



Looking within

ABB is making use of its own IRB 140 robots to step up productivity, improve quality and reduce costs in its own factories

DAVID MARSHALL – Today’s automated industrial processes for manufacturing industries are a far cry from Charlie Chaplin’s iconic depiction of a factory worker frantically struggling to keep up with an assembly line production in the 1936 film classic “Modern Times.” ABB was the first company to introduce a fully electrical, microprocessor-controlled robot in 1974. Since then, there has been a steady increase in the role of industrial robots in manufacturing, impacting the productivity and safety of these industries. ABB is a leading supplier of industrial robots, with more than 200,000 installations worldwide. In keeping with the notion of “practicing what we preach,” ABB not only manufactures robots for use in industry, but also uses robots to manufacture its own products. One such example is Czech-based ABB Elektro-Praga, which employs ABB’s IRB 140 robots in the manufacturing of its dual-plug sockets.

1 IRB 140 at a glance

- Payload of 6 kg, spherical reach of 810 mm that is 360 degrees rotational, fast acceleration, and a large working envelope
- Can be suspended at any angle, permitting flexible, easy and cost-effective integration
- Runs on the latest IRC5 robot controller
- Two Ethernet interfaces enable PCs to be integrated for process monitoring, production information and program adjustments
- Open software language and system configurability allow for adding new functionality
- Arms are IP67 protected
- Collision detection option with full-path retraction makes the robot reliable and safe
- TrueMove and QuickMove second-generation technology ensures accuracy for path, position and speed

2 The IRB 140 Foundry Plus



Acquired by the ABB Group in 1993, Elektro-Praga – now ABB Elektro-Praga – specializes in wiring accessories such as low-voltage circuit breakers, switches, sockets and control products. To enhance the quality of its products, boost productivity and reduce costs, ABB installed a new production line at its factory in Jablonec nad Nisou in the Czech Republic for the manufacturing of the company's Tango line of dual-plug sockets. The production system features three 6 kg capacity industrial robots from ABB.

Small wonder

The IRB 140 robot → 1-2 is compact and powered by a high-performance motion control unit. Each six-axis machine boasts quick acceleration and a high payload. The compact robot is exceptionally fast, accurate and powerful. It has one of the fastest cycle times (as fast as 0.77 s) of any articulated robot.

In the future, the factory plans to use the same production unit for at least four other product lines. Adjusting the production line takes 10 minutes or less, and the product variant can be changed up to 30 times per week, resulting in flexible “production to order.”

The production unit incorporates three digital cameras – an ideal solution for handling imaging applications such as high-speed assembly or semiconductor inspection. The cameras run on Cognex Vision Pro software, which supports the coordination of the robots and enables the arms to “pick and place” components at each point in the assembly process.

Higher productivity

Requiring only one operator, three robots work two eight-hour shifts per day. Cycle time is only 2.3 s per electrical socket, and the robots process 8,500 dual-plug sockets per shift. Prior to automation, each shift required up to nine people to process 950 pieces per person.

The IRB 140 robots have sophisticated control systems that allow variable task programming. Any number and virtually any type of visual inspection can be included within the cycle by simply changing the parameters of the robot and PLC programs.

Stoppages or errors are shown on the operator's monitor, indicating exactly where and what the problem is, and enabling downtime to be kept to an absolute minimum.

Adaptable technology

The IRB 140's flexibility has been seen elsewhere in the production plant. When difficulties with the material feed on another assembly line for light switches occurred, the problem was solved by installing another IRB 140 linked to a

vision system. This solution had been implemented previously to solve a manufacturing problem in another material feeding station at the plant. Now, the small metallic frames are being fed reliably. The use of a single robot increased the line's output by 15 percent.

Adaptability is one reason for the IRB 140's success. Another is its ease of use: Once the software has been configured, operators need only a few hours' training.

All mechanical arms are completely IP67 protected, enabling easy integration of the IRB 140 for a variety of applications.

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Title picture

The IRB 140 in action: Three of these six-axis robots can process 8,500 pieces in an eight-hour shift and require only one operator.