabinet remained the same. The CNC panel, interface boards, and IO boards were mounted in the enclosure replacing the old CNC system.

Field Devices

All existing field devices remained in place for the retrofit. The I/O was connected to the new CNC through terminal strips on the NUM I/O boards. The customer added additional fixturing components to the machine requiring additional IO and custom programming.

Installation Time

Upon arrival on site, MCI removed all the old control hardware out including the CNC, VGA monitor, and operator panels. We sorted out the wiring and removed all the wiring that would not be reused. We then installed the new Operator Panel on the pendant and the CNC sub-panel. After these were installed, all the wiring was landed to the new sub-panels and verified. When the wiring was complete, we began powering up and testing the new control. By the end of the 4th day on site, we were running dry-cycles on the machine and ready to run parts. After we were confident that the machine was running properly, we started testing the part programs and running parts to check for quality and consistency.

Integration time

Integration time included producing machine schematics, creating a Bill of Material, ordering and receiving all the hardware, building the required sub-panels for the CNC and the Operator Panel, writing all the machine logic, and configuring all the machine parameters. This typically takes six to eight weeks from the time an order is placed to installation.

Documentation

NUM produces complete documentation for integrators and end-users. A complete set of manuals was provided to the customer. In addition to the Operator's Manual, a full set of Electrical Schematics (AutoCAD Format) were provided to the customer. MCI also provided documentation for all customer Mcodes developed for the customer along with operational instructions.