SEW EURODRIVE

Intelligent power and energy management

Control cabinet technology:
Power and Energy Solutions

Power and Energy Solutions

Intelligent power and energy management

Future-proof drive and automation solutions bridge power failures, utilize regenerative energy, and reduce connection costs and energy costs. Thanks to intelligent energy and power management, Power and Energy Solutions from SEW-EURODRIVE provide all the essentials for these functions. While solutions with braking resistors and regenerative power supply devices are functional, they are unable to unlock the full potential of an application.

By contrast, Power and Energy Solutions use power supply modules with controlled DC link voltage that enable the use of energy storage units. They represent our concept of future-proof drive technology and automation solutions – with sustainability included!

Efficient

The use of robust storage capacitors in the DC link ensures the majority of necessary power peaks can be covered by the energy storage unit.
The necessary connection power is reduced – and so are your connection costs.

Intelligent

When your system is in regenerative mode, the energy that is extracted is stored in the energy storage unit. That saves energy compared with inefficient braking resistors – and significantly reduces EMC loads in the power grid compared with regenerative power supply units.

Reliable

You benefit from the energy storage unit when your power grid is fluctuating or even fails completely. Stop your system in a safe position, terminate your machine cycle, or completely bridge the gap until your power supply is available again – and avoid the high consequential costs associated with a sudden blackout.

Make your future efficient, intelligent, and reliable – with just one solution

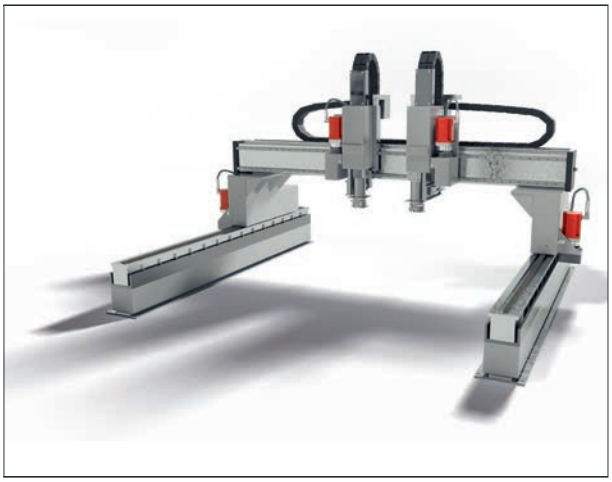
→ Potential uses and advantages
Pages 4 + 5

→ Device overview
MOVIDRIVE® modular drive inverters
with Power and Energy Solutions (PES)
Pages 6 + 7

→ Startup with software modules
MOVIKIT® Pages 8 + 9

Typical potential uses of modular multi-axis systems with an energy storage unit

Bridging power failures, reducing power peaks, saving energy



Dynamic machine modules
Reliably avoid crashes and their consequential costs during power failures – protect your system with a safe stop (controlled stopping) or terminate your full machine cycle.

Mobile applications
Mobile applications that are not constantly being supplied with energy are reliant on energy storage units. An energy storage unit can, for example, supply power to a shuttle as it makes its way into a warehouse. The size of the energy storage unit is designed to suit the route layout and the masses being transported.

Logistics applications: Storage/retrieval systems / automated small-parts warehouses
Frequently raising and lowering large masses leads to power peaks, which energy storage units can reduce by up to a factor of 15. Starting up all aisles simultaneously is no problem. What's more, energy storage units generate only minimal heat, which makes them particularly suitable for use in very low-temperature conditions, unlike braking resistors.

Amusement rides
Other application areas for multi-axis systems with an energy storage unit include amusement rides. Here, too, they help save energy and compensate for power failures.
Another advantage is that the lower connected load means several amusement rides can be connected to the same infrastructure.

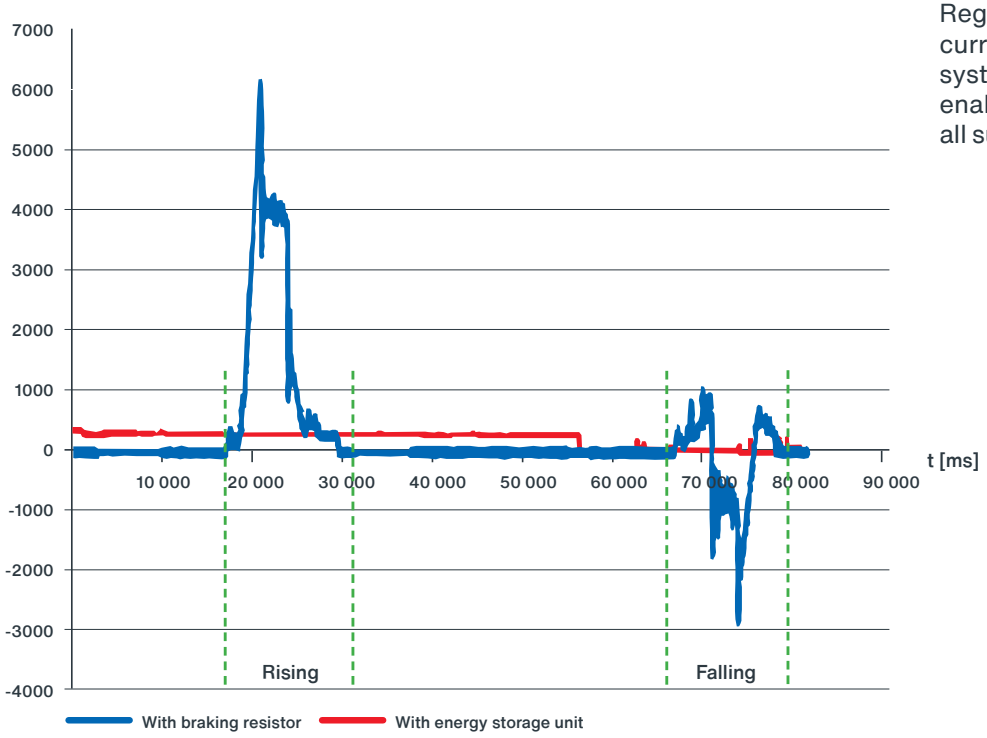
Benefits of the Power and Energy Solutions

Reduction in consequential costs

Blackout protection in the event of power failures and fluctuations. When things go wrong, the energy storage unit supplies as much power as is required to move the system to a park position, terminate a machine cycle, or even completely bridge a power failure, for example. As a result, worst-case scenarios such as wearing out the wheels of storage/retrieval systems or experiencing a complete machine crash are prevented. Expensive system cleaning operations to tackle burnt components or parts that have become stuck together because of a power failure can also be consigned to the past.

Avoidance of braking resistors

(and their additional costs): The system only consumes as much energy as it actually needs. You can therefore reduce your energy consumption and thus your energy costs.



Power consumption from the supply system in watts.

Reduction in connection costs

Since the power consumption from the supply system is constant and up to a factor of 15 lower, you can design all peripherals, such as fuses, cables, line filters, line chokes, and conductor rails to be smaller.

Reduction in EMC load

The units exhibit a consistently low supply system consumption and, compared with alternative solutions such as regenerative power supplies, generate only a minimal harmonic load. A low EMC load delivers a higher grid quality.

Complete transparency

thanks to detailed monitoring of grid data and consumption data.

Connection to DC and AC networks

Regardless of whether you have a direct current or alternating current supply system, Power and Energy Solutions enables a global connection to virtually all supply systems.

Peace of mind for grid fluctuations and emergency power supplies

Overview of devices

At their core, Power and Energy Solutions are about integrating an energy storage unit into the MOVIDRIVE® modular multi-axis system. This integration is made possible by the precise control that the MDP92 power supply module has over the DC link voltage.

The MDE90 power supply module enables you to:
- Use MOVIDRIVE® modular to connect the solution to a DC supply system,
- Integrate an energy storage unit into a DC link with a standard power supply module or
- Supply power to axis modules in mobile applications via an energy storage unit.

The MDS90 switched-mode power supply with DC and AC power supply makes it possible to safeguard a 24 V power supply to your controller and axis modules, even in the event of a power failure. Make the most of the benefits that Power and Energy Solutions offer. They can provide a crucial competitive edge, particularly when grid quality is poor or inconsistent. Depending on how long the power supply is down, the power supplied by the energy storage unit can keep production running or move the system to a defined safe position.

Power supply module with controlled DC link voltage

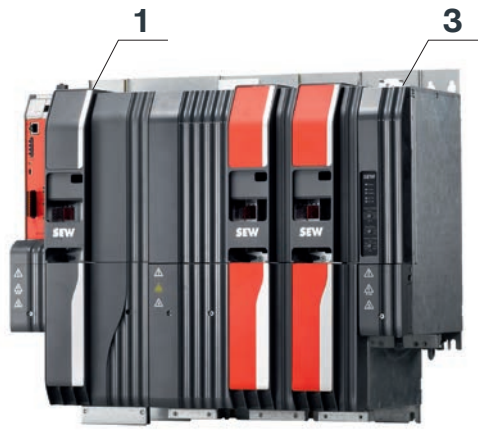
MDP92A (1)

+ 25 kW nominal power
+ 40 kW maximum power
+ Axis modules up to 140 A can be connected

DC/DC converter module

MDE90A

+ 75 A nominal current
+ 120 A maximum current
+ $\eta \triangleq 99.8\%$



24 V switched-mode power supply with AC and DC supply.

MDS90A (3)

+ 22.5 A output current
+ AC and DC power supply
+ Voltage supply to all 24 V consumers even during power failure

Mobile discharger for electrical installation work

EKD-003

+ Rapid discharge
+ For all energy*
+ Easy to use

*from SEW-EURODRIVE

Find out more:
www.seweurodrive.com/PES

Overview of energy storage units

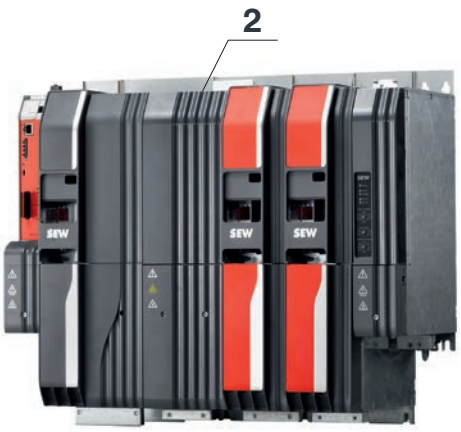
Adapt your energy storage unit to the needs of your application, whether you have a compact, highly dynamic handling machine or a powerful storage/retrieval system. The Power and Energy Solutions energy storage units cover an energy content from 2 kWs to 6600 kWs.

This ensures that a whole range of functions can be implemented during a power failure, from a safe machine stop through to bridging several complete machine cycles – with energy savings and peak shaving included.

DC link storage unit

MDC90A (2)

+ DC link energy storage unit (4 kWs)
+ Electrolytic capacitors for highly dynamic operation
+ Up to 4 energy storage units can be switched in parallel



Energy storage unit modules

MOVI-DPS®

+ Double-layer capacitor technology (supercapacitor)
+ Decentralized energy storage unit (IP65)
+ Modular system, energy content from 10 kWs to 1100 kWs

Energy storage unit cabinet

ESS-R2/R3

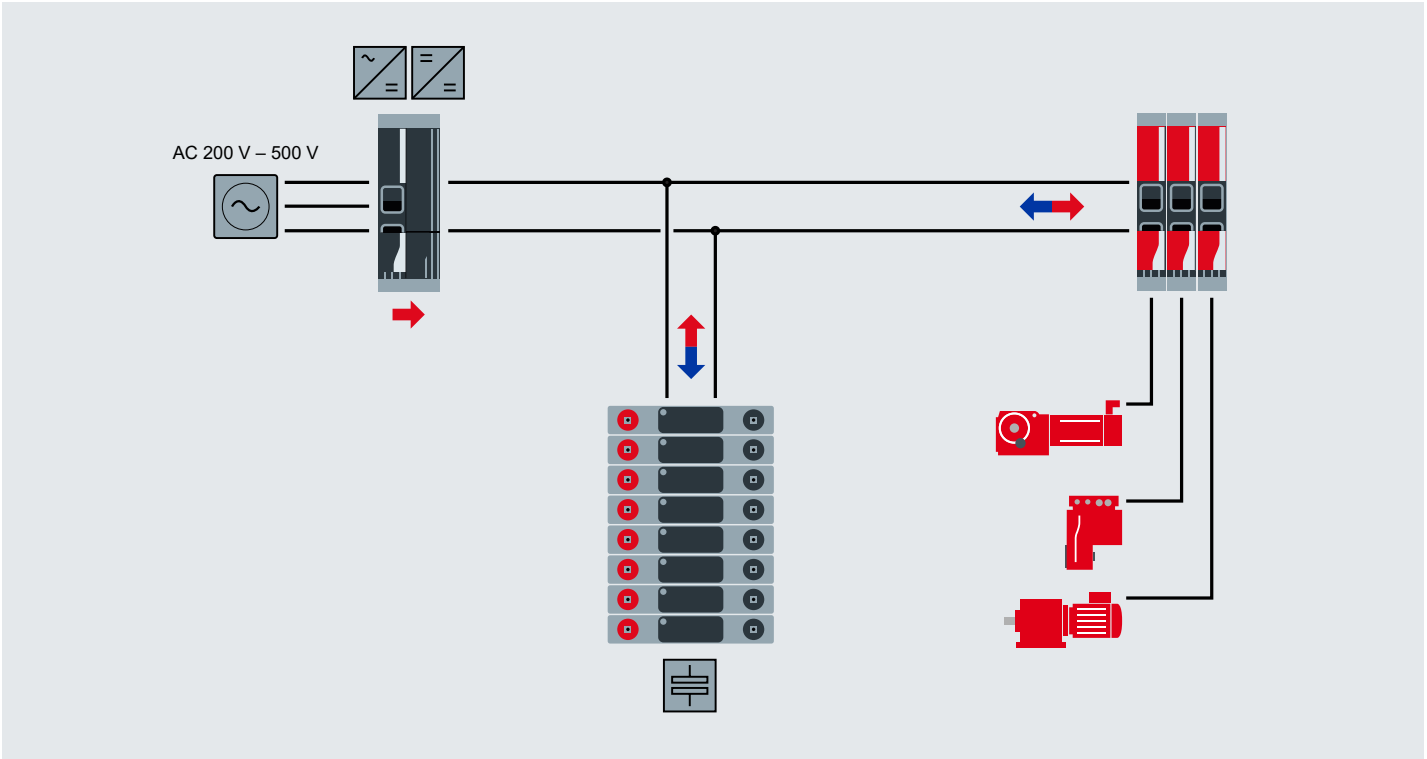
+ Double-layer capacitor technology (supercapacitor)
+ Turnkey storage unit cabinet system
+ 1200 – 6600 kWs energy content

Saving time and costs on startup

PowerMode:

Direct connection of the energy storage unit in the DC link

- PowerMode – typical in stationary systems and machining systems
- Power peaks – high motor power while keeping grid load low
- Every power peak for the drive inverter is covered by the energy storage unit
- Variable DC link from 480 V – 800 V



Software modules make it possible to parameterize hardware and ensure rapid startup for solutions with an energy storage unit. Time-consuming programming is avoided.

MOVIKIT® PowerAndEnergySolutions
PowerMode:

Ensures the energy storage unit can be operated safely and reliably via automated DC link synchronization and continuous monitoring; makes it possible to set the state of charge dynamically.

MOVIKIT® PowerAndEnergySolutions addon
PredictiveChargeControl:

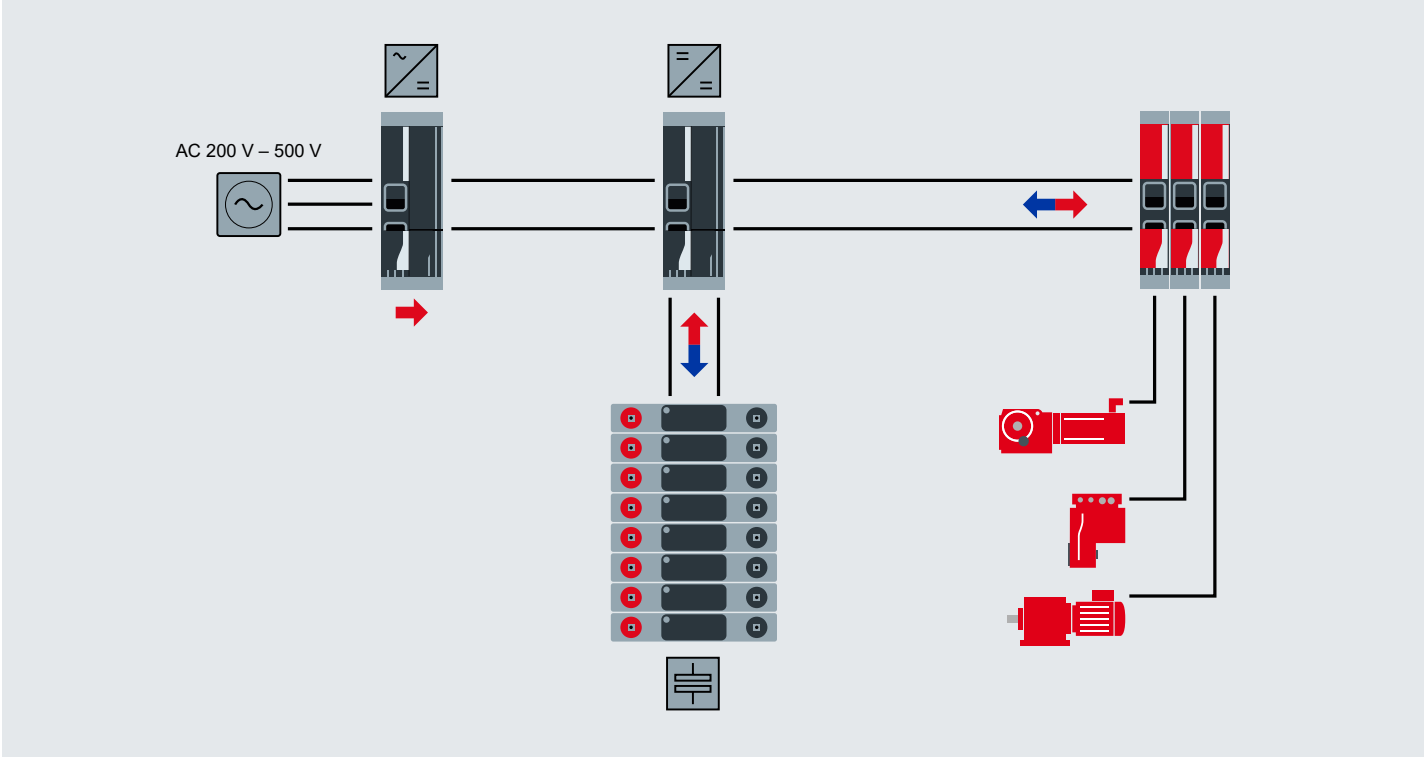
Adjusts the state of charge of the energy storage unit depending on the potential energy, rotational energy, and kinetic energy of the application:
- Based on the potential height energy of the hoist or
- Via a general reserve

The MOVIKIT® software modules have been developed for our inverters and controllers and help save time during the startup of an application. If you opt for Power and Energy Solutions, you can equip our hardware components with the corresponding MOVIKIT® software modules, which can be used to optimize the hardware for your specific application scenario.

EnergyMode:

Connection of the energy storage unit to a DC/DC converter module

- EnergyMode: Typical in mobile applications such as automated guided vehicles
- Separation of the energy storage unit from the DC link by a DC/DC converter
- Efficient use of the storage unit due to the wide variability of the storage voltage range from 100 V to 800 V
- Connection of a drive system to a DC grid



Software modules facilitate the automatic synchronization and switching on of the storage unit and the variable control on the DC link side or energy storage unit side with dynamically adjustable power limiting and current limiting.

MOVIKIT® PowerAndEnergySolutions
EnergyMode

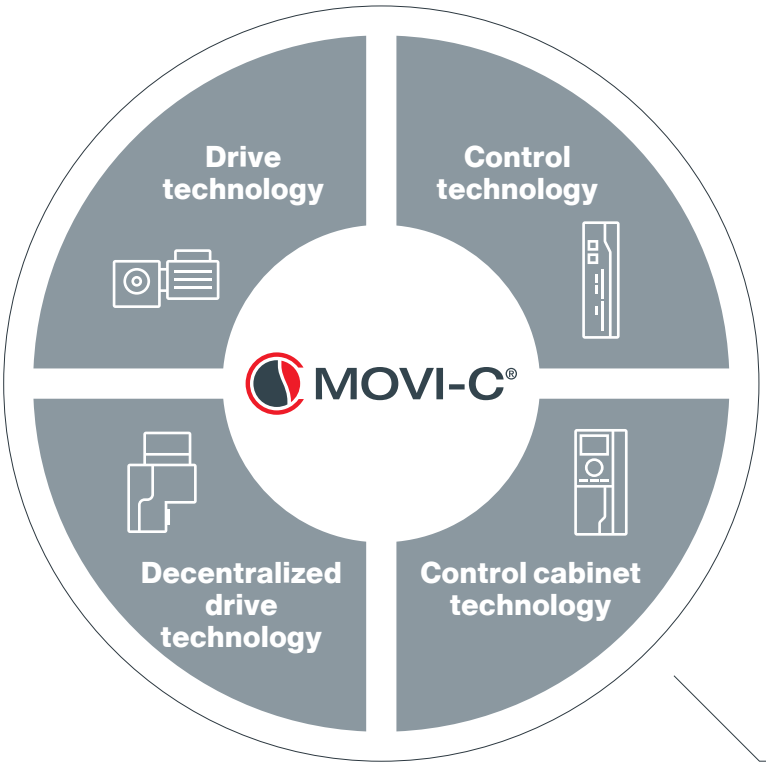
Ensures the power supply to the DC link through the energy storage unit that is connected to the DC/DC converter module. This means the storage unit design can be smaller and that deeper discharges from the storage unit are possible.

Detailed information about the functions of the MOVIKIT® software modules for Power and Energy Solutions is available on our website:

Find out more:
www.seweurodrive.com/movikit

MOVI-C®

The modular automation system
for complete solutions from a single source



Power and Energy Solutions is part of the MOVI-C® modular automation system

3 × 3 reasons to use MOVI-C®

Simplicity
THREE steps: Plan – Connect – Move

Future-proofing
THREE promises: Customized solutions – Today – and Tomorrow

Consulting and service
THREE success factors: Delivery capability – Consulting – Worldwide


SEW
OK
STOP
RUN
DRIVE
RUN
ERR
LA IN
LA OUT
F-RUN
F-ERR
SEW

Other aspects of the
MOVI-C® modular automation system
that might interest you
Control technology
Drive technology
Decentralized drive technology

Driving the world.

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