

Press Release

Assembly concepts for diversification, flexibility and production adaptation

Flexibility is the right strategy

Processing reliability ensured through intelligent manual work stations

Peter Smith, production engineer at a well-known manufacturer of heating control units explains his situation: "Our heating control units (HCU) are available, according to type and size of heating system, in many design variations. With the recent introduction of our new control units we are starting three separate series, our HCU25, HCU50 and HCU100. When launching our new series onto the market we are unable to accurately estimate any expected production numbers. It is also difficult to plan out how the quantities required of each individual version will develop in relation to one another. It is for exactly this reason that we require some highly flexible assembly equipment. Ideally, production should be able to be simple, reliable and economically adapted to each of the product versions. Additionally, for our HCU assembly we have the highest requirements for processing reliability as is usual for electronic components. The sequential order of assembly must be guaranteed and each step must be documented and integrated into our manufacturing execution systems".

These high standards of process reliability and documentation advocates an automatic solution, which eliminates the possibility of human error. The required flexibility and adaptation to varied production versions however recommends a flexible operator controlled semi-automatic assembly solution. "There are several options in approaching this assembly task" explains Jürgen Hierold, Sales Manager at DEPRAG SCHULZ GMBH u. CO. "In this instance; I would suggest a flexible, upgradeable assembly line with intelligent manual work station".



Complete Intelligent Manual Work Station

But what exactly is an "intelligent manual work station"? On an intelligent manual workstation processing reliability is guaranteed just as it is on an automatic assembly system. As a reaction to increased demand of one HCU version, it can be upgraded to a semi- or fully-automatic production line. The specialists at DEPRAG

SCHULZ GMBH u. CO have been engaged for decades with the complex demands of reliable screw assembly. They offer a comprehensive program of sophisticated standard modules from which the manual work stations can be built - reliably, economically and ergonomically.

The structure of the manual work station is ingeniously conceived and designed to suit the required standards of processing reliability. Jürgen Hierold clarifies, "It is particularly important to define the requirements for processing reliability well in advance. Processing reliability is based on reliable repeatability of the individual processing steps and parameters within pre-set tolerances. The size of the tolerance window for components defines the level of quality". If the demands and solutions for processing reliability throughout the entire assembly process are set and recorded in detail, then errors during the conceptual phases can be eliminated. It is these errors, which are most difficult and expensive to correct later on.

The flexibility required by Mr. Smith can also influence various processing steps. Therefore, during planning the needed flexibility must be addressed and defined as well. Does the demand for flexibility influence production procedures? How often will it be necessary to convert the machine? What is the product's life span? What should happen to the manual work station once the product is no longer produced? How many alterations to production numbers are expected and must each manual work station be able to produce all three models? DEPRAG has a solution ready for every question. It is important to ask the questions at the right time. For example: A combined screw feeding device supplies different types of screw to a screwdriver. This is precisely directed using

a screwdriver positioning portal: The XY coordinates of the screw assembly position are recognized by the portal, communicated to the feeding system and screwdriving controller and then the required screw fastener and screwdriving parameters are selected. That way, it is possible to use one manual work station to reliably assemble all models, HCU25 with M3x8 screw, HCU50 with M3x10 screws and HCU100 with M4x12 screws. The correct screw is always supplied and assembled using the correct torque. The requirements from Mr. Smith to ensure that the sequential order of screw assembly is followed can also be controlled by the screwdriver positioning portal. If the screwdriver is positioned over the wrong screw location, it will not start but is locked-out. Screw assembly will only be completed if the correct order is strictly adhered to.



Screwdriver Positioning System

Using interchangeable adaptors, assembly can be flexibly converted to accommodate the various sizes of HCU25, HCU50 and HCU100. Work piece adaptors are equipped with integrated sensor technology and communicate with a line PLC.



Screwdriver with Controller and CleanFeed System

Jürgen Hierold further explains: "Our customer had particularly tight windows of tolerance for the assembly of the HCU units and the quality requirements were very high. One factor in the fulfillment of these requirements was the selection of the most suitable screwdriving technology". Electronic freely programmable screwdriving tools enable the evaluation of screwdriving parameters, statistical calculations, product data acquisition, linking to manufacturing execution systems, documentation and archiving of assembly results. High processing reliability during the individual assembly steps guarantees work station components which are systematically designed to suit the application. All system components must harmonies, interact and communicate with one another. As well as tried and tested high quality

screwdriving tools there are screw- and part feeders, screwdriver positioning systems for reliable operator guidance, screwdriver and sequence controllers with corresponding software, and part adaptors as well as positioning equipment all harmonized to suit one another.

It is only a manual work station which incorporates an operator's needs right from the start that can guarantee optimal production. Under the keyword Ergonomics, DEPRAG places emphasis on a series of solutions, which play a key role in equipping a user-friendly work place. They are focused on fatigue-free, reliable operation, safety in the workplace, operator friendly activation, clear visual displays, and evaluation and troubleshooting of processing data and errors. An optimal flow of materials and the ergonomic design of the screwdriving tool is also important. The acceptance of the work environment by the operator will also be increased by the clear HMI (human machine interface) with optimal visualization, user friendly hard- and software, which is easy to understand. Only the one that enjoys his work is good at it!

When assembling highly sensitive printed circuit boards for the HCU series on an intelligent manual work station, the electronic components are protected by targeted electro-static discharge. The ESD-enabled DEPRAG solutions function continuously (for all components of the manual work stations) and this is recordable and verifiable for the end-user. The same care is taken in the realization of technical cleanliness. Dirt particles can damage sensitive components. They can be created in the feeding of connection elements or by the screw assembly itself. To minimize the danger of dirt particles in the production process the following can be utilized: feeding systems without vibration, positioning and assembly of connection parts with vacuum suction or particle killers. The requirements for technical cleanliness and ESD-capability should be continuously realized for all individual components of a system. It is therefore of a great advantage when all components are coordinated.

“The collaboration with DEPRAG has been impressive. All our technical requirements were realized with already existing harmonized standard components within the shortest period of time. And what is particularly important for us, all system components come to us from one source. When we need to increase our production capacity we can flexibly expand our assembly line”.

Please use the following [link](#) to download our new catalog “The Manual Work Station” and learn more about the individual components providing processing reliability, flexibility, ergonomics, ESD-capability, technical cleanliness and cost-effectiveness.



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