

## ROBOTICS

# In pursuit of perfection



Since the robots were installed in 2000, production of moulded case circuit breakers more than doubled.

At the ABB SACE factory in Frosinone, Italy, (90 minutes south of Rome) the benefits of using ABB robots in production are plain to see.

The Frosinone facility has been manufacturing electronic and thermo-magnetic low-voltage circuit breakers since 1988, producing core components and assembling final products. In 1993, two ABB robots joined the production line to handle soldering tasks, but it was not until 2000 that Frosinone decided to more aggressively take advantage of robotic capabilities.

Two SACE Division engineers—Savina Fardelli, Production Engineering Manager, low voltage breakers, and Marco Dolce, Process Engineering Manager—decided to rethink the entire system of production, using robots to make it more efficient with lower costs and improved quality.

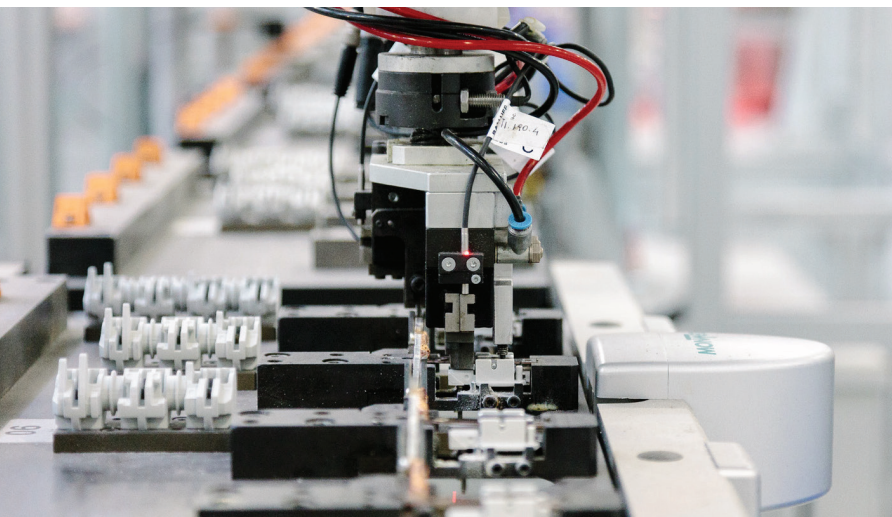
“We can reconfigure the shapes and sizes of our products very easily because of the flexibility of the robots,” Fardelli says. “We can also introduce new lines quickly and at a lower cost by retraining our existing workers.”

Designing, developing, and manufacturing low voltage circuit breakers at ABB SACE’s Frosinone plant in Italy has been streamlined with the addition of ABB robots.

It was in 2000 that an IRB 140 robot arrived at the plant to be put to work on the packaging line. Fardelli and Dolce decided that the robot (and all the others to follow) should be painted white rather than the traditional orange. “We wanted to communicate a sense of cleanliness, luminosity, and surgical precision,” says Fardelli of the decision.

In 2006, more robots—a mix of 120s, 140s, 1600s, 2400s, 4600s, and 360s—were added to handle soldering, packaging and assembly tasks. Four years later other welding robots arrived. By the end of 2012, more than 40 ABB robots will be working in Frosinone—half of them performing welding and assembly functions—and the rest working in a variety of roles including quality control, testing, packaging and pick-and-place applications.

Since the robots were installed, cost benefits have been clearly evident. As of 2000 production at Frosinone has more than doubled without an increase in the number of employees. In 2000, the plant produced around one million low voltage case circuit breakers; today it produces 2.5 million moulded case circuit breakers plus another 75,000 air circuit breakers. Over the same period, there have also been no layoffs.



By the end of 2012, more than 40 ABB robots will be performing welding, soldering, packaging and assembly tasks.

Workers who formerly handled simple tasks now have more sophisticated assignments, and training is an on-going process. Additionally, because robots make less noise than non-robot automated systems, the overall sound level is more manageable for the humans who work alongside them. And the advantages go beyond increased output, maximised manpower and decreased noise; there are time benefits as well. As Dolce points out, the design of an automated non-robot system may require three engineers and considerable time to construct the necessary equipment. A robot line requires one programmer and, at maximum, a few days to develop the appropriate production line structure.

Lowering the number of product rejects is another of the engineers' main cost-saving goals. In fact, their aim is to reduce rejections from three percent to zero through an increased use of robots.

"Our main focus is to lower the cost of our product without sacrificing quality," says Dolce. The robots are also compact, saving valuable space and energy on the factory floor. For example after introducing an IRB 120 robot, space requirements on the floor shrank from 200 square meters to 50 square meters. And because of its efficiency, a robotic production line consumes 30 percent less energy.

Speed, a valued feature of ABB robots, is not as important for circuit breaker production as it is for, say, high volume consumer products. The robots at Frosinone are not used at their full speed because precision and accuracy are emphasized, and flexibility is paramount in the cost-saving equation.

In an on-going effort to keep product quality up and lower costs, Dolce and Fardelli are currently working on a new assembly line featuring robots that will be up and running by March 2013.

### **Frosinone**

Founded: factory in Frosinone built in 1969 (as SACE), became part of ABB SACE in 1988

Location: ABB SACE in three locations in Italy:

- Bergamo (since 1934)
- Dalmine (since 2008)
- Frosinone (since 1969)

Product lines: Centre of Excellence in ABB Group for design, development, and manufacture of low voltage circuit breakers (moulded case circuit breakers and air circuit breakers).

Activities in Frosinone: engineering, quality control, supply management.

Assembly and manufacturing of

- MCCB's Tmax T1 ÷ T8-XT- Isomax S3
- MCCB's Formula –
- ACB's Emax E1 ÷ E6-X1-T7