DEPRAG

Controller Technology

Control systems for sophisticated automation tasks

- ■ **Integrated standard software guarantees the highest functionality**
- ■ **Simple and reliable operation**
- ■ **Service friendly remote maintenance**
- ■ **Great value for money – optimal adaptation to DEPRAG screwdriving technology**
- ■ **Open connectivity and integrated network capabilities**
- ■ **Conforms to current safety standards**
- ■ **Realtime data integration**

Controllers in modern production systems have increasingly complex tasks to perform.
The controller system **DCOS** (**D**EPRAG **CO**NTROLLER **S**YSTEM) is designed to fulfil the highest requirements. It is particularly user friendly and has high functionality. The DCOS controls, records, documents and analyses.

Applications from decades of experience in the fields of feeding, screwdriving, assembly and measuring technologies were combined in its development.
Multi-axle systems such as the DCAM (DEPRAG COMPACT ASSEMBLY MODULE) can be created quickly and simply using this controller technology.

Controller Technology

DCOS Processing and System Controllers
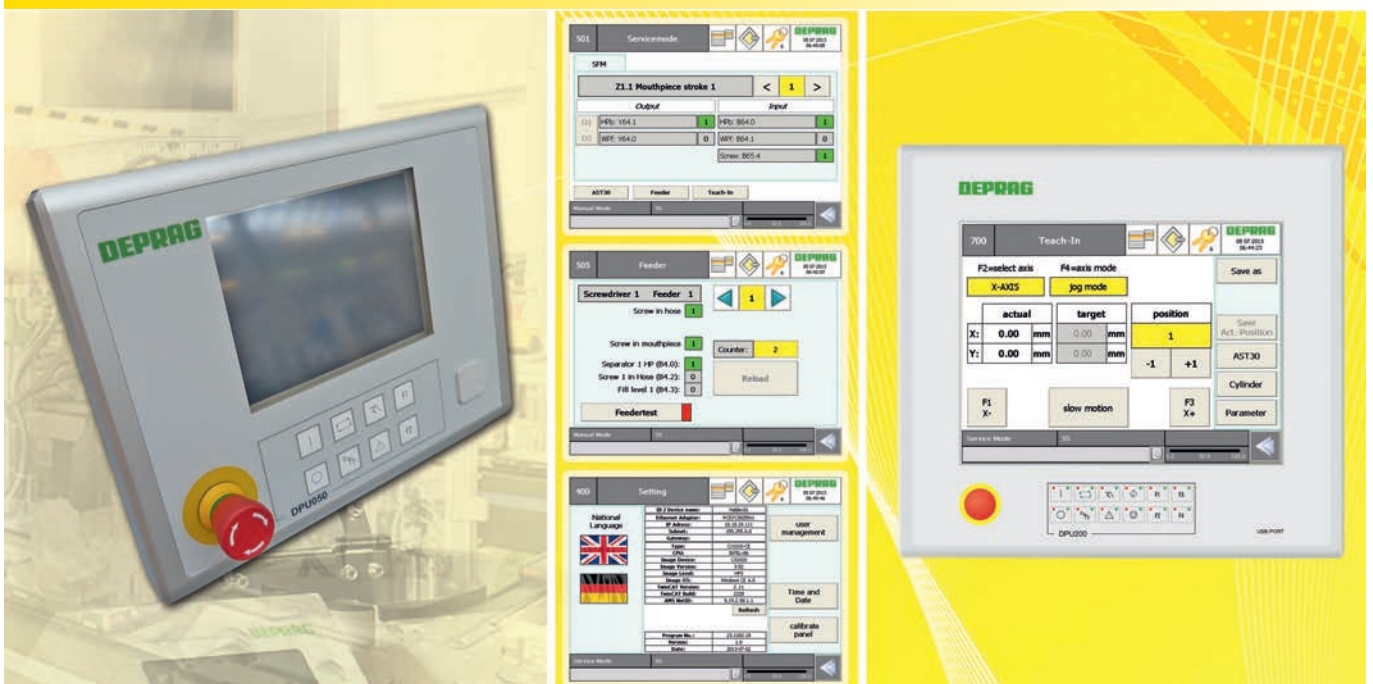
DCOS (DEPRAG CONTROLLER SYSTEM) demonstrates the diversity of the PC world

The integrated networkability enables unproblematic connection to SCADA and MES systems, optimal data administration and storage and above all, the access to common PC applications such as browsers, data back-up and remote access opens up almost infinite user possibilities.

A DCOS consists of:

• the control and operating unit - DPU010 (without display), DPU050, DPU100 or DPU200

• the control cabinet - DSEC10, DSEC20, DSEC30 or DSEC40

• and standardised software packages - DFUN, DVIP, DPRO, DAST and DSPEC

Control and Operating Unit DPU - (DEPRAG PROCESSING UNIT)

DPU050

The DPU series controllers are based on an industrial PC. The compact controllers DPU010, DPU050, DPU100 run on the Windows CE operating system whereas the DPU200 uses Windows 7 Ultimate.

The DPUs control complex motion sequences with extremely short cycle times (typically < 6 ms). A colour touch screen with VGA resolution (except on the DPU010) enables high level user comfort in the operation and display of operating conditions. Two USB ports allow the user to connect additional peripheral devices with ease. The DPU can access the company network or world wide web via the freely accessible Ethernet port.

• **DPU010 and DPU010c -** The DPU010 is the smallest controller in the DPU series. The controller was developed with 16 digital inputs and outputs each in order to meet the requirements of small screwdriving tasks where visualisation is not required. The DPU010C offers the option of communication with a higher level controller via one of the available communication modules such as EtherCat, Profinet, Profibus, CANopen, Interbus, EtherNet/IP or Ethernet. Using this method components, such as a screwdriving function module, can be programmed easily and controlled via the selected communication module. The DPU010(c) doesn't need a DSEC control cabinet.

  Possible areas of application:
  - Manual work stations without visual operator guidance
  - Screwdriving function modules with feed system
  - Control of standard range DEPRAG products

• **DPU050 -** The DPU050 has a VGA resolution display, a membrane keypad with 8 buttons and an emergency stop button. The integrated RS232 port allows direct connection to a scanner. In combination with the corresponding control cabinet DSEC10 there are already 32 digital inputs and outputs each available. This controller option can already guide a position control stand or position control portal together with a screwdriving controller. The DPU050 can be used in conjunction with DSEC10, DSEC20 or DSEC30 control cabinet.

  Possible areas of application:
  - Manual work stations with operator guidance, sequence and screw position visualisation
 - Automatic stations or semi-automatic machines with pneumatic actuators

• **DPU100 –** This high performance controller can guide axis systems with up to three axes. Complex manual work stations with operator guidance, sequence and screw position visualisation as well as fully automatic machines with several part stations such as rotary indexing machines with up to 4 user stations can be realised.
  This controller adds the option of connecting a database such as a BDE or ERP system. The DPU100 can be used in combination with all standard DSEC control cabinets.

DCOS Processing and System Controllers

- **DPU200 –** The DPU200 is the most efficient controller of the DPU series. The controller has a 15" display with XGA resolution (1024 x 768 pixels) for improved image visualisation.

  It can control complex fully automatic machines such as axis systems with more than three axes. It offers unproblematic connection to databases such as BDE or ERP systems. There are various interfaces and protocols available e.g. OPC, OPC-UA or TCP/IP.

  The DPU200 can also be used in conjunction with all DSEC control cabinets.

DPU200

If you cannot find a suitable controller for your requirements in our standard range (e.g. cycle times smaller than 1 ms for regulators and fast measurement applications) we can also modify our controllers to meet your needs.
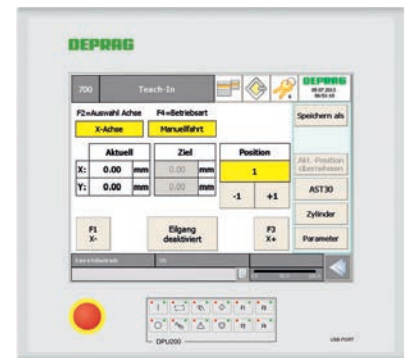
Control Cabinet DSEC - (DEPRAG SAFETY EXTENSION CONTROLLER)

As well as the DPU a control cabinet such as DSEC10, DSEC20, DSEC30 or DSEC40 is used, depending on the control task. These each contain 32 digital inputs and outputs which are connected to the DPU via the modern Ethercat field bus.
A 24V DC voltage supply is already integrated in the DSEC to supply the control components (DPU, sensors and actuators etc.). To meet the safety function requirements the DSEC10 and DSEC20 both include two inbuilt safety relays.

Both control cabinets DSEC30 and DSEC40 are equipped with freely programmable compact safety controllers enabling highly complex safety functions.

DSEC10

- **DSEC10 -** The DSEC10 can be used anywhere it is necessary to carry out small control tasks including visualisation. This includes manual work stations with or without position control, automatic stations or semi-automatic machines with pneumatic actuators.

- **DSEC20 -** More complex manual work stations, screwdriving or assembly cells call for the use of the DSEC20. Unlike the DSEC10, this control cabinet includes an additionally integrated profibus master module for unproblematic connection of additional fieldbus subscribers, a second safety relay for safety door monitoring and a separate main switch to enable the complete station to be disconnected easily from the network. Single phase devices can be supplied with voltage through the central input feed and controlled through the DSEC20. Due to the larger 24V power supply with 10A output electricity and the bus module, the DSEC20 can control a larger number of outputs in comparison with the DSEC10.

- **DSEC30 –** The DSEC30 is the right solution for screwdriving and assembly automation systems with higher performance and safety requirements. The design with three phase alternating current input allows the connection of alternating current drives used for example on rotary indexing tables and belt drives. The integrated compact safety controller realises the highest safety level PL e if required. The software technical assignment of the safety components offers a high degree of flexibility when interconnecting the individual safety functions at the top level.

- **DSEC40 –** The DSEC40 can additionally control up to three NC axes. As standard step motors and the corresponding power units can be used to carry out precise positioning tasks. Upon request applications with servo or linear motors are also an option. Screwdriving or assembly automation machines with axis systems compose the application areas of the DSEC40.

TECHNICAL DATA

Compact Controller DPU010

Compact Controller DEPRAG Processing Unit	Type Part no.	DPU010 951347A							
Compact Controller incl. communication module DEPRAG Processing Unit	**Type** Part no.	**DPU010C CANopen** 951412A	**DPU010C Devicenet** 951413A	**DPU010C Interbus** 951414A	**DPU010C Profibus** 951410A	**DPU010C Profinet** 951411A	**DPU010C EtherCat** 951415A	**DPU010C EtherNet/IP** 951416A	**DPU010C Ethernet** 951417A
Display		unavailable							
Operating voltage		24V DC + 24V DC Safety							
Current consumption	A	0.25							
Power consumption	W	6							
24V DC voltage supply internal		unavailable, external power unit optional, no bus subscriber can be connected							
Evaluation of safety functions		unavailable, must be carried out by higher level controller							
CPU		32 Bit, 400 MHz							
Number of standard inputs		16							
Number of standard outputs		16							
Working storage		64 MB							
Mass storage		256 MB Micro SD							
UPS		1 second UPS							
Operating system		Windows CE							
Operating temperature	°C	0 to 55							
Housing - safety class		IP54							
Weight	kg / lbs	approx. 8 / 17.6							
Remote maintenance		optional (Ethernet Modem)							
Programming		IEC61131-3 (AWL, KOP, FUP, ST AS, CFC)							
Ports		1xEthernet 10/100 MBit/s, 1xUSB							
Available bus systems		available communication modules (slave connections) EtherCat, Profinet, Profibus, Devicenet, Interbus, CANopen, EtherNet/IP, Ethernet							
▶ **Suitable Control Cabinets** (please find description on page 3, technical data on page 5)		no DSEC control cabinet necessary							
▶ **Suitable Software Packages** (please find description on page 6)		DFUN10 and / or DPRO10 and / or DSPEC							

Optional Accessories for DPU010

Power supply			Power supply data:
DPU010 24V DC EU	Part no.	951420A	Input: AC 100-240V 50-60Hz
DPU010 24V DC USA	Part no.	951421A	Output: DC 24V 1.67A
			Dimensions WxLxH: 1140 x 62 x 31.5 mm
			Accreditations: UL, GS, TÜV certified
Port RS232 *)	Part no.	951422A	Port data:
			Transmission channels: TxD and RxD, full duplex
			Transmission rate: 2400.... 115200 Baud
			default: 9600, 8 data bits, no parity, 1 stop bit
			Data buffer: 864 Byte receive buffer, 128 Byte transmit buffer
			Level interface: RS232
			Dimensions (WxHxD): 15 x 100 x 70 mm

*) The DSPEC software is neccessary to operate the RS232 interface.

TECHNICAL DATA

Control and Operating Unit DPU050, DPU100 and DPU200

| Control and Operating Unit	Type	DPU050	DPU100	DPU200
DEPRAG Processing Unit	Part no.	815266A	8099722	8134992
Display		touch panel 6,5" colour	touch panel 6.5", colour	15" TFT-display with touch screen, colour
Resolution		VGA (640 x 480 pixels)	VGA (640 x 480 pixels)	VGA (1024 x 768 pixels)
Voltage		24V DC	24V DC	24V DC
Current consumption	A	0.75	0.75	approx. 4.5
Power input	W	18	18	80 / 110 with USV
Additional functions				
- Membrane keys		8 unlit	12 membrane keys with green and red LED	
- Emergency stop button		yes		yes
CPU		AMD LX800, 500 MHz	Intel Atom, 1.6 GHz	Intel Celeron 2000E 2.2 GHz
Port		1xEthernet, 1xEtherCat, 2xUSB 2.0, 1xRS232	1xEthernet, 1xEtherCat, 2xUSB 2.0	1xEthernet, 1xEtherCat, 2xUSB 2.0 Front, 1xUSB 2.0 in rear plate
Working storage		256 MB DDR3	1GB DDR2 RAM	2GB DDR3L-RAM
Mass storage		1 GB Compact Flash	1GB Compact Flash	Hard disk, 2.5" 320 GB
Operating system		Windows CE	Windows CE	Windows 7 Ultimate
Operating temperature	°C	0 to 55	0 to 55	0 to 45
Housing - protection class		IP65 (splash proof)		
Dimensions (W x H X D)	mm / in.	290 x 225 x 50 / 11.3 x 8.8 x 1.9	290 x 225 x 50 / 11.3 x 8.8 x 1.9	426 x 395 x 95 / 16.6 x 15.4 x 3.7
Weight	kg / lbs	approx. 4.5 / 9.9	approx. 4.5 / 9.9	approx. 13 / 28.6
Remote maintenance		optional (Ethernet, modem)		
Programming		IEC61131-3 (AWL, KOP, FUP, ST, AS and CFC)		
▶ Suitable Control Cabinets (please find description on page 3, technical data see below)		DSEC10, DSEC20 or DSEC30	DSEC10, DSEC20, DSEC30 or DSEC40	DSEC10, DSEC20, DSEC30 or DSEC40
▶ Suitable Software Packages (please find description on page 6)		DFUN50 and / or DVIP50 and / or DPRO50 and / or DAST100 and / or DSPEC	DFUN100 and / or DVIP100 and / or DPRO100 and / or DAST100 and / or DSPEC	DFUN200 and / or DVIP200 and / or DPRO200 and / or DAST200 and / or DSPEC

Control Cabinet DSEC..

Control cabinet	Type	DSEC10	DSEC20	DSEC30	DSEC40-1	DSEC40-2	DSEC40-3
DEPRAG Safety Extension Controller	Part no.	951401	809969	809970	383527A	383527B	383527C
Power supply		230V / 115V	230V / 115V	3/N/PE 400V / 50 Hz	3/N/PE 400V/ 50 Hz		
Power input max.	VA	150	2000	4000	4000		
24V DC Internal power supply	A	5	10	10	10		
		1 bus subscriber can be connected	Connection options to up to 4 active bus sharing units (e.g. valve blocks)				
Analysis of safety functions		discretely assembled safety circuit		through small safety controller			
Safety category emergency stop		Category 4, PL e possible according to EN13849					
Safety category safety door circuit		Category 2, PL c possible according to EN13849		Category 4, PL e possible according to EN13849			
Amount of standard inputs		32 inputs, 2 of which are pre-reserved	32 inputs, 4 of which are pre-reserved	32 inputs, 4 of which are pre-reserved	32 inputs, 5 of which are pre-reserved		
Amount of standard outputs		32 outputs, 1 of which is pre-reserved	32 outputs, 1 of which is pre-reserved	32 outputs, 1 of which is pre-reserved	32 outputs, 1 of which is pre-reserved		
Bus systems present		EtherCat	EtherCAT, Profibus	EtherCAT, Profibus	EtherCAT, Profibus		
Space reserved for extension terminals		max. 8 TE	max. 24 TE	max. 24 TE	max. 24 TE		
		Optional extension package (OK, communication, ..)					
Axle system DCAM (Standard)		-	-	-	Step motor controller, Servo motor controller		
Axle system DCAM XS (Option)		-	-	-	Linear motors		
Housing dimensions (WxHxD)	mm	380 x 380 x 210	600 x 600 x 210	760 x 760 x 300	600 x 600 x 350		
	in.	14^{31}/$_{32}$ x 14^{31}/$_{32}$ x 8^{17}/$_{64}$	23^{5}/$_{8}$ x 23^{5}/$_{8}$ x 8^{17}/$_{64}$	29^{15}/$_{16}$ x 29^{15}/$_{16}$ x 11^{13}/$_{16}$	23^{5}/$_{8}$ x 23^{5}/$_{8}$ x 13^{25}/$_{32}$		
Housing protection class		IP54	IP54	IP54	IP54		
Weight	kg / lbs.	approx. 15 / 33	32 / 70.4	40 / 88	40 / 88		

STANDARD SOFTWARE

DCOS is particularly attractive due to its innovative software packages!
The use of tried and tested standard components reconfirms their functionality. This facilitates greater processing reliability for the operator.
Software packages with various scopes of performance have been developed for DCOS.
Despite standardisation the software can also be quickly and simply adapted to meet customer specific requirements.

Software Packages

| DFUN	DVIP	DPRO	DAST	DSPEC
DFUN10 Part no. 815454		DPRO10 Part no. 815632		
DFUN50 Part no. 815455	DVIP50 Part no. 815629	DPRO50 Part no. 815633		Part no. based upon order
DFUN100 Part no. 815456	DVIP100 Part no. 815630	DPRO100 Part no. 815634	DAST100 Part no. 815641	
DFUN200 Part no. 815457	DVIP200 Part no. 815631	DPRO200 Part no. 815635	DAST200 Part no. 815642	
The basic software package regulates the functions of your system components. The functionality matches the performance capability of the relevant system control.	The software package for visualisation and positioning. Operator guidance on the positioning control necessitates processing and sequencing visualisation. The functionality matches the performance capability of the relevant system control.	This software package supports the process control through BDE, MDE and MES connections. The functionality matches the performance capability of the relevant system control.	The software-panel for EC and EC Servo Systems. DAST is used to supervise the operation and visualisation of the screwdriver sequence controller (AST series) through the system control. The functionality matches the performance capability of the relevant system control.	For the regulation of customer specific applications. DSPEC is required when actions and functions are used which are not covered by the software packages DFUN, DVIP and DPRO.

Software Application Examples
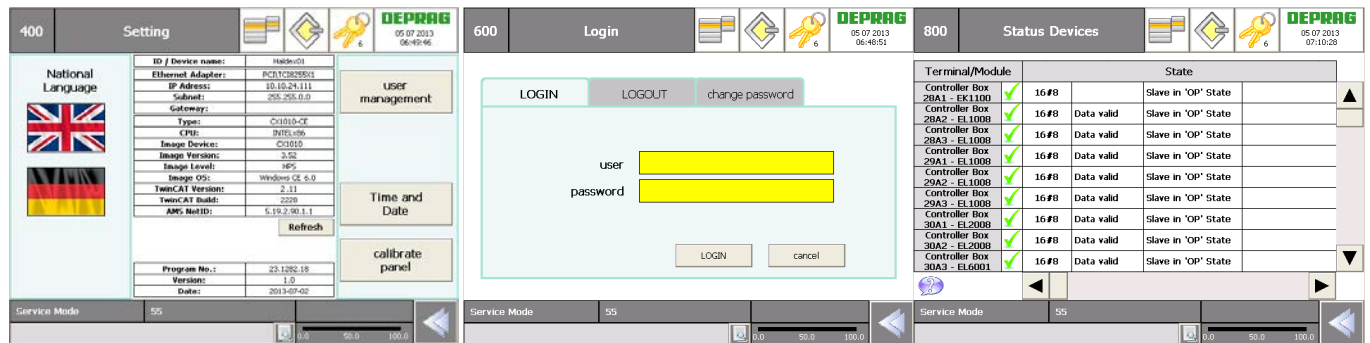
Display: Setup
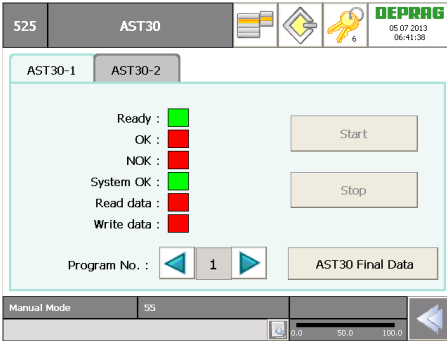
Display: Password entry
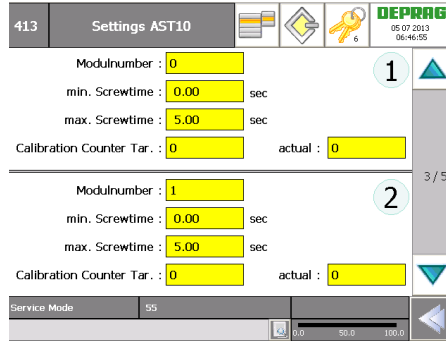
Diagnostics view for EtherCat or profibus devices
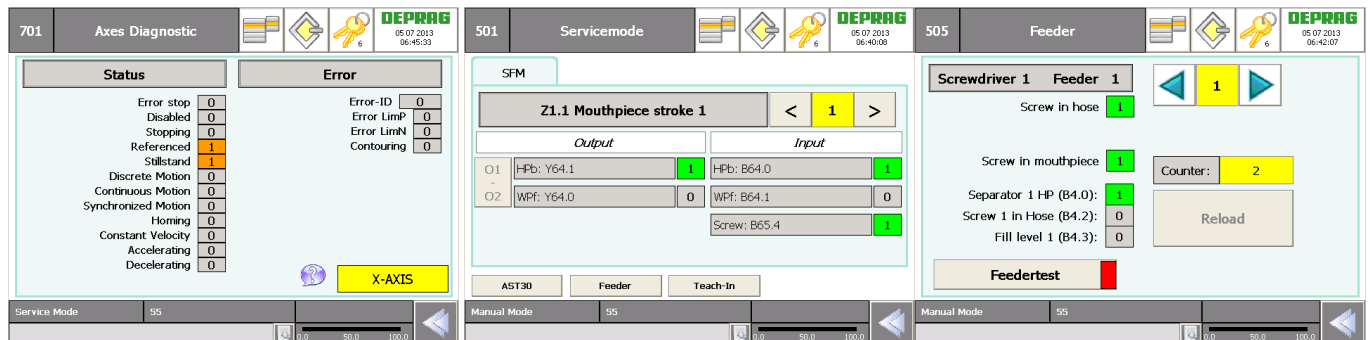
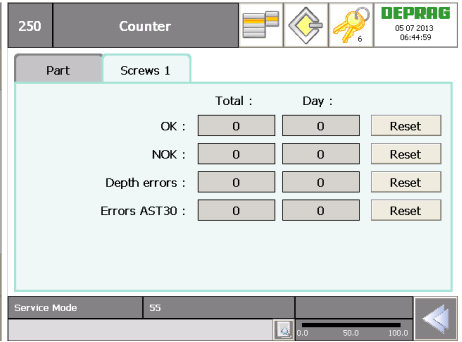Diagnostics view for axis controller

Display for set-up mode

Display for set-up mode screw feeding
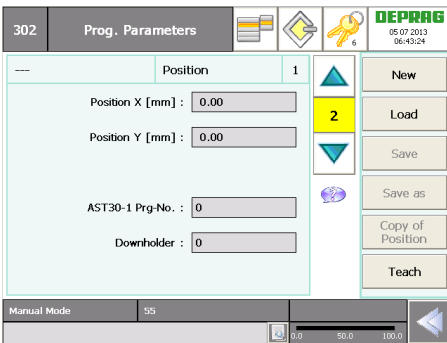
Software Application Examples
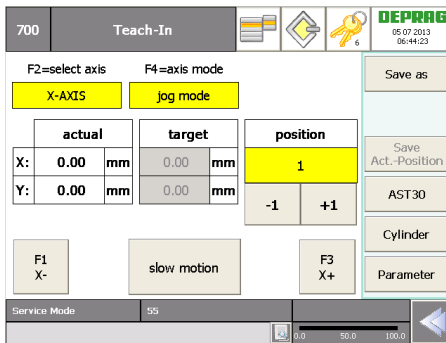
Display for set-up mode AST30
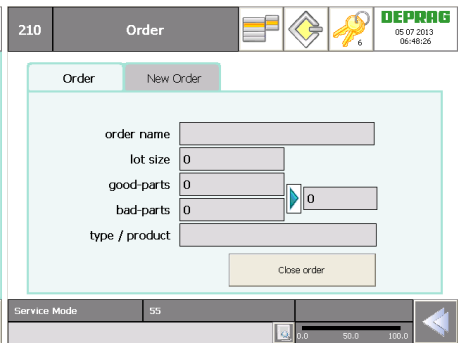
Display for screwdriving system parameter setting

Display counter reading

Display program parameter administration

Display teach mode for axis systems

Display order management

OPTIONAL EQUIPMENT

Remote Maintenance for Controllers DPU...

Remote access maintenance module	Part no.	814132
Technical Data:		
Version		Din rail device for controller housing
Telephone connection		Internet connection via network, WAN interface or modem (analog)
Voltage		24V DC
Dimensions (W x H x D)	mm / in.	48 x 137 x 140 / 1.87 x 5.34 x 5.46
Weight	kg / lbs	0.65 / 1.43
Dial modes		MFV / IWF

If you order a complete controller together with the remote access maintenance module, the installation into the controller is included.
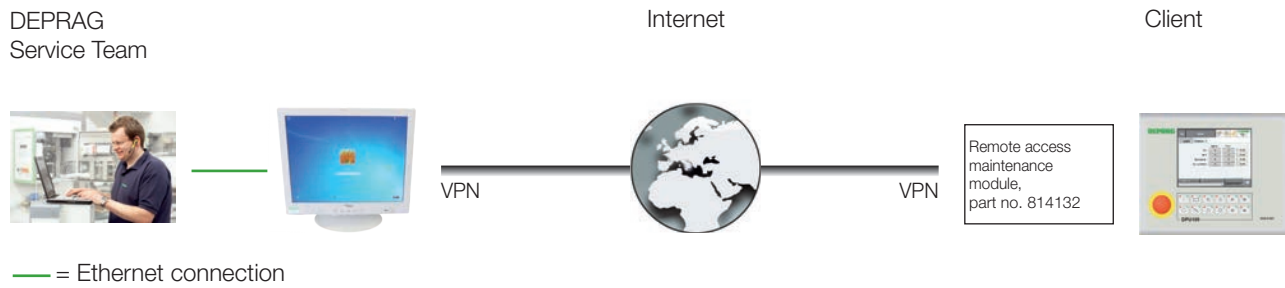
The remote access module is available with din rail mounting bracket (for installation into a control box). The diagnosis and servicing of your controller can be done very fast and economically by data transmission via a remote access module and telephone. With this remote access maintenance module, trouble shooting diagnosis- and software updates can be performed from any location.

Example: Remote access module connected to the Screwdriving- or Assembly System
The remote access module can be mounted on a din rail in the control box and connected to your PLC with a cable. An analogue telephone line, connected to the remote access module is necessary for the set-up. If an ISDN line is used a pulse code modulator must be available.

APPLICATION EXAMPLES

Example: Remote access module on a Service-PC

| DEPRAG | Internet | Client |
| Service Team | | |

VPN   VPN

Remote access
maintenance
module,
part no. 814132

—— = Ethernet connection

DEPRAG

CERTIFIED AS PER DIN EN ISO 9001