

Press Release

DEPRAG screwdriving technology for low torque applications

Low-Torque Tools – Assembly & Miniaturization go hand-in-hand

Choosing the right screwdriver guarantees maximum precision and highest quality

"Electronic components simplify our lives. Both in the workplace and as part of our daily routine electronics are useful, be it with computers & cell phones and in industries such as appliance, entertainment or automotive. They are indispensable in innovations relating to all areas of modern technology". This is how the German Federal Ministry for Education and Research describes the role of microelectronics within their policy document from 24.06.2014. The Federal Government has recognized the meaning of this research arena for a long time and even considers this one of the central key technologies of the modern industrial society. In the future research into micro- and nano-electronics will be even more strongly supported at the national and European level. The Federal Ministry for Education and Research will, within the framework of the development program IKT 2020 Innovations, strengthen the dominant technological position of Germany in electronics in order to secure a competitive position and increase the attractiveness of Germany as a location for business.



The DEPRAG Miniature Screwdriver assortment

The commercial application areas of automotive, medicine, logistics, energy and machine building will thereby be significantly promoted in order to reach quality goals such as efficiency, security, user friendliness and resource efficiency. In the foreground of this support will be the smooth link between technologies and application fields with the aim of implementing research results as quickly as possible with economic success.

The challenges and time-consuming nature of any new development is however only truly understood by technicians. Hidden from view beneath the product surface of all highly complicated electronic systems is the pressure to develop at an acceptable price, manufacture and bring onto the market an utterly reliable as well as energy efficient product. Vastly increased performance capabilities and constant miniaturization have characterized the past decades of developments in electronics.

DEPRAG SCHULZ GMBH u. CO. is known for their continued product optimization and for introducing new developments for the assembly of miniaturized components. The specialists in screwdriving technology lead the market with an innovative screwdriver for tiny assemblies - the NANOMAT low-torque screwdriver. This small screwdriver reaches highly accurate, extremely low torques from 8 Nmm to 300 Nmm at speeds of up to 2000 1/min – and that in four different speed ranges. Therefore the DEPRAG NANOMAT is a screwdriver with one of the smallest torques on the market.

DEPRAG Sales Manager Jürgen Hierold describes some application examples of the low-torque screwdriver: "The NANOMAT can be used in medical technology for reliable processing of hearing aids or pacemakers. These screwdrivers also have wide ranging application in the watch industry or precision engineering for the manufacture of measurement devices". Another application area is the optical industry where in the assembly of glasses, objectives, cameras, lens and microscopes tiny connection elements must be screw assembled. In the production of electronic products and components such as mobile telephones, calculators, games consoles and computers the miniaturization of devices has a great influence on the type of assembly required.

What first sounds so easy as an assembly procedure can be filled with tricky pitfalls to negotiate.

From the point of screw assembly the assembled elements behave as one complete part. The task of the screw is to join the component parts together so tightly that external influences cannot displace them. The attainment of this force – pre-load force, is determined by the designer but can only be measured with difficulty in series assembly - a large problem when trying to achieve zero error assembly. As a substitute the torque value with which the screw



The DEPRAG stationary Nanomat®

is assembled is used. This value can be calculated from the required pre-load force and is then used as value to determine correct screw assembly.

Alongside the training of staff and the use of high quality material, the selection of the right screwdriving tool for the application plays the main role in guaranteeing processing reliability in assembly procedure. The extraordinary processing quality of the ergonomic NANOMAT low-torque screwdriver and its design for tough industrial conditions ensures an extremely long lifespan.

The flexible EC screwdriver for highest requirements

The NANOMAT-EC spindle screwdriver provides the highest possible processing reliability for industrial assembly from its reliable and low maintenance brushless EC motor. It is designed with excellent dynamics and high top torques to be the ideal driver for screw tightening. It has integrated torque recording, based on precise motor current measurement and the evaluation of additional dynamic influencing factors as well as torque measurement enabling exact control of multi-stage screwdriving processes and the documentation of screwdriving results.

DEPRAG screwdrivers are based on EC technology and can boast a torque accuracy of $< 2\%$ standard deviation which remains true for millions of cycles. Therefore the machine capability index of ≥ 1.67 at a tolerance of $\pm 10\%$ relating to 6 Sigma is attainable. A Cmk value of 1.67 means that the error percentage is under 0.6 per million screw assemblies.

Maximum flexibility and processing reliability with the sequence controller AST6

The sequence controller AST6 is the ideal controller for stationary screw assemblies used with the tried and tested NANOMAT-EC low-torque screwdriver in a torque range of 0.02 Nm – 0.2 Nm. The tightening procedure with friction values guarantees highest precision at low torque using the sequence controller AST6. The controller is very user friendly and allows exact and simple monitoring and control of the angle and torque.



The DEPRAG Nanomat® stationary Screwdriver with AST6 controller

The sequence controller already contains standard screwdriving programs for assembly to torque and loosening to angle. Their parameters can be adapted to the screwdriving task via the touch screen. The AST6 enables free programming of screwdriving sequences. These can be created and adapted quickly and simply as required over the user interface provided by the integrated web server. The color 4.3"

TFT touch display allows quick access to the 100 standard programs. Individual user profiles can be selected via a program number or there is a choice of programmable program name.

There is no need for additional software as the parameter setting and selection of controller functions can be carried out easily with any normal web browser or the touch display. Due to its small size the controller is particularly suited to stationary applications in confined spaces.

The sequence controller AST6 proves itself as an all-rounder which allows storage, documentation and evaluation. The last seven production days are recorded and saved. Then screwdriving results data can be retrieved via the Ethernet connection. Field bus and input/output communication interfaces are available. Additional functions such as the graphic display of screwdriving graphs, integrated SPC functions and comprehensive analysis options are also optionally available. Comprehensive software packages for screw joint analysis, documentation and processing data collection round off the options.

The DEPRAG screwdriving sequence controller AST6i is prepared for the future demands of the "Industrie 4.0" – a high-tech strategy project from the German Federal Government. The aim of a smart factory is one step closer due to DEPRAG. The type of intelligent factory distinguished by adaptability, resourcefulness and ergonomics as well as integration of clients and business partners in the creation of business and adding value. DEPRAG places particular importance on self-optimization, self-configuration, self-diagnosis and cognition which makes automation more intelligent which in turn can better support the workers in their increasingly complex tasks.

The pneumatic screwdriver as a basic solution

The pneumatic NANOMAT low-torque screwdriver is available as a handheld or spindle screwdriver for stationary use.

The NANOMAT screwdriver reaches the high precision of the torque control due to the solid principle of the mechanical decoupler and shut-off clutch. This enables torque accuracy of less than ± 3 percent even after millions of operating cycles. Under appropriate operating conditions the DEPRAG air driver with shut-off clutch attains a Cmk value of ≥ 1.67 with a tolerance entry of ± 10 % relating to 6 Sigma in accordance with ISO 5393. A Cmk value \geq of 1.67 expressed another way means an error percentage of only 0.6 per one million assemblies! Within the shortest time the pneumatic screwdriver can be set to the required torque without the need for special tools.



The DEPRAG handheld Nanomat®

The DEPRAG designers have given their NANOMAT low-torque screwdriver other advantages as well. The ergonomic handle enabling sensitive and precise screw handling, the integrated quick change chuck allowing quick and simple bit exchange without the need for tools. This means that standard bits with A3 connection in accordance with DIN ISO 1173 can be used. The vacuum suction from the integrated vacuum implement also provides great benefits, troublesome hoses around the handle or screw positions are also eliminated.

The NANOMAT spindles can be easily integrated and are particularly small in size. Test screwdrivers are available in right rotation, left rotation and reversible, push-to-start or via remote valve. The standardized extremely slim-line design is ideal for miniature assemblies. The NANOMAT spindle screwdriver measures only 12 millimeters diameter and perfect for small gaps between screw positions in stationary use.

Of course the NANOMAT spindle screwdriver also benefits from the famous DEPRAG guidance system which regulates optimal pressure on the screw via spring tension.

Even for tiny assemblies DEPRAG fulfils constantly high requirements as a complete solution provider. The NANOMAT low-torque screwdrivers are of course supported by a whole range of periphery devices such as automated screw feeding systems, precise torque measurement instruments or reliable guidance stands for manual assembly.

DEPRAG SCHULZ GMBH u. CO. employs 600 people in over 50 countries. The experts in screwdriving technology are continually driving the market for screwdriving tools with their innovations and product improvements. However close consultation with customers is also an extremely important part of their work. Jürgen Hierold: "Together we find the right screwdriver for the application. Only in this way are we able to fulfill the individual assembly requirements of our clients".



As well as excelling in the screwdriving technology, the full service provider has mastered conceptual design and arrangement of manual work stations, semi and fully automated assembly systems as well as the production of high quality pneumatic motors and pneumatic tools.

Acquaint yourself with DEPRAG at this year's INTEC, the international trade fair for machine tools, production and automation technology held this year from the 24th – 27th February in Leipzig Germany. In hall 2, at stand D62 you will find a complete manual work station informing visitors about the individual components which make up this reliable, flexible, ergonomic, ESD-capable, technically clean and efficient technology from DEPRAG

Press contact:
email: sales@depragusa.com

DEPRAG, Inc.
640 Hembry Street
Lewisville, TX 75057

(800) 433-7724
(800 4 DEPRAG)
(972) 221-8731 Local Phone
(972) 221-8163 Fax
www.depragusa.com