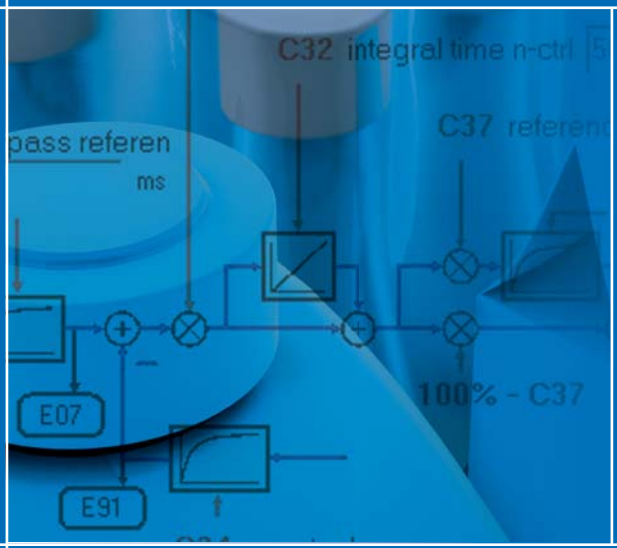
Digital drive solutions for packaging systems

Modular System Hardware and Complete Application Solutions



STÖBER

An innovative sector in upheaval

STÖBER has been at the heart of the packaging industry for many years

The manufacturers of machines for the packaging and bottling industries form part of STÖBER's traditional customer base.

Over the course of time many solutions have been prepared in a close development partnership. The sector-specific understanding of the application has developed from this partnership.

A key insight of the collaboration was that in this sector the highest value is placed on the topic of machine availability. For this reason a flexible, responsive after sales service for drive technology was setup.

From the mechanical line shaft to the digital line shaft: more productivity – more flexibility

Time to Market' is becoming increasing important for the producers of basic foodstuffs and luxury foodstuffs due the every shorter product cycles and the growing flood of variants. For machine suppliers this means increasing the speed of the machines, providing much more flexibility, and above all realizing significantly shorter delivery times for turn-key packaging machines.

The implementation of these requirements overwhelms a control system with a central mechanical line shaft. As modern electronic drives with a digital line shaft work at high speed and reliably, they can be used to meet the requirements of the packaging sector without problems.

The digital line shaft controls the entire drive system. It is a solution comprising sensors, a servo system and a programmable real-time controller.

This new drive and control system has been introduced gradually by many machine manufacturers. The experience with these machines with their hybrid control was positive. As a consequence the way was finally open to fully digitally controlled machines.

The common path

With its traditional proximity to the packaging industry, STÖBER has followed the development of the digitization of the drive system with a high level of involvement. To control the company's servo geared motors using its servo inverters, typical functions were developed as software function modules with great foresight at a very early stage.

These new programming tools made and make it possible to simplify, to rationalize and to methodically optimize the preparation of programs for functions.

Flying saw

Stretch packer

Common objectives

Along with the ‘all in one’ design, there are also bottling and packaging lines of modular construction so that investments can be utilized more flexibly.

Independent of the type of control concepts, which are described elsewhere, STÖBER drives and components are always suitable for demanding requirements in the packaging industry.

STÖBER is continuously further developing and updating its components. However, frantic ‘product innovations’ are consciously avoided as these could cause uncertainty when making decisions.

Machine manufacturers and integrators are actively supported during design, programming and commissioning by flexible support from STÖBER.

It is ensured the user's interests are met by the high durability of the hardware and software – also in conditions of stress – and by the availability of specific customer service for the drive system.

STÖBER drive system

All components, down to the cables, come from development and production at STÖBER. The resulting synergy produces optimum efficiency and superior reliability.

Overwrapping machine

Cartoning machine

Two-lane packer

Sensors, drive system and controller program instead of mechanical disc cams

Motion controlling

The choice of controller architecture

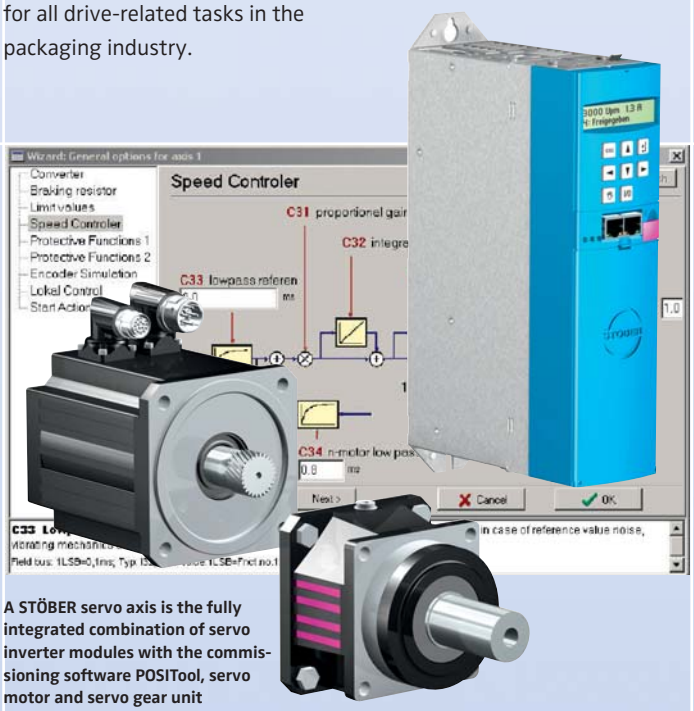
Whether primary or secondary packaging, on automated bottling and packaging devices there is a very wide range of configurations such as all-in-one systems, lines of machines or solitary individual stations. There are many different general conditions to be taken into account:

- Number of axes
- Complexity of the functions
- Cycle times
- Integration in existing lines
- Integration in an existing production controller
- Frequency of retooling
- Quick program change
- Synchronization after emergency stop
- General climatic conditions
- Cyclic, continuous or full shift operation
- Ease of adjustment and maintenance
- New design, modification or upgrade
- EU Machinery directive 2006/42/EC – in particular Safety of machinery EN ISO 13894
- Local or remote maintenance
- Is in-house programming or a ready-to-use configuration preferred?

The examples make clear the complexity of the topic. It is best to seek competent advice even in advance of the planning of a controller. For this purpose system consultants from STÖBER with experience in the sector are available to provide advice and practical support.

STÖBER offers systems and components for efficient solutions

Independent of the system architecture chosen, STÖBER drive system components are suitable for all drive-related tasks in the packaging industry.



A STÖBER servo axis is the fully integrated combination of servo inverter modules with the commissioning software POSITool, servo motor and servo gear unit

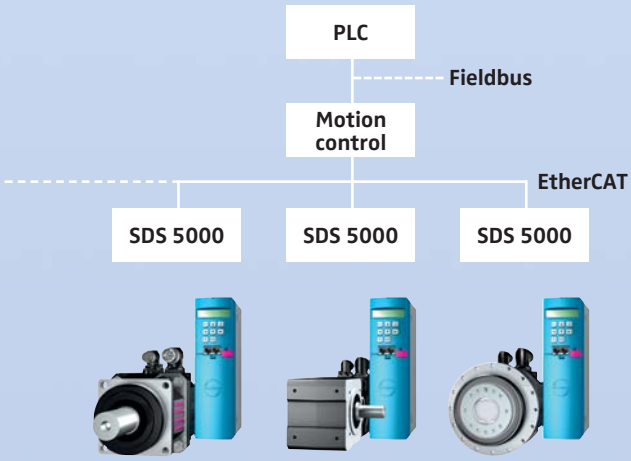
All modules are also available separately for special requirements

STÖBER power drive system for drive concepts with PLC or PC/Motion Controller

If the control system architecture includes a higher level computer, the STÖBER digital servo axes provide the basis for a powerful drive system.

If necessary, parts of the control tasks can be undertaken decentrally by the servo inverters. In particular in case of short cycle rates or in case of high speed requirements, the utilization of autonomous functions in the servo axes can be an advantage.

On the use of high performance POSIDYN® SDS 5000 servo inverters, secure remote maintenance over the internet is also possible.



Lean solutions – with drive-based electronic shaft

The software for the STÖBER servo inverters can depict an electronic shaft for multiple axis operation using the integrated PLC functions.

Due to the integrated IGB bus on the POSIDYN® SDS 5000 servo inverter, it is possible to communicate directly and conveniently with several (up to 32) axes and in this way control smaller machines in real-time without limitations. Restarting within the network also does not require any precautions.

As a rule such a drive-based architecture is supplemented with a simple PLC.

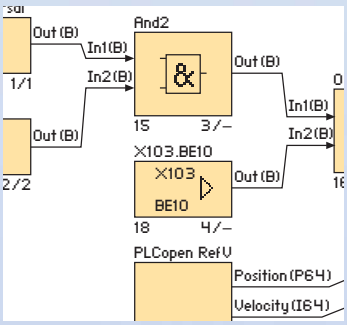
Particularly in the case of modular machine concepts or packaging lines comprising several sections, the drive-based line shaft can also support the advantages of modular concepts on the control side.

Comprehensive library with standard applications and additional modules

The device software for the 5000 generation of inverters offers a very comprehensive range of features.

In the programming layer the preparation of standard programs by those with practical experience is supported with many convenience features.

More experienced, trained users can use the configuration layer with its graphic editing and Motion Control components in accordance with PLCopen.



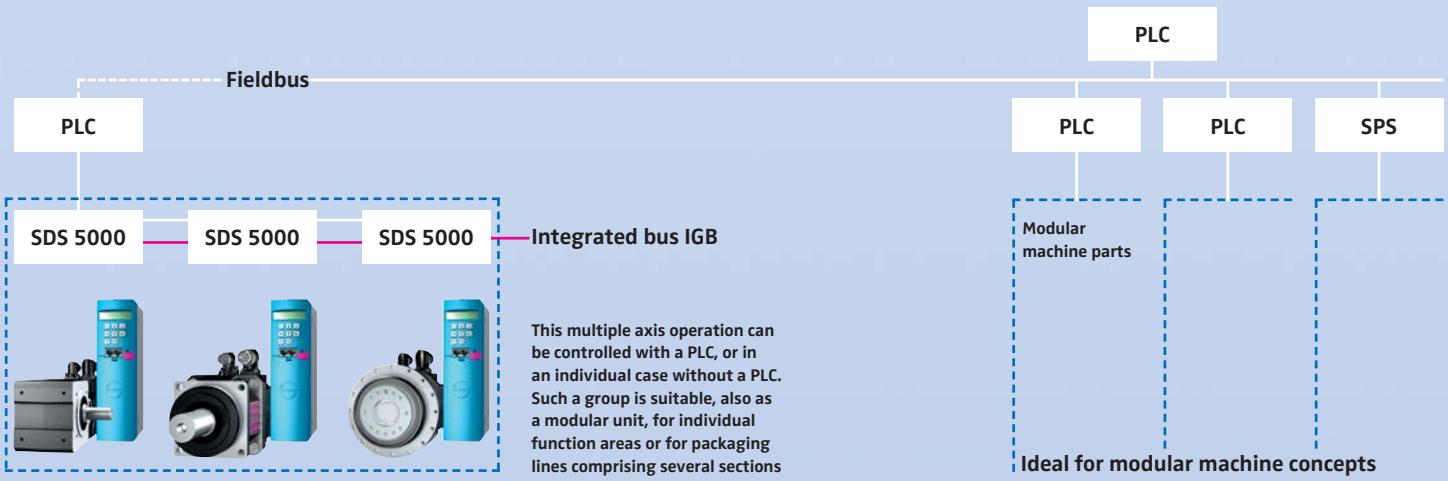
Open graphic programming for trained users

Standard applications:

- Speed control (fixed reference values, instantaneous reference value, master or slave drive ...)
- Motion block positioning (optimized for positioning without higher level controllers, data storage in the inverter)
- Command positioning (optimized for fieldbus operation, data storage in controller)
- Disc cam application (basic program for open programming and the expanded applications that build on it)

Advanced applications:

- Synchronizer (Synchronization of an axis with a running machine)
- Flying saw (marking, sawing, cutting for moving material using linear axis)
- Rotating knife (cutting moving material using rotational axis)
- Two lane pocket-type conveyor (used for collecting together products)
- Thrust crank (also in the retrofitting sector)
- Print mark regulation (synchronization with printed packaging material)
- Conveyor belt synchronization (synchronization of products to parts of the machine)

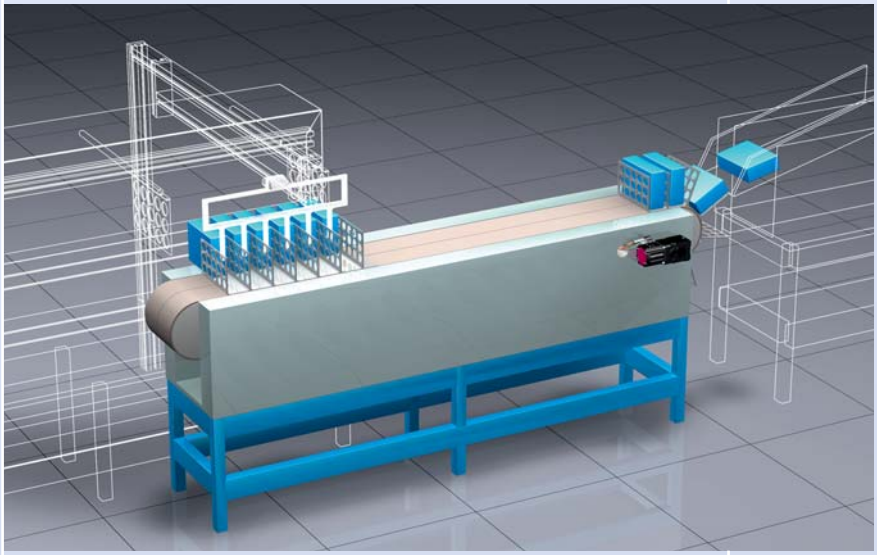


Hand in hand

A satisfied user is the common goal

Almost every packaging machine is a custom machine or at least a custom version.

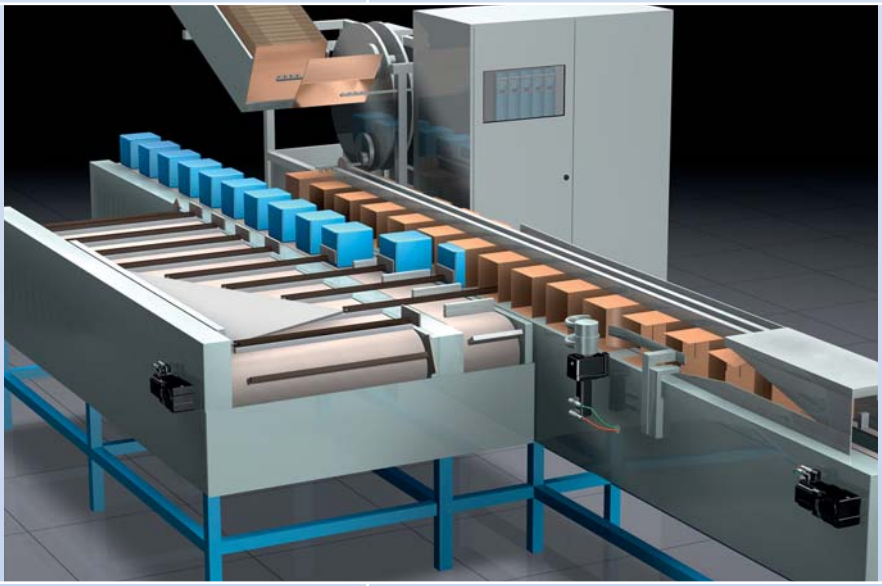
The design of the function and the controller as well as the integration of the complete drive system into the related concept required extensive expertise and partnership-based collaboration from those involved. This aspect includes adherence to schedule and a sense of responsibility for the entire project. After all in the end the only thing that counts is the result.



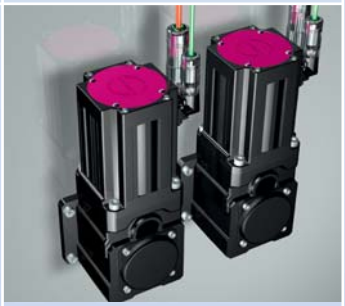
Two-lane conveyor for packer
Modular solution – expandable to three-lane convey

Autonomous motion control function via two POSIDYN® SDS 5000 servo inverters in the IGB network

Quick product change via simple PLC



Cartoning machine electronic shaft and control of 6 servo drives and 2 adhesive nozzles via 6 POSIDYN® SDS 5000 servo inverters in the IGB network



With the super-compact SMS KL helical bevel geared motors, right-angle drives can be positioned close together

Left:
POSIDYN® SDS 5000 servo inverter
Fully digital, for SMS servo geared motors

Middle:
POSIDRIVE® MDS 5000 inverter
Fully digital, for all geared motors

Right:
POSIDRIVE® FDS 5000 frequency inverter
for MGS geared motors
(asynchronous motors)

Software, electronics and mechanics from a single source

Due to the internally coordinated development and harmonization of all components, STÖBER as a system manufacturer can realize drive system solutions with the highest efficiency of synergy.

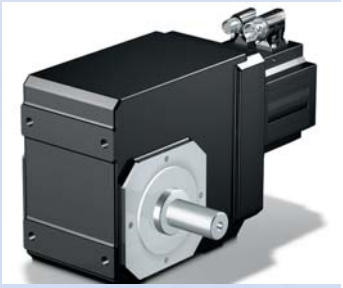
This complete range simplifies the drive concept and drive design. It is also advantageous during commissioning and in case of after-sales service.

On the right you can see typical servo geared motors, as are used in modern bottling and packing plants. You will find the complete range of SMS geared motors on the rear of this brochure.

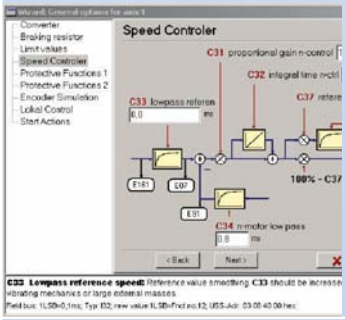
SMS P planetary geared motor
Acceleration torque: 10 – 3,000 Nm
Backlash < 3 – 8 arcmin
Universal for power and precision

SMS PH planetary geared motor
Acceleration torque: 34 – 6,910 Nm
Backlash < 3 – 4 arcmin
Designed for the highest requirements

SMS KL helical bevel geared motor
Acceleration torque: 15 – 65 Nm
Backlash < 16 – 25 arcmin
Super compact and of wide ranging application



SMS K helical bevel geared motor
Acceleration torque: 29 – 13,200 Nm
Backlash < 1.5 – 3 arcmin
Versatile with flange, solid shaft or hollow bore



POSITool commissioning software
With a 3-layer architecture POSITool provides the best overview, optimum ease of use and efficiency during programming and commissioning

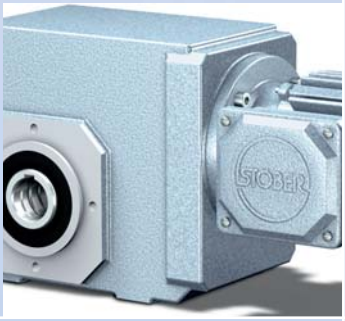
For those with practical experience:
Wizard functions and the consistent orientation of the function module on the project permit an efficient approach

For experts:
Trained users use the configuration layer with graphic editing in accordance with PLCopen

Program preparation as service:
With 'Tailor Made Application' STÖBER offers function expansions or complex application development as a service

POSIDYN® SDS 5000 servo inverter
In multiple axis operation (electronic shaft) with Integrated Motionbus and IGB network. The network (up to 32 axes) is set up automatically on switch on

You will find information on motion control interfaces for higher level controllers in the internet: www.stoeber.de > Products > Software/Download > Fieldbus



MGS K helical bevel geared motor
Specific surface treatment for hygiene applications. Output designed as hollow bore or solid shaft in stainless steel 1.40.57. Enclosure type IP 56
Special FoodTech version

www.stober.com

Service

The STÖBER service system comprises 36 expert partners in Germany and more than 80 companies in the STÖBER SERVICE NETWORK worldwide.

This service concept guarantees local expertise and availability when needed.

The concept is supplemented by the remote maintenance concept for the servo inverters in the POSIDYN® SDS 5000 series.

In general, the service specialists in the Pforzheim factory 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 (0)180 5 786323

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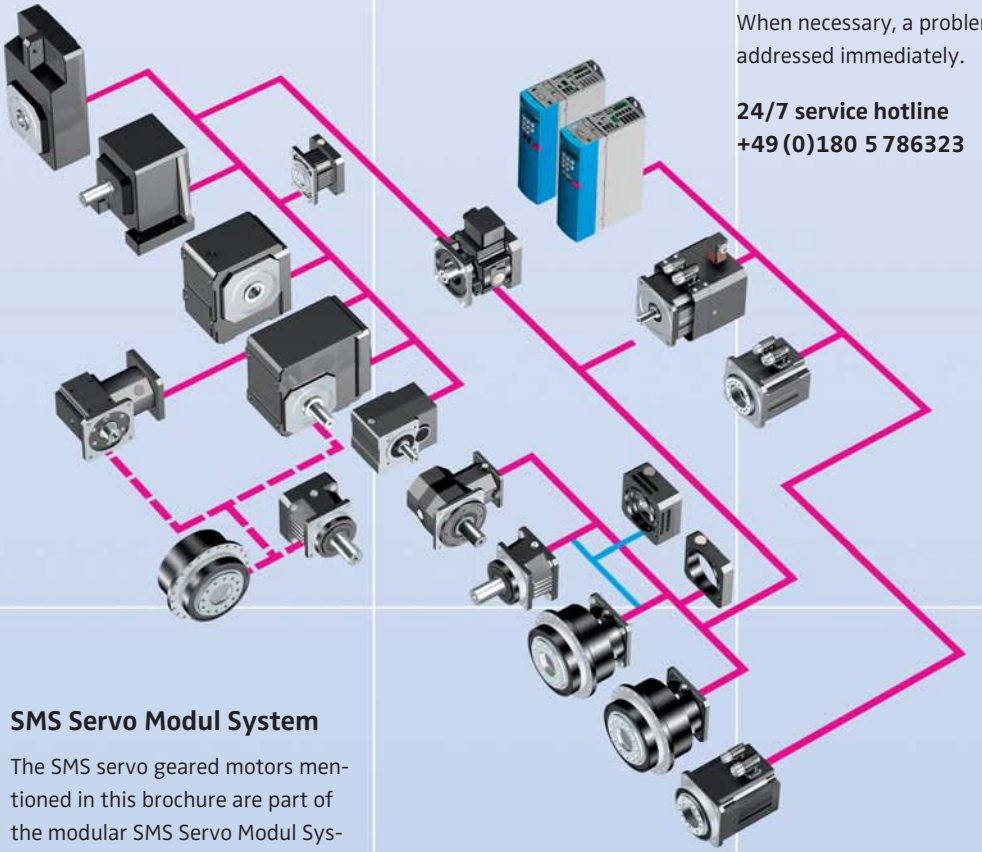

SMS Servo Modul System

The SMS servo geared motors mentioned in this brochure are part of the modular SMS Servo Modul System.
The variety of right-angle and axial versions provides an excellent basis for the design and usage of application-optimized and energy-efficient servo axes.
You will find detailed information on this topic on our web site www.stoeber.de

MGS AC geared motors

The MGS axes are primarily used for main drives. As their frequency inverters also work with the POSITool programming software, they can be conveniently integrated into a complete solution.

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