

Example application: Output and size require a PD6-N Plug & Drive stepped motor from Nanotec

Joke with the mini-BagBoy for the first time without servomotor or pneumatics

Devices and machines for film sealing is the domain of Joke Folienschweißtechnik GmbH. With a new machine for smaller runs, the need was to cover the lower output range. "1000 plastic bags are expensive, 100,000 are cheap", explains Norbert Schumacher, Technical Manager at the company based in Bergisch-Gladbach, Germany. Bags are often also required in different sizes. The desire for a small automated device has been noted, particularly from the automotive and semi-conductor industries and from the medical technology sector.



Sheet rolls are clamped, rolled out to the required length, cut and welded with a base seam at the same time. All standard devices from Joke work in this way. This is why the decision in favor of drive components is clear: Servomotors with motion control, as used in all motors in the large range from the renowned manufacturer. They provided the positioning accuracy and the speed to produce bags to the exact length. There was a hitch in this tried and tested solution, however: It was not compact enough for the planned size of the mini-BagBoy 400.

"The search was on for stepper motors with the same functionality", recalls Schumacher, who was in charge of the development project. Two drives per machine were to ensure precise functioning for the bag length and a straight cut. One drive actuates the feed roller and controls the feed length corresponding to the bag length. The second stepper motor is required for the cutting and welding equipment. Joke uses the pulse welding process in all devices, where the sealing bar moves downwards simultaneously with the cutting movement of the top blade. In the lower position, the bag is then sealed against a rubber plate. After cutting, the bags drop onto a delivery table. Here the drive generates an entire working stroke with one rotation. "The advantage of stepper motors is the optimal interplay between the feed and lifting movement that can be accurately coordinated with speed optimisation", according to the Project Manager.

All parameters, including stroke length, number of cycles, sealing/cooling time, item quantities, etc. are entered via a touchscreen, and the system is controlled by an S7 interface. As the length is set in millimetres, but the drive uses increments for its calculations, the millimetre measurements are converted into the required number of steps and forwarded to the drive control.

Following a comprehensive evaluation process, the choice was made in favor of the Plug & Drive motors from Nanotec Electronic. The combination of stepper motor with integrated controller met Joke's requirements for a compact solution. After all, the mini-BagBoy is small enough to fit on any workbench or work table.

Two motors of model number PD6-N8918M9504, size 86, are now in use in every mini-BagBoy 400. With a length of 121 mm, the dimensions were correct and the holding torque of 5.9 N was right. They also impressed in terms of price, quality and performance. Thanks to the Nanotec's proprietary dspDrive technology and open/closed loop support, there were simply no disadvantages in relation to the servomotors formerly used, and they are considerably more compact. The dspDrive technology is based on a digital signal processor and uses software to regulate the motor current in a higher resolution than with standard ICs. The motor runs with lower resonance, and also offers an adaptive step resolution of 1% increments from 1.8 to 1/64 or 1/128 in the open loop as well.

Whether the Plug & Drive motors are working in open or closed loop mode, the Windows-based software NanoPro is used for the setting work. Closed Loop has the advantage of lower energy consumption. Overload reserves permit output peaks without the system failing and the low resonances means that the motors are quieter. The reduced heating is easy on the motor bearings and extends their service life, thus also extending the overall availability of the machine. "The interaction between the drive and the Siemens S7 control and the Cimon touchscreen also functions perfectly." Schumacher is pleased with his decision in favor of the Plug & Drive motors.

The mini-BagBoy can produce bags with a film width between 400 and 600 mm and lengths of between 15 and 4000 mm and more, including on multiple tracks. "The machine is ideal for manufacturing small runs of different bag sizes at low-cost", confirms the Project Manager. Customers have found exactly the same thing, and several machines have already been sold.

