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Press Release

New function control fc20 presented at the AUTOMATICA

Functional diversity and a high degree of user-friendliness

Seven sequences with 99 respective screwdriving programs realizable

Flexibility and functionality, and high process reliability with low investment costs, these are the industry's demands to master the control tasks in screwdriving and assembly technologies, which are becoming increasingly complex. With the introduction of their new function control fc20 for pneumatic and electric screwdrivers at the AUTOMATICA in Munich this year, DEPRAG SCHULZ GMBH & CO. has succeeded in satisfying these demands. The automation specialists combined all their expertise in the further development of the fc10 control. The new fc20 impresses with its extensive user-friendliness, its high flexibility and the numerous possibilities of individual screwdriving process configuration. With the introduction of the fc20, DEPRAG is staying true to its company policy - Improving what has proven successful and setting standards through innovation.

The new function control fc20 was developed for use in combination with DEPRAG pneumatic screwdrivers: MICROMAT®-F, MINIMAT®-F and DEPRAG electronic handheld screwdrivers of the 341 series. Their extraordinary diversity makes them unique: screwdriving processes for up to seven sequences of respectively 99 programs each can be created individually. For example the assembly of an electronic component: first task is to screw a transformer with four screws M4 onto the electronic component, the second task is to fix the circuit board to it with two screws M2. In step three the casing is assembled with four screws M6. With the new fc20, which can control up to three different types of screwdriver, high flexibility in the various screwdriving demands of a component can be reached. The controlled execution of all three assembly steps "transformer assembly", "circuit board installation", and "casing assembly" are performed in sequence.

The small size, high function fc20 controls the intelligent DEPRAG pneumatic screwdrivers MICROMAT®-F, MINIMAT®-F and DEPRAG electronic handheld screwdrivers. This is how it works: after detecting the screwdriver's starting signal, air supply is released by the new fc20 while communicating with the pc10 control unit. Correct torque is pre-set for the application directly on the screwdriver. The screwdriver is turned off automatically by a highly precise disconnect and shut-off clutch as soon as the pre-set torque is reached. The fc20 is "signaled", either by the screwdriver's pneumatic controller or in the case of an electronic screwdriver the control module, that the screwdriving process has been completed. Now, the fc20 compares the needed screwdriving time with the target time.

If the duration of the screwdriving process is within the range of tolerance, the message OK is transmitted. It is now ensured that the screwdriving process was completed successfully, and that the screw has not been damaged through material defects of the work piece or the screw, or through premature lifting of the screwdriver, or through repeated tightening of the same screw or through over tightening of the screw. The fc20 controls the number of screwdriving processes per work piece: not a single screw is left out!

The control's flexibility is outstanding. Up to seven sequences can be arranged from up to 99 programs respectively. If during the assembly of the transformer in our example the first M4 screw has to be assembled in 1 second, the second in 1.2 seconds, the time frame for each of the two screws is set individually. For screw 1 the time frame is from minimum 0.9 seconds to maximum 1.1 seconds, for screw 2 between minimum 1.1 seconds and maximum 1.3 seconds. The next step, circuit-board installation, does not begin until all four screwdriving processes needed for transformer assembly are OK.

The new fc20 has freely useable power outputs, so the integration of a work piece lock into the process is possible. This means that the finished work piece can only be removed from the work piece holder once all three assembly tasks (transformer, circuit board, and casing) have been successfully completed and have been released as OK. This additional process security can easily be programmed by the user themselves.

The correct completion of a screwdriving task is only possible if the single components are in their correct position in the work piece holder. The new process control "recognizes" up to three part sensors and thus makes a precise presence and position check, even with components that have several tiers.

The fc20's documentation features are especially versatile. Each respective screwdriving process can be attributed to a specific work piece. Optionally, a barcode scanner can be connected to the fc20; the end values are stored along with the respective screwdriving process on the component's barcode. These end values are stored for seven days and can be transferred to a PC via a serial interface for process traceability. The number of good/bad screwdriving processes as well as the average screwdriving duration allow for control and optimization or the assembly process.

Communication with a superordinate control (PLC or industrial PC) is carried out via 24V E/A- interface. The fc20 has 5 power outputs. Two are reserved for the "OK" or "NOT OK" signals, a connected illuminated display shows the success or failure of the screwdriving process. The other three power outputs are freely used in the sequences - for example for the part-lock. The control can also be integrated into a Screwfeeder.

An extensive range of diagnostic possibilities round off the wide spectrum of the new screwdriver control's application options. Using a transducer, the worker can control the preset torque directly at the work piece, making it much easier for maintenance and quality management. Integrated diagnostic features are able to test all of the control's inputs and outputs and display their current states. Furthermore, an internal voltage monitor ensures fc20's continuous functional reliability.

A secured Human Machine Interface (HMI) increases assembly quality. For decades, DEPRAG has been researching and developing screwdriving and screwfeeding technologies, the planning and construction of assembly stations and the measurements necessary for process reliability. Their engineers know all about the difficulties faced in assembly. This competence is reflected in the user-friendliness of the new fc20. An integrated graphic touch screen display, with a straightforward structure and clearly legible display of texts and symbols as well as color differentiation of the results (green or red) ease operation for the workers. The menu for the fc20's various features can be touch screen accessed. A clearly structured menu shows the way to the desired submenu, where the definition of sequences and programs or the selection of diagnostic functions is easily carried out.

DEPRAG Mechatronics Development Manager Bernd März is certain: "The new fc20 screwdriver control encompasses everything that systems engineers and assembly specialists expect. It offers numerous functions within its minimal space and enables high process reliability with low capital expenditure."

DEPRAG SCHULZ GMBH & 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, but 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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