New self-learning robots with VR Tracking technology: the next level of coating at Pentax Industries

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Pentax Industries S.p.A. has decided to insource and keep its coating operations in-house as a strategic move to guarantee quality, durability, and process control. In 2025, it upgraded its lines by installing three GR 680 six-axis articulated robots with VR Tracking technology, supplied by CMA Robotics.

At Pentax, the coating phase is critical to maintaining full process control and meeting the high quality and functional performance standards required internationally.

Pentax Industries S.p.A. (Veronella, Verona, Italy) is a leading global manufacturer of electric water pumps. Established through the merger of Elettromac and Zetabase in 1990, it has consolidated its international presence in over one hundred markets, with a particularly solid position in Latin America and the Middle East. Its technological offering is wide and varied, with pumps for domestic and industrial applications, fire-fighting systems, and large hydroelectric plants. In recent years, it has also strengthened its submersible electric pump division through the acquisition of a specialist firm in the province of Como (Italy). Currently, the company has over 150 employees: 140 work at the headquarters in Veronella, the heart of the assembly and finishing operations, and 15 operate in Albinea (Reggio Emilia, Italy), where large pumps for hydroelectric plants are manufactured.

"We outsource 90% of our machining operations. In-house, we mainly deal with assembly and coating," explains Gianluca Cengia, systems and general affairs manager at Pentax Industries. "As for the latter, this has always been a strategic choice to meet the high aesthetic and, above all, functional requirements of our international customers." For over twenty years, the company has been using coating robots supplied by CMA Robotics. Recently, it has renewed this collaboration by installing three new self-learning GR 680 robots with VR Tracking technology.

Complex geometries and maximum customisation

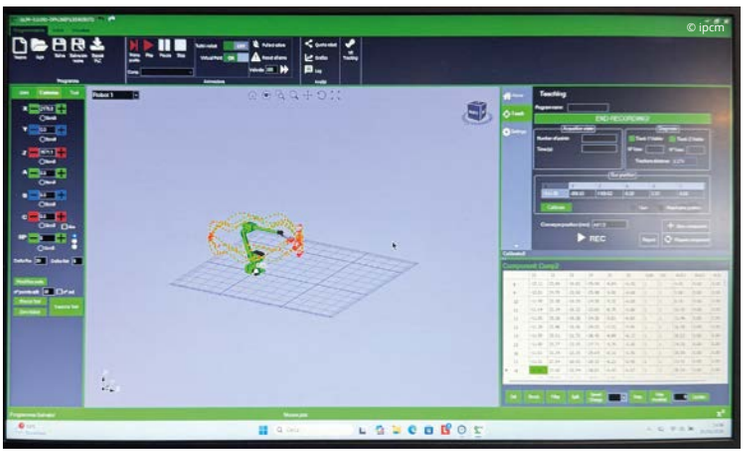
"Our range includes products with very different designs and intended uses. Managing such a varied production is challenging. Moreover, given the geographical distance that separates us from most of our suppliers, having full control over the main processes, including finishing, is essential to minimise errors and avoid waste at the customers' end," continues Cengia. After arriving at the plant, the components undergo the cleaning process in the pre-treatment system supplied by Tecnofirma (Monza, Monza and Brianza, Italy) to remove processing oils, shavings, and impurities. The entire production is then assembled and tested in-house before being sent to the coating process. "We have five automatic coating lines built over the years by SAVIM Europe (Arbizzano, Verona) and a manual system treating larger and heavier parts that cannot be handled on chain systems."
The configuration of the lines is similar, but each one is devoted to specific types of products:

◆ one for large-sized components;
◆ one for complete pumps and accessories;
◆ one for smaller pumps;
◆ one for medium-sized components;
◆ one for very heavy parts weighing up to 35 kg, suspended using hoists.

The new GR 680 robots have been installed on the first three lines, while the fourth and fifth lines are equipped with previous-generation robots, also supplied by CMA Robotics.

On each line, the operators manually load the components onto a monorail conveyor supplied by CM Automazione (Giussano, Monza e Brianza, Italy), which takes them to the automatic, water-curtain coating booths by SAVIM Europe, where robots apply the paint using mixing systems supplied by WAGNER (Valmadrera, Lecco, Italy). "We use exclusively water-based paints. Years ago, we were among the first to adopt this type of coating product, in line with our commitment to environmental sustainability," emphasizes the owner, Knight of the Order of Merit of the Italian Republic Gianluigi Pedrollo. After paint application, the parts are transferred to the drying oven, then unloaded manually and sent to the finishing line.

"With a view to sustainability, the plants operate in a closed loop: they are equipped with filtration systems that separate paint overspray and filter presses that extract solid sludge, allowing the purified water to be recovered and recirculated into the booths' water curtains," explains Cengia.



Monitor display of the trajectory traced by the operator and stored by the system for subsequent automatic replication by the robot.

Technical features of the self-learning robots

The three GR 680 robots supplied by CMA Robotics are six-axis articulated machines designed for maximum freedom of movement and access to even the most complex geometries. "The previous robots were five-axis models. Moving to six axes means adding a 360° wrist articulation that helps reach every surface area on the coated component, ensuring uniform and complete coverage," explains Marco Zanor.

The main innovation introduced is VR Tracking, an advanced self-learning technology where an operator uses a special lightweight joystick equipped with a spray gun to manually coat the first workpiece. Sensors monitor the trajectory and store it so it can be replicated by the robot, streamlining programming compared with traditional methods. "On the previous models, programming was done using an older generation self-learning system," explains Gianluca Cengia. "The improvement has been significant, especially in terms of ergonomics: our operators no longer have to physically drag the robot structure to teach it new trajectories but can use a lightweight, easy-to-handle device instead."

The new robots are also equipped with software that enables real-time adjustments to existing programmes for corrections or optimisations without needing to recreate the entire work sequence. Finally, the setup includes a new motor with an electronic axis for precise rotation of parts and a CAPV system that electronically manages needle opening, atomisation, and spray pattern width, ensuring high repeatability, control of the applied film, and waste reduction.

Coating application via an articulated robot.

A robot's operator console.

"For us, the true technological leap occurred in 2002 with the first switch from reciprocators to CMA robots, which significantly reduced overspray," notes Cengia. "Over the past twenty years, we have continued to evolve, especially in terms of software, and the VR Tracking system is a clear example of this progress. Maintenance has also become easier: the new-generation brushless motors have made the robots more reliable and faster, streamlining servicing.

The reasons behind the investment

"In 2025, we decided to make this investment to address a specific need. The first robots installed in 2002 had reached the end of their service life, and the difficulty in sourcing spare parts was beginning to jeopardise production continuity. Additionally, we needed to respond more swiftly to requests from companies importing our products worldwide, which often require product customisation with their own branding (which translates into the need for frequent colour change operations), dedicated labels, and specialised packaging," explains Giorgio Pedrollo, General Manager of the company.

Choosing CMA as the technology partner was a natural decision. "When we decided to upgrade our systems, turning to CMA Robotics was almost automatic. In addition to the technological upgrade aspects, the real added value for us lies in its excellent service and support. As well as its invaluable geographical proximity, we also benefit from its remote support, which means assistance can be provided in real time, ensuring operational continuity and minimising any plant downtime. Its team's responsiveness and reliability are critical factors for us in keeping up with the pace demanded by international markets."

After more than twenty years of collaboration, the installation of the new GR 680 robots strengthened a long-term technical partnership geared towards innovation and ongoing improvement, supporting the high standards of quality, reliability, and production flexibility that set Pentax's electric pumps apart in the over one hundred global markets in which it operates.