Automacad Concrete Lends A Helping Arm to Concrete Production

Case Study

Automacad Concrete (Québec, Canada) designed an automated conveying system equipped with an ABB industrial articulated robot to pick and place hardened concrete. Automacad worked with ifm efector (Exton, PA) to equip the ABB robot with vacuum sensors, pneumatic controls and the AS-i networking system.

Results

- To maintain proper vacuum levels through the tool head, ifm's PQ Series vacuum sensors are compact and easily fit on the tool head to provide a 4-digit numeric display of vacuum pressure.
- Two ifm AC 5215 digital input modules provide connection and communication to the main controls.
- Tool head replacement is simple. Each tool head is addressed differently to allow clear identification and confirmation of the tool head is in use.
- The robot arm is mounted with ifm's airbox AC 5243 to control pneumatic valves that draw the vacuum from the tool head.

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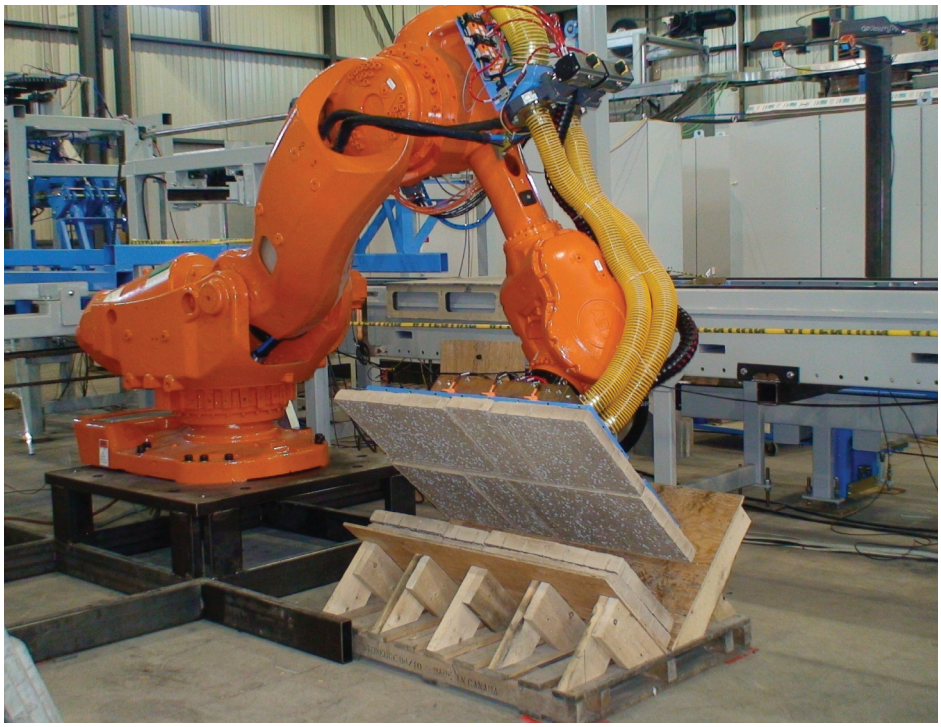

Lifting concrete slabs using a vacuum tool head requires powerful suction. Each concrete slab can weigh up to 700 pounds and the ABB robot arm is capable of handling the production at full extension and at maximum speed.

Automacad Concrete, Quebec, Canada, designs and builds customized equipment for manufacturers of concrete products. The company specializes in custom-built equipment solutions for wet-cast and dry-cast concrete production. Finished products include masonry stone-like products such as blocks, pavers, and veneers used in landscaping and building design applications.

Automacad continuously looks for ways to modify and improve processes in concrete production by creating new equipment concepts for their customers. An idea came to Automacad President, Louis Hébert while observing plant employees manually carry heavy slabs of concrete to a strapping area for shipment. This idea came to fruition in 2010 when Automacad was assigned the task to design and build an automated packaging system for one of the largest manufacturers of landscape products.

Hébert's team designed an automated conveying system equipped with an ABB® industrial articulated robot with 5-axis overhead robot arm to pick and place the hardened concrete slabs from the conveyor to the strapping area. This one-step automation process increases packaging speed, eliminates manual lifting and the occasional pinched finger.

Depending on the weight and shape of the concrete, Automacad uses various robot tool heads to lift the slabs. These interchangeable tool heads use vacuum to suction the concrete slab to the tool head. The robot arm rotates and places the slab in the proper position in the strapping area.

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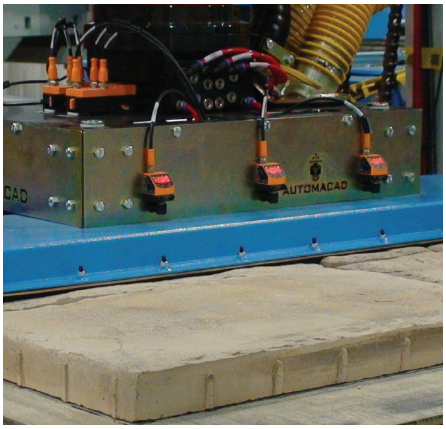
pounds and the robot arm is capable of handling the production at full extension and at maximum speed.

Maintaining proper vacuum levels through the tool head takes a highly reliable vacuum control device. Automacad consulted with their sensors and controls partner, ifm efector North America, to find the proper solution.

ifm suggested their PQ Series vacuum sensors that are specifically designed for pneumatic applications and offer an extremely small footprint. The compact, cube-shaped sensors (30 x 32 x 42mm) easily fit on the tool head and offer a bright 4-digit numeric display. A pushbutton setup offers simple adjustment of setpoints.

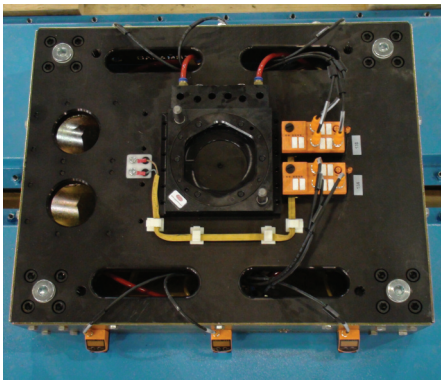


ifm PQ Series vacuum sensors are compact (30 x 32 x 42mm) and easily fit on the tool head. The sensors provide a bright 4-digit numeric display and pushbutton setup.

Each tool head is mounted with six PQ 7809 vacuum sensors with a measuring range of -14.5 to 14.5 psi of full vacuum. Two ifm AC 5215 digital input modules provide connection and communication to the main controls. An ifm patchcord, 4-wire M8 to 4-wire M12, connects each PQ 7809 sensor to a port on an AC 5215 input module.

Automacad's robotic engineer was challenged with the number of sensors on the tool head and also in identifying each tool head appropriate to the slabs to be picked and placed.

Since the ABB robot is supplied with a DeviceNet interface, Automacad's engineer decided to use an AS-i DeviceNet Master to gather all of the I/O and analog information on the robot and the tool



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heads. Hébert states "Using AS-i for networking sensors and controls has been a part of the Automacad culture since 2005." The company has applied the single two-wire cable on their various conveyors, popular Split-Impact machines and safety devices.

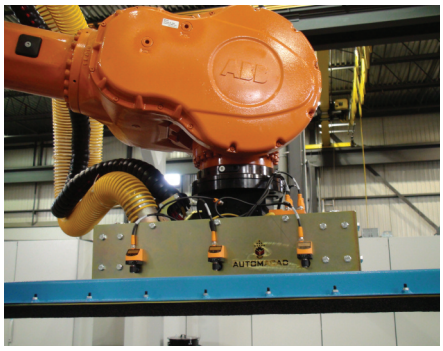
One of the main advantages of using AS-i includes the elimination of the wiring connector between the tool and the robot. Where typically a 30-pin connector is used, the Automacad engineer designed a simple and cost-effective 2-point connection using screws; pennies for the screws versus hundreds of dollars for the specialty connector. In addition to simplifying its connectivity, each tool head is addressed differently to allow clear identification and confirmation of which tool head is in use.

The robot arm is also mounted with ifm's airbox AC 5243 to control pneumatic valves that draw the vacuum from the tool head. The low-profile airbox mounts easily on the robot arm and can rotate in one of three directions with a simple twist to accept the AS-i cable vertically or horizontally, allowing Automacad to stock fewer parts. Although unconfirmed, it is believed that this project is the first ever in North America to use AS-i on an ABB robot.

"Using AS-i on the ABB robot has allowed us to prove once again that Automacad is at the forefront of innovation in the concrete industry," says Hébert. "With its lack of restrictions, AS-i allows us to add and subtract components easily and reduce installation time."

Automacad takes pride in the products and services they offer their customers. Their equipment provides customers a high-level of automation that in turn improves efficiency, increases uptime and creates a greater output on production lines.

Hébert says, "We took it upon ourselves to do something different; something that would challenge conventional thinking and in doing so, we have simplified the application and improved cost effectiveness for our customers and Automacad."s



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ifm efector thanks Automacad Concrete for their participation in this article.

For more information about Automacad, visit www.automacadconcrete.com

For more information about ifm sensors and controls, visit www.ifm.com/us or call 800-441-8246.