Be always one step ahead

SCHMIDT & HEINZMANN USES INNOVATIVE SEW AUTOMATION KIT

Automobile construction is becoming more and more integrated today, and with it, production. In order to enable its customers, as in this example, to supply trunk lids just-in-time in a very high quality the special machine manufacturer, Schmidt & Heinzmann, chose a drive solution from the new, modular MOVI-C® modular automation system from SEW-EURODRIVE.

SEW EURODRIVE

Schmidt & Heinzmann
COMPOSITE EQUIPMENT & MACHINERY

FULLY AUTOMATIC BONDING MACHINE FROM SCHMIDT & HEINZMANN FOR TRUNK LIDS WITH THE MOVI-C® AUTOMATION KIT

Apart of the e-mobility area, many volume manufacturers in automobile construction are discovering also the field of luxury. This means for the manufacturers in just this area that the competition is increasing and that they are developing their model ranges either with a greater width or height. Specifically in the luxury area, however, there are not high unit numbers coming off the production line. Thus, it is good to have a supply chain that provides just-in-time.

This is exactly what EACC in Markgröningen does. EACC (Euro Advanced Carbon Fiber Composites GmbH) is a subsidiary of the Japanese chemicals, fibres and textiles company, Toray Industries, and produces parts from carbon-reinforced plastic for the automobile industry. EACC has a presence at two locations in Germany: in Esslingen and, since 2016, in Markgröningen, which is also the SMC factory for EACC (SMC = Sheet Molding Compound, see also Box 1).

High-tech for 15 kilo

EACC has now built a new factory in Markgröningen dedicated to one automobile manufacturer. Here, the complete trunk lids will be produced in the future for different sizes of model ranges that will be launched in the coming years. They will be in a quality (Class A – see Box 1) that allows to deliver the parts directly to manufacturer's paint shop. SMC pressing has already been known for many years, but the special part here is IMC (In-Mold Coating), i.e. during the pressing process, EACC applies a conductive coat at the same time, which is the pre-requisite for direct CED painting later at the manufacturer (CED = cathodic electrodeposition).

For the trunk lid itself, there are only the reinforcing elements, i.e. hinge attachments and lock area, produced out of steel, and the aerial elements for radio, GPS and mobile telephone reception.

The trunk lid itself is produced in an SMC composite material. In production it consists of two parts - the outer and the inner shells - and in its completed state weighs just around 15 kilograms. EACC produces the individual parts in a high-precision process and almost completely automated. Only at the interfaces between processes are highly-qualified employees involved manually to either deburr or to check the quality. In this respect, EACC relies on 100% inspection.
After both the outer and inner shells have been pressed and deburred, they are cleaned in a washing and cleaning line so that no more contamination can attach. Otherwise, it would damage the surfaces in the subsequent bonding process, which is also naturally already supported by the IMC. The shells to be connected are now positioned in the bonding machine on a mold baseplate. The bonding process is started and monitored via an operating panel.

The bonding machine itself is a portal with axes moveable in the X, Y, and Z directions. On the Z axis there is a fully automated application machine for the adhesive, which applies the adhesive material at the set positions or surfaces. To apply the two-component adhesive, the portal positions the application machine at the respective position or moves along the contour line for longer adhesive areas. Afterwards, the connecting unit moves forward and the pressing/bonding process starts.
With just about 1.5 tons of pressure, the parts are now bonded so firmly that the trunk lid fulfils all safety requirements. In addition to the pressure, some heat is applied so that the materials flow a little at the adhesive points without distorting, so that the individual parts of the trunk lid are connected with form and friction fitting. Ultimately, it must not vibrate at high speed and must naturally also withstand the appropriate crash tests.

Complex movements …

For the control of the adhesive portal, the special machine manufacturer and experts in the plastics industry, especially in the field of fiber-reinforced plastics, and long-term partner of SEW-EURODRIVE, Schmidt & Heinzmann from Bruchsal (see Box 2), selected the new, modular MOVI-C® automation kit. A TwinCAT 3 CNC takes on the complete control system, but below that the double-axis module from the MOVI-C® modular system is working, which is connected to the EtherCAT® master via the CiA 402 MOVIDRIVE(R) modular drive profile. To connect the MOVI-C® drives below the TwinCAT is possible in a simple and uncomplicated manner.

The X axis of this gantry system is the travel path of the mold carrier. Thus, the travel path is defined from placing the parts to be bonded until their transfer to the handling robot after the completed bonding process. This axis can be travelled at a speed of up to 350 mm/s for 5,500 mm travel distance. The handling units for the portal (Z axis) have a travel distance of 400 mm and can be moved at a maximum speed of 80 mm/s. The movement is controlled by a MOVIDRIVE® modular MDA90A single-axis module from the MOVI-C® automation system together with a CMPZ71S servo motor with a low-play PSF servo planetary drive.

… simply implement it

The advantage in the planning and commissioning phase was the MOVISUITE® engineering software that is a component of the MOVI-C® modular system. For besides the clear time and cost saving from accelerated engineering, the software impresses above all with its usability: planning, commissioning, operation and diagnostics all solved in one piece of software.

Properties of MOVISUITE® are:

» commissioning and parameterization of the MOVIDRIVE® Drive CONTROLLER

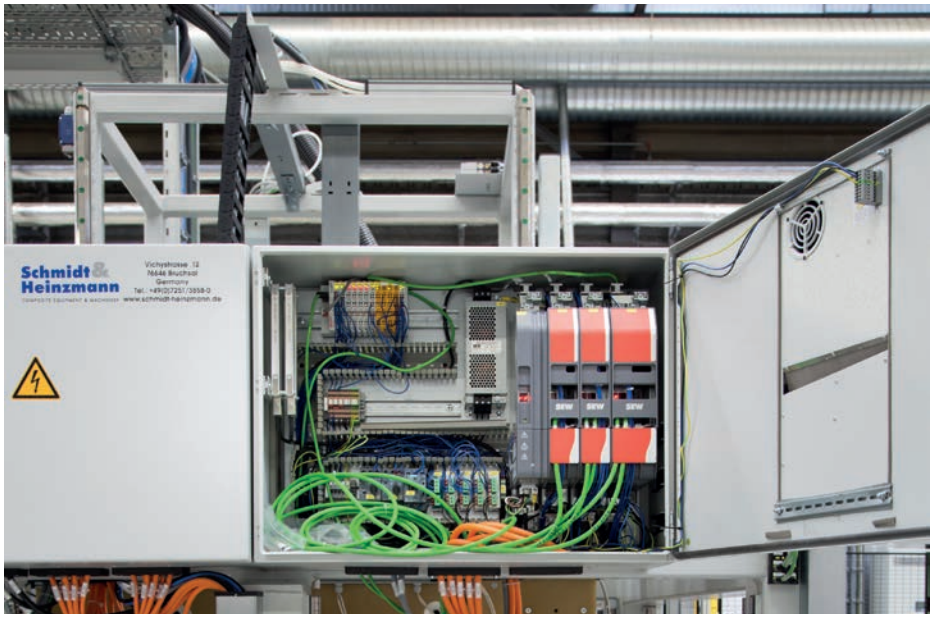
» fast and simple familiarization using a modern interaction design

» intuitive operability of the controller function such as of the manual operation during commissioning of the drive chain

» configuration and IEC program production of the controller

The upper mold that applies the pressure to the bonding surfaces on the workpiece holder where the individual parts of the future trunk lid are lying is controlled by a double-axis module that controls the two CMP80 (installed as direct drive) servo motors in strict synchronization.

The bonding unit is formed among others by the Y and Z axes. The MOVIDRIVE® modular MDA90A double-axis module with two CMP63 servo motors equipped with PSFB servo drives ensures the correct movement.



Satisfied partners

As we make very high demands of this factory, particularly regarding quality of the bonding, after all we are producing Class-A parts, we looked for a special machine manufacturer we could buy such a machine from.

"We were already familiar with the know-how of Schmidt & Heinzmann from previous projects, and knew that we had a project partner here with whom we could reach our goals together. For us, Schmidt & Heinzmann is the best choice today."

according to Michael Vahl, General Manager Production and Logistics at EACC at the Markgröningen location. But they are also happy at the special machine manufacturer in Bruchsal. We decided for the solution from SEW as we have built a new machine here and generally use state-of-the-art technology so that our customer's investment is also futureproof. We were able to optimally implement the requirements of EACC together with respect to the quality to be produced.

"With reference to the drive technology, SEW-EURODRIVE, with its new, modular MOVI-C® automation system was a perfect partner for us, also due to the geographical proximity and long time working together. As SEW has integrated the CiA 402 drive profile between the control system and the axes, it was easy to connect the various axes to the EtherCAT® master,"

summarizes Steffen Märtiens from Schmidt & Heinzmann.

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