



Screwdriving technology

Automation

Air motors

Air tools

# DEPRAG

**Handheld Screwdriver electric**

## MINIMAT-EC-Servo Screwdriver

**Maximum flexibility and processing reliability**

**Angle head design - torque ranges between 7 - 120 Nm**

- flexible
- documentation features
- high precision
- sensor control

The handheld MINIMAT EC servo screwdriver in connection with the sequence controller AST30 enables free programming of the screw tightening process and features maximum flexibility and processing reliability.

Within the performance range of the screwdriver, torque, speed, stand-by and turn-direction may be individually adapted to fit the required tightening process.

The integrated transducer for torque and angle permits the exact control and supervision of the tightening process, as well as the documentation of important processing parameters. Thus, the highest possible precision during the tightening process is guaranteed.

The EC servo screwdriver is used in applications with high safety requirements in which a direct measurement system is required.

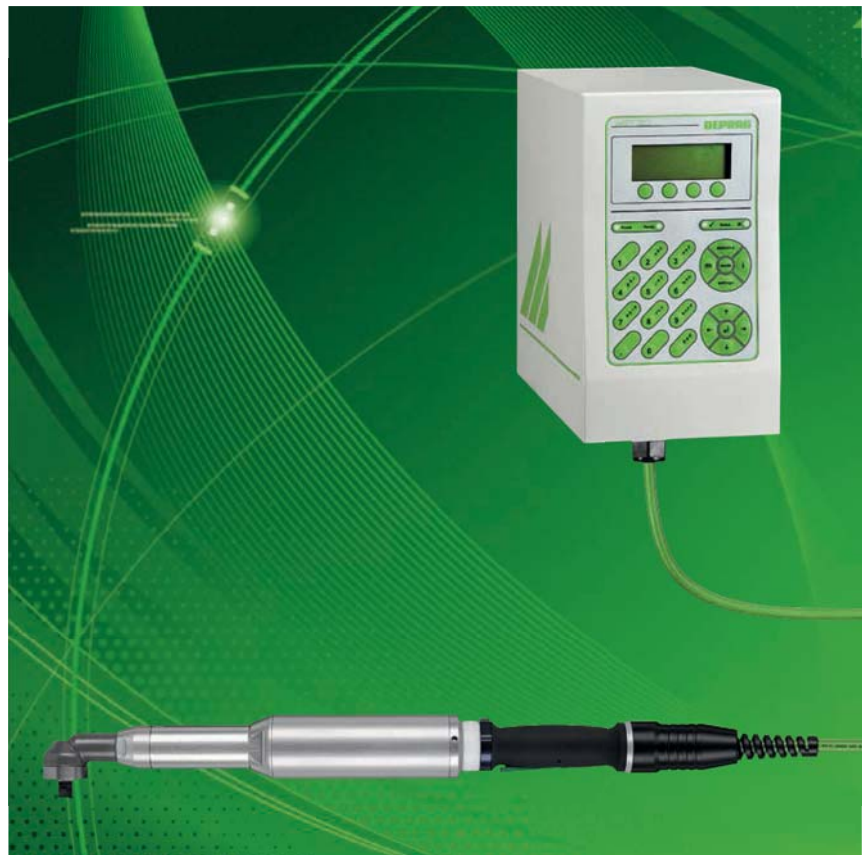
The brushless EC-motor is the reason for the maintenance-free operation, eliminating wear-and-tear parts. It also achieves a high motor dynamics and is capable of reaching the necessary high peak-torque required for fastener tightening.

The DEPRAG screwdrivers based on EC-technology enable a torque accuracy of < 1% standard deviation, which can be relied upon after millions of cycles. Thus, a Cmk value of  $\geq 1.67$  with  $\pm 5\%$  tolerance in reference to 6 Sigma is reached. A Cmk value of 1.67 means that the error rate is less than 0.6 per one million screw assemblies.

To operate the screwdriver, a sequence controller AST30 with integrated power supply and a motor cable is necessary. The motor cable is available in different lengths.

Comprehensive software addition modules enable data registration and graph display for statistic evaluation and screw joint analysis.

Position dependent programme selection, monitoring of the screw sequence and further functions for increased processing reliability are realisable in combination with a position control stand.



## DEPRAG Sequence Controller AST30-31

The sequence controller already contains ready-to-use basic programs with common tightening processes, so that the operation can take place using just a few steps. This necessitates the connection to a standard PC with the supplied Windows®-Software TC 30-PC.

The integrated display- and operating keypad visualizes the operating conditions and screwdriving results and it also allows the direct changing of screwdriving parameter (i.e. speed, shut-off torque) required for the production-process - without having a PC-connection. Over the operating keypad or the I/O-port of the controller it is possible to change the two available default screwdriving programs. Once the cycle finishes, a status signal is optically displayed on the screwdriver and also reported back to the PLC, if a PLC is used.

The storage of screwdriving graphs and end value data sets (e.g. torque, angle etc.) for manual work stations and



- Highest precision over the entire torque range
- Torque control/angle monitoring
- Angle control/torque monitoring
- Friction coefficient defined screw joint
- 32 freely programmable sequences
- Comprehensive analysis functions
- Available communication ports: Ethernet, RS232, PLC-input/output, Profibus
- Can be used in combination with DEPRAG feeders
- For manual and stationary applications

screwdriving stations can be carried out automatically using the Interface Graph-Loader. The corresponding software enables immediate display on the computer screen of the current screwdriving graph, the screw assembly can be evaluated straight after completion and \*.csv and \*.bin files can be saved in individual directories. When using this EC-system with a PLC, then the communication can be made using the standard supplied Profibus port. When using either bus-ports, Profibus or Ethernet (optional) and if those ports are connected with an IP-system, then the complete assembly process (screwdriving-curve, statistics, archiving) and the data-exchange between computers is possible. When the TC 30-PC data logger software (optional equipment) is used, it is possible to transfer the measuring data of several controllers to a PC using different ports (i.e. USB, Ethernet).

## TECHNICAL DATA MINIMAT-EC-Servo Screwdriver ANGLE HEAD DESIGN

Screwdriver	Type	315EWT58-0350-E10	315EWT58-0600-E12	315EWT58-1200-E12
reversible	Part no.	399853 B	399853 A	399853 C
Line voltage (DC)	V	300	300	300
Torque min.	Nm / in.lbs	7 / 62	12 / 106.2	25 / 221.3
Torque max.	Nm / in.lbs	35 / 310	60 / 531	120 / 1062
Speed min.	rpm	50	25	15
Speed max.	rpm	800	550	250
Diameter	mm / in.	58 / 2 <sup>9</sup> / <sub>32</sub>	58 / 2 <sup>9</sup> / <sub>32</sub>	58 / 2 <sup>9</sup> / <sub>32</sub>
Length	mm / in.	550 / 21 <sup>21</sup> / <sub>32</sub>	550 / 21 <sup>21</sup> / <sub>32</sub>	590 / 23
Weight	kg / lbs	2.4 / 5.28	2.4 / 5.28	3.2 / 7.01
Noise level	dB (A)	62	62	62
External square drive	DIN 3121	E 10 (9/8")	E 12.5 (1/2")	E 12.5 (1/2")
Torque measuring system				
DMS (strain gage) fully bridged		yes	yes	yes
accuracy classification		1	1	1
Angle encoder				
channel		A-B	A-B	A-B
resolution degree		1	1	1

Please also find suitable tool inserts in our brochure D 3320 E.



It is necessary to use a torque support (e.g. stand, handgrip) for maximum torque: over 60 Nm for angle design. Suitable torque supports can be found in our brochure D 3340 E.

## ACCESSORIES

### Required Accessories - Sequence controller

<b>Sequence controller 230 V</b>	<b>Type</b>	<b>AST30-31-O-230 V</b>
	Part no.	385455 C
<b>Sequence controller 115 V</b>	<b>Type</b>	<b>AST30-31-O-115 V</b>
	Part no.	385455 D
Power unit (AC)	V / Hz	230 / 50 (60)
	V / Hz	115 / 50 (60)
Insulation		IP 54
LC-display		4 lines
24V input/output interface		7 inputs / 6 outputs
Membrane keyboard		yes
USB interface		yes
Profi bus		yes
Ethernet		optional
Amount of connectable drivers		1
Dimensions (W x H x D)	mm	170 x 295 x 340
	in.	6 11/16 x 11 39/64 x 13 3/8
Weight	kg / lbs.	9.5 / 20.9 (EU)
	kg / lbs.	9.7 / 21.3 (US)

Programming kit no. 385426 C (consisting of operating manual, software package and programming cable) is a single standard component of the sequence controller.



### Required Accessories - motor cable (MINIMAT-EC-Servo screwdriver to sequence controller)

Length	5 m/ 16.4 ft. (standard)	<b>Type</b>	<b>KMO-AST30-31-5 m</b>
		Part no.	404908 A
Length	8 m/ 26.2 ft.	<b>Type</b>	<b>KMO-AST30-31-8 m</b>
		Part no.	404908 B
Length	12 m/ 39.4 ft.	<b>Type</b>	<b>KMO-AST30-31-12 m</b>
		Part no.	404908 C

### Optional Equipment

<b>PC-Software</b>	<b>Type</b>	<b>TC30-PC</b>
	Part no.	828560
TC 30-PC statistic	Part no.	828634
TC 30-PC data logger	Part no.	829085
TC 30-PC to QS-STAT conversion programme**) (additional modules at request)	Part no.	830458
<b>Software Addition:</b>		
Shut-off at effective torque	Part no.	829613
Friction controlled fastening to torque	Part no.	829614
<b>Interface Graph Loader</b> (hardware and software)	Part no.	385834 A
Connection cable (AST30-31 - Graph-Loader)	Part no.	385835 C
Software update (Graph Loader)	Part no.	206517
<b>Ethernet-Module</b>	<b>Type</b>	<b>AST30-EN</b>
	Part no.	388729 A
Programming cable PC to AST30-31 (USB)	Part no.	831420
<b>Printer</b>	<b>Type</b>	<b>ND 100 *)</b>
	Part no.	823476
Cable AST30-31 to ND100	Part no.	385419 A
Data cable AST30-31 to PC	Part no.	385423 A
Support for AST30-31	Part no.	947405 A
Suspension ring	Part no.	406767 A

\*) for additional technical data please see our catalog D 3022 E

\*\*) only in connection with data logger software



Interface Graph-Loader



Ethernet module

## MORE OPTIONAL EQUIPMENT

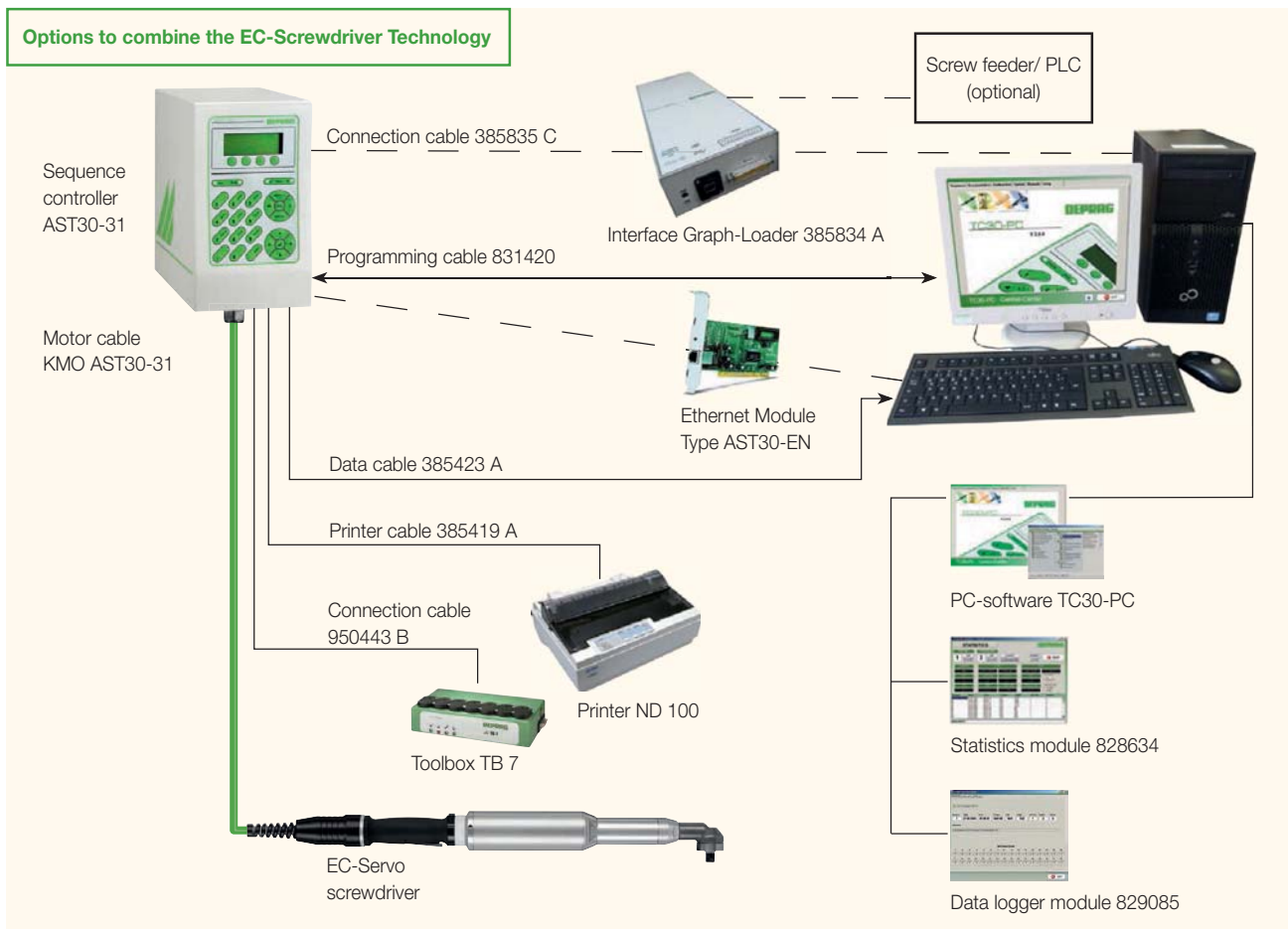
### Toolbox to suit controller type AST30-31

This Toolbox increases the AST30 application range concerning both manual working stations and in conjunction with PLC controllers. It can be used with upto 7 tools with a diameter of upto 24 mm (AF 19). The selection of the AST30's screwdriving programs will be done automatically and will suit the selected tool. LED's will show the OKAY/NOT OKAY assemblies as well as the readiness of the Toolbox and the AST30. Through the 24 Volt input / output interface the Toolbox will be connected directly to the AST30 or a PLC controller.



Toolbox	Type	TB 7
	Part no.	398097 A
<b>Data:</b>		
Tool holders		7
Tool size	mm / in.	upto Ø 24 / 0.9 (AF 19)
Voltage	V	DC 24
Amperage	mA	100
Input / output interface		SUB-D 15-pin connector
Start signal		4-pin connector
Dimensions (W x H x D)	mm / in.	225 x 50 x 120 / 8.8 x 1.9 x 4.7
Weight	kg / lbs	1.2 / 2.6
<b>Optional equipment:</b>		
Connecting cable AST30 - Toolbox	Part no.	950443 B

### Options to combine the EC-Screwdriver Technology



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