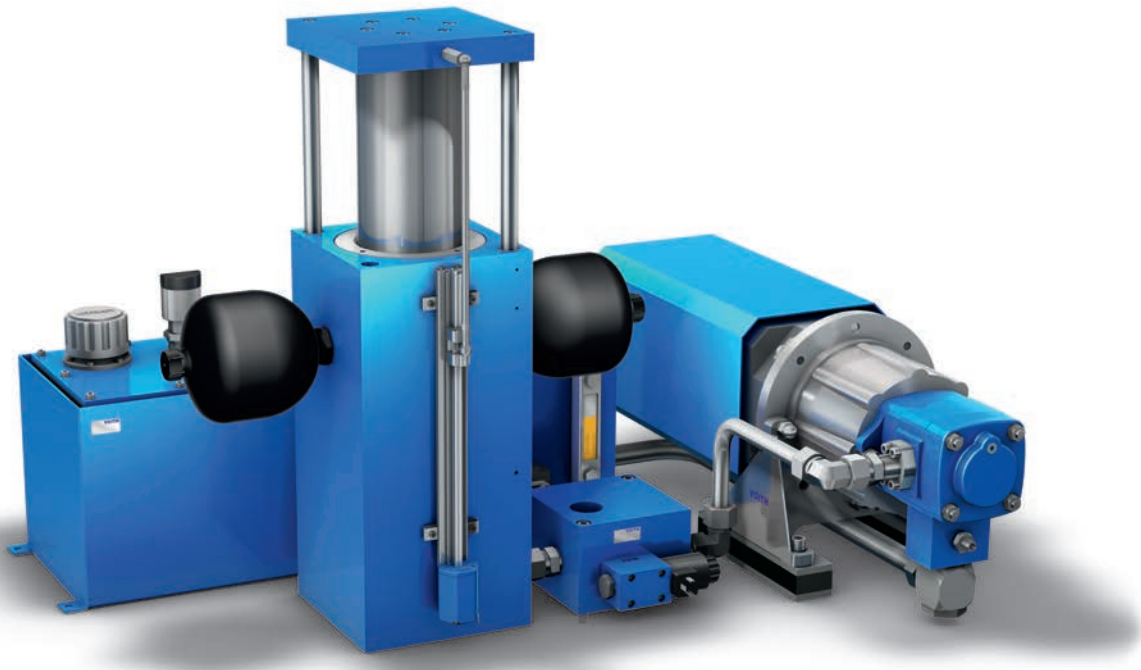


DrivAx CSH

Die cushion drive

Product data sheet



Advantages

- + High productivity and flexibility
- + Resource-saving and energy efficient
- + High reliability and availability
- + Integrated process monitoring
- + Modular and scalable kit

DrivAx servo drives

Efficient drive technology for high productivity

DrivAx servo drives combine the advantages of hydraulics with the advantages of servo drives. The result: energy-efficient drives with low heat and noise emissions and at the same time high robustness, power density and dynamics.

DrivAx servo drives consist of a variable speed pump and a servo motor, which simultaneously serves as drive and control for the actuator.

They are suitable for all linear movements requiring high forces and precision. At the same time, they are highly productive while protecting the environment, climate and resources.

Perfectly adaptable to your requirements, DrivAx servo drives are available in various system configurations:

- Motor pump combination
- Self-contained drives
- Application-specific system solutions

Machine and equipment manufacturer

Why you should rely on DrivAx servo drives?



The allrounder with a modular set-up

DrivAx servo drives supports all common standard interfaces, enabling them to be easily integrated into existing machines. Various pre-configured modules allow optimal dimensioning of the system, precisely matching to your application. Furthermore, the drive can be scaled and synchronized to cover all conceivable force spectra. The allrounder for all applications.



Less is always more – no servo valves required

The drive technology of the future works without a complex infrastructure. DrivAx drives are based on a combination of a servo motor and a variable speed pump. The servo motor drives the system and precisely controls the force, movement, and position of the actuator. Control valves, hydraulic power units and complex piping are no longer required. True to the principle: less is more.



Easily integrated, rapidly enabled

DrivAx drives are compact, optionally self-contained systems and therefore very easy to integrate into machines. A mechanical interface, an electrical connection, and data connections for the sensor system are all that is needed. As there is no need for complex power unit pipings, valve technology cabling, and filtering of the hydraulic fluid, you save a lot of time while designing and commissioning your machine. For lean mechanical engineering without compromise.

DrivAx IPS



2002

DrivAx PSH



2011

DrivAx CLDP



2012

DrivAx CSH



DrivAx PDSC



2014



Operators of machines and plants Why you should rely on DrivAx servo drives?



Increase productivity, save resources

No proportional valves, but the pump regulates the volume flow and pressure. Only as much electrical energy as the process actually requires is converted into power. Efficiency at its best. And at the same time, electricity costs and CO₂ emissions are reduced. It's not just the environment that benefits.



Intelligent solutions for Industry 4.0

DrivAx servo drives work precisely, with high forces, while paving the way for sustainable, climate-friendly production processes. Intelligent sensors and electronics control, regulate and monitor the drive system, which not only enables high machine productivity but also gives the system diagnostic capability – ready for Condition Monitoring and Predictive Maintenance.



The reliable endurance runner

DrivAx servo drives are compact power packs with a high level of endurance and low maintenance. The actuator is practically wear-free in operation, while proven pump technology and reduced system complexity guarantee long maintenance intervals. Compared to electromechanical solutions, the lifetime is increased by 80%, even in highly demanding operating conditions.



Less oil, good for the environment

DrivAx servo drives only consume as much energy as is currently needed in the process. This not only reduces electricity costs, but also the heat input into the hydraulic medium and the necessary cooling effort are reduced. Hydraulic fluid can be reduced by up to 90%. Green light for clean technology.

DrivAx CLCP



2016

DrivAx RQ4



2021

DrivAx IQ4



2022

DrivAx CSH

Compact, energy-efficient and highly productive

DrivAx CSH are servohydraulic die cushion drives suitable for high forces and precision

In deep drawing presses, two subsystems play the decisive role for productivity and workpiece quality: the press drive and the die cushion. A precisely defined blank holder force ensures controlled flow of the material into the drawing die and is the basis for a stable forming process.

The innovative Voith DrivAx CSH die cushion drive provides you with a highly flexible servo-hydraulic drive system. With this drive, you actively and precisely set the curves for position, force and speed – and you can do this over the entire deep drawing process. Your die cushion becomes a servo cushion!

Conventional die cushion drives and control systems usually incur losses. Often, these drives require cooling systems that consume additional energy. Even the energy that the motion of the ram introduces into the die cushion is almost always lost in the form of thermal energy (heat). The servo technology used is inherently economical in energy consumption. In addition, it is possible to recover virtually all of the energy of the ram motion in the form of electrical energy. As a result, you considerably increase the energy efficiency of your press. You save up to 80% of the energy costs compared to a conventional hydraulic die cushion drive without servo technology.

The DrivAx CSH Die Cushion Drive represents a unique solution both for the modernization of existing presses and for new systems. Customarily, productivity can be increased by 50% and more. You can fabricate complicated deep-drawn parts economically with a reliable process. The press produces at a remarkably lower cost/piece. You enhance your position over that of your competitors.

Benefit from our many years of expertise in all aspects of hydraulic servo drives. Starting with the calculation and design, continuing with the installation and commissioning, up to questions of cost-optimized operation and maintenance concepts - we are your partner with system competence.

Technical data (standard versions)

- Die cushion force 200 to 10,000 kN
- Rated power up to 2 MW
- Position-control accuracy up to 0.01 mm
- Force-control accuracy up to $\pm 1\%$
- 15.4-inch TFT LCD control panel with intuitive touchscreen operator interface
- Communication: PROFIBUS/PROFIsafe, PROFINET, Ethernet, USB

Scope of delivery

- Servo motor pump group DrivAx IPS
- Cylinder
- Power pack (optimum filtering circuit, cooling,...)
- Accumulator
- Cabinet
 - Converter
 - Control Simatic S7
 - Software package
 - Control buttons
- Sensors
- Cable with a defined length for:
 - Sensors
 - Motor
 - Valves of scope of delivery
- Performance fluid PF-400
- Software package
- Retrofit package
- Automatisations

Option

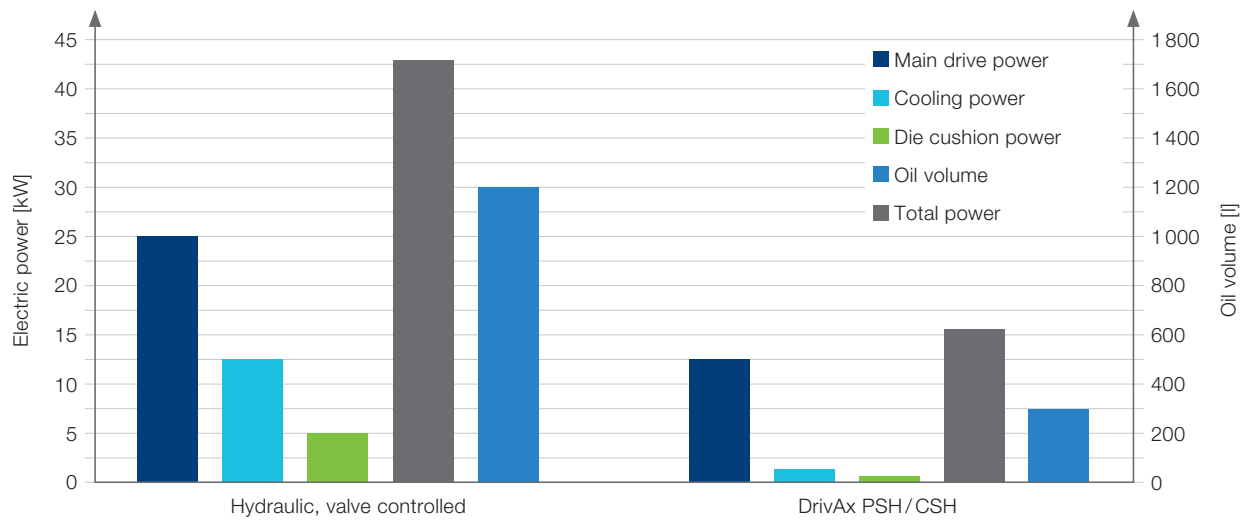
- Safety technology

Advanced scope of delivery

- Advanced safety features in Simatic S7 CPU

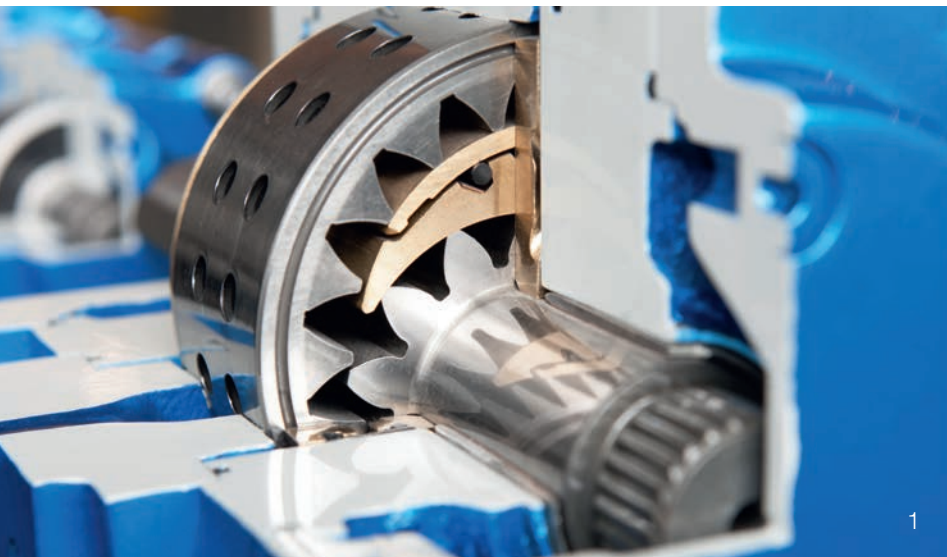
- 1 Cutaway of internal gear pump model IPS
- 2 DrivAx IPS
- 3 Cabinet

Energy

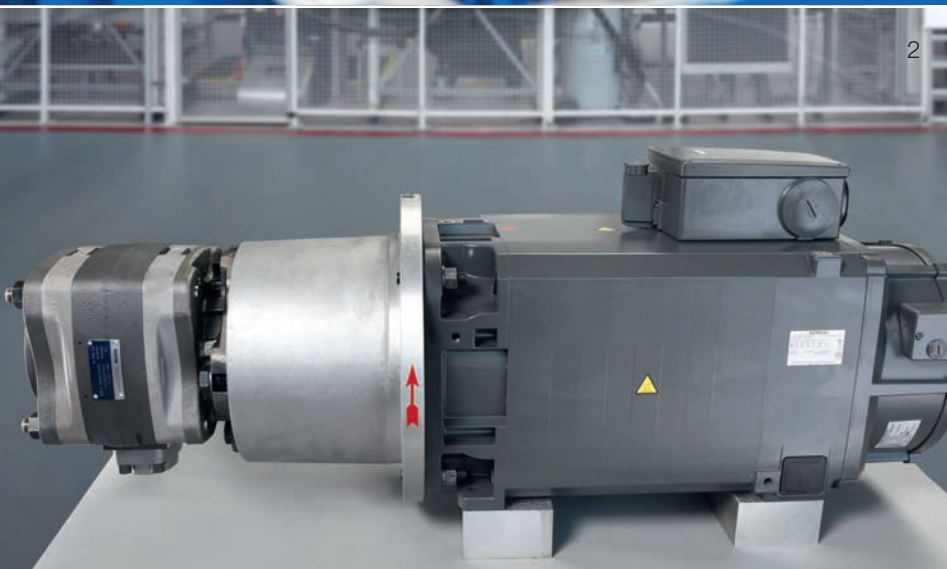


Technical data of the compared drives

- Press force: 3150 kN
- Speed rapid traverse : 660 mm/s
- Speed load: 140 mm/s
- Positioning accuracy: 0.01 mm



1

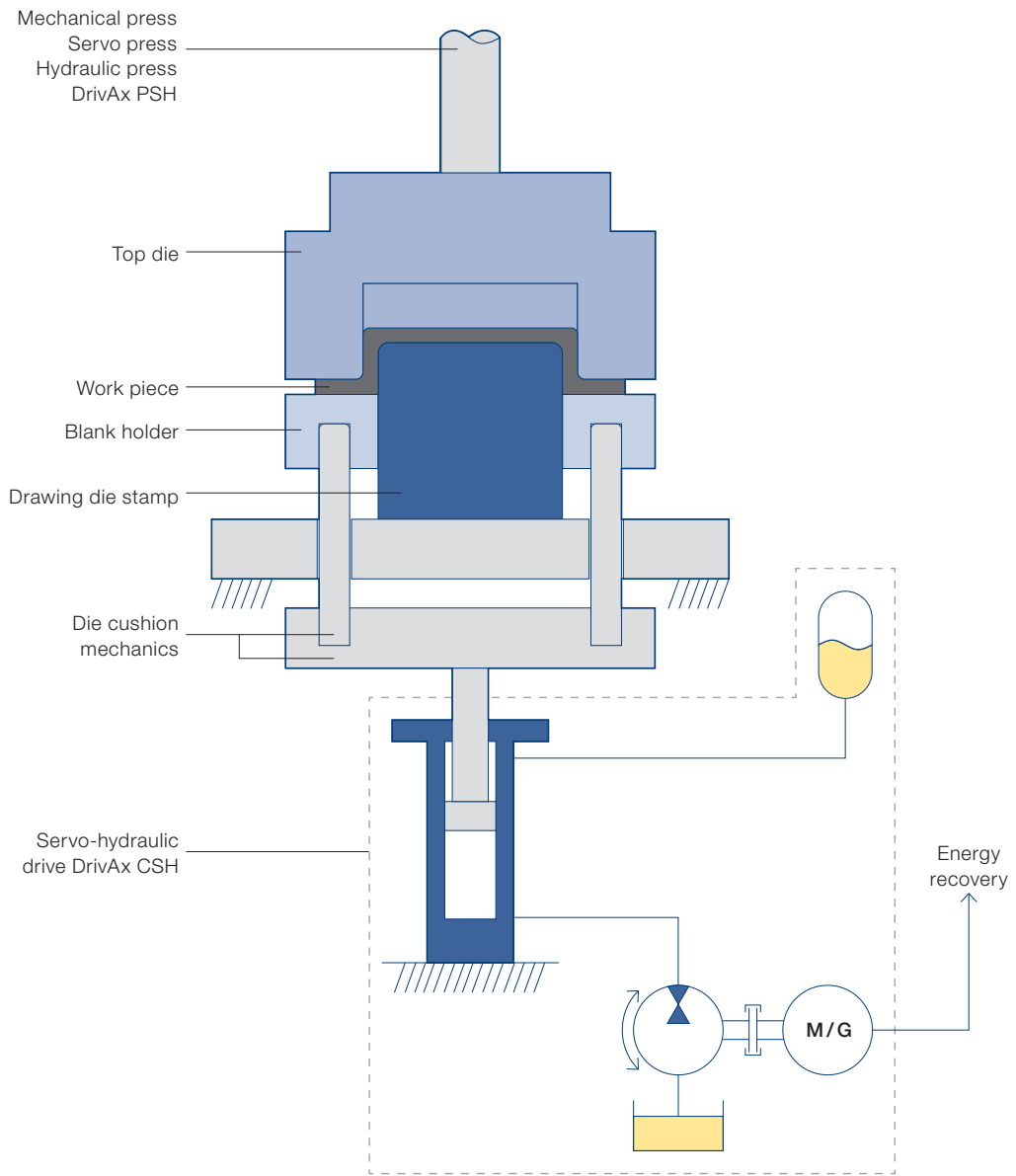


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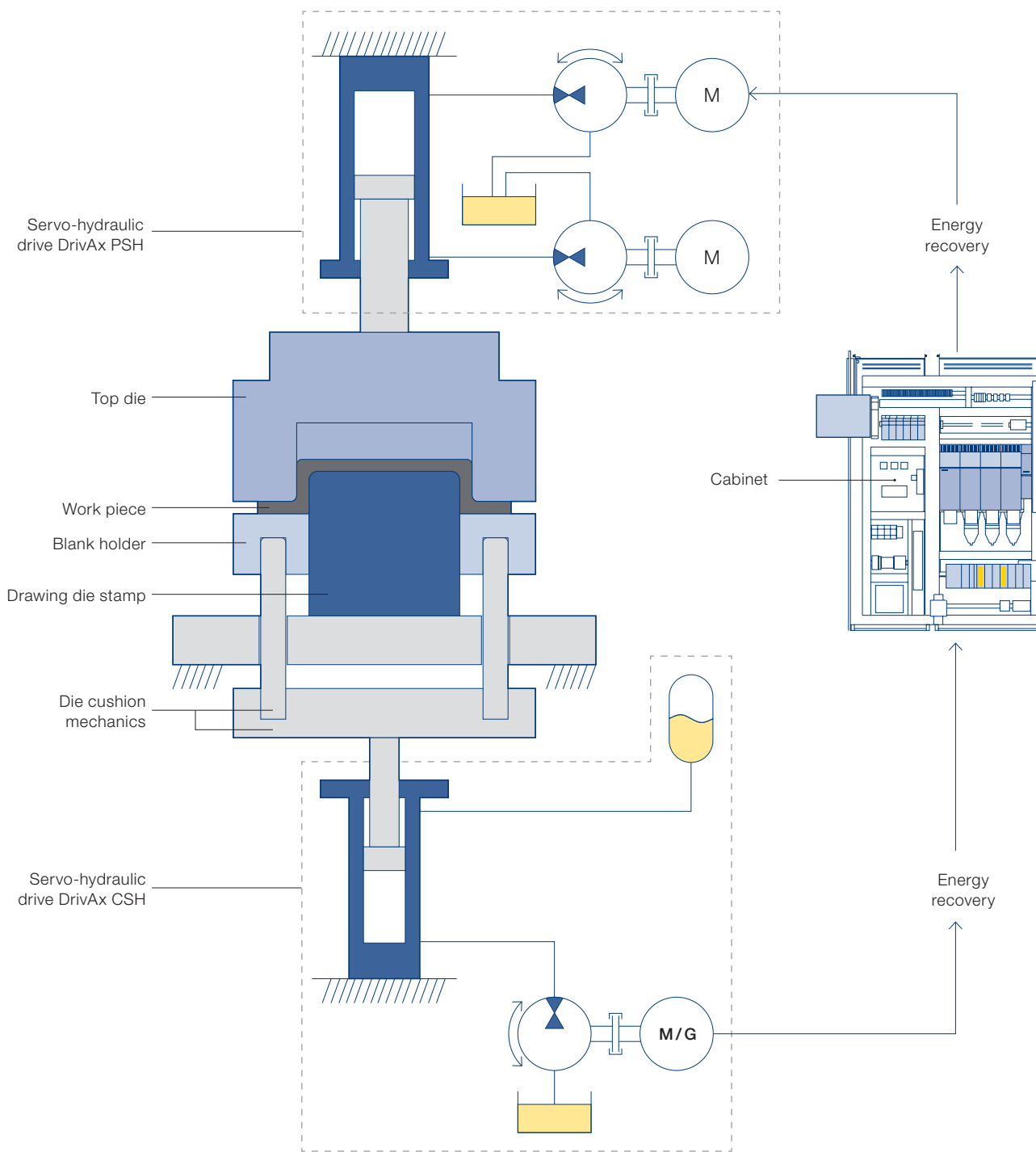


3

CSH operating principle



DrivAx PSH-CSH combination, 80 % energy saving



Advantages using DrivAx CSH

Features	Advantages	Benefits
Speed and motion control of the actuator with a variable speed internal gear pump driven by a servo motor, operating as motor or generator	<ul style="list-style-type: none"> • Reduced energy consumption • High dynamics thanks to low mass moment of inertia • Lower cooling power • Lower noise emission • No control valves • Recovery of system energy • Adjustable blankholder force • Controlled and reproducible die cushion force curve • Synchronization of slide and die cushion by adjustable pre-acceleration • Decoupling of the die cushion movement from the slide movement after reaching bottom dead center 	<ul style="list-style-type: none"> + Reduced investment and operating costs + Quick and easy installation and commissioning + Reduced effort and costs for noise protection measures + Wrinkles and cracks are avoided, even in complex workpieces due to defined material flow + Arbitrary progressions of surface pressure - also decreasing or oscillating + Realization of increased drawing depths + Higher surface quality due to controlled impact of the upper die on the workpiece + Tools and press are subjected to lower stresses and have longer service intervals + The drawing cushion with the workpiece can be moved independently of the slide + A part ejection function is programmable
Hydraulic power transmission	<ul style="list-style-type: none"> • Almost wear-free • Over-load safe operation • High power density • High forces realizable 	<ul style="list-style-type: none"> + Low service costs thanks to long service intervals + Tools are protected, production downtimes are avoided and investments in overload safety are not necessary + Reduced machine footprint
Modular design	<ul style="list-style-type: none"> • High variety of options • Scalable 	<ul style="list-style-type: none"> + Reduced development time and cost + Free selection from different servo motor and frequency converter manufacturer + Power can be adapted exactly to the machine cycle, thus reducing investment costs + High forces can be realized
Position measuring system, temperature and pressure sensors integrated into the drive	<ul style="list-style-type: none"> • Process monitoring without additional sensors and measuring systems • Sensors protected from damage and other process conditions 	<ul style="list-style-type: none"> + Drive is Industry 4.0-ready + Integration into the machine control without investment in sensors and measuring systems + Reliable sensor technology avoids production downtimes
Free programming of the drive via an intuitive touchscreen user interface	<ul style="list-style-type: none"> • Control algorithms are optimally adapted to hydraulics and electronics • All relevant parameters can be programmed and visualized on site 	<ul style="list-style-type: none"> + Fast and efficient commissioning + Easy integration into the machine control

AFFC-Cushion control

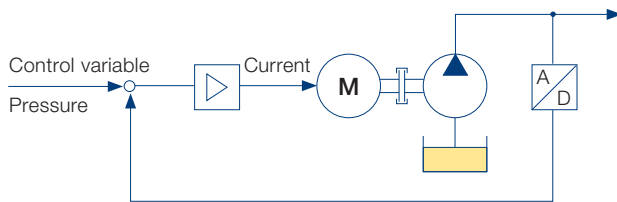
The process force of the die cushion is determined by the pressure in the working chamber. For pressure control the CSH uses the advantageous Adaptive Feed Forward Control (AFFC).

Well known historical methods (SoA) use the motor current as a control variable to finally control the pressure via the motor torque. These systems are less robust and are critically responsive to output side disturbances.

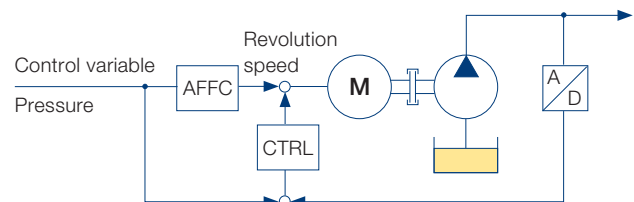
From the knowledge of the system components, the innovative AFFC calculates the motor speed as the control variable for controlling the pressure. Due to the adaptive component of the actual value signal, this regulation works extremely stable and robust against disturbances from the process.

Comparison control types

SOA



AFFC



This is a translated document
Original language: German.
Legally binding language version of the document: German.

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