



SUCCESS STORY

Arrivederci hydraulics: A fully electric roll forming system!

SIEMENS

Italian machine manufacturer Dallan is set to deliver its first fully electric roll forming machine in the summer of 2025. This machine illustrates the challenges involved in switching from hydraulics to an electric mode, the advantages this delivers, and the role Siemens technology played in the process.

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Hydraulic systems are thermally and mechanically robust and offer very high power in a compact space, thereby enabling strong process forces to be generated. These forces can also be controlled directly. These characteristics pose major challenges when it comes to replacing hydraulic systems with electric ones. This can only be achieved with state-of-the-art, high-performance components, which applies to the drivers, but also to the control technology that is more complex in a fully electric system. In addition, there are safety aspects entering the picture, such as the emergency stop or standstill detection, which must also be implemented purely electrically. Once these challenges have been overcome, however, they are rewarded with a wide range of benefits: from energy efficiency and advantages in maintenance and sustainability to higher machining precision. All this is highlighted in the new 'FULL ELECTRIC punching, roll forming, and cutting system' from the manufacturer Dallan S.p.A., based in Castelfranco Veneto, Italy. First presented in May 2025 at the Lamiera trade fair in Milan, the machine was also sold there immediately on location.



Completely hydraulic-free: the new 'FULL ELECTRIC punching, roll forming, and cutting system' from Dallan S.p.A.

Dallan specializes in machines and systems for the automated processing of thin strip metal with material thicknesses of 0.15 to 5 mm. The machines are equipped with moving tool carriers, so that the strip is processed on the fly, i.e., punched and profiled. They also cover the associated processing steps and automation solutions. The sheets are fed into the process by a strip feeding system and, depending on the processing technology, are processed at speeds of up to 120 or even 140 m/min.

All functions on 11.5 meters

By dispensing with hydraulics, Dallan has created a clean and sustainable production environment. With the new FULL ELECTRIC system, the entire process steps are housed in a single module: the strip sheet metal, which is a maximum of 1.2 mm thick, passes through the pre-processing group, the roll forming unit, and the flying shear, and at the end, finished, punched, and custom-cut profiles emerge. "This means we have combined a full 90 percent of the processes our users need in a single module," as Andrea Dallan, CEO and son of the company's founder, states.

Project planning in a comprehensive development environment

Dallan has long relied on NX and Teamcenter for mechanical design. NX offers CAD/CAM/CAE functions, while Teamcenter centralizes product data. Both were already in use when Dallan was still part of a group of six companies. In 2013, they were all taken over by Dallan and combined under a single roof. One of these companies was responsible for automation at the time and implemented interfaces for many supplier brands. Under Dallan's direction, this changed: since then, Siemens components have been the preferential choice for new designs. As Andrea Dallan explains: "Up to a certain point, working with different suppliers worked well. But as the complexity of our systems increased, we switched over entirely to Siemens." TIA Portal is now used as a project planning platform with simulation tools and seamlessly integrated engineering.



The new 'FULL ELECTRIC punching, roll forming, and cutting system', shown here with a packaging module, is Dallan's answer to the question of what the future of strip processing should look like.

When developing the new FULL ELECTRIC system in TIA Portal, it was therefore possible to design all the relevant components in this environment. This included both the SIMATIC S7-1500TF technology CPU with safety functions and the other systems installed, such as the SINAMICS S120 and SINAMICS G120 drives and SIMOTICS S-1FK2/1FT7 series synchronous motors.

"When we decided to develop the new roll forming machine as a fully electric machine, it was clear that we would not be compromising on the components. This machine, the first in an entire series of machines, is our answer to the question"

Andrea Dallan, CEO, Dallan S.p.A.

Hardware accompanied by important soft factors

Andrea Dallan cites another pivotal reason for switching to Siemens technologies: "We are more than satisfied with the support the Italian Siemens team provides. They are a partner with whom we want to continue to take great strides." The conversion of Dallan's main products to Siemens architecture was just the beginning, and it will take some time before the entire machine portfolio has been converted. In addition to the hardware conversion, the specific software for each machine also had to be rewritten – and Dallan's portfolio includes a considerable variety of solutions.

Development input paying off

The switch from hydraulic to electric called for a wide range of tests during the development phase. As far as the components were concerned, everything could be slightly oversized in the very first machine design, which is where fine-tuning comes in. This is facilitated by TIA Portal: in this environment, the program, automation, and safety logic are located in the same PLC. This means that the movements of the axes can be combined and their performance optimized by way of just one single controller. And this tuning proved extremely successful: "By comparison with a 120 m/min system with hydraulic units, we measured energy savings of 34 percent with the FULL ELECTRIC system,"

says Andrea Dallan. "This remarkable progress is also the result of the good cooperation between our team and the Siemens team."

Recovering energy with flying shears

The new FULL ELECTRIC machine uses the flying shear principle, once with a cutting device and once for punching. The flying shear follows the sheet metal at a speed of 120 m/min, cuts it, and returns to the starting point to repeat the process. It plays an important role in two respects: in terms of energy savings and in the options it offers for implementing its key functions. First, let's stay with the topic of energy: the flying shear involves large masses that have to be braked sharply again and again. The SINAMICS S120 is a Siemens modular frequency converter for high-performance motion control applications. This drive system features a common DC link for energy exchange and enables energy management. This means that braking energy can be recovered, contributing to significant energy savings.

When it comes to implementing the key functions of the flying shear, Siemens provides a tested and continuously updated standard function library that has been used by Dallan Engineering for some time now. Based on this, Dallan technicians have, for example, made it possible to produce custom-made roller shutter slats using "Coil To Window" technology. After entering the window dimensions and the desired number of aluminum profiles, the machine produces the appropriate roller shutter curtain.



Dallan has its own HMI, which imports all the information from the customer's ERP or measuring system. This creates a production list that contains all relevant information, from dimensions through to the packaging type.

For aluminum profiles with a polyurethane base, material savings of around 15 percent can be achieved – in addition to the energy savings. In this context, it is also worth mentioning Dallan's own HMI, which imports all the information from the customer's ERP or measuring system. This creates a production list that contains all the relevant information, from dimensions to the packaging type. "The development of this software took five years and was directly connected to our decision to develop a new generation of machines and to start cooperating closely with Siemens," as Dallan relates.

Machine technology of the future with a new look

Light gray cladding, dark gray cabins, transparent hoods, eye-catching details in yellow: the new generation of machines, including the new FULL ELECTRIC system, stand out immediately with their all-new design. At second glance, i.e., in ongoing applications, the fully electric operation is advantageous because work on the machine is cleaner and there is no handling of hydraulic oil required. Over the medium to long term, users will also be pleased that maintenance and service are easier in a fully electric scenario – and, last but not least, that they are achieving tremendous energy savings in operation. So there are no pangs in bidding farewell: Arrivederci hydraulics.

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