

## MINIMAT-EC

**straight handle design - torque ranges between 0.01 - 25 N·m**  
**pistol-grip design - torque ranges between 0.06 - 18 N·m**  
**angle head design - torque ranges between 0.4 - 25 N·m**

**The flexible EC screwdriver for the highest standards**

- flexible
- data recording
- highly accurate
- ESD-capable versions available

The EC screwdriver with brushless drive technology combined with the AST series screwdriver controller offers maximum flexibility and process control. The integrated torque and angle measurement system enables precise control of the screw assembly process and guarantees the highest accuracy and reliable documentation of important process parameters.

Through the combination of different screwdriving strategies with flexible tightening parameters, multi step screw run-down sequences can be realised in one assembly cycle.

## Handheld Screwdriver electric

**Screwdriving System consisting of the components:**

- EC Screwdriver
- Motor cable
- Sequence Controller
- Power supply cable

**Controller AST5**

**Controller AST11**



## ADVANTAGES

### DEPRAG EC SCREWDRIVER – flexible for the highest standards

The DEPRAG EC screwdrivers allow free programming of the screw tightening process. Within the power range of the selected tool, the torque value, speed, stand-by and direction of rotation can be adjusted individually to the assembly requirement.

Outstanding features of handheld EC screwdrivers are their high torque precision and the large range of control functions – perfect conditions for process security and control on highest level.

The brushless electric motors provide low maintenance operation. They are ideally suited for the tightening of screws due to their outstanding dynamics and an achievement of high peak torque values. The integrated torque control - based upon precise measurement of the motor current along with the evaluation of other dynamic factors - as well as angle measurement, allows precise control of multistage screwdriving processes and documentation of the resulting values.

With these screwdrivers a torque accuracy of < 2% standard deviation and a Cmk value of  $\geq 1.67$  at a tolerance of  $\pm 10\%$  is possible. In other words a Cmk value of 1.67 means there is an error rate of just 0.6 errors per one million assemblies.

The operation of the screwdriver requires a programmable sequence controller (AST) with integrated amplifier and a motor cable (available in different lengths). The sequence controller offers standard screwdriving programs for tightening screws to a specific torque value respectively loosening at a specific angle value.



It is necessary to use a torque support (e.g. stand, handgrip) for maximum torque: over 4 N·m for straight design, over 10 N·m for pistol grip and over 60 N·m for angle design. Suitable torque supports can be found in our brochure D3345E.

### DEPRAG SEQUENCE CONTROLLER AST5 – compact size for torque upto 2 N·m



- highest precision for lowest torque ranges
- small size for confined spaces
- colour touch screen with 4.3" TFT display
- torque control/angle monitoring
- angle control/torque monitoring
- friction-torque testing and friction-controlled fastening to torque
- 100 freely programmable sequence programs
- can be used in combination with DEPRAG feeders

The DEPRAG sequence controller AST5 is the ideal controller for manual screw assemblies in combination with the tried and tested DEPRAG EC screwdrivers of the MINIMAT-EC (size 22) series within a torque range of 0.01 N·m – 2.0 N·m.

**Operator friendly:** The sequence controller already includes standard screwdriving programs for tightening to torque and loosening to angle. Parameters can be directly altered to suit screwdriving tasks using the touch screen. The AST5 allows free programming of your manual screwdriving sequences for hand-held screwdriving tools. If required, further screwdriving programs can quickly and easily be set-up using the existing standard program.

**High number of programs:** Use the colour TFT touch screen for fast access to the 100 programmable user programs.

**Based on web browser:** To set parameters and access additional control functions, simply use any common web browser or the integrated key pad. Additional software is not required.

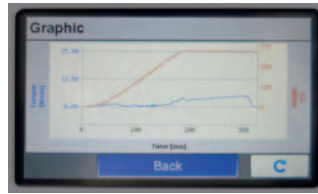
**Small size:** Due to its small size the controller is particularly suitable for use in manual work stations where there are confined spaces.

**Storage, documentation and evaluation:** The AST5 records the screwdriving results for the last 7 production days. Additional features include the graphic display of screwdriving graphs, integrated PLC functions, comprehensive analysis options and the option of combination with an automatic screw feeding machine. A software update service is optionally available. Also available are comprehensive software packages for screw joint analysis, documentation and process data collection.

## Examples of the functions display on the AST5



Main menu



Graphic display of screwdriving graphs

Statistics	
Program:	1 P. 1
Sample size:	50
Average:	5.080 N-cm
Standard dev.:	0.067 N-cm 1.32 %
CP/CPK value:	3.78 / 3.78
Torque	Angle Limits CP

Statistics display



Web interface and controller display (available in 13 languages)



Program selection

Screwdriving Sequence	
Program:	1 Standard 1
Step:	1
Extended fasten to torque	
Shut-off torque:	5.00 N-cm
Torque lower limit:	4.50 N-cm
Torque upper limit:	5.50 N-cm

Program set-up

## DEPRAG SEQUENCE CONTROLLER AST11 – flexible EC technology for the highest standards

- highest precision over the entire torque range
- torque control/angle monitoring
- angle control/torque monitoring
- friction-torque testing and friction-controlled fastening to torque
- 16 freely programmable sequence programs
- comprehensive analysis functions
- communication port: Ethernet - for parameterisation of the web server
- PLC: inputs/outputs
- integrated RS232 port with varied options:
  - 4 fieldbuses available: Profibus, Profinet, EtherCat, EthernetIP
  - direct connection of a barcode scanner
  - connection of a serial printer
- integrated functions for process control
- can be used in combination with DEPRAG feeders
- for manual and stationary applications



The DEPRAG controller AST11 is the ideal sequence controller for manual and stationary screw assemblies together with the tried and tested DEPRAG EC screwdrivers MINIMAT-EC.

**Operator friendly:** The sequence controller already includes standard screwdriving programs for tightening to torque and loosening to angle. Parameters can be directly altered to suit screwdriving tasks using the controller's keypad. The AST11 allows free programming of your screwdriving sequences for hand-held or stationary screwdriving tools. If required, further screwdriving programs can quickly and easily be set-up using the already existing basic program.

**Freely programmable:** Fast access to the 16 programmable screwdriving programs is enabled by the integrated display- and operating unit.







**Based on web server:** To set parameters and access additional control functions, simply use any common web browser or the integrated key pad. Additional software is not required.

**Various communication options:** Several communication options, especially for stationary use, via PLC and optionally RS232, Profinet, Profibus, EtherCat, Ethernet IP.

**Saving, documentation and evaluation:** The AST11 displays the screwdriving results of the last 7 production days. Additional software modules offer graphic display of screwdriving graphs, integrated PLC functions, comprehensive analysis options via a PC. Combination with an automated DEPRAG screw feeder is also possible. A software update service is optionally available.

## SYSTEM COMPONENTS

### MINIMAT-EC Screwdriver handheld, Straight handle design, size 22, ESD-capable

<b>Screwdriver</b>		<b>Type</b>	<b>320EGA22-00005</b>	<b>320EGA22-00012</b>	<b>320EGA22-00025</b>	<b>320EGA22-00050</b>	<b>320EGA22-00080</b>
Push-to-start		Part no.	420555G	420555F	420555A	420555B	420555C
<b>Screwdriver</b>		<b>Type</b>	<b>320EGT22-00005</b>	<b>320EGT22-00012</b>	<b>320EGT22-00025</b>	<b>320EGT22-00050</b>	<b>320EGT22-00080</b>
Lever start		Part no.	419900G	419900F	419900A	419900B	419900C
<b>Screwdriver</b>		<b>Type</b>	–	–	<b>320EGZ22-00025</b>	<b>320EGZ22-00050</b>	<b>320EGZ22-00080</b>
In combination with feeder		Part no.	–	–	424408A	424408B	424408C
Torque min.		N-m / in.lbs	0.01 / 0.09	0.03 / 0.27	0.05 / 0.45	0.1 / 0.9	0.16 / 1.4
Torque max. *)		N-m / in.lbs	0.05 / 0.45	0.12 / 1.06	0.25 / 2.2	0.5 / 4.4	0.8 / 7.1
Speed min.		rpm	120	120	100	80	60
Speed max. *)		rpm	1500	1500	2000	1600	1200
Diameter		mm / in.	30.5 / 1.2	30.5 / 1.2	30.5 / 1.2	30.5 / 1.2	30.5 / 1.2
Length		mm / in.	202 / 7.88	202 / 7.88	202 / 7.88	202 / 7.88	202 / 7.88
Weight		kg / lbs.	0.55 / 1.21	0.55 / 1.21	0.55 / 1.21	0.55 / 1.21	0.55 / 1.21
Noise level		dB (A)	60	60	60	60	60
Line voltage (DC)		V	24	24	24	24	24
Internal hex drive DIN ISO 1173			B3 (3 mm)	B3 (3 mm)	B3 (3 mm)	B3 (3mm)	B3 (3mm)
Suitable inserting tools and connection parts with inserting end DIN ISO 1173			A3 (3 mm)	A3 (3 mm)	A3 (3 mm)	A3 (3mm)	A3 (3mm)
<b>Optional equipment:</b>							
Spring sleeve cpl., without screw suction	Part no.		403280K				
Spring sleeve cpl., with screw suction	Part no.		403280L				
Support ring suitable for screwdrivers with push-to-start	Part no.		389775C				
<b>Screwdriver</b>		<b>Type</b>	<b>320EGA22-00120</b>		<b>320EGA22-00200</b>		
Push-to-start		Part no.	420555D		420555E		
<b>Screwdriver</b>		<b>Type</b>	<b>320EGT22-00120</b>		<b>320EGT22-00200</b>		
Lever start		Part no.	419900D		419900E		
<b>Screwdriver</b>		<b>Type</b>	<b>320EGZ22-00120</b>		<b>320EGZ22-00200</b>		
In combination with feeder		Part no.	424408D		424408E		
Torque min.		N-m / in.lbs	0.18 / 1.6		0.4 / 3.5		
Torque max. *)		N-m / in.lbs	1.2 / 10.6		2.0 / 17.7		
Speed min.		rpm	50		30		
Speed max. *)		rpm	900		550		
Diameter		mm / in.	30.5 / 1.2		30.5 / 1.2		
Length		mm / in.	202 / 7.88		202 / 7.88		
Weight		kg / lbs.	0.55 / 1.21		0.55 / 1.21		
Noise level		dB (A)	60		60		
Line voltage (DC)		V	24		24		
Internal hex drive DIN ISO 1173			F6.3 (1/4")		F6.3 (1/4")		
Suitable inserting tools and connection parts with inserting end DIN ISO 1173			E6.3 (1/4")		E6.3 (1/4")		
<b>Optional equipment:</b>							
Spring sleeve cpl., without screw suction	Part no.		364672A				
Spring sleeve cpl., with screw suction	Part no.		364672C				
Support ring suitable for screwdrivers with push-to-start	Part no.		389775C				

\*) as per VDI/VDE 2647 Directive

The motor cable, 2.5-meters long, is solidly connected to the screwdriver






size 22 with lever start and motor cable

#### Remark:

Details on our feeding systems can be found in brochure D3820E.



**MINIMAT-EC Screwdriver handheld, Straight handle design, size 27, ESD-capable**

<b>Screwdriver</b> Push-to-start		<b>Type</b> Part no.	<b>320EGA27-0010</b> 434343B	<b>320EGA27-0018</b> 434343E	<b>320EGA27-0022</b> 434343C	<b>320EGA27-0040</b> 434343D
<b>Screwdriver</b> Lever start		<b>Type</b> Part no.	<b>320EGT27-0010</b> 424242B	<b>320EGT27-0018</b> 424242E	<b>320EGT27-0022</b> 424242C	<b>320EGT27-0040</b> 424242D
<b>Screwdriver</b> In combination with feeder		<b>Type</b> Part no.	– –	<b>320EGZ27-0018</b> 424735E	<b>320EGZ27-0022</b> 424735C	<b>320EGZ27-0040</b> 424735D
Torque min.		N-m / in.lbs	0.15 / 1.3	0.4 / 3.5	0.4 / 3.5	0.7 / 6.2
Torque max. *)		N-m / in.lbs	1 / 8.85	1.8 / 15.9	2.2 / 19.5	4 / 35.4
Speed min.		rpm	50	100	50	40
Speed max. *)		rpm	1000	1000	700	400
Diameter		mm / in.	30.5 / 1.2	30.5 / 1.2	30.5 / 1.2	30.5 / 1.2
Length		mm / in.	267 / 10 <sup>33</sup> / <sub>64</sub>	255 / 10 <sup>3</sup> / <sub>64</sub>	255 / 10 <sup>3</sup> / <sub>64</sub>	267 / 10 <sup>33</sup> / <sub>64</sub>
Weight		kg / lbs.	0.59 / 1.3	0.59 / 1.3	0.59 / 1.3	0.63 / 1.39
Noise level		dB (A)	60	60	60	60
Line voltage (DC)		V	48	48	48	48
Internal hex drive DIN ISO 1173			B3 (3mm)	F6.3 (1/4")	F6.3 (1/4")	F6.3 (1/4")
Suitable inserting tools and connection parts with inserting end DIN ISO 1173			A3 (3mm)	E6.3 (1/4")	E6.3 (1/4")	E6.3 (1/4")
<b>Optional equipment:</b>						
Spring sleeve cpl., without screw suction	Part no.	403280K			364672A	
Spring sleeve cpl., with screw suction	Part no.	403280L			364672C	
Support ring		389775C			389775C	

\*) as per VDI/VDE 2647 Directive



**MINIMAT-EC Screwdriver handheld, Straight handle design, size 36, ESD-capable**

<b>Screwdriver</b> Push-to-start		<b>Type</b> Part no.	<b>320EGA36-0040</b> 404866A	<b>320EGA36-0060</b> 404866B	<b>320EGA36-0090</b> 404866F	<b>320EGA36-0120</b> 404866C	<b>320EGA36-0180</b> 404866D	<b>320EGA36-0250</b> 404866G
These types are also available in combination with feeder								
<b>Screwdriver</b> Lever start		<b>Type</b> Part no.	<b>320EGT36-0040</b> 425876A	<b>320EGT36-0060</b> 425876B	<b>320EGT36-0090</b> 425876F	<b>320EGT36-0120</b> 425876C	<b>320EGT36-0180</b> 425876D	<b>320EGT36-0250</b> 425876G
Torque min.		N-m / in.lbs	0.8 / 7	1 / 8.85	2 / 17.7	2 / 17.7	3 / 26.6	5 / 44.25
Torque max. *)		N-m / in.lbs	4 / 35.4	6 / 53.1	9 / 79.65	12 / 106.2	18 / 159.3	25 / 221.25
Speed min.		rpm	100	70	50	35	25	20
Speed max. *)		rpm	1000	740	500	380	280	220
Diameter		mm / in.	36.5 / 1.42	36.5 / 1.42	36.5 / 1.42	36.5 / 1.42	36.5 / 1.42	36.5 / 1.42
Length		mm / in.	260 / 10 <sup>15</sup> / <sub>64</sub>	260 / 10 <sup>15</sup> / <sub>64</sub>	260 / 10 <sup>15</sup> / <sub>64</sub>	260 / 10 <sup>15</sup> / <sub>64</sub>	260 / 10 <sup>15</sup> / <sub>64</sub>	260 / 10 <sup>15</sup> / <sub>64</sub>
Weight		kg / lbs.	0.84 / 1.8	0.84 / 1.8	0.84 / 1.8	0.84 / 1.8	0.89 / 1.9	0.89 / 1.9
Noise level		dB (A)	62	62	42	62	62	62
Line voltage (DC)		V	48	48	48	48	48	48
Internal hex drive DIN ISO 1173			F6.3 (1/4")	F6.3 (1/4")	F6.3 (1/4")	F6.3 (1/4")	F6.3 (1/4")	F6.3 (1/4")
Suitable inserting tools and connection parts with inserting end DIN ISO 1173			E6.3 (1/4")	E6.3 (1/4")	E6.3 (1/4")	E6.3 (1/4")	E6.3 (1/4")	E6.3 (1/4")
<b>Optional equipment:</b>								
Spring sleeve cpl., without screw suction	Part no.					364672A		
Spring sleeve cpl., with screw suction	Part no.					364672C		

\*) as per VDI/VDE 2647 Directive



**Remark:**

Details on our feeding systems can be found in brochure D3820E.






## SYSTEM COMPONENTS

### MINIMAT-EC Screwdriver handheld, Pistol grip, size 27

Screwdriver	Type	320EPT27-0010	320EPT27-0022	320EPT27-0040
Trigger-start	Part no.	403636B	403636C	403636D
Torque min.	N·m/in.lbs	0.15 / 1.3	0.4 / 3.5	0.7 / 6.2
Torque max. *)	N·m/in.lbs	1 / 8.85	2.2 / 19.5	4 / 35.4
Speed min.	rpm	50	50	40
Speed max. *)	rpm	1000	700	400
Weight	kg / lbs.	0.62 / 1.36	0.64 / 1.41	0.68 / 1.5
Noise level	dB (A)	60	60	60
Line voltage (DC)	V	48	48	48
Internal hex drive DIN ISO 1173		B3 (3mm)	F6.3 (1/4")	F6.3 (1/4")
Suitable inserting tools and connection parts with inserting end DIN ISO 1173		A3 (3mm)	E6.3 (1/4")	E6.3 (1/4")
<b>Optional equipment:</b>				
Spring sleeve cpl., without screw suction	Part no.	403280A		364672A
Spring sleeve cpl., with screw suction	Part no.	403280B		364672C

\*) as per VDI/VDE 2647 Directive

### MINIMAT-EC Screwdriver handheld, Angle head, size 27, ESD-capable

<b>Screwdriver</b>		<b>Type</b>	<b>320EWT27-0022-E6</b>	<b>320EWT27-0035-E6</b>	<b>320EWT27-0060-E6</b>
Lever start		Part no.	400580B	400580C	400580E
External square drive DIN 3121			E6.3 (1/4")	E6.3 (1/4")	E6.3 (1/4")
Connection parts with inserting end DIN 3121					
Internal square drive			G6.3 (1/4")	G6.3 (1/4")	G6.3 (1/4")
<b>Screwdriver</b>		<b>Type</b>	<b>320EWT27-0022-E10</b>	<b>320EWT27-0035-E10</b>	<b>320EWT27-0060-E10</b>
Lever start		Part no.	409902B	409902C	409902E
External square drive DIN 3121			E10 (3/8")	E10 (3/8")	E10 (3/8")
Connection parts with inserting end DIN 3121					
Internal square drive			G10 (3/8")	G10 (3/8")	G10 (3/8")
<b>Screwdriver</b>		<b>Type</b>	<b>320EWT27-0022-F6</b>	<b>320EWT27-0035-F6</b>	<b>320EWT27-0060-F6</b>
Lever start		Part no.	409903B	409903C	409903E
Internal hex drive with quick change chuck DIN ISO 1173			F6.3 (1/4")	F6.3 (1/4")	F6.3 (1/4")
Connection parts with inserting end DIN ISO 1173					
External hex drive			E6.3 (1/4")	E6.3 (1/4")	E6.3 (1/4")
<b>Screwdriver</b>		<b>Type</b>	<b>320EWT27-0022-D6</b>	<b>320EWT27-0035-D6</b>	<b>320EWT27-0060-D6</b>
Lever start		Part no.	409900B	409900C	409900E
Internal hex drive for bits DIN ISO 1173			D6.3 (1/4")	D6.3 (1/4")	D6.3 (1/4")
Connection parts with inserting end DIN ISO 1173					
External hex drive			C6.3 (1/4")	C6.3 (1/4")	C6.3 (1/4")
<b>Screwdriver</b>		<b>Type</b>	<b>320EWT27-0022-DM6</b>	<b>320EWT27-0035-DM6</b>	<b>320EWT27-0060-DM6</b>
Lever start		Part no.	409901B	409901C	409901E
Internal hex drive for bits with magnet DIN ISO 1173			D6.3 (1/4")	D6.3 (1/4")	D6.3 (1/4")
Connection parts with inserting end DIN ISO 1173					
External hex drive			C6.3 (1/4")	C6.3 (1/4")	C6.3 (1/4")
Torque min.	N·m/in.lbs		0.4 / 3.5	0.7 / 6.2	1 / 8.85
Torque max. *)	N·m/in.lbs		2.2 / 19.5	3.5 / 31	6 / 53.1
Speed min.	rpm		80	50	30
Speed max. *)	rpm		800	500	300
Weight	kg / lbs.		0.8 / 1.76	0.8 / 1.76	0.8 / 1.76
Noise level	dB (A)		60	60	60
Line voltage (DC)	V		48	48	48

\*) as per VDI/VDE 2647 Directive








size 27  
pistol grip  
with trigger-start

**MINIMAT-EC Screwdriver handheld, Pistol grip, size 36**

Screwdriver	Type	320EPT36-0040	320EPT36-0060	320EPT36-0120	320EPT36-0180
Trigger-start	Part no.	400532A	400532B	400532C	400532D
Torque min.	N-m/in.lbs	0.8 / 7.1	1 / 8.85	2 / 17.7	3 / 26.6
Torque max. *)	N-m/in.lbs	4 / 35.4	6 / 53.1	12 / 106.2	18 / 159.3
Speed min.	rpm	100	70	35	25
Speed max. *)	rpm	1000	740	380	280
Weight	kg / lbs.	1 / 2.2	1 / 2.2	1 / 2.2	1.05 / 2.3
Noise level	dB (A)	62	62	62	62
Line voltage (DC)	V	48	48	48	48
Internal hex drive DIN ISO 1173		F 6.3 (1/4")	F 6.3 (1/4")	F 6.3 (1/4")	F 6.3 (1/4")
Suitable inserting tools and connection parts with inserting end DIN ISO 1173		E 6.3 (1/4")	E 6.3 (1/4")	E 6.3 (1/4")	E 6.3 (1/4")
<b>Optional equipment:</b>					
Spring sleeve cpl., without screw suction	Part no.			364672A	
Spring sleeve cpl., with screw suction	Part no.			364672C	
Handle	Part no.			410971	

\*) as per VDI/VDE 2647 Directive

**MINIMAT-EC Screwdriver handheld, Angle head, size 36, ESD-capable**

<b>Screwdriver</b>		<b>Type</b>	<b>320EWT36-0060-E6</b>	<b>320EWT36-0120-E6</b>		
Lever start		Part no.	405646B	405646C		
External square drive DIN 3121			E6.3 (1/4")	E6.3 (1/4")		
Connection parts with inserting end DIN 3121						
Internal square drive			G6.3 (1/4")	G6.3 (1/4")		
<b>Screwdriver</b>		<b>Type</b>	<b>320EWT36-0060-E10</b>	<b>320EWT36-0120-E10</b>	<b>320EWT36-0180-E10</b>	<b>320EWT36-0250-E10</b>
Lever start		Part no.	410932B	410932C	405646D	405646E
External square drive DIN 3121			E10 (3/8")	E10 (3/8")	E10 (3/8")	E10 (3/8")
Connection parts with inserting end DIN 3121						
Internal square drive			G10 (3/8")	G10 (3/8")	G10 (3/8")	G10 (3/8")
<b>Screwdriver</b>		<b>Type</b>	<b>320EWT36-0060-F6</b>	<b>320EWT36-0120-F6</b>		
Lever start		Part no.	411307B	411307C		
Internal hex drive with quick change chuck DIN ISO 1173			F6.3 (1/4")	F6.3 (1/4")		
Connection parts with inserting end DIN ISO 1173						
External hex drive			E6.3 (1/4")	E6.3 (1/4")		
<b>Screwdriver</b>		<b>Type</b>	<b>320EWT36-0060-D6</b>	<b>320EWT36-0120-D6</b>		
Lever start		Part no.	410934B	410934C		
Internal hex drive for bits DIN ISO 1173			D6.3 (1/4")	D6.3 (1/4")		
Connection parts with inserting end DIN ISO 1173						
External hex drive			C6.3 (1/4")	C6.3 (1/4")		
<b>Screwdriver</b>		<b>Type</b>	<b>320EWT36-0060-DM6</b>	<b>320EWT36-0120-DM6</b>		
Lever start		Part no.	411301B	411301C		
Internal hex drive for bits with magnet DIN ISO 1173			D6.3 (1/4")	D6.3 (1/4")		
Connection parts with inserting end DIN ISO 1173						
External hex drive			C6.3 (1/4")	C6.3 (1/4")		
Torque min.	N-m/in.lbs		1	2	3	5
Torque max. *)	N-m/in.lbs		6	12	18	25
Speed min.	rpm		75	40	20	15
Speed max. *)	rpm		750	400	240	180
Weight	kg / lbs.		1.25	1.25	1.25	1.3
Noise level	dB (A)		60	60	62	62
Line voltage (DC)	V		48	48	48	48

\*) as per VDI/VDE 2647 Directive



size 36  
angle head with lever start

## SYSTEM COMPONENTS

### MOTOR CABLE

Motor cable for screwdriver size 27 and 36		straight connection	with 90° angle connection
Length 2.5 m / 8.2 ft. (standard)	Part no.	385442A	385442E
Length 5 m / 16.4 ft.	Part no.	385442B	385442F
Length 8 m / 26.2 ft.	Part no.	385442C	385442G
Length 12 m / 39.4 ft.	Part no.	385442D	385442H

### SEQUENCE CONTROLLER AST5

Suitable for screwdriver	MINIMAT-EC	320EGA22-..., 320EGT22-.. and 320EGZ22-.. (Page 4)
<b>Sequence controller</b> with integrated performance electronics	<b>Type</b> Part no.	<b>AST5</b> 385555A
Voltage	V	24
Power input	W	150
Display		TFT-colour display 4.3"
24V input/output interface		-
Ethernet		yes
Number of connectable screwdriver		1
Dimensions (W x H x D)	mm / in.	162 x 143 x 65 / 6 3/8 x 5 5/8 x 2 9/16
Weight	kg / lbs	1.5 / 3.3
Power supply unit	Part no.	2041061 (included in delivery)

#### Required Accessories

<b>Power supply cable</b> 230 V length 1.8 m / 5.9 ft.	Part no.	812587
<b>Power supply cable</b> 115 V length 1.8 m / 5.9 ft.	Part no.	812295

### SEQUENCE CONTROLLER AST11

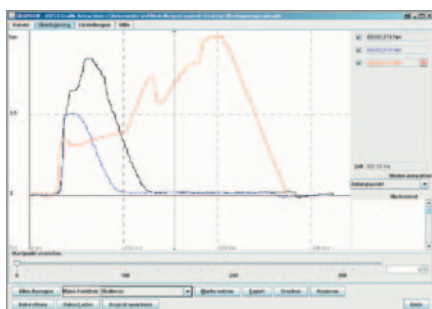
Suitable for screwdriver	MINIMAT-EC MINIMAT-EC MINIMAT-EC	320EGA/EGT/EGZ22-.. (Page 4) 320EGA/EGT/EGZ27-.., (Page 5) 320EPT27-..., 320EWT27-.. (Page 6)	320EGA36-..., 320EGT36-.. (Page 5) 320EPT36-..., 320EWT36-.. (Page 7)		
<b>Sequence controller</b>	<b>Type</b> Part no.	<b>AST11-1</b> 390041A	<b>AST11-1-S</b> 390041B	<b>AST11-2</b> 390042A	<b>AST11-2-S</b> 390042B
Module „safety stop“		no	yes	no	yes
Power unit (AC)	V / Hz	100 - 240 / 50 / 60		100 - 240 / 50 / 60	
Power consumption	W	400		400	
Insulation		IP 54		IP 54	
LC-display		4 x 20		4 x 20	
24V input/output interface		12 inputs / 8 outputs		12 inputs / 8 outputs	
Membrane keyboard		yes		yes	
RS 232 Interface		yes		yes	
Ethernet		yes		yes	
Amount of connectable screwdrivers		1		1	
Dimensions (W x H x D)	mm / in.	160 x 295 x 200 / 6 19/64x11 39/64 x 7 7/8		160 x 295 x 200 / 6 19/64x11 39/64 x 7 7/8	
Weight	kg / lbs	5.8 / 12.8		6 / 13.2	

#### Required Accessories

<b>Power supply cable</b> Length 1.8 m / 5.9 ft. (EU)	Part no.	385443A
<b>Power supply cable</b> Length 1.8 m / 5.9 ft. (USA)	Part no.	385443B
<b>Power supply cable</b> Length 2.5 m / 8.2 ft. (China)	Part no.	385443C



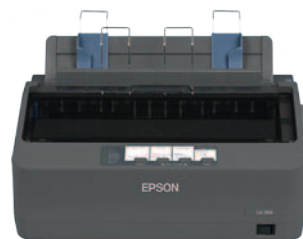
Optional Accessories	suitable for	AST5	AST11	
<b>Toolbox</b>	<b>Type</b>	-	<b>TB 7 - AST1x</b>	
	Part no.	-	398097B	
<b>Technical Data:</b>				
Tool holders			7	
Tool size	mm / in.		up to Ø 24/0.9 (AF 19)	
Voltage	V		DC 24	
Amperage	mA		100	
Input/output interface		-	SUB-D 15-pin connector	the toolbox is an available accessory and it may be connected to a PLC: Type TB 7 - PLC, part no. 398097C
Start signal			4-pin connector	
Dimensions (W x H x D)	mm / in.		225x50x120 / 8.8x1.9x4.7	
Weight	kg / lbs.		1.2 / 2.6	
Connection cable AST1x-Toolbox	Part no.		385451A	
Fieldbus module Profibus	Part no.	-	428010A	
Fieldbus module Profinet	Part no.	-	428010B	
Fieldbus module EtherCat	Part no.	-	428010C	
Fieldbus module Ethernet IP	Part no.	-	428010D	
<b>Required accessories for the fieldbus module:</b>	Part no.	-	207725A (EU) 207725B (US)	
Connection cable AST11 to fieldbus module				
Patch cable (2m) (connection ASTxx - PC)	Part no.	831902	831902	
Stand	Part no.	416004A	405278A	
Plug RJ45-IP54	Part no.	-	385453A	
Plug 7-pin (slide connector start clearance/feeder)	Part no.	833553	-	
Touch pen	Part no.	832190		
Part sensor M18	Part no.	-	354841C	
Printer Type ND350	Part no.	-	112462A	
<b>Interface Graph Loader</b> (hardware and software)	Part no.	385834A	385834A	1) see description on page 10
Connection cable (ASTxx - Graph-Loader)	Part no.	385835A	811420	
<b>Software</b> Graph 10E (release code)	Part no.	202698	202698	
<b>Software</b> statistic (release code)	Part no.	206081	206081	
<b>Software</b> datalogger (release code)	Part no.	202699	202699	
<b>Software</b> Friction value screwdriving (release code)	Part no.	201820	201820	
<b>Software ASTxx Serial Remote</b> (release code) for the simple storage of screwdriving curves and result-data to a PC	Part no.	206565	206565	2) see description on page 10
<b>Software</b> GRAPH10 BIN-> CSV	Part no.	201992	201992	3) see description on page 10
<b>Software Graph Viewer</b> (for sequence controller AST)	Part no.	128900	128900	4) see description on page 10
Activation	Part no.	128901	128901	
<b>Software</b> Deprag Data eXchange (for sequence controller AST)	Part no.	132679	132679	5) see description on page 10
Activation	Part no.	132680	132680	



GRAPH10E – Multiple torque graph



Interface Graph-Loader



Source: www.epson.de

Printer ND350



Toolbox

**1) Interface Graph Loader (hardware and software)**

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.

**2) Software ASTxx Serial Remote (release code)**

The program ASTxx Serial Remote is started on a PC and is controlled by commands over a serial interface (COM-Port). With this program, screwdriving curves and result-data can be transferred fast and simply onto a PC. The PLC controls when and which data should be stored. The storage place (also the directory) on the PC is determined by the PLC as well. The directory is setup automatically on the PC.

**3) Software GRAPH10 BIN-> CSV -** The software converts your binary files into csv files for further processing.

**4) Software Graph Viewer for evaluation of screwdriving curves**

During each screw assembly when using a sequence controller AST, the relevant measurement values are recorded in a file. There is now a new software product: the DEPRAG Graph Viewer, to simply and easily evaluate and analyse these measurement values.

Visualisation of measurement values over time

In this visualisation, various measurement sizes can be shown in relation to the screwdriving procedure. All available measurement values can be displayed in chronological order.

Visualisation of measurement values over angle

In this visualisation, the angle can be analysed in relation to the screwdriving procedure. The y-axis can be freely chosen by the user. This can e.g. enable analysis of angle in relation to torque or angle in relation to motor current, etc.

In order to precisely analyse the screw assembly, a video can be played in visualisation over angle. Use the "start" and "pause" buttons in the same way as a video player to visualise the curve sequence of the screwdriving process. Individual sequences can be selected and displayed using the time bar.

Superposition of measurement values over time / over angle

As well as visualisation over angle and visualisation over time, there is also an option to display several curves at the same time in order to draw correlations and recognise trends. Any number of curves can be added. It is also possible to align curves to specific synchronisation points and hide or show screwdriving steps.

• **Simple filtering and synchronisation in search history**

Screwdriving curves can be filtered according to program step or by torque. All displayed curves can be coordinated to one synchronisation point.

• **Easy operation**

The required units, sizes and contents can be flexibly selected by the user.

• **Several display views at one time**

In order to compare several curves, more than one screwdriving curve can be opened at the same time.

• **Usability & "touch first"**

The new software has been developed to be "touch first" and allows easy operation – without mouse or keyboard.

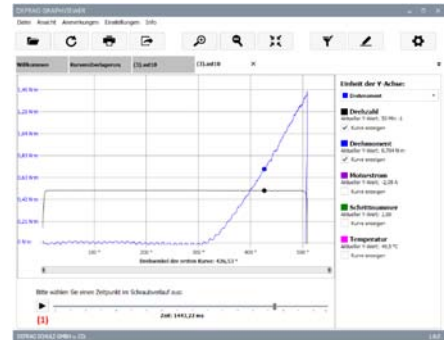
• **Additional features**

- Add individual texts and reference arrows
- Conversion of units
- Save and load files
- Export files
- Zoom
- Multi-language (German, English)
- Print curve data
- Download directly from controller

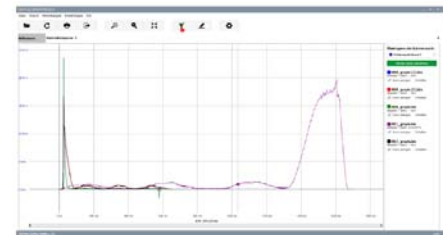
• **System prerequisites**

- Windows 7, 8, 10
- The software is available as a download and requires activation (128901)

➤ **Use with current AST software version is recommended.**



Visualisation over angle



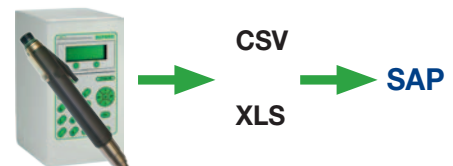
Superposition over time

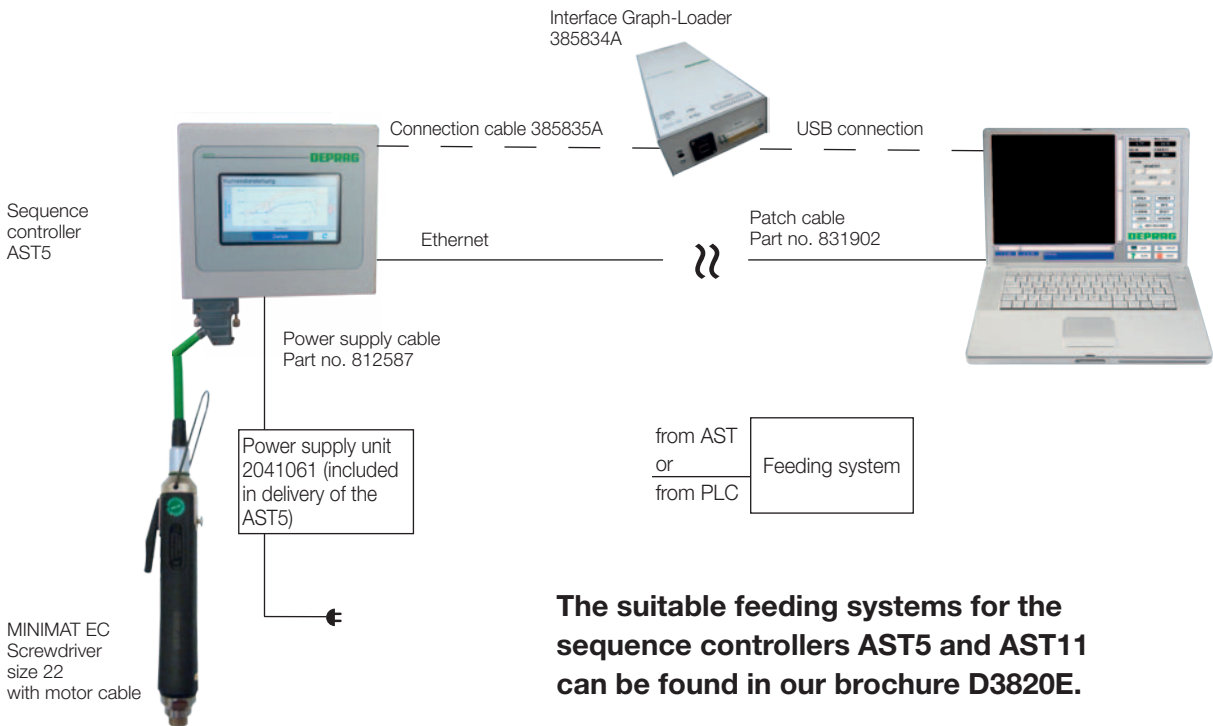
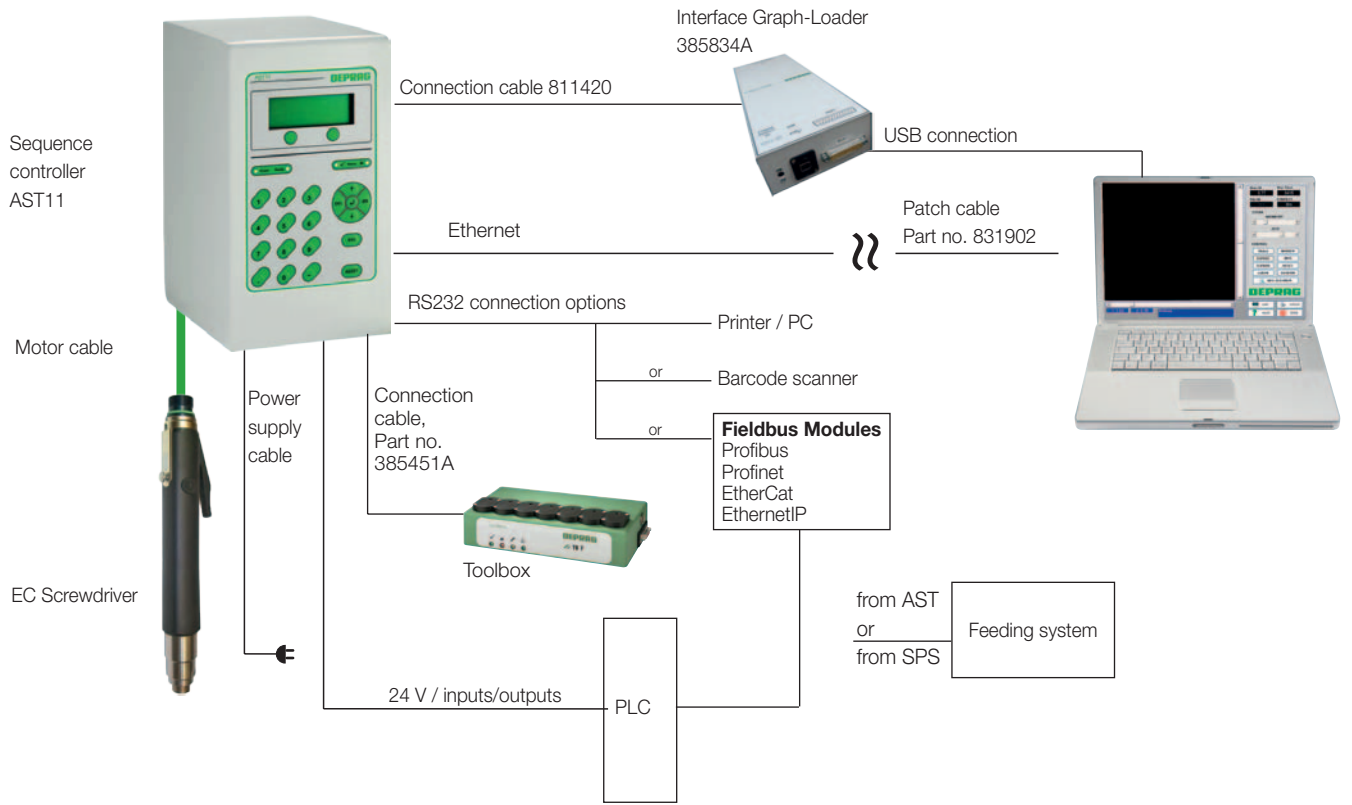
**5) Software Deprag Data eXchange for AST sequence controllers enables DEPRAG graphic files to be exported either as csv or Excel files**

AST sequence controllers, the adaptive screwdriving system ADAPTIVE DFS and the ComCenter document relevant processing data for every screw assembly, which is then saved in a distinctive DEPRAG format. The so-called "graphic files" contain all screw curves, end values and details relating to the screwdriving process and are only readable by DEPRAG's own software solutions. In order to use and analyse this data in other systems, it is necessary to transform the internal format into a universal machine-readable format. The new software solution DEPRAG Data eXchange enables DEPRAG graphic files to be exported either as csv or Excel files. This data can now be used in other software solutions. Optional areas of application include:

- integration in a databank
- analysis in Matlab
- SAP integration
- filing in customer-specific processing software

**Compatibility:** all Windows systems (7, 8, 10) without any need for configuration. The software configures itself and is ready to run with just one click. The software is available as a download and requires activation (132680).





**The suitable feeding systems for the sequence controllers AST5 and AST11 can be found in our brochure D3820E.**

# DEPRAG

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**CERTIFIED AS PER DIN EN ISO 9001**

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