Elektro-Praga's Technology Department Manager Vladimír Růžička is impressed by the IRB 140's flexibility in adapting to a wide variety of production solutions.

Quality Czech

ABB Elektro-Praga employs robots to reduce costs, boost productivity and raise quality levels.

Text James Drake **Photo** Vladimir Weiss

When ABB Group bought Czech electrotechnical engineering manufacturer Elektro-Praga in 1993, it was lured by two major selling points: high-quality products and low wages. That's not surprising; Czechs have a long tradition of high-quality light engineering that was strong enough to survive 40 years of communism. But with the country's accession to the European Union six years ago, salary levels have been steadily climbing.

In 2009 Elektro-Praga (now officially re-named ABB Elektro-Praga) decided to install a new production line at its factory in the northern town of Jablonec nad Nisou, and the company could no longer rely on cheap human labor. Instead, it chose a production system that featured three industrial robots from its sister company ABB Robotics.

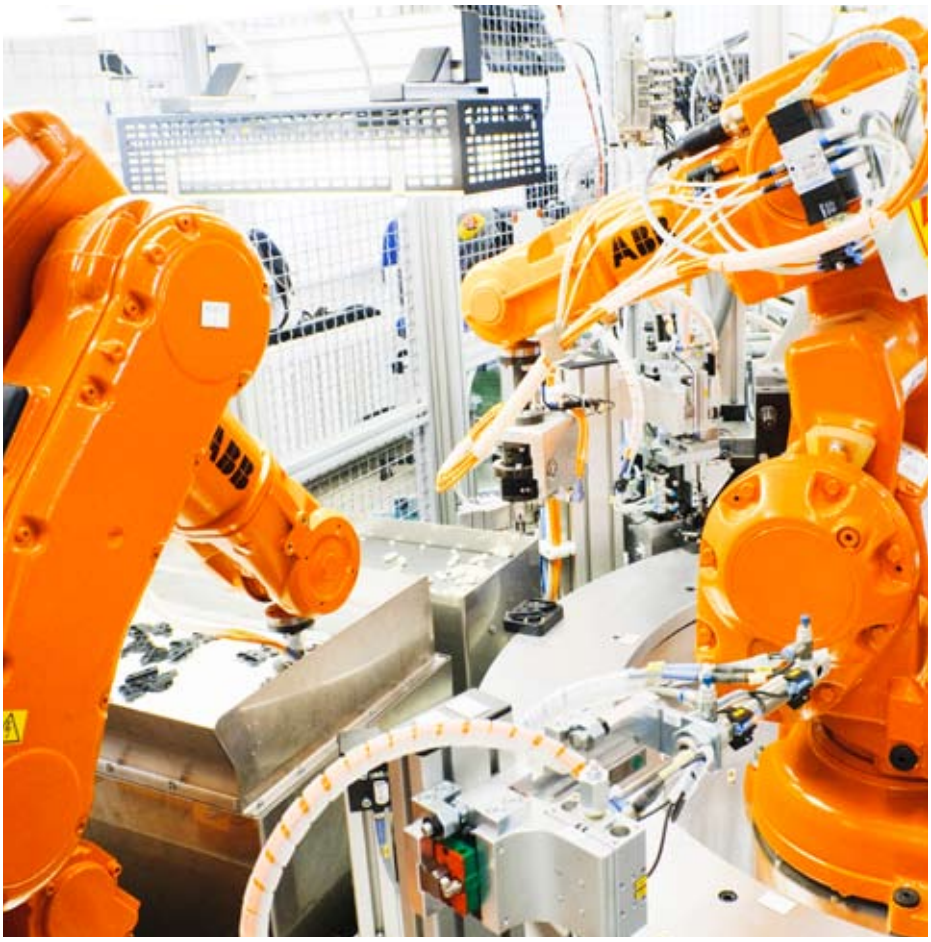
Small wonder

The IRB 140 robot is compact and powered by a high-performance motion control unit. Each six-axis machine boasts quick acceleration and a high payload.

"Although it's small, the robot is exceptionally fast, accurate and powerful," says Petr Prade, Chief of Design at MMT, the system integrator that built the new production line. "It has one of the fastest cycle times of any articulated robot."

Elektro-Praga – which specializes in wiring accessories (low-voltage circuit breakers, switches, sockets and control products) – currently employs the new robotics installation for the company's Tango line of dual plug sockets. In the future, the company plans to use the same production unit for at least four other product lines.

"That'll present no problem at all," says ABB Robotics Senior Account Manager Vladimír Slabý. "It takes no more than



The robots only require supervision by one operator, and they process about 8,500 pieces per shift.

IRB 140: QUICK FACTS

- It has a payload of 6 kg, a spherical reach of 810 mm that is 360 degrees rotational, fast acceleration and a large working envelope.
- It can be suspended at any angle, permitting flexible, easy and cost-effective integration.
- It 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.
- Its arms are IP67-protected.
- The 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.

10 minutes to adjust the production line, and the product variant can be changed up to 30 times per week, resulting in really flexible 'production to order.'"

The production unit incorporates three digital cameras – the ideal solution, Prade believes, 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, the robots work two eight-hour shifts per day. Cycle time is only 2.3 seconds per electrical socket, and the robots process 8,500 pieces per shift. (Before automation, each shift had up to nine people processing 950 pieces each.)

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 amending the robot and PLC programs.

"If there is a stoppage or error, the computer screen tells me precisely where and what the problem is – so the downtime while I fix it is absolutely minimal," says operator Jana Dolková, who used to help assemble the sockets by hand before the robots were installed.

"Unlike humans," adds quality control inspector Petr Neuman, "robots leave no unsightly fingerprints on finished parts."

Adaptable technology

The IRB 140's flexibility has been seen elsewhere in the production plant. "Some months ago, we had problems with the material feed on another assembly line, for light switches," says Technology Department Manager Vladimír Růžička. "We solved this by using another IRB 140 linked to a vision system."

Now the small metallic frames are being fed reliably. "And the line's output has been boosted by 15 percent – just by using a single robot!"

In fact, the robot's adaptability is just one reason for the IRB 140's popularity all over the world. Another is its ease of use: Once the software has been configured, operators only need a few hours' training.

"For multiple operations, six-axis robots are always the best way to go," says Prade. "The IRB 140 is easy to re-use in any future installation."

But according to Slabý, the clincher is the compactness of the robot. "If you can save space, you save money," he says. "And after all, saving – and making – money is what this robot is all about!"

About MMT

Czech systems integrator MMT s.r.o. offers comprehensive services in the area of mechanical engineering and robotic automation for all branches of industrial production. Since it was founded in 1996, MMT's work has spread to other countries in Central and Western Europe.

For more information,
please visit www.mmt.cz.