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Screwdriving Technology
OFFERING ASSEMBLY SOLUTIONS
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Press Release

A change of direction towards "intelligent workstations" can pay off.

Back on the road to success with flexibility and process reliability.

Combining manual and automated assembly processes.

The manufacturing industry is in an unprecedented recession. Due to the economic crisis large systems in many production halls are standing still, or working at low capacity. The only way to reach positive results in assembly processes is to quickly adjust to varying production rates. Manufacturing specialists still lack medium term planning certainty; sales forecasts are inaccurate and remain speculative. Flexibility is the right strategy to pursue. In assembly engineering this leads to an increased demand for "intelligent workstations" that make a combination of manual and automated assembly possible.

Quick adjustment to unexpected rises in unit numbers is usually dealt with through additional manpower. Tried and tested system modules, combined with a system that has high process reliability, allow this flexible manpower adjustment without a sacrifice in quality. For decades, the German company DEPRAG SCHULZ GMBH & CO. has been devoting itself to the complex demands of process-reliable manufacturing. The specialist in screwdriving technology and automation has a range of sophisticated standard modules to create workstations which are both ergonomic and economic. With increasing demand, these can be expanded to semi-automatic or fully automatic production lines. Even in manual assembly, process reliability reaches the high level of automated assembly systems. During the trade fair “AUTOMATICA”, taking place from June 8th to June 11th in Munich, the automation specialists from DEPRAG, the long-established company situated in Amberg, Germany, will be available at their exhibition stand to answer any questions concerning process reliability and the “intelligent workstations”.

The “intelligent workstations” are the perfect solution for the following assembly task: a consumer electronics component is assembled in six steps. The bottom part of the casing is placed into a work piece holder with integrated sensors (1). Now, a circuit board (2) and further components (3) are fitted to the casing, the respective top part of the casing (4) is added and screwed to the bottom part (5) with eight screws. Then, the finished work piece is taken out of the work piece holder (6). Using various elements assembly specialists arrange an assembly system that is adjustable to varying unit numbers. If capacity increases, top quality is still ensured while employing newly trained staff.

For the development of the „intelligent workstation“ for this specific case, DEPRAG uses standard components from its product range, that have successfully been tried and tested in assembly, to make possible a personalized conception of the assembly system while maintaining an optimal price-performance ratio. All system modules are manufactured in-house. Screwdrivers, screwfeeders, controllers and process monitoring are fully compatible. The customer profits from the expertise and long-standing experience of the screwdriver technology specialist.

First of all, the planned assembly requires the insertion of the bottom part of the casing into the work piece holder. This first step is the basis for the high process reliability that is characteristic for all DEPRAG components. The work piece holder is equipped with integrated sensors that monitor and control the correct sequence of the assembly. The worker places the circuit board into the bottom part of the casing and adds the other intended components to it. This process is monitored as well. Afterwards, the top part of the casing is screwed to the bottom part.

Scratches on the casing are a legitimate reason for the end consumer to file a complaint. Therefore the screwdriving task must be carried out gently, taking care not to harm the units. This is why assembly specialists use a template with a hold-down function that eases the guiding of the screwdriver and prevents damage to surfaces during assembly. The worker screws eight screws per component, the sequence is fixed.

An “intelligent workstation” is also expected to be quickly and easily adjustable. The new DEPRAG series 6 screwfeeder is the perfect choice for this case. It adjusts to the operators' working rhythm. When the production rate rises, the experienced operator can keep working at “his own pace” and his less experienced colleague who is being trained can work at a slower pace. The RFID-Interface-System allows for 10 different operators, their personal-specific parameters (that are entered using the display) are easily accessible at shift change. The operator activates his personal data with his access chip and can go on with his screwdriving tasks at his own pace. The work process is therefore widely accepted because nobody feels overstrained and no one feels held back.

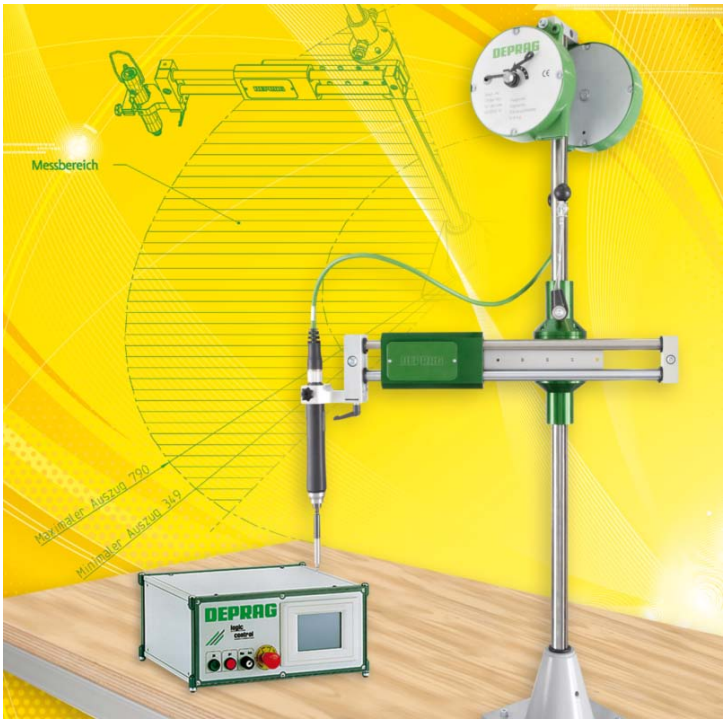
The new DEPRAG series 6 screwfeeders supply screws precisely and reliably. In order to do so, the vibratory amplitude in the feeder bowl is independently controlled and regulated by measurement technology. Therefore, there is no fluctuation in feed rate caused by variations of volume in the vibratory feeder.

“Intelligent workstations” combine manual labor with the high process reliability of automated assembly. The assembly of the aforementioned consumer electronics component requires 8 screws to be tightened in a fixed sequence. For this task, DEPRAG uses the “Position Control Stand” and the MINIMAT®-EC screwdriver. When screwing a number of screws to a component, the correct sequence often plays an important role in the quality of the assembly, for example with respect to tightness. With the Position Control Stand, the customer has an effective tool for coordinating this process. The screwdriver will only start, if the chosen sequence is kept.

The MINIMAT®-EC screwdriver used for this task is also designed to achieve absolute process reliability. Within the power range of the chosen tool, torque value, angles, speed, stand-by and direction of rotation can be adjusted individually. The brushless EC-motors provide low maintenance operation and long operating life of the screwdriver. Due to their outstanding dynamics and high peak torque values, they are ideally suited for the tightening of screws. Integrated monitoring of torque and angle values allow exact control of the screw tightening process, as well as the documentation of all important process parameters.

For the operation of the MINIMAT®-EC screwdriver, the DEPRAG sequence controller AST10 with an integrated power electronics system is required. The sequence controller contains standard programs for screwdriving tasks. Their parameters are directly adjustable via the operator's keyboard. If the production order changes, the flexibility of these “intelligent workstations” becomes especially obvious. The new screwdriving sequence can easily be created using the screwdriving programs available in the standard program.

Even more flexibility and efficiency for manufacturer and operator is provided by the integrated web server. No matter which system software the customer uses, communication with the sequence controller is carried out via a common web browser (for example MS-Explorer) and an Ethernet interface. The AST10 web server makes the creation and parameterization of screwdriving programs with the Linux system software possible. The display of parameters and settings is carried out just as on the internet: on static or dynamic web pages. The AST10's web interface communicates with the DCOS control vial http.



The new controller family DCOS (**D**EPRAG **CO**NTROLLER **S**YSTEM) offers optimal controlling for the "intelligent workstations". This control system works with an industrial PC and in comparison to the conventional PLC it opens the manifold possibilities of the PC world to the operator. The system consists of the hardware components DPU 100 (**D**EPRAG **P**ROCESSING **U**NIT) as well as the peripherals DSEC (**D**EPRAG **SE**CURITY **C**ABINET) 20, 30 or 40, and a software package that is tailored to the needs of screwdriving, screwfeeding and assembly. In the standard software package DCOS CLASSIC, CLASSIC-plus, ADVANCED and PROFESSIONAL, the DEPRAG automation specialists have incorporated all problem solutions from their decades of experience in the field of screwdriving, screwfeeding and assembly technology. Functionally reliable and economic workstation solutions can be realized quickly as they are based on proven, standardized solutions. Furthermore, this package offers a high degree of user friendliness, extensive documentation possibilities, and optimal functional reliability. Preparations for traceability in manufacturing and process reliability of the "intelligent workstations" are thereby excellently implemented!

Single steps in manufacturing, such as screwdriving, labeling, palletizing, clipping, laser inscribing, welding, or gluing of components can be automated by the employment of a manually assembled assembly platform made up of the popular DEPRAG product family DCAM (**D**EPRAG **C**OMPACT **A**SSEMBLY **M**ODULE). Fully automated systems are often inflexible and in the case of low production rates they cause expensive overcapacities. Greater demand on the other hand, leads to supply bottlenecks, unhappy customers and high costs. In this case, flexibility is crucial for success. A DCAM can quickly be modified according to changing demands. Feeder systems and process modules can be exchanged and readjusted.

The DCAM is a compact working platform. The modular and flexible platform concept in connection with the freely programmable axles makes it versatile for various assembly and installation tasks. Hundreds of DCAM assembly lines are in operation across the world, for example in the assembly of mobile phones. They are either assembled manually by an operator or through an automated feeding system.

A DCAM combines efficiency with the highest possible process reliability. The operating costs stay relative to the order situation. If the order volume rises, productivity can easily be increased by employing further operators or extensions. "Intelligent workstations" - composed of the proven assembly modules - or a DCAM assembly platform are a good way to stay on the road to success with strategy and entrepreneurial flexibility, despite fluctuating production numbers.

The DEPRAG SCHULZ GMBH u. CO. situated in Amberg/Germany is represented by 600 employees in over 50 countries. For decades, DEPRAG engineers have been working on innovative concepts for automation and offer full service to almost all industrial sectors. DEPRAG is not just a supplier for system integrators with innovative screwdriving and feeding technologies, it also offers extensive automation solutions. A “one stop shop” company, that takes full responsibility. A trait that is especially valuable for the customer when it comes to service and maintenance.

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