



## Cobot makes manufacturing safer and more efficient at Phoenix Contact

### Highlights

- Phoenix Contact wanted to eliminate some repetitive and tedious tasks on its manufacturing floor
- Adding a collaborative robot, or cobot, to the plant floor helped improve the efficiency of packing boxes, while freeing workers up to focus on more important tasks
- The first cobot was such a success that Phoenix Contact has already added a second

### Customer profile

In 2005, Phoenix Contact established a development and manufacturing company at its U.S. headquarters near Harrisburg, Pennsylvania. The D&M company brings production closer to customers in North and South America. Phoenix Contact brings a unique perspective to Industrial Internet of Things (IIoT) applications. Not only does Phoenix Contact develop and manufacture products that make the IIoT possible, but the company actively uses these technologies to improve its own operations and sustainability initiatives.



**Figure 1:** The cobot places a terminal block into a package.

### Challenge: Repetitive and tedious tasks take workers away from more important jobs

Until a few years ago, Phoenix Contact's automated terminal block assembly machine required an operator to stand at the machine and package the parts. The parts came out of the machine horizontally, across a work table. There was a drop-off, and the parts would fall off the track and land in the finished box. The operator had to watch the process and count how many parts were pushed into the box. Once the box was full, they'd have to switch to a new box.

“Since the cobot is doing it, the operator can react quicker and resolve these issues to bring up our uptime”

– Mike Doyle

Depending on which part the machine was manufacturing, the worker often had to pick up the connectors and lay them in a special orientation so that larger connectors would fit in the box.

The task was repetitive and tedious, which can cause eye strain and is hard on the joints in the hand. It also took workers away from more important operations, so Phoenix Contact wanted to find an automated solution. However, because workers would still interact with the machine, any solution needed to ensure safety.



**Figure 2:** Frank Sabatini, lead production operator in the DC Automated Assembly department, performs a changeover, setting up the cobot to run a different part.

### **Solution: Collaborative robots**

Robots have been widely used in industry for many years, but cobots, or collaborative robots, are a more recent arrival to the market. While traditional robots are programmed to perform certain tasks and complete certain capabilities independently, cobots are built to work alongside humans in a safe and collaborative way.

Cobots can complete assigned tasks on their own without human guidance, but should a human need to interfere, the cobot knows to suspend its task until redirected without harming the human.

With this in mind, Phoenix Contact integrated a new cobot (nicknamed Octavius) onto its U.S. manufacturing floor to aid the human hand in packaging and distribution. The ABB YuMi cobot completes tasks involving packaging and orienting by working on the end of a machine that drops off parts that are to be placed in a box. The YuMi is a power- and force-limiting cobot. If a human worker comes into contact with it, the cobot's operations will immediately stop. Grippers on the cobot pick up the connectors, reorient them, and place them into the bottom of the box. After a layer of 10 pieces has been placed, the cobot places a cardboard inlay on top.

### **Results: More efficiency and less downtime**

Adding the cobot to the manufacturing facility saved money on labor. The cobot gives workers the free time to do more critical tasks rather than tedious, repetitive ones like orienting packaging items and placing them into boxes.

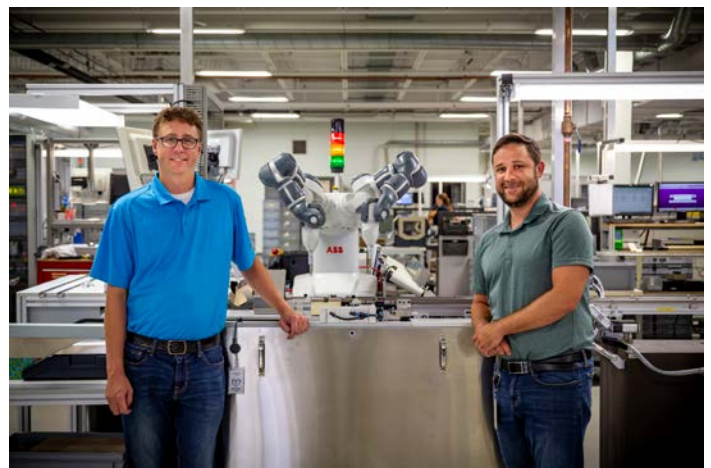
Not only has it improved cost efficiency, but as Kurt Bruehl, manufacturing operations manager, explained, "The cobot will always be there to get the job done. If an employee is unable to come to work, it still allows us to run with fewer people, so it helps our operations when we're down a person or need a little bit of extra help in other areas."

Now, the cobot completes these manual tasks for them. The machine can run independently and free up time. The worker can run a second machine simultaneously or complete a hand assembly task, increasing overall output and productivity.

"If an error would occur while you were packaging your boxes, you might finish that task and let the machine sit idle so you could go and address the issue. This would increase your downtime. Since the cobot is doing it, the operator can react quicker and resolve these issues to bring up our uptime," stated Mike Doyle, associate operations manager.

Employees can work in close contact with the cobot without fear of the cobot working outside of its bounds. That is the difference between a robot and a cobot: a robot will exert as much force as needed to get the job done, while a cobot knows when to stop.

Operators and workers were well versed in robotics and safety measures to ensure they were comfortable with integrating the cobot into the workplace and on the floor alongside them.



**Figure 3:** Mike Doyle and Kurt Bruehl with Octavius.

“A robot is going to move from point A to point B, and it will do anything in its power to get there,” commented Doyle, “so it will hurt you if it needs to get to point B. A cobot says, ‘I need to go to point B, but I need this much energy.’”

Additionally, several Phoenix Contact products support the cobot. While ABB takes care of the physical and mechanical motions, the supporting electronics like the PLC, wire harnesses, safety controllers, and even an HMI interface screen that works between the operator and the other articles are all Phoenix Contact products.

The first cobot was so successful that Phoenix Contact has already implemented a second. The second cobot is a different model, but performs a similar activity. But at this location, the finished product falls directly into the box, so the new cobot only has to move the empty box. While Octavius had two arms, the new cobot only has one.

Nathan Kruis, Senior Industrial Engineer, explained, “The YuMI takes on repetitive tasks to give our team a boost in meeting the needs of customers.”