

Automation Technology at the Highest Level

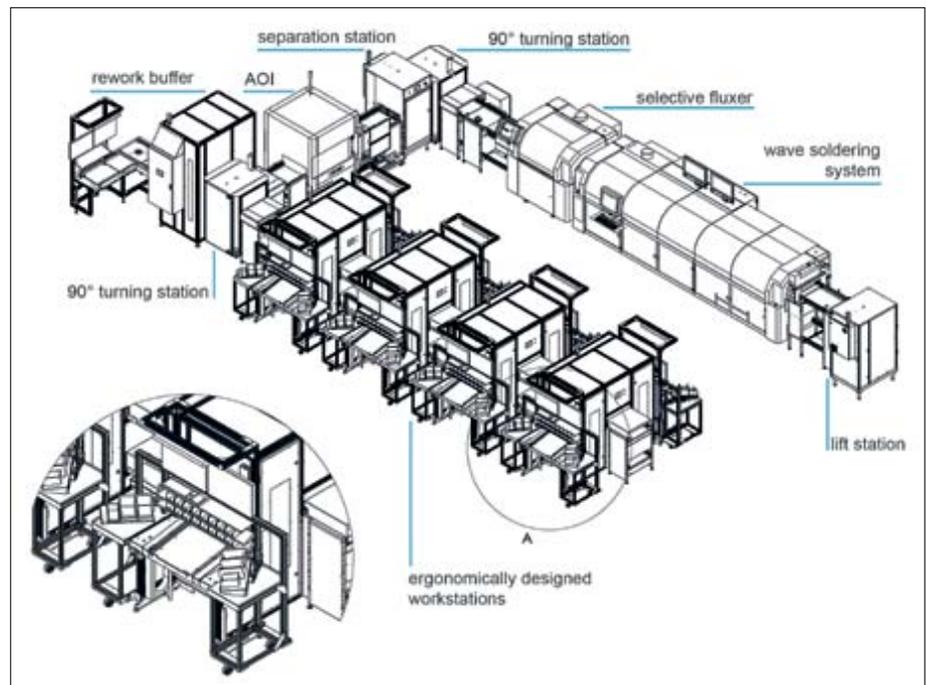
A passion for work that creates innovative solutions

BY PHILIPP TRABOLD, DIRECTOR OF HANDLING SYSTEMS BUSINESS UNIT, HEIKE SCHLESSMANN, MARKETING

Whenever creative ideas, solid know-how, a wealth of experience and a passion for one's work come together, the challenges and issues involved in the production process give rise to exciting projects and finally ideal solutions.

In the past 40 years, SEHO has made crucial contributions to the developments in the electronics industry. Their continuous research and close cooperation with partners in science and industry allowed SEHO time and again to convert innovative soldering technologies quickly into systems ready for serial production. This has earned them multiple technology awards. For the last few years, we have been committed to a single-source strategy: complete solutions for soldering processes and automated production lines. SEHO is the only manufacturer to offer their customers systems for all areas of automated soldering, solutions for the automated optical inspection of solder joints, and intelligent automation designs for board handling and materials management.

In order to achieve greater efficiency in electronics manufacturing processes as well as a sustainable reduction of manufacturing costs, we have constantly expanded its automation solutions portfolio in recent years. Headed by Mr. Philipp Trabold, SEHO assembled a dedicated team of engineers, technical product designers, industrial mechanics, electricians and software specialists who have worked together to turn this product group into one of the company's biggest revenue drivers. "Our portfolio includes pure board handling using conveyors or elevated conveyors; the ergonomic design of workstations; as well as buffer units, rotating and turning stations or lift stations that move boards or workpiece



■ Manufacturing line with workstations, turning stations, AOI, separation station, soldering machine and rework buffer.

carriers from the return conveyor level to the placement belt level," explains Philipp Trabold. Flexible cobots and robots are another fixture of this business unit.

"For each project, the customer's specific requirements provide our starting point from where we work together to develop the optimal manufacturing system for the customer," explains Philipp Trabold. "Of course, we always keep an eye on the budget," he adds.

In addition to the desire to introduce a greater degree of automation into the manufacturing process, another challenge is frequently to integrate a lot of functionality on the smallest possible footprint to allow an overall increase of productivity.

A project that was recently realized posed the challenge of fitting a complete THT production line with automatic

soldering frame management on just 120 square metres. The entire line system including a our wave soldering system is set up in a U shape and designed for high production volumes.

In order to use the space as efficiently as possible, the eight required component placement workstations were arranged in four opposite pairs that share a main conveyor segment towards the production line.

When planning the workstations, the focus was on the workers and the ergonomic aspects of the system. For example, the unit where the component placement is performed can be tilted to allow workers to create optimal conditions. Material trays and line side racks where the placement components are arranged in an easy-to-see and easy-to-reach layout

are naturally part of the system. From a logistics perspective, the integrated line side racks offer the additional advantage of mobility for setting up, which avoids interruptions at the placement stations.

And of course, the ergonomic design of the workstations includes individual electrical height adjustment. “This allows workers to choose between standing up or sitting down. Each person can adjust the working height to their preferences at any time,” explains Philip Trabold. And of course, workers do not need to put the soldering frame onto the main conveyor segment manually when they are done. A handling unit between workstation and main conveyor takes care of this task at the push of a button. This unit automatically adjusts to the specific workstation and compensates for the height difference. Safety transfer units with safety guards prevent any risk of injury to the operators.

All workstations share the main conveyor that moves the soldering frames to a 90° turning station in order to change their travel direction, i.e. the direction for component placement. Opposite workstations are always synchronized, so regardless of which workstation an operator is at, their placement task remains the same. The AOI system integrated in the production line then inspects each assembly to verify the correct component placement. An adjacent automatic separation station separates fault-free soldering frames from the ones with defects. The fault-free frames go through another 90° turning station and then enter the wave soldering system. The soldering frames with placement errors are lowered automatically to the return conveyor level where they are returned to the relevant placement workstation.

After wave soldering is complete, the soldered assemblies are also lowered to the return conveyor level and pass through the AOI again for the solder joint inspection. Fault-free soldering frames are then moved to the relevant workstation.

To prevent back-ups if assemblies with soldering defects cannot be processed immediately, the production line includes a central rework buffer that can hold bad boards awaiting rework. With the push of a button, an operator can request a soldering frame which is then delivered automatically to the workstation. And of



■ Elevated conveyor for handling of soldering frames.

course, the relevant handling unit automatically adjusts to the current height setting of the operator’s workstation.

This project uses RFID to perform the automatic control of the soldering frames within the production line. Alternatively, it is of course also possible to integrate bar code readers or similar identification systems into such a production line.

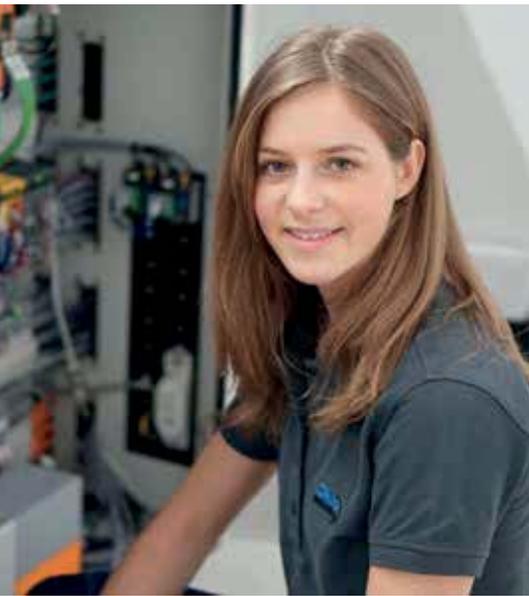
In another project involving the automatic handling of soldering frames, the special challenge was that the customer was using frames of different lengths which they needed to continue to use. The production line design includes four component placement workstations that are parallel with the main conveyor, as

well as handling units for feeding and picking up the soldering frames. Each of the handling units is equipped with six buffer stations between placement conveyor and return conveyor. The SEHO team developed inward transfer units that adjust automatically and flexibly to the required length of each soldering frame. By reading each frame’s transponder, the inward transfer units for the main conveyor adjust to the required length within seconds.

“We have realized some customer projects that didn’t have anything to do with electronics manufacturing per se. Those really allowed us to bring all of our creativity to the table,” says



■ Turning station: change of the soldering frames’ travel direction and synchronizing workstations.



■ “We love what we do, and that’s why we’re good at it.” Simone Neukirch, Electronics Specialist.

Philipp Trabold. In the end the focus was, as always, on improving ergonomics and making it easier for workers to do their jobs. The goal of one project was to automate handling processes that involved material packages weighing 25 kg or more that needed to be managed within manufacturing area and that also

required a logistics connection between a regular manufacturing environment and a clean room.

Philipp Trabold’s team had the idea of using roller conveyors with Smartmotor control. Heavy-duty turning stations with hoists for re-directing the material packages were a key component of this automation design. Likewise, the docking stations for transferring the packages from the industrial trucks to the handling system. The special highlight, however, was an automatic wall pass-through air lock for moving the packages from the production facility into the clean room environment.

“We love what we do, and that’s why we’re good at it,” says Ms. Simone Neukirch, an electronics specialist in the team. Philipp Trabold adds: “Production line automation is really exciting because each customer faces unique challenges in their manufacturing operations. Our team is highly experienced in planning and design, automatic control systems and software development, as well as the mechanical and electrical installation of the individual components. From our first creative idea all the way to the commissioning of the complete production line, we are constantly in touch with our customers to ensure that we make their



■ Philipp Trabold – Director of Handling Systems Business Unit.

specific automation solution a reality.”

SEHO’s single-source philosophy has another crucial benefit for users: All components of the production line, including SEHO’s soldering and AOI systems, harmonize perfectly in their technology and in the production process, and they include communication interfaces that simply work. [G](#)



■ SEHO’s Automation Technology team.