



Right sizing and optimizing the electric drive systems, with dynamic energy management solutions



Electrical drive systems are complex, if enhanced further with energy management modules for drive controllers, this adds more complexity. Here, the Servosoft software offers great assistance, it simplifies the sizing process, considers the electrical energy flows in the drive system and helps in selecting suitable energy management solutions based on the respective drive controllers.

Christian Vardin, CEO of ControlEng Corporation, is highly enthusiastic as he presents his program, 'Servosoft'. His enthusiasm is completely justified, as the startup which he started 13 years ago has now grown into a powerful sizing tool that is renowned within the electrical drive industry - and not just in North America, but across all continents, with its diverse formats and customized products, and with Europe as its main focus. The sophisticated algorithms not only help calculate and select electro-mechanical drive components and drive electronics, but are also instrumental when it comes to running simulations at the touch of a button. In addition, if the client has better alternatives for optimization, then the software allows manual intervention at anytime. 'Servosoft' also provides a comprehensive database containing more than 125,000 products related to drive systems, from which a specific drive technology solution can be assembled.

Driven by the motto "from the load to the plug," the program models all servo system components, both mechanical and electrical. The mechanical components include rotary or linear servomotors, appropriate drives and couplings, rack and pinion drives, linear actuators, servo pumps, etc. Electrical requirements are covered by drive controls (whether servo controllers or frequency converters), power supplies, brake devices, capacitor modules, as well as several types of electric motors. The newest version of 'Servosoft', v4, has an even larger product selection - the dynamic energy management systems from Michael Koch GmbH. The software hereby provides advanced sizing routines to round up and further optimize the defined drive system through the addition of the energy management solutions.

Koch's product portfolio

Calculation, selection, and simulation of energy storage solutions are some of the key innovations in 'Servosoft' v4 that were not available in the previous v3 version. "We are very pleased that, after our safe brake resistors, our dynamic energy management solutions have now also been included in 'Servosoft'", says Michael Koch, the man in charge and managing partner of Michael Koch GmbH. This statement applies to almost the

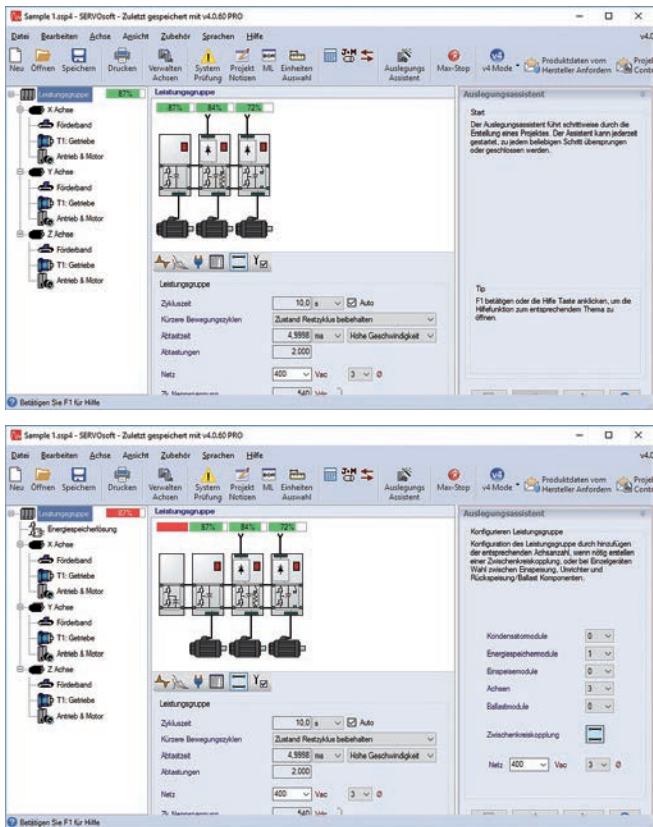
entire product spectrum, which now includes solutions for various important energy issues pertaining to electric drive technology. The devices perform crucial tasks, ranging from the classic buffering of 'regen energy' and using it as supplementary energy geared towards assisting with brake resistors (thus increasing the energy efficiency of the drive system), up to reduction of power and peak loads in the grid. "Our devices actively manage the electrical energy at the heart of the drive - the DC link. It does not matter how many axes are powered by the DC link," adds Koch.

Regen energy and the reduction of peak loads

When it comes to off-grid buffering of 'regen energy', Koch offers devices that accumulate and supply energy, ranging from 1 kilojoule to several megajoules, within a short period. Koch's systems can easily process capacities reaching over 100 kilowatts. The use of Koch devices in production machines currently allows for savings of up to 30 % in electrical energy, depending on the configuration of the drive system. With shorter cycles and more operational hours per year, the Koch systems offer faster return on investment - an important criterion, even though this is much more than a pure energy investment. This is because the devices from Koch provide an incredible range of other benefits that stem from the smoother voltage curve in the DC link. For instance, they often make it possible to run machines faster and thus produce more. Such gains in produc-

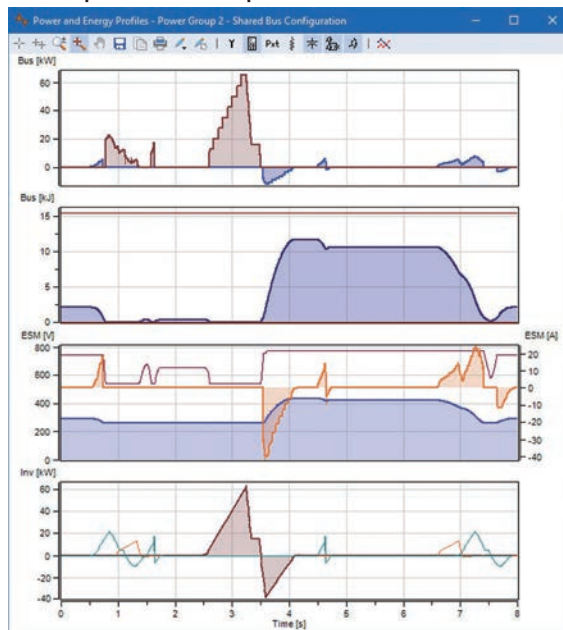


01 The product database of Servosoft includes more than approx. 5,000+ types of safe brake resistors and several hundred types of dynamic energy management devices for all applications - from energy buffering to uninterruptible power supplies



02 Start window of the abovementioned sizing process

03 Step 2 – Selection in process



tivity shorten the payback period significantly, with simultaneous reduction of the negative effects of pulsating machines.

Short-term peak loads of drives, which depend on the machine's operating cycle, necessitate high expenditures in infrastructure, as the infrastructure must be able to handle the current required for such peaks. Cables, connectors, contactors – these are just 3 examples that are affected directly. The dynamic energy management devices from Koch make it possible to compensate for such peak loads without burdening the grid. Depending on the machine cycle, the average load can be reduced significantly.

Uninterruptible power supply

The devices from Koch also protect against damage and downtime, due to their ability to additionally serve as UPS systems. Connected directly within the energy flow of the drive controller, the devices can supply and integrate up to hundreds of amperes for a pre-specified time, depending on the requirements. In this case, the production process continues without any interruptions. Were it not for the communication between the Koch device and either the drive controller or control unit, the machine would not even notice any grid fluctuations or interruptions. In addition to unplanned mains interruptions, it is also possible to compensate for planned mains interruptions and even implement off-grid power supply for your electric drives. In such cases, the devices from Koch step in and power the drive systems at the pre-specified intervals. Energy management devices from Koch use capacitors, super-capacitors, or batteries, depending on the amount of energy required. Most applications use capacitors or super-capacitors. Koch delivers all systems ready for use, from small stand-alone devices to systems in control cabinets. Plug & play is always assured, with this guarantee even covering large active energy management solutions.

Powerful sizing routines

With the new 'Servosoft' v4, the client can find their energy management solutions that best suit their drive system in just a few

clicks and with minimal input. All the static and dynamic data needed for each component is stored in the system, to the point where it is like a virtual twin. The drive system is illustrated using symbols once all components have been selected. In addition, the defined load cycle with its dynamics is illustrated in an attached graph. This makes the system conditions over the cycle very clear and easy to examine. "We attach immense value to making the drive model transparent and clear in all its mechanical and electrical dimensions over the course of the entire cycle", explains Vardin. All of the drive system's details are comprehensively defined. "With just a little practice", Vardin adds, "it becomes very easy to implement and optimize the drive projects". In the end, you have the individual components with all technical definitions on a bill of materials, adopted from the program's product database. This data serves as the basis of the calculation routines used when defining and optimizing the system. 'Servosoft' also provides assistance with drive-related problems. For instance, there are 15 pre-set drive mechanisms that enable fast definition of drive systems, now also in combination with Koch's dynamic energy management systems.

In any case, the database is well-stocked with detailed technical information relating to products from Koch. Several hundred types of dynamic energy management devices, ranging from small to large, are included. The user can apply a shoe-box sized 'Dynamic Energy Storage' DES 3.0 just as easily as they can apply a complete system that is delivered ready for installation as a fully fitted control cabinet, along with its different active devices and super-capacitor modules. Furthermore, the database is updated regularly for as long as there are changes to the products. "The calculation routines have come a long way and we really do not expect any major changes in the sizing approach itself. However, Koch is very active, so I am sure that more exciting products will be added to the database" adds Vardin with conviction.

Photographs: Michael Koch GmbH

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