Case study

SEW Eurodrive electronics plant Bruchsal

High degree of automation is supported by PCB magazines

SEW Eurodrive sets international standards in terms of intelligent products and services provided from one source. For almost 90 years, its drives have been moving for example conveyors, assembly lines, bottling plants, home appliances, luggage at airports and human beings on escalators or in elevators.

Ultramodern manufacture pays a major contribution to the company's success, which includes PCB assembly with microscale components. cab series 800 magazines can adjust to PCB widths by motor and thus support autonomous line management at the electronics plant in Bruchsal, Germany.

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Uniform fusion

Series 800 PCB magazines provide a coupling. When inserting a magazine onto the loader of an assembly line, the flange on the servo motor of the loader connects to the coupling. The flexible side wall of the magazine moves on threaded spindles with uniform precision to a reference spot. Then the magazine automatically adjusts to the width of the flat modules specified by the plant control. There is no need for providing pre-adjusted magazines on stock. Human errors are avoided, while process quality increases.

Pushing innovations

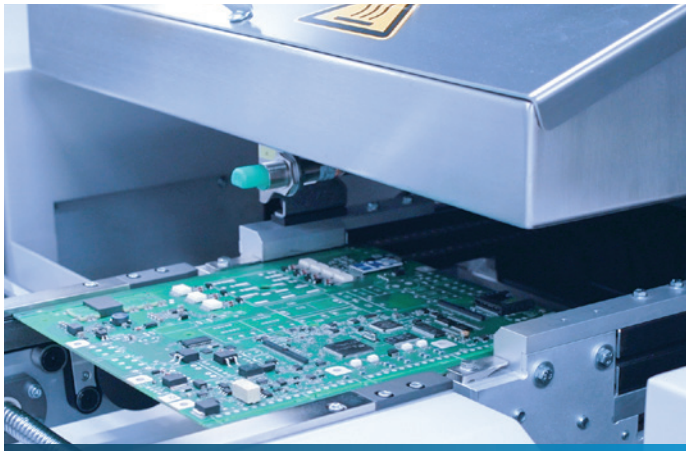
Bernhard Kirchgäßner is a fixed value at SEW Eurodrive. He is responsible for flat modules being assembled automatically on surfaces (Surface Mounted Technology, six SMD assembly lines) and in wired manner (Through Hole Technology, three THT production lines). Perfectly assembled flat modules enable frequency inverters (pictured right) control and regulate drives in machines and plants. Mr. Kirchgäßner has been successfully collaborating with cab for more than 20 years. When talking to him, it quickly becomes clear that systematic optimizing is a matter of his heart.

Questions and answers

Most production sites are monotonous. However, here it is Science-Fiction. What is the reason?

Kirchgäßner: We focus on human beings. This means we are constantly taking into consideration new opportunities to relieve our employees and work even more individual for customers and suppliers. Digital solutions provide the basis to operate our plants in accordance to demands using the Kanban principle. The operators mainly supervise the automated processes. Once an order has been transmitted, we can deliver the electronic component as requested by a customer on the following day at the latest.

Bernhard Kirchgäßner is enthusiastic about the quality of cab PCB magazines.



More than **3,500 raw materials** are processed.

What exactly happens in SMD assembly?

Kirchgäßner: First, PCBs are fed from cab magazines to the production line. Solder paste is printed on the PCBs and measured. Pick and place machines may pick up 20 components per access from a material roll, align them and place an hourly average of 70,000 components on their correct spots on PCBs. By soldering the components on the PCBs in a reflow heat chamber, assembly is finished.

How do you ensure maximum product quality?

Kirchgäßner: No flat module leaves a production line without a check. A minimum of 6,000 automated optical measurements per module ensure that only high-quality products are refed from a line to cab magazines and stacked. When removing a loaded magazine from a loader, the slots on the magazine are locked by bars to secure flat modules during transport.

Talking of transport – this also may be autonomous.

Kirchgäßner: At the plant, mobile assistance systems carry large and smaller cargo from one workstation to the other. Routes are clearly defined, no drivers are needed. At the end of a SMD line, cab magazines and all the data relevant for processes are picked up. Flat modules assembled on one side are transferred to the next production step. In the case of PCB assembly on top and bottom sides, the magazines find their way back to the beginning of a line. The PCBs are turned to their opposite site and refed to a line. Assembly starts again.

What defines the intelligence of the plant?

Kirchgäßner: Intelligence results from innovative machines interacting with measuring systems, software and human beings. Components are provided on each SMD production line by default. If a material is running out of components, the pick and place machine notifies the plant control. The latter requests a new roll of material at the warehouse and notifies the Smartwatch on the operator‘s arm about the upcoming removal. A new roll is automatically provided directly at the plant no later than two minutes after the output signal. The new material can be inserted by the operator. In the meantime, plant operation has continued without interruption.

Which further aspects are decisive?

Kirchgäßner: Flexible software enables us to switch a SMD production line to a new product without downtime. All the relevant track widths and machine parameters adjust automatically. The new assembly job is committed to each machine involved. The plant self-adjusts at the right time. By having the first product of a new batch follow directly to the last product of the previous batch, there might be 30 product changes per line on one workday. If batches are small, a maximum of three different products may run simultaneously in one line. Software creates a copy image of the production line. All the plant operators are provided status and product details in real time on Smartwatches. About 50 million data records relevant for production are written every month. All the components and processes are traceable and documented for future use.

Optical inspection ensures soldered joints, components and polarities are correct.

What do operators learn from those data records about the PCB magazines?

Kirchgäßner: For example, monitors display how many minutes are needed to completely load a magazine. The operators get to know how many PCBs have already been loaded in a running job, which magazines are being loaded at present and how many magazines are still waiting to be loaded. By this, we are always keeping an eye on total times in production, gross and net.

How far do the magazines support the high degree of automation in the company?

Kirchgäßner: We manufacture in Bruchsal about 350,000 flat modules per month. These have to be transported securely every day. cab magazines of the 800 series are made of electrically conductive plastics. They adjust to widths, lock and unlock automatically. With regard to our PCBs being assembled on their top and bottom sides, these are significant features. At all of them, cab and their magazines reliably meet our expectations.

Smart drive technology

SEW Eurodrive manufactures at 16 sites worldwide. 80 technology centers bring in expertise in the fields of sales, engineering, system integration, trainings and further services. 17,000 employees in 51 countries are working for the company, of whom 600 ensure product innovations in research and development.

www.sew-eurodrive.de/home.html

Video of the application:
www.cab.de/en/sew-video

For information on PCB magazines see **www.cab.de/en/magazines**