

Managing DC Link Energy



Dynamic
Storage-Manager

DSM

Dynamic Storage-Manager DSM

The DSM 4.0 is the heart of a system which provides you with numerous advantages. Hereby it basically helps you to earn more money. Either by directly saving electrical energy or by increasing the productivity of your machine or system. The DSM 4.0, in many cases, can lead to an acceleration of the process and with it an increase in the amount of produced parts per time unit. Or it intercepts voltage dips which usually cause standstills and/or a loss of data. It can reduce peak loads and keep up the energy supply to the system in case of planned and unplanned mains interruptions: for seconds, minutes or even longer. Because it manages different storage media, which are can be chosen based on the applications requirements. And all of that maintenance-free.

Storage-Manager for various storage media

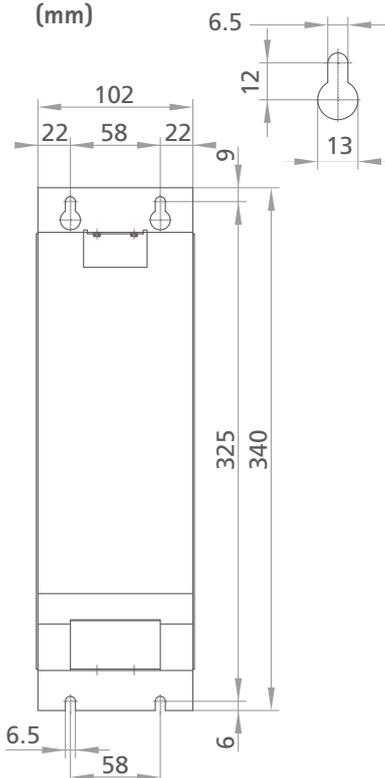
- > Electrolytic Capacitors
- > Supercaps
- > Batteries

and applications

- > Manage regen energy
- > Reduce load peaks
- > Intercept voltage dips
- > Manage failures of the mains
- > Independant from the mains



Installation dimensions and mounting-holes (mm)



The Friend of DC Links

In the center of the system is the Dynamic Storage-Manager DSM 4.0. It is the connection between the electric storage units and the DC-grid, which in Drive Controllers are called DC-Links. The DSM 4.0 is always being connected directly to the DC-Link of the drive controller. No matter which task the DC-Link will bring, the Dynamic Storage-Manager will fulfill it. And it will do it fast. So fast, that humans and machines wouldn't even notice if the DSM 4.0 would not communicate with the drive controller or the higher-level control.

It charges with regen energy from the system and supplies it once needed or once being told to do so. Just so that it is best for the application. Or for the mains, where unwanted effects of high power loads can be leveled and avoided. Consistently used, this can save a lot of costs.

Hereby it supports the drives electronics, especially in short cycles, in a way that the service life of the drives electronics is drastically extended and unplanned standstills are minimized. This support can even have the effect that the system can be accelerated if the mechanical parts of the system are made for faster cycles. Faster machines, higher quantities, higher productivity and more profit!

Especially when being used with batteries, the DSM 4.0 shows its strength as an absolutely uninterruptable power supply for DC-grids, and with it for drive controllers and thus electric drives. Voltage dips as well as planned or unplanned mains interruptions lose their threat. And if a 24 voltage Emergency Energy Supply NEV is added to the system, even the device, that are in need of a 24 voltage grid, such as controls, industry-PCs, sensors, brakes and many more stay active.

Technical Data DSM 4.0

Parameter	Value
Continuous voltage DC-Links	180 up to 800 VDC
Peak current max. (6s)	60 A
Continuous current max.	20 A
Storage voltage level max.	450 VDC (400 VAC connected voltage level of the drive controller)
Power up to	27 kW, parallel connection of devices possible
Measurements H x W x D	340 x 102 x 187 mm
Digital I/Os	+
Bus connection	RS422/RS485
Weight approx.	6.0 kg
Protection class	IP 20

Energy and Cycles per DSM 4.0:

Storage	Energy	Number of cycles
Elcos	1.4 up to 40 kJ	> 100 mio.
Supercaps	80 up to 1,600 kJ	> 1 mio.
Batteries	3,000 up to 280,000 kJ	> 1.000

Surveillance Functions

- > Digital I/Os for storage surveillance and contactor control
- > Bus communication for further analysis and control possibilities



Easy Connection

The DSM 4.0 manages the energy flowing between DC-Link and storage. The physical connection occurs at the front of the device.

1. Plus and minus of the storage have to be connected under "Storage"
2. Plus and minus for the DC-Link of the drive controller have to be connected under "Drive"
3. Digital interface
4. RS422/RS485 connector
5. RS422/RS485 connector for further DSM 4.0

Easy Power Increase

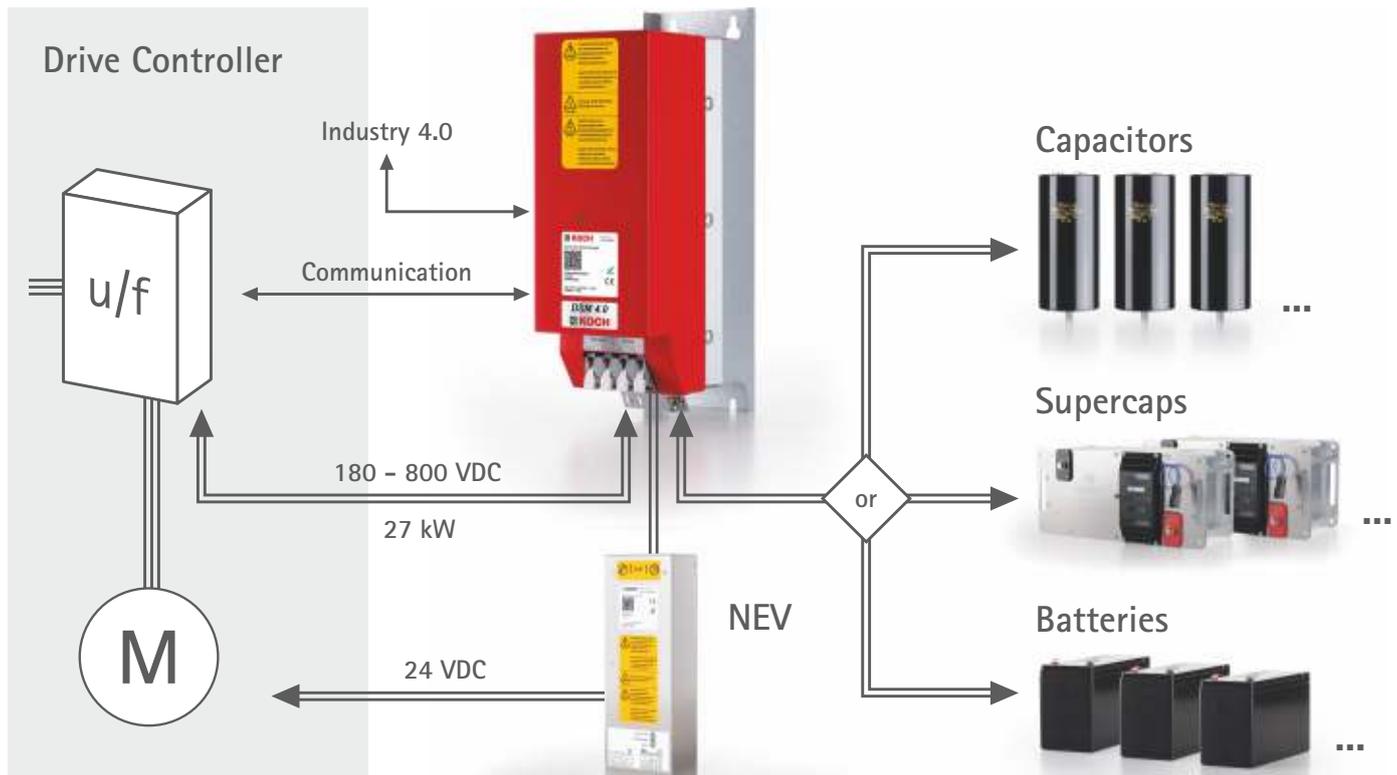
By connecting several DSM 4.0 units in parallel with access to the same storage, the power can easily be increased. The devices are cascadable without any further changes. A bus-connection fulfills the requirements of communication.



The System DSM

The requirements of the drive controllers DC-Link, thus of the drive system, are crucial for the composition of the DSM 4.0 system. The required power, amount of energy and cycles, which are given by the application, are decisive.

Important: None of the used storage media requires maintenance. The entire system works maintenance-free.



Applications

1. Managing Regen Energy

Short cycles, many repetitions: The classic case of a buffer functionality, which the DSM 4.0 perfectly manages. It leads to a calm voltage level in the DC-Link.

2. Reducing peak loads

Short power peaks stress the mains. The DSM 4.0 provides the necessary energy on command and smoothes the grid.

3. Managing failures of the mains

In case of a failure of the mains the DSM 4.0 keeps the system running - for the whole time the amount of energy in its storage was designed. And not only one or multiple drives, but also for the peripheral devices on the 24 VDC-grid via the NEV (page 7).

4. Enabling grid-independent operation

If the power from the mains is only available every now and then, the DSM 4.0 delivers the required energy with its connected storages. The same applies here: Not only for one or multiple drives but also for the peripheral devices via the NEV (page 7).



Information video DSM 4.0
(www.youtube.com)

Applications

Managing regen energy

Goal: Safe energy, avoid unplanned stand-stills



Situation:

The machine brakes every second with a starting power of 10 kW and then within 0,4 seconds down to 0 kW. After a break of 0.1 s, the system accelerates again.

Problem:

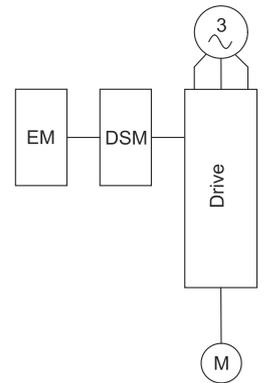
Fast cycles and heavy loads lead to an overload of the drives electronics and thus to unplanned stand-stills. In addition to that, 2,000 Ws of electrical energy could be saved with each cycle, thus approx. 2 kWh each hour of production.

Solution:

One DSM 4.0 in combination with one capacitor module EM2020.

Results:

1. Decreased power input, Saving of 2 kJ each cycle or approx. 2 kWh each hour of production
2. Extension of the service-life of the drives electronics
3. Potential increase of the amount of cycles and increased productivity, if the mechanical parts of the machine are made for faster cycles



Reduce Power Loads

Goal: Reduce the connected power to the mains, save energy



Situation:

High costs caused by high power peaks as well as high energy consumption.

Problem:

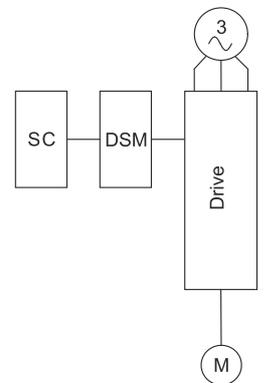
The machine accelerates with a big load that leads to a high peak power at the mains. In addition to that unused regen energy is being wasted.

Solution:

One DSM 4.0 in combination with Supercaps.

Results:

1. Power peak from the mains is reduced drastically
2. Saving regen energy by buffering it in the storage and providing it back to the system once it accelerates.



Applications

Voltage dips or failure of the mains

Goal: Energy supply during voltage dips or failure of the mains



Situation:

The critical drive with 45 kW power is not secured against voltage dips or failure of the mains.

Problem:

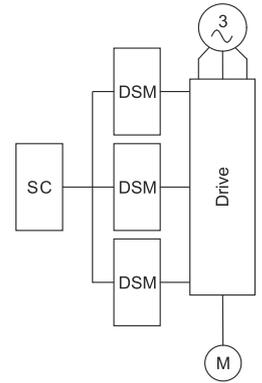
To ensure that an expensive tool is not destroyed, and thus maintaining delivery capability and avoiding contract penalties, the critical drive has to be kept running for at least 10 seconds in case of voltage dips or failure of the mains.

Solution:

Three DSM 4.0 units connected in parallel with an adequate energy storage consisting of Supercap modules.

Results:

1. Controlled and uninterrupted power supply to the machine during voltage dips
2. Controlled stop of the machine in case of failure of the mains
3. Enabling the machine to go into a defined position while securing the workpiece and the tool



Failure of the Mains

Goal: Energy supply during failure of the mains



Situation:

Safety standards require that an AGV (automatic guided vehicle) does not stop in a fire protecting door.

Problem:

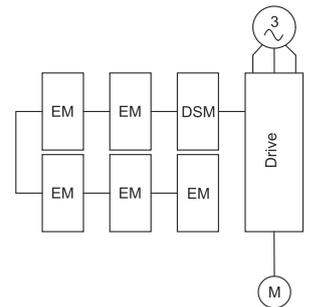
In case of a failure of the mains, a fire protecting door cannot close if an AGV has stopped in the door way.

Solution:

One DSM 4.0 with five capacitor modules EM2020.

Results:

1. AGV leaves the dangerous area in case of a failure of the mains
2. The fire protecting door can close.



Independent operation from the mains

Goal: An existing system shall be operated independent from the mains



Situation:

Between relocating a work group from one location to the next (in total two dozen) the system constantly has to be connected to the mains.

Problem:

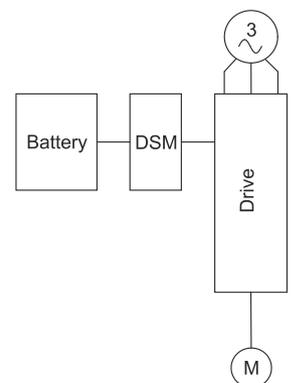
Time consuming for the workers and the used cable wears out.

Solution:

One DSM 4.0 with batteries

Results:

1. Batteries are being charged once and supply the necessary energy for both shifts during a working day
2. Work time is saved
3. Cable as a potential source of danger is minimized



Useful Supplement

24 VDC Emergency Energy Supply NEV

The NEV serves as mains-independent voltage supply to a 24 V DC-grid. Therefore the NEV uses a power supply like the Dynamic Storage-Manager DSM 4.0. In case of strong voltage dips or failure of the mains, the NEV provides your secured 24 VDC-grid with energy. The duration of the supply basically depends on the load and on the existing energy in the energy supply. Even the setup of the energy supply has an impact on the duration of the supply with electrical energy. With a slightly reduced output power, the NEV can even be used as a power supply unit. But normally a regular power supply unit, that does the continuous power supply, is being connected to the NEV. Consumers integrated in the DC-Link that have to be supplied by the NEV in case of a failure of the mains have to be connected to the NEV. As a result the NEV automatically learns the niveau of the external voltage supply and thus the niveau that the NEV has to work on once needed.



Active 24 volt support power supply unit

- > space-saving
- > no manual configuration
- > supports in case of failure of the mains or voltage dips
- > no switches
- > can be used as an power supply unit

Koch Control Cabinet Solutions KTS

KTS are the standard control cabinets, which we offer for the case when our energy storage systems no longer have any space in the control cabinet of the machine or line. Eventually, many machine operators also want to use the benefits of DSM 4.0 for existing machines. Upgrade and retrofit are the keywords. But even as an "option" for new machines. In this case we can equip control cabinets and supply them completely assembled.



Integrate DSM 4.0-Energy Storage-Systems in a control cabinet

- > ready for mounting and installation
- > temperature monitoring
- > fuse protected
- > customized solutions

Direct contact

Do you have questions about products, technology or applications?

Call us, send us an e-mail or a fax. We will respond immediately.

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Managing DC Link Energy

Energy storage solutions and safe brake resistors in wire-wound and PTC technology

We offer:

- **Tested product quality**
- **Certified processes**
– we undergo regular inspections by third parties
- **Individual application support**
– owing to our modular system we can offer more than 60.000 solutions
- **Machine-specific implementation**
– we match our products with your machines
- **High reaction rate**
– we provide you with a suitable offer in the shortest possible time
- **Short delivery times**
– all components are in stock
- **On-time deliveries every time**
– we deliver on schedule in optimal lot sizes
- **Reliable partner**
– we strive for long-term business relationships
- **Direct customer relationships**

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