

MINIMAT-EC-Servo Screwdriver

Maximum flexibility and processing reliability

Angle head design - torque ranges between 7 - 120 N·m

- flexible
- documentation features
- high precision
- sensor control

The handheld MINIMAT EC servo screwdriver in connection with the sequence controller AST30-31 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.

Handheld Screwdriver electric



The 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 ≥ 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 AST30-31 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.

SYSTEM COMPONENTS

MINIMAT-EC-SERVO SCREWDRIVER ANGLE HEAD DESIGN

| Screwdriver | Type | 315EWT58-0350-E10 | 315EWT58-0600-E12 | 315EWT58-1200-E12 |
|---------------------------------|--------------|--|--|-------------------------------------|
| reversible | Part no. | 399853B | 399853A | 399853C |
| Line voltage (DC) | V | 300 | 300 | 300 |
| Torque min. | N·m / in.lbs | 7 / 62 | 12 / 106.2 | 25 / 221.3 |
| Torque max. | N·m / 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 ⁹ / ₃₂ | 58 / 2 ⁹ / ₃₂ | 58 / 2 ⁹ / ₃₂ |
| Length | mm / in. | 550 / 21 ²¹ / ₃₂ | 550 / 21 ²¹ / ₃₂ | 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 (3/8") | 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 D3320E.

SEQUENCE CONTROLLER

| Sequence controller 230 V | Type | AST30-31-O-230 V |
|-------------------------------|-----------|-------------------------------|
| | Part no. | 385455C |
| Sequence controller 115 V | Type | AST30-31-O-115 V |
| | Part no. | 385455D |
| Power unit (AC) | V / Hz | 230/50 (60) / 115/0 (60) |
| Insulation | | IP 54 |
| LC-display | | 4 lines |
| 24V input/output interface | | 7 inputs / 6 outputs |
| Membrane keyboard | | yes |
| USB interface | | yes |
| Profibus | | 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) / 9.7/21.3 (US) |



- 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

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 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).

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

MOTOR CABLE (MINIMAT-EC-Servo screwdriver to sequence controller)

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

SYSTEM COMPONENTS

Optional Equipment

| PC-Software | Type | TC30-PC |
|--|----------|-----------|
| | 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 |
| Software Addition: | | |
| Shut-off at effective torque | Part no. | 829613 |
| Friction controlled fastening to torque | Part no. | 829614 |
| Interface Graph Loader (hardware and software) | Part no. | 385834A |
| Connection cable (AST30-31 - Graph-Loader) | Part no. | 385835C |
| Ethernet-Module | Type | AST30-EN |
| | Part no. | 388729A |
| Programming cable PC to AST30-31 (USB) | Part no. | 831420 |
| Printer | Type | ND 100 *) |
| | Part no. | 823476 |
| Cable AST30-31 to ND100 | Part no. | 385419A |
| Data cable AST30-31 to PC | Part no. | 385423A |
| Support for AST30-31 | Part no. | 947405A |
| Suspension ring | Part no. | 406767A |

*) for additional technical data please see our catalog D3022E

**) only in connection with data logger software



Interface Graph-Loader



Ethernet module



At DEPRAG, we are committed to constantly improving our software solutions. To harness these benefits, we recommend regularly updating to the latest edition. For more information, please contact our service department at service@deprag.de.

More optional equipment

Toolbox to suit controller type AST30-31

| Toolbox | Type | TB 7 - PLC |
|-------------------------------------|----------|----------------------------------|
| | Part no. | 398097C |
| Data: | | |
| 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 |
| Optional equipment: | | |
| Connecting cable AST30-31 - Toolbox | Part no. | 950443B |



Toolbox

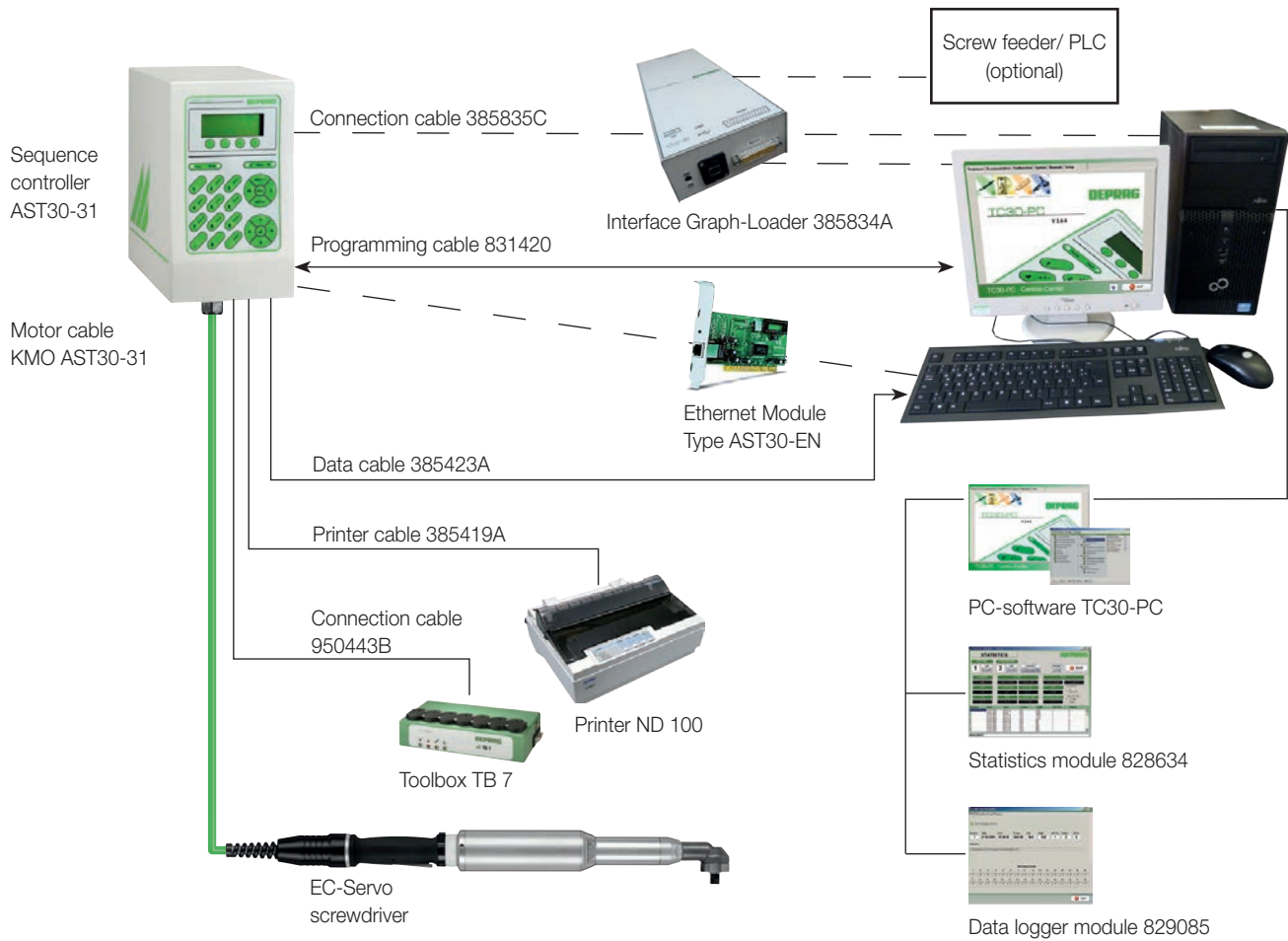
This Toolbox increases the AST30-31 application range concerning both manual working stations and in conjunction with PLC controllers. It can be used with upto 7 tools with a diameter of upto 24 mm (AF 19).

The selection of the AST30-31'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 AST30-31. Through the 24 Volt input / output interface the Toolbox will be connected directly to the AST30-31 or a PLC controller.



It is necessary to use a torque support (e.g. stand, handgrip) for maximum torque: over 60 N·m for angle design. Suitable torque supports can be found in our brochure D3345E.

OPTIONS TO COMBINE THE EC-SCREWDRIVER TECHNOLOGY



For the Netherlands

Zumpolle b.v.

Zumpolle B.V. • Valeten 14 • 5301 LW Zaltbommel • Tel: 0418671816

DEPRAG



CERTIFIED AS PER DIN EN ISO 9001