



## Special Features: SMT and Production



# Plug-and-Produce: Selective Soldering Made Easy

By Heike Schlessmann, Marketing, SEHO Systems GmbH

The potential for innovation in electronics makes it one of the most dynamic industries today. Selective soldering has seen a dramatic increase for years, more so than any other soldering process in electronics manufacturing.

The consistent trend towards the miniaturization of assemblies means that more and more products are evolving from the classic through-hole layout to reflowable SMT assemblies. This leaves only a few through-hole components that need to be soldered after reflow. These components may not be available in SMD format or might be significantly more expensive than their corresponding wired component. These are typically plug connectors, electrolytic capacitors or coils, and often, are temperature-sensitive components or electric mobility parts.

Due to high quality requirements, many sectors of electronics manufacturing today no longer accept the manual soldering of these components. There are too many uncontrollable variables that impede a reproducible process and

the potential for human error is too great. Also, the costs of manual soldering are not insignificant. There are also



*Soldering process with a 7° angle – perfect peel-off and minimization of potential soldering defects.*

“hidden” costs, such as training for employees and costs for consumables.

### Plug-and-Produce Soldering

A high degree of automation in production typically means large investments in machinery. Especially for small or mid-sized production volumes, the investment in an automated selective soldering process appears unprofitable. However, this perspective changes if automation is not excessive, but adequate.

The result is the perfect interplay of man and machine. The priority is on keeping it simple. The operator must be

able to understand the processes and know how to operate the system at a glance, what the machine is doing and why.

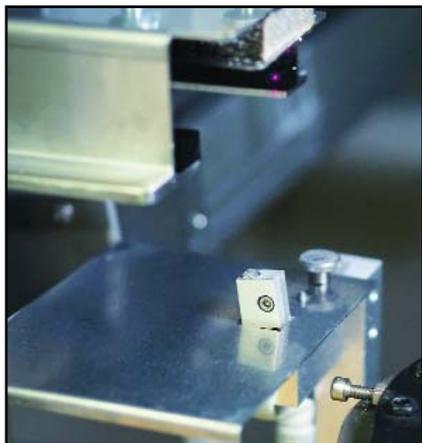
With these factors in mind, SEHO recently introduced its StartSelective selective soldering system. StartSelective is a “plug-and-produce” selective soldering system for those just entering the automated soldering field, or for anyone looking for a short-term capacity expansion. It is fully equipped to begin production immediately.

“In particular with regard to human-machine interaction, we wanted the StartSelective to be really different from other machine designs,” says Alexander Blum, selective soldering product manager at SEHO. “In this respect, the machine is a complete success. No special skills are required for operation.”

The soldering programs are created offline at any PC workstation so that the system is always available for production. A USB stick or a network connection is then used to transfer the soldering programs that were created

offline to the machine quickly and easily. The system itself comes with an HMI touch panel. The operator only needs to push a few buttons in order to load the program and start the process.

While the operator loads and unloads the assemblies manually, the entire processing workflow in the system is fully automated — keeping things simple. For the individual process stations of the StartSelective, SEHO sticks with tried-and-tested technology. All



**Precise micro drop jet fluxer with function and positioning control.**

process-relevant components, such as the micro drop jet fluxer, preheat system and soldering unit have been used successfully for years in other SEHO soldering systems.

“The StartSelective is the first machine where we combined them in this form,” says Blum. “We involved our customers in the development process of the system and their focus was on the consistently high quality of the manufactured products and on lowering their production costs.”

The preheat section of the StartSelective is equipped with pulsar heaters over the entire surface, which are noted for their high energy density and extremely quick response times. The heaters can be activated in pairs with individual power output as needed, which ensures not only the optimal temperature management on the circuit board surface even if mass conditions vary, but also reduces the energy con-

sumption of the system to a minimum. In addition, there is a top heater that supplies a continuous controlled heat input for constant process conditions even in long soldering cycles.

A particular highlight is the soldering area with a 7° soldering angle that is optimized for the use of non-wetted mini-wave nozzles. This results in ideal solder peel-off and the effective minimization of potential soldering defects.

The solder nozzles stand out for their stable, reproducible flow behavior — a basic prerequisite for good soldering quality. They allow minimal distances between vias so that even complex assembly layouts can be soldered easily. “Non-wetted nozzles have more benefits, though, which is another thing that sets the StartSelective apart from other machine designs,” says Blum. “These nozzles are maintenance-free and have an almost unlimited service life, which means there are no follow-up costs. In addition, they do not require any aggressive chemicals to be added for activation. This is a benefit both for the health of the production staff and for the environment, and of course it also saves production costs.”

The soldering unit itself includes an electromagnetic drive to ensure consistent wave height. It requires minimal maintenance and is virtually free from wear.

#### **Built-in Quality**

The fact that the quality of a finished product matches the requirements is something that end customers today simply take for granted. This alone does not guarantee sales. However, poor quality can do a lot of damage. The production of defective products has a negative impact on deliveries and costs. In the worst case, even the brand image can take a hit. For this reason, it is always better to prevent defects than to correct them.

The StartSelective all-around, care-free package also includes continuous monitoring and automatic control of all relevant process steps. The heating circuits in the system are continuously monitored, and a sensor system controls the heating output in the preheat area,

as well as the soldering area. In the fluxing area, a spray jet monitor checks the proper functioning and positional accuracy of the system.

The solder level in the crucible is continuously monitored and solder wire is supplied automatically as needed. A contact measurement of the solder wave surface automatically controls the wave height in order to ensure consistent process conditions. The nitrogen flow rate is also constantly measured and monitored.



**StartSelective selective soldering system.**

Due to its compact design, the machine takes up only about 27 ft<sup>2</sup> (2.5m<sup>2</sup>) allowing it to fit into any production island. It can also be placed in the corner of the production floor as a stand-alone system.

“Another way in which the StartSelective is different from other systems is that operation is done at the front, while all retooling or maintenance is done through a door on the right side of the machine. This means no more worries about the lack of space on the production floor, and yet the machine is able to process assembly formats up to 20 by 20 inches,” says Blum.

For one-piece flow, the StartSelective offers an exceptional return on investment as well as quality and reproducibility of the soldering results and 100 percent flexibility from the very first piece.

Contact: SEHO North America, Inc., 1445 Jamike Avenue, Suite 1, Erlanger, KY 41018

☎ 859-371-7346 fax: 859-282-6718

E-mail: [sehona@sehona.com](mailto:sehona@sehona.com)

Web: [www.seho.de/en/north-america](http://www.seho.de/en/north-america) □

See at productronica, Hall A4 Booth 578