POSIDRIVE® MDS 5000

175 Posi LatchMod
0 : rising edge
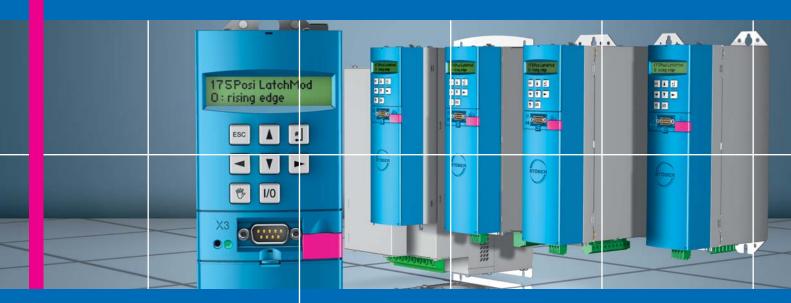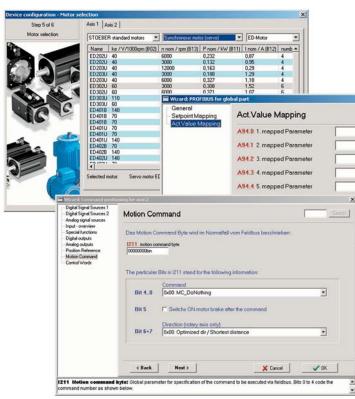
The universal servo inverter
for fully digital servo axes

STÖBER

THE FULLY DIGITAL POSITIONING AXIS

THE FIRST COMPLETE SYSTEM FOR EFFICIENT AUTOMATION

With the development of the POSIDRIVE® MDS 5000 servo inverter, STÖBER ANTRIEBS-TECHNIK is launching a total revision of the hardware and software for the servo system.

The data communication between the POSIDRIVE® MDS 5000 and the STOBER ED EK and EZ synchronous servo motors is now entirely digital. The main factor allowing rational realization of this fully digital servo axis lies in the development of fully digital absolute encoders at industrial-scale prices. The STOBER synchronous servo motors in the ED, EK and EZ series are equipped with these devices.

Innovative software generation
The commissioning software POSITool is based on a completely new, modular 3-layer architecture with ergonomic interface design.
An applications library with parameterization assistant and an additional flexible graphics programming facility forms a successful bridge between custom-made design and universality. This new system technology brings to an end the era of overloaded and confusing operating programs from the pioneering period of inverters.

The benefits are obvious
This comprehensive and rational slimming down of the system results in significant cost benefits for hardware, configuration, cabling, installation and commissioning.

The close coordination of all the STOBER servo components is clear from the example of the electronic motor rating plate. Its data is used automatically in the parameterization of the POSIDRIVE® MDS 5000 servo inverter.

STOBER EK synchronous servo motor with digital absolute valuator (standard version)

2

Multiple use by alternate control of different servo drives

Servo drives often go into action at timed intervals. Typical examples of this are handling operations and format adjustments. Multimotor operation with only one POSIDRIVE® MDS 5000 servo inverter is suitable for these applications.

The digital technology makes it possible

For the first time the inexpensive and reliable axis changeover application is available for unrestricted use on servo drives.

Axis changeover switch

The POSISwitch® AX 5000 external module has been developed for connection of the digitally controlled synchronous servo motors. Actuation is just via the existing encoder cables, without further operations.

Software

The POSITool software can manage up to four separate position or speed regulated axes and control them alternately.

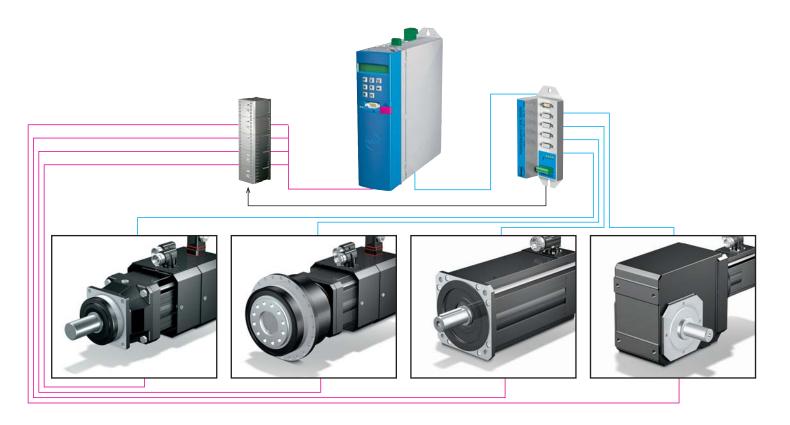A smooth transition from axis to axis is guaranteed by the software.

POSISwitch® AX 5000

Power and signal flows are controlled with correct timing. The axis management does not require additional software complexity in a primary control.

Sequential operation without functional limitation

If four drives are used as endless axes with absolute encoders, the exact positioning is still free from rounding errors even if the gear units have different and non-integer gear ratios.

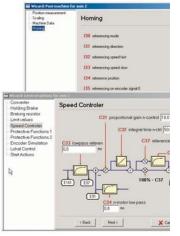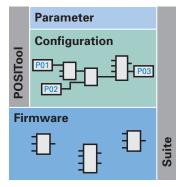# ALTERNATE CONTROL OF SEVERAL SERVO DRIVES

MODULAR
SOFTWARE ARCHITECTURE

MODULAR H

The rapid pace of developments in electronics is leading to continuous improvements and expanded functions, especially in servo inverters, and yet this is associated with constant growth in user software complexity. A trend which is in stark contrast to the demand for simpler and more accurate usability.

This conflict of objectives has been addressed by STÖBER ANTRIEBSTECHNIK and Software Suite V5 developed as a solution. This suite includes the commissioning software POSITool, a comprehensive library with standard applications, as well as the firmware for the inverter generation 5000.

Instead of rigidly defined firmware with an endless number of parameter variations the user has a modern, ergonomically designed operator interface.

Scalable software architecture

For everyday
To configure a drive, the commissioning software POSITool offers a library with typical preproduced basic applications. Here is a selection:
- Fast reference value
- Comfort reference value
  Speed or torque reference value (selectable)
  3 analog reference values
  16 fixed reference values
  Motorized potentiometer
  PID controller reference value
  Reference values scalable as absolute or percentage value
- Command positioning
  Powerful single axis positioning control with command interface in accordance with PLCopen® and the additional function POSILatch. Position measurements can then be taken on external signals (e.g. linear measurements)
- Motion block positioning
- Electronic cam function
  Connection of up to 32 axes

The consistent project orientation of the modules is proving extremely effective.

The parameterization work is supported by assistant functions.

For experts
The new, user programmable firmware has been upgraded to include a graphics editor layer in conformance with PLCopen®. An experienced or trained user will find a variety of predefined function blocks in various libraries. With these, basic applications can be modified or given extra functions.

Extra service
For a completely new functionality requirement or for comprehensive adaptation of the basic application, STÖBER ANTRIEBSTECHNIK offers this as "tailor-made applications" service.

Other highlights
The software scalability allows optimum adaptation of functionality and response time to the application. The cycle time for setpoint processing depends only on the calculation of the activated system modules and the parameters.

Complex applications can also be mapped on the same hardware platform without modifying the firmware.

The STOBER POSISwitch® AX 5000 axis changeover switch is prepared for use on the software side. Up to 4 servo axes with different functionalities can be controlled alternately.

Functional housing design
As part of the STOBER EMC strategy, all the housings in the POSIDRIVE® MDS 5000 series are made of galvanized sheet steel. They shield against electromagnetic interference and thus increase the units' RFI immunity and reduce interference emission.

The front housing is made of high-impact plastic and incorporates the operator keypad, display, LED indicators, Paramodul and RS232 interface, along with the slots for the optional boards and terminals.

The same design plastic front housing is used for all the sizes.

Paramodul
Plug-in memory module for transfer of all program and settings data.

If a POSIDRIVE® MDS 5000 has to be replaced, the existing Paramodul is simply plugged in again to restart operations. The functionality is retained without restriction.
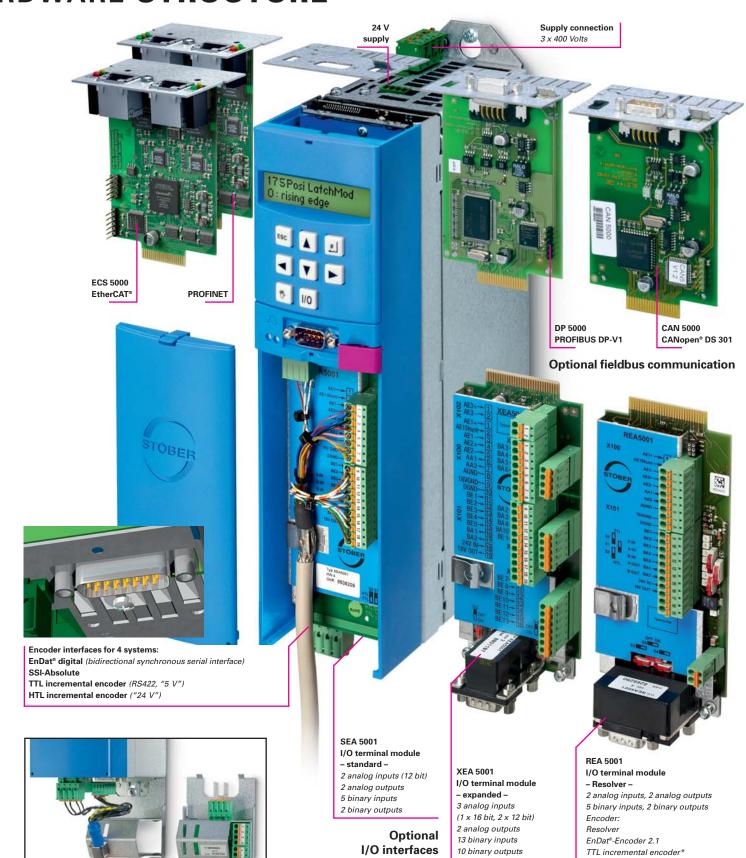
This plug-in memory module is also an ideal, immediately available tool for documentation updating of operating conditions.

SYSTEM CONCEPT OF TOTAL MODULARITY

ARDWARE STRUCTURE

24 V supply

Supply connection
3 x 400 Volts

175Posi LatchMod
0 : rising edge

ECS 5000 EtherCAT®

PROFINET

DP 5000 PROFIBUS DP-V1

CAN 5000 CANopen® DS 301

Optional fieldbus communication

Encoder interfaces for 4 systems:
EnDat® digital *(bidirectional synchronous serial interface)*
SSI-Absolute
TTL incremental encoder *(RS422, "5 V")*
HTL incremental encoder *("24 V")*

SEA 5001
I/O terminal module
– standard –
2 analog inputs (12 bit)
2 analog outputs
5 binary inputs
2 binary outputs

Optional I/O interfaces

XEA 5001
I/O terminal module
– expanded –
3 analog inputs
(1 x 16 bit, 2 x 12 bit)
2 analog outputs
13 binary inputs
10 binary outputs
2 x D-SUB 9 incremental
encoder (TTL) or SSI
Input/output interface
(X20 – SDS compatible)

REA 5001
I/O terminal module
– Resolver –
2 analog inputs, 2 analog outputs
5 binary inputs, 2 binary outputs
Encoder:
Resolver
EnDat®-Encoder 2.1
TTL incremental encoder*
SSI encoder*
Stepper motor signals*
The adapter is included in the scope
of delivery of the REA 5001

*(Simulation and evaluation)

EMC shield, the motor cable shield connected with a clip
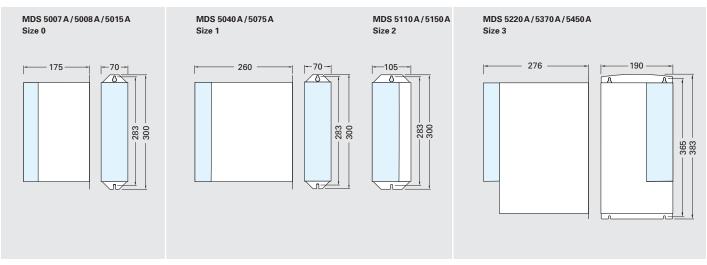**On the right: Version with integral brake module for 24 V brake**

5

THE COMPLETE RANGE
FROM 0.37 TO 45 KW

Functional modular housing design

The operator module is the same for all the sizes.
The sheet steel housing design is part of the STOBER EMC strategy (filter class A). It shields against electromagnetic interference.

This increases the units' RFI immunity and reduces interference emission. The front is the only part made of plastic which is pleasant to the touch.

MDS
5220 A / 5370 A / 5450 A   **MDS 5110 A / 5150 A**   **MDS 5040 A / 5075 A**   MDS
5007 A / 5008 A / 5015 A

Installation

The POSIDRIVE® MDS 5000 servo inverters can be mounted in compact control cabinets 300 mm deep.

MDS 5007 A / 5008 A / 5015 A Size 0	MDS 5040 A / 5075 A Size 1	MDS 5110 A / 5150 A Size 2	MDS 5220 A / 5370 A / 5450 A Size 3
175 / 70 / 283 / 300	260 / 70 / 283 / 300	105 / 283 / 300	276 / 190 / 365 / 383

SYSTEM BASIS

Powerful processor core
32-bit RISC processor
Current controller 125 µs

Control modes
Synchronous servo motors
Asynchronous motors
(V/f, sensorless VC, VC)

Encoder interface
Absolute encoder, digital
(EnDat®, SSI)
Incremental encoder (TTL, HTL)
Optional: Resolver

Serial interface
RS232 with USS protocol

Option board slots
Communication
I/OTerminals

Operational reliability
Generously sized power stage
for 250 % accelerating current

Thermistor motor protection
PTC thermistor monitoring

Brake chopper integral
Thermal model monitoring of
external resistor for short circuit
and overload

DC link connection
For energy exchange between
several inverters

Operator unit
8 keys, changing of parameters,
manual operation (clear text
display and LED indicators)

Paramodul
Plug-in module for power failu-
re safe storage of all application
specific data.
Data transfer without any fur-
ther aids

Control electronics supply
Power supply unit with connec-
tion facility for external +24 V or
DC link power supply
(the control section remains
fully functional even if the sup-
ply voltage is switched off)

Ease of installation
All terminals plug-in type
(spring-loaded terminals)
Supply and motor connections
in separate places
DC link terminals, two of each,
facilitate parallel connection
EMC plate for shield connection

ASP 5001
Option for the implementation
of safety functions:
- *STO and SS1 as per*
  EN 61800-5-2
- *Stop category 0 and stop*
  category 1 as per
  EN 60204

Integration is possible for
applications up to (max.):
- *PL e in category 3 as per*
  EN ISO 13948-1:2008-12 and
- *SIL 3 as per*
  EN 61800-5-2:2008-04

POSITool Windows Software
Application selection
(with assistant)
Parameterization
(with assistant)

Manages several servo inverters
in one installation
Drive optimization with POSI-
Scope, oscilloscope function for
internal signals (movement
visualization), operational data
monitoring and diagnosis

**The POSILatch function uses external signals and evaluates them as measurement function.
POSILatch can replace a separate PLC measuring system**

Size	Size 0			Size 1	
Type	MDS 5007 A	MDS 5008 A	MDS 5015 A	MDS 5040 A	MDS 5075 A
ID	55401	55402	55403	55404	55405
Recommended motor power	0.75 kW	0.75 kW	1.5 kW	4.0 kW	7.5 kW
Supply voltage	(L1-N) 1 x 230 V +20%/-40% 50/60 Hz	(L1-L3) 3 x 400 V +32%/-50% 50 Hz (L1-L3) 3 x 480 V +10%/-58% 60 Hz		(L1-L3) 3 x 400 V +32%/-50% 50 Hz (L1-L3) 3 x 480 V +10%/-58% 60 Hz	
Line fuses	1 x 10 AT	3 x 6 AT	3 x 10 AT	3 x 16 AT	3 x 20 AT
Operation with synchronous servo motor (servo control mode)					
Rated current I_R	3 x 3 A	3 x 1.7 A	3 x 3.4 A	3 x 6.0 A	3 x 10 A
I_{max}	250 % / 2 sec., 200 % / 5 sec.			250 % / 2 sec., 200 % / 5 sec.	
Switching frequency	8 kHz (adjustable to 16 kHz with derating)			8 kHz (adjustable to 16 kHz with derating)	
Operation with three-phase asynchronous motor (V/f, SLVC, VC control modes)					
Rated current I_R	3 x 4 A	3 x 2.3 A	3 x 4.5 A	3 x 10 A	3 x 16 A
I_{max}	180 % / 5 sec., 150 % / 30 sec.			180 % / 5 sec., 150 % / 30 sec.	
Switching frequency	4 kHz (adjustable to 16 kHz with derating)			4 kHz (adjustable to 16 kHz with derating)	
Braking resistor internal	–			–	
Braking resistor external	100 Ω: max. 1.6 kW	100 Ω: max. 3.2 kW		47 Ω: max. 6.4 kW	47 Ω: max. 13.
Permissible motor cable length, shielded	100 m, from 50 m with output choke			100 m, from 50 m with output choke	
Conductor cross-section	max. 2.5 mm²			max. 4 mm²	
Enclosure	IP 20			IP 20	
Weight kg (without packing)	2.2			3.8	
Output frequency	0 – 700 Hz			0 – 700 Hz	

SYSTEM OPTIONS

CE compliance
All POSIDRIVE® MDS 5000 inverters conform to the applicable EMC Directives and meet the criteria of Low Voltage Directive EN 50178. Standard features comprise an effective range of measures, among them an integral EMC filter and the high-quality galvanized sheet steel inverter housing.
Levels and terms apply as defined by IEC 1131.
All POSIDRIVE® servo inverters are CE-marked

UL compliant
The inverters are UL and cUL ("Canadian UL") listed and meet the requirements of UL 508C and UL 840 standards

Absolute Encoder Support AES
For buffering supply voltage when using the inductive Multi-turn EnDat® 2.2 absolute encoder EBI1135 (when the 24 V power supply to the inverter has been switched off)

Fieldbus communication
PROFIBUS
PROFINET
EtherCAT®
CANopen®

I/O terminal module
SEA 5001
XEA 5001 (incremental encoder and SSI interfaces)
REA 5001
Resolver and
EnDat® Encoder 2.1 interface

POSISwitch® AX 5000
For sequential control of STOBER ED, EK and EZ synchronous servo motors with digital absolute encoders.

Submounted braking resistors
Braking resistors for installation at the rear of the unit

Braking resistor
VHPR series
IP 54 enclosure, UL

ASP 5001
Starting lockout

VHPR
Braking resistor

	Size 2		Size 3		
	MDS 5110 A	**MDS 5150 A**	**MDS 5220 A**	**MDS 5370 A**	**MDS 5450 A**
	55406	55407	55408	55409	55410
	11 kW	15 kW	22 kW	37 kW	45 kW
	(L1-L3) 3 x 400 V +32%/-50% 50 Hz (L1-L3) 3 x 480 V +10%/-58% 60 Hz		(L1-L3) 3 x 400 V +32%/-50% 50 Hz (L1-L3) 3 x 480 V +10%/-58% 60 Hz		
	3 x 35 AT	3 x 50 AT	3 x 50 A gG	3 x 80 A gG	3 x 85 A gG
	3 x 14 A	3 x 20 A	3 x 30 A	3 x 50 A	3 x 60 A
	250 % / 2 sec., 200 % / 5 sec.		250 % / 2 sec., 200 % / 5 sec.		
	8 kHz (adjustable to 16 kHz with derating)		8 kHz (adjustable to 16 kHz with derating)		
	3 x 22 A	3 x 32 A	3 x 44 A	3 x 70 A	3 x 85 A
	180 % / 5 sec., 150 % / 30 sec.		180 % / 5 sec., 150 % / 30 sec.		
	4 kHz (adjustable to 16 kHz with derating)		4 kHz (adjustable to 16 kHz with derating)		
	–		30 Ω: 100 W / max. 21 kW		
.6 kW	22 Ω: max. 29.1 kW		15 Ω: max. 42 kW		
	100 m, from 50 m with output choke		100 m		
	max. 6 mm²		max. 35 mm² without connector sleeve		
	IP 20		IP 20		
	5.0		11.8	13.2	
	0 – 700 Hz		0 – 700 Hz		

ACCURATE COMMISSIONING

The Windows commissioning software POSITool contains the following functions:
- Application configuration
- Drive parameterization
- Drive programming
- Drive commissioning
- Application commissioning
- Function optimization

The prepared functions and parameters are transferred via the RS232 interface on the device front.

STOBER EK synchronous servo motor with digital absolute encoder on the motor shaft (B side)

Commissioning the STOBER ED, EK and EZ synchronous servo motors

No software knowledge is necessary for this preparation work. All the adjustments are done by dialog via the operator panel with text display. The POSIDRIVE® MDS 5000 servo inverter comes supplied with the "rapid set point" application.

Commissioning the complete application

This can be done either via the connected PC or after data transfer via the device operator panel. The Paramodul is also suitable for data transfer. Further parameterization corrections and additions can be made directly. Some knowledge (basic training) is necessary for this task.

Digital drive tuning

The POSIScope software tool reduces trial runs for individual drive optimization to a minimum.

Trial and error is replaced by a full diagnosis. In real time the procedure is observed, recorded, analyzed and immediately displayed by oscillograph on the PC monitor. The fine tuning thus obtained results in perfectly adjusted drives.

On applications with high specifications, POSIScope can be used for system maintenance.

Advanced seminars for general users and experts

The POSITool software assistant supports configuration and parameterisation of the STOBER standard applications. Basic and advanced information on the safe handling of POSITool necessary on the job can be acquired at an application seminar.

In practical, individually designed seminars, general users learn the ways in which they can utilise the potential of the POSITool standard applications fully and effectively.

After attending the 'Free Graphic Programming' seminar, experts can expand the POSITool standard applications themselves to adapt them to specific needs.

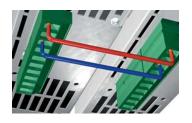Further information and dates can be found on our website www.stoeber.de (Services).

QUICK TO ASSEMBLE

Perfect, practical connection layout

The mains or 24 V supply connection is made 'from above' through a plug-in terminal strip.

Quick DC link connection. Double DC link permit enable simplified parallel connection.

The separate connections for motor, DC link and braking resistor are located on the bottom of the housing. The PTC thermistor and braking relay are also attached here by simple plug-in mounting.

Service

The STOBER service system comprises 38 expert partners in Germany and more than 80 companies in the STOBER SERVICE NETWORK worldwide.

This full service concept guarantees local expertise and availability when needed.

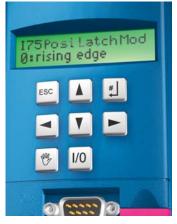In general, the service specialists can be reached at any time via a 24/7 service hotline.

When necessary, a problem can be addressed immediately.

> **24/7 service hotline**
> **+49 180 5 786323**

VERY EASY TO USE

Easy data transfer and acceptance by Paramodul.

Display and keypad are integrated. Rapid diagnosis, status monitoring, direct parameter access and manual operating functions are possible.

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