



Screwdriving technology

Automation

Air motors

Air tools

DEPRAG

MICROMAT
MINIMAT

MICROMAT / MINIMAT Handheld Screwdrivers

The perfect Tool for every Application

- **Torque Range from 0.02 to 80 Nm [2 inch ounces to 708 inch pounds]**
- **Handle Design according to application requirement**
- **Most modern Drive Technology implemented**
- **Maximum Processing Safety with each available design stage**

The entire application spectrum, including the newest and most difficult industrial screwdriving requirements can be best handled with the new, considerably expanded MINIMAT handheld Screwdriver program. All the tools within the extensive MINIMAT design series have the same ergonomic form which is especially important for use in an industrial environment, as well as the reliability and high durability, which is the basis for all DEPRAG products.



MINIMAT
Control Screwdriver

SENSOMAT

MINIMAT-F

MINIMAT-QC

MINIMAT-EC

MINIMAT-EC-Servo-Screwdriver



Tool Selection

DEPRAG-MICROMAT, DEPRAG MINIMAT Control Screwdrivers

Air operated with integrated, highly accurate shutoff clutch

The standard solution for most screwdriving applications is the proven air-shutoff screwdriver, which has an integrated, highly precise MINIMAT-shutoff clutch. The MICROMAT and MINIMAT clutch transfers the torque - up to the preset value - onto the screw. Despite an occurring inertia, the special clutch design reduces the transferred torque and then switches the air-motor off at approximately 50 % of the nominal torque. Consequently, the once reached nominal torque value will not be influenced.

The different changes in the kinetic energy, which are caused by speed fluctuations at changing screw joints (hard or soft) or when air pressure fluctuations occur, will not result into uncontrollable torque increases when using the DEPRAG MICROMAT/MINIMAT shutoff screwdrivers. The special clutch distinguishes the DEPRAG Screwdriver from other, conventional shutoff screwdrivers, where the shutoff occurs only at the respective maximum torque.

This special clutch design enables our Screwdrivers to reach extreme high torque accuracy, in many cases below $\pm 3\%$ of the standard deviation. These accurate torque values will be kept constant over several million of cycles. The shutoff process is in all cases clearly noticeable. Every screwdriver in this design series can be torque calibrated, because of its independence from air-pressure fluctuations and changing screw joints. Detached from the workstation, this series of Screwdrivers can be calibrated, checked and values recorded using our appropriate measuring transducers and measuring instruments.

SENSOMAT

Test Screwdriver with integrated, sensor controlled clutch-lockout

The DEPRAG-SENSOMAT is a special Screwdriver for self-tapping-, thread-cutting-, or self-drilling compact screws. Whenever the driving torque is close to or higher than the final seating torque, the DEPRAG SENSOMAT assembles the screw with full motor power and only releases the shutoff clutch prior to the full-seating of the screw head. At that time, the Screwdriver shuts off at the preset final torque with the accustomed accuracy, assuring the correct seating of the screw while also applying the required torque.

MICROMAT-F / MINIMAT-F

Air operated Screwdriver with additional function control

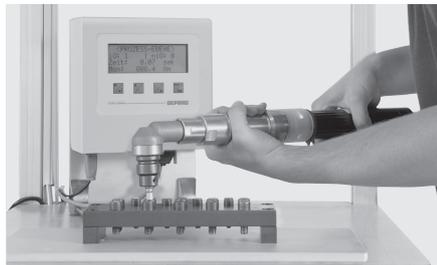
The DEPRAG-MICROMAT-F / MINIMAT-F Screwdriver - used in manual applications - links the well-known MINIMAT functions with an additional function-con-

troller. Only properly completed screw-driving assemblies are released by the connected function-controller FC 10. If an assembly error occurs, the controller locks-out the connected Screwdriver. Additionally, the number of screws per part can be supervised. In short, the Screwdriver with the multifunction controller supervises itself, 100 percent.



MINIMAT-QC

Quality-Control Screwdriver with Torque Measurement



Using a suitable strain gauge transducer, the MINIMAT-QC handheld Screwdriver acquires the final torque value reached by the shutoff clutch and displays / registers the appropriate torque value on the Measuring Electronic DME 1000 QC. In addition, all the standard functions of the MICROMAT-F/ MINIMAT-F Screwdriver series are integrated into the MINIMAT-QC as well.

This solution allows not only for the assembly results to be supervised and guaranteed, but also assures that the assembly results can be statistically processed and documented.

MICROMAT-EC/MINIMAT-EC SCREWDRIVER

Brushless electric drive with current shutoff control

Another expansive step in the variety of the MINIMAT handheld Screwdriver program is the use of brushless EC-motors. With this drive-technology and an affiliated controller, the maximum possible flexibility can be reached on manual workstations. All essential process parameters



can be input, controlled and documented on the controller AST 10. When connecting the AST 10 controller to a higher control system, the flexibility of the MINIMAT-EC screwdriving system can be further extended to also finally include the possibility of reaching different torque values within one assembly cycle.

MINIMAT-EC-SERVO SCREWDRIVER

Brushless electric servo-drive torque control



Screwdriver is the most advanced system assuring maximum flexibility and process safety. These Servo Screwdrivers find their application especially on high torque requirements and when the utmost process safety is a must. In addition to the current control, this drive system also includes a strain gauge transducer, which acquires and documents the torque values reached by the Screwdriver.

MINIMAT ED

Electric Screwdriver with an integrated electromagnetic shut-off clutch, a convenient torque setting by the push of a button and a digital torque-display that is directly located on the screwdriver housing.

The new and handy "All-in-one-Tool" can be adapted, quickly and easily, to fit each new screw assembly requirement. The MINIMAT-ED incorporates many of the advantages that are part of the well-known DEPRAG air-operated screwdriver series. By becoming a market-leader in the area of automatic screwdrivers, DEPRAG has shown innovative products for decades and most recently introduced the EC- and EC-servo-screwdrivers, which are respected worldwide for their reliability, precision and durability.

The MINIMAT-ED is recommended for all tightening applications, particularly those that require variable torque-settings. This new tool is perfectly suited for the use in rework areas with ever-changing parameters such as in the manufacturing of controllers or control boxes, as well as in all industries having mass production, for example the electronics industry.



We offer a totally adapted tool solution, which coincides with the requirements of the respective assembly process and which is independent from the drive selection. All DEPRAG MICROMAT and DEPRAG MINIMAT Screwdrivers feature the following design advantages:

1 Processing Safety and Accuracy

Every described Screwdriving System guarantees a high processing safety. By selecting a suitable system, the process may be amended in many cases with additional parameter, such as: cycle time, cycle counter, angle, torque measuring.

All DEPRAG Screwdriving Systems guarantee a minimum of 3 % accuracy [standard deviation] of the final torque; this accuracy is in many cases even higher. If there is a special assembly case, which requires even tighter tolerances, then we recommend the use of our EC-electric servo screwdrivers with an optimized screwdriver program that will reach an accuracy of less than 1 % standard deviation.

2 High Power Variety

The large range of the different drive methods, together with a high performance density, results into the wide torque-range of each individual design series, as well as the entire MINIMAT program. The numerous speed stages also allow for an exact adaptation of the tool to the intended assembly requirement by retaining a maximum flexibility for other, not considered tasks, such as: low speeds for plastic assemblies or high speeds for assemblies of long screws into pre-tapped threads.

3 Design according to required task

According to the application, we can offer the correct tool from the large MINIMAT design series:

- Straight (inline) design for vertical assembly
- Pistol-Grip design for horizontal assembly
- Angle-Head design for tight access or for applications requiring a high torque

4 Application oriented start-function

In general, the straight Screwdriver has a push-to-start function integrated. This start function allows the screwdriver to start automatically, while being operated using a natural, perpendicular movement. The hand grips the housing without forcing an uncomfortable holding or starting position. For some special applications, we offer a driver variation, which has a lever-start.



The pistolgrip driver, where the fingers are anyway positioned correctly on the handle, has a trigger start function.



The angle head screwdriver has a lever- or push-button start function.



5 Ergonomic Design

The ergonomic form of these tools is particularly important when used in an industrial environment, where the mass production with handheld power tools is necessary. The high performance density of all our motors is especially important, since it allows the particularly slim design and the low tool-weight of all DEPRAG-MICROMAT- and MINIMAT handheld Screwdrivers.

Furthermore, these tools excel through their remarkably well-developed grips, which correspond with the newest demands of the industrial health departments. Especially with the straight [inline] tools, an ergonomic grip design is of high importance.

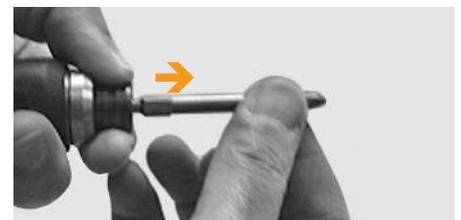
The MICROMAT Screwdriver, because of its design size and its operation for small torque values, is held like a ballpoint pen. The driver is therefore especially slender and has a small groove – for the fingertips – built-in.



The MINIMAT Screwdriver requires a low-force handhold. Torque reaction and push-to-start pressure are absorbed without a tight grip. The design of the housing in the modified rectangular shape corresponds to a natural hand position and makes a skid-free and well positioned power transfer possible. The close proximity between handgrip and the screw location reduces operational strain without interfering with the field of vision. The housing is skin-friendly and non-skid, even when used with moist or oily hands; it also protects against hot and cold temperature fluctuations.

6 Bit Change

A common characteristics of all MINIMAT handheld Screwdrivers is the standard integrated quick-change-chuck. This feature allows an easy and fast exchange of bits/sockets and their positive hold. Furthermore, the quickchange-chuck does not interfere if a screw finder is to be used.



7 Quiet Operation – at full power

An additional important component of modern ergonomics is the transference of a high power output at the lowest possible noise level. All MINIMAT Screwdrivers are recognized because of an especially low noise level.

DEPRAG air-operated tools are situated in an area between 60 and 66 dB (A); this noise dampening is achieved without any loss of performance. They clearly have a noise level below the average noise level of an industrial workstation.

Because of their design, the electric screwdrivers operate at an even lower noise level.

8 Integrated Screw Suction

All screwdrivers, designed for low torque ranges and therefore suitable for the assembly of small screws, are standard equipped with an integrated vacuum connection for a screw suction feature. To generate vacuum air, DEPRAG can offer corresponding injectors, vacuum pumps and the necessary spring sleeves.

9 ESD-Design Screwdriver

To use our tools on ESD workstations, nearly all the MINIMAT Screwdrivers are available in an equivalent ESD-design, including all necessary components.



10 Automatic Screwfeeding

Most all of the MICROMAT-MINIMAT Screwdrivers can be used when combined with our Screwfeeding Machines. Fast cycle times can be achieved by the use of automatic feeding. Furthermore, even ergonomically difficult screws, for example extremely small screws, can be processed safely and quickly.



As a special ergonomic design, we offer the DEPRAG-ERGOMAT cylinder-integrated Screwdriver, for torque values up to 2 Nm [18 inch pounds]. The ERGOMAT automatically carries out the axial down-movement. After the screw is fed, the bit is positioned firmly above the screw head. Therefore, the positioning of the screw to the part is considerably simplified.

11 Best Possible Workstations

For the best design of a workstation, we offer in addition to the listed Screwdrivers, a full and versatile line of accessories, such as parallelogram stands, balancers, air-connections, torque reaction arms, screw presenters and a full line of bits and inserting tools.

12 Industrial Norms and Quality

All tools of the MICROMAT-MINIMAT series are designed – independently from the selected drive-technology – for heavy use in industrial production facilities. Our quality control starts with the design of important machine parts, such as bearings, gear components, materials, etc. and continues through the whole manufacturing process. Our production process assures the highest precision, the best possible material hardening of parts and a final quality control that is detailed and thorough. It also includes technical counsel given by our assembly experts to our customers at their production facility.

DEPRAG

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