Powerful and versatile in use

Energy storage units by Liebherr

LIEBHERR

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Scalable and efficient

The Liebherr energy storage unit is a powerful yet versatile storage unit based on double layer capacitors that is used in electrical drive systems and plants. Cyclical, surplus generator energy is saved and converted back into energy, as and when required. This improves the energy balance of the applications.

Depending on the amount of energy that is to be stored temporarily, up to ten energy storage units can be connected in parallel, thereby increasing the storage capacity and enabling a higher power to be accommodated. Thanks to the Liebherr energy storage unit, the stored energy remains within the system, keeping it available for subsequent work. The system provides the option of reducing the connection rating or using a smaller diesel engine to enable cost savings.

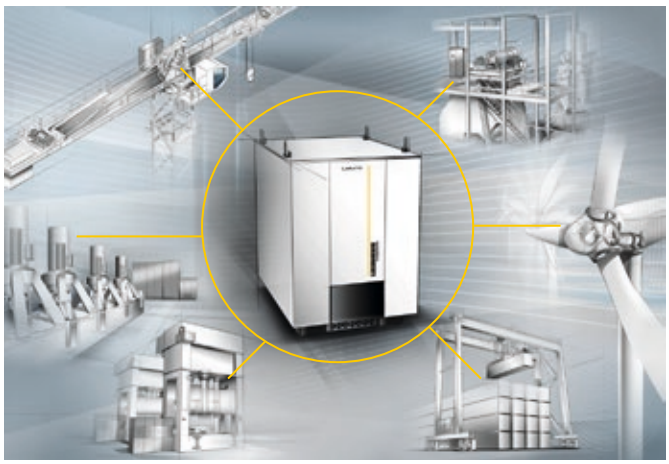
The energy storage unit is used to smooth power peaks, reduce the mains connection rating, or retain braking energy in the system so it can be supplied to following processes.

Areas of application

- Process technology
- Lift and travel applications
- Mechanical engineering
- Mobile and stationary applications
- Indoor and outdoor use

Overview of product features

- "Connect & Use" principle
- Compact design
- Easy installation and operation
- Durable thanks to high cycle stability
- Higher storage capacity through parallel connection
- Flexible communication interface



System overview and properties

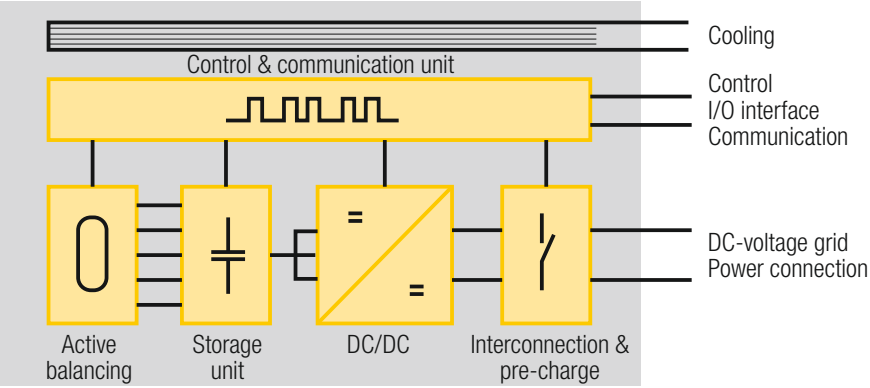
Simple system integration

The liquid-cooled energy storage unit contains all individual systems and assemblies (such as the storage unit itself, a bidirectional DC/DC converter, the control and communication unit, as well as a connection unit), which are required to enable complete integration in a DC-voltage grid.

The DC/DC converter is used for adjusting the capacitor voltage to the main supply voltage. As all these individual systems and devices are combined in one unit, integration in an application is made much easier thanks to the significantly reduced interfaces and smaller space requirement associated with this.

Components of the system

- Connection unit with all-phase disconnector and pre-charging
- Three-phase DC/DC converter
- High-performance storage unit
- Intelligent and effective active balancing
- Intelligent control and regulation with monitoring and communication
- Liquid cooling system



Reduced planning cost

The Liebherr energy storage unit combines all functional units in one. Both external coordination expenses with different suppliers as well as internal organisational and consultation expenditures for integrating such a system are consequently reduced to a minimum.

Quick and easy integration

The system is designed as 2-pole and can be integrated in machines or plants and commissioned via a connect & use principle with minimal installation expense. Despite a maximum power density, the space requirement is only very small.

Simple retrofitting

The storage unit can easily be retrofitted in existing systems, as only a connection to a DC-voltage grid (for example the converter intermediate circuit) and to a coolant system or an individual cooling unit is needed.

Technical design

Electrical data

Type	LES200-1500-04-CA0-CL0
Storage medium	Double layer capacitor
Energy content	1.5 MJ
Power output	100 kW / 15 seconds
Input voltage range	530 V … 800 V DC
Control voltage	+24 V
Power loss	5.5 kW
Operating temperature range	-30° C … +45° C
Communication	CANopen, Profinet

Operating modes

Current control	Defined charge and discharge current on the basis of desired current set point
Voltage control	DC link voltage is controlled on the basis of a desired value
Voltage control with desired value range	DC link voltage is kept within a defined voltage range
Energy control	Provision of a defined level of energy

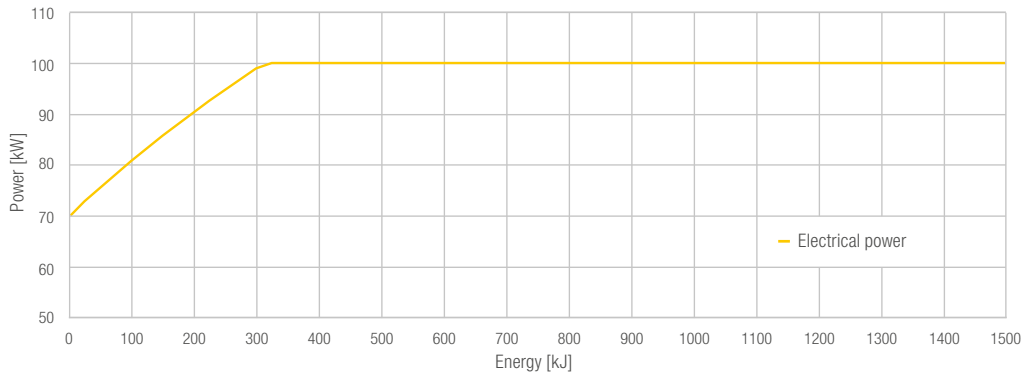
Mechanical Data

Cooling medium	50% water / 50% glycol
Coolant requirement	30 l/min
Min. input pressure	2 bar
Max. input pressure	3.5 bar
Pressure loss	2 bar
Coolant inlet temperature	≤ 45° C
Protection class	IP 65
Dimensions (HxWxD)	1,100 x 750 x 1,120 mm
Weight	500 kg
Paintwork	C4 (according to ISO 12944-2)

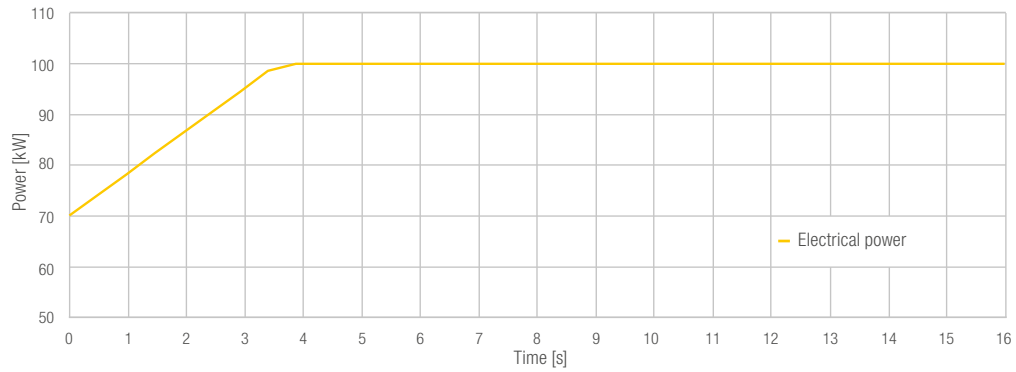
Options

Cooling units stationary	Cooling unit connection: 1 energy storage unit
	Cooling unit connection: 2 energy storage units
	Cooling unit connection: 4 energy storage units
Hose set	2 m
	5 m
	Individual length: on request
Water distributor	Connection: 4 energy storage units

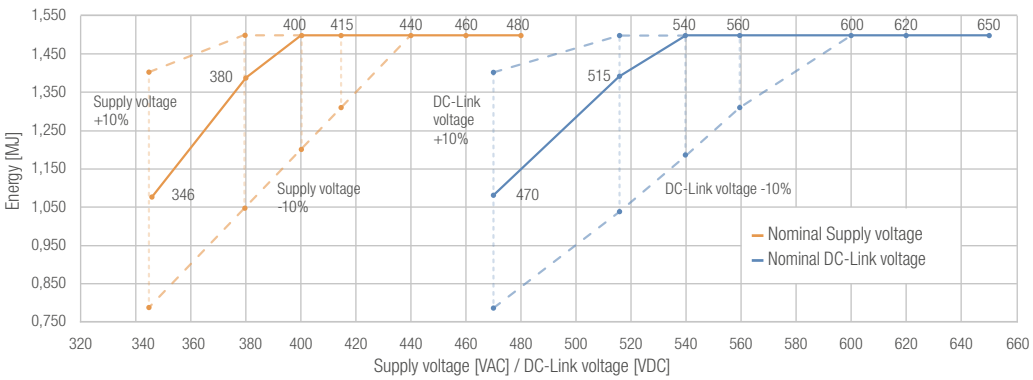
Power to energy



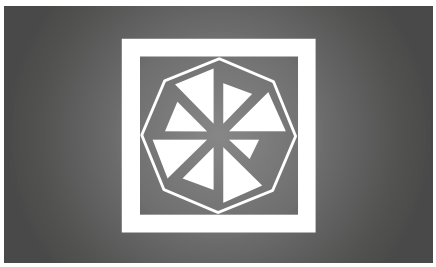
Power to time



Energy to supply voltage

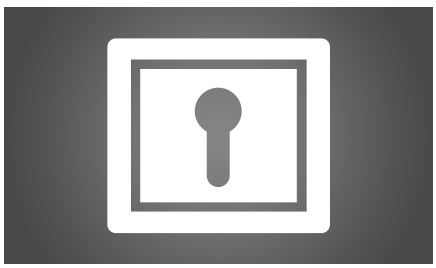


Features



Integration
Simple mechanical and electrical integration in a plant or system. Only the electrical power cables as well as the power supply need to be connected. A CANopen and Profinet interface is available for extended functionality.

The inlet and outlet still have to be connected to a cooling system for the cooling.



Safety
A sophisticated protection concept forms the basis for safe operation of the storage unit in relation to the device and operator. An isolating unit with fuses and switching contacts disconnects the storage unit from the power supply in the event of an error. An integrated discharge unit discharges the stored energy. A display indicates if the storage unit is charged or discharged.

Device protection
The high protection class IP65, as well as a correspondingly robust mechanical and electrical design ensure that the device is protected. Continuous monitoring of the process and status information such as voltage, charge/discharge current, temperature etc. increases the intrinsic protection and extends the overall operating time of the device.

Housing
The housing combines utility and design. Dust and water do not pose any problem. The connection unit of the power cables and the plug interfaces are correspondingly sealed, this allowing both indoor and outdoor operation. The modern design is optimised for the high power contained in the energy storage unit. The two side panels "containing" the energy are symbolised by the brackets.

Analysis
The OPAL software provides a versatile and easy-to-operate program for parameterisation, observation and analysis. When using an industrial PC as a superordinate control, OPAL offers automatic data logging for advanced system analysis.

Parameterisation & diagnostics

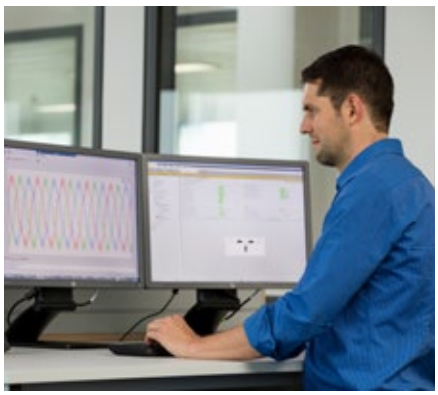
Parameterisation and diagnostics
The Liebherr commissioning and diagnostic software is intuitive to use, making the user's daily work with our power electronics considerably easier. It stands for observation, parameterisation, analyse by Liebherr – in short OPAL.

All-In-One
OPAL is an all-in-one software solution for the commissioning and diagnostics of Liebherr power electronics. This comprises all functions and features that are required for quick and easy configuration and monitoring, thereby helping to make planning and downtimes shorter.

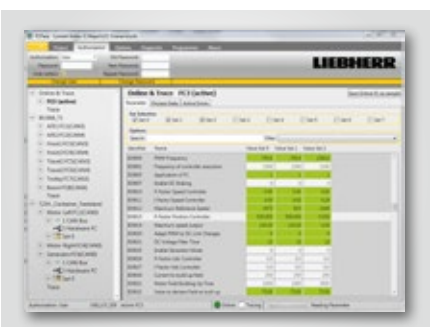
Management and project planning
The software helps the user to create his project. Various functional units, such as frequency converters, active front-end units or also energy storage units can be combined within a project. Each separate unit can be parameterised individually. Predefined selection options are available for this. Parameters can be edited both offline and online. Entire parameter sets can be cloned easily by copying and pasting. A comparison function can compare select parameter sets within one another and adopt individual parameters, if required.

User interface and user administration
The user interface has a clear layout to ensure intuitive and project-oriented operation. Projects can be protected against unauthorised access by different access rights. Three user levels are available for this.

Monitoring and diagnostics
All process data can be logged via a trace function and saved as either a graphic or file. As a result, not only the data currently visible in the display window but also all data from the start of the logging can be saved. This allows longer processes to be checked in detail. An automatic data logger is also available. As soon as OPAL is started, select process data begin to be logged. These are saved in a separate file.



Project management
- Management of multiple functional units in one project
- Access online and offline



Diagnostics
- Multi-FC-Trace functions
- Simultaneous logging of process data from different functional units

Configuration
- Clear configuration and parameterisation
- Up to 8 parameter sets per unit
- All process parameters can be changed online

Examples of use

Process technology

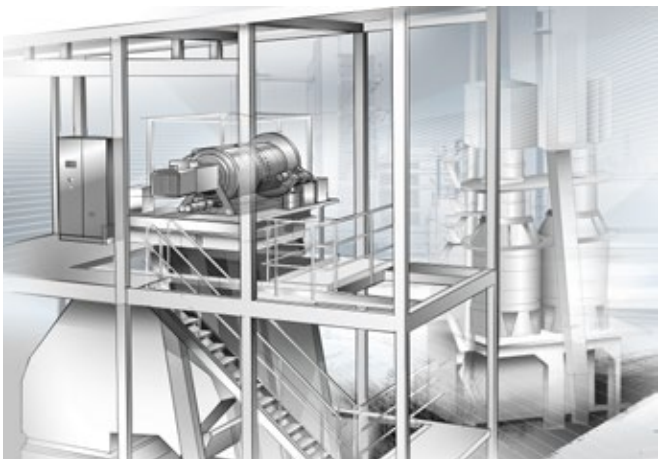
Energy storage units by Liebherr are versatile in use.
Use in mobile and stationary applications – both indoors and outdoors.

Process engineering
- Peak load shaving
- Reduction of mains power
- Heavy duty start-up

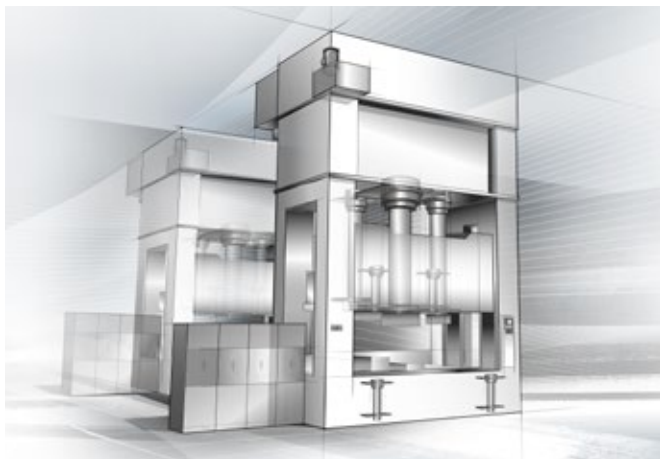
Mechanical engineering
- Reduction of mains power
- Improved energy balance through use of cyclical energy

Lift and travel applications
- Reduction of mains power
- Smaller combustion engine size
- Peak load shaving
- Use of recuperation energy
- Reduced emissions

Lift and travel applications



Mechanical engineering

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Components

Request data
Energy storage unit

General

Date of enquiry:		Phone:	
Company name:		Email:	
Contact:		Application / Area of use:	
Street:		Device / Type:	
Postcode:	Town:	Quantity required:	
Country:		Desired delivery date:	

Project information

Project designation:		Input voltage range:	
Application:	Coverage of peak loads ☐ Energy recovery ☐	Ambient temperature range:	
Version:	New project ☐ Retrofit ☐	Installation site:	Outdoor ☐ Indoor ☐ Other _____
		Expected service life:	
		Description of the load cycle:	
		Number of loads cycles per year:	

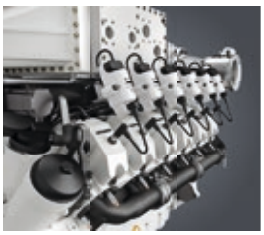
Other requirements

Cooling system provided:	Yes ☐ Data: _____ No ☐ Other ☐ _____
Required acceptances / Classifications:	

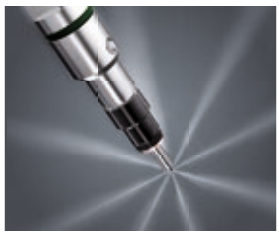
Further remarks / Requirements

Please return the completed form to:
components@liebherr.com

Liebherr Components


Gas engines


Diesel engines

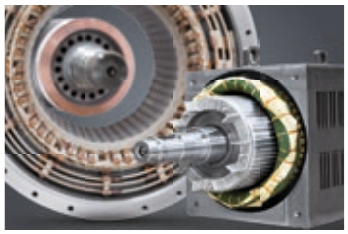

Fuel injection systems

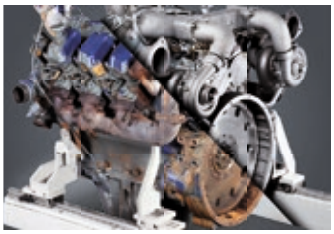

Axial piston hydraulics


Hydraulic cylinders

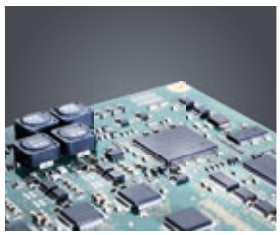

Slewing bearings


Gearboxes and winches

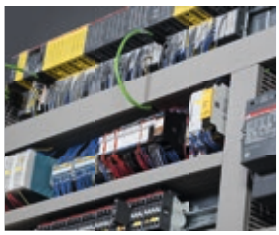

Electric machines


Remanufacturing


Human-machine interfaces and gateways


Control electronics and sensor technology


Power electronics


Control cabinets


Software

From A to Z – the components division of the Liebherr Group offers a broad range of solutions in the area of mechanical, hydraulic, electric and electronic drive system and control technology. The efficient components and systems are produced at a total of ten production sites around the world to the highest standards of quality. Central contact persons for all product lines are available to our customers at Liebherr-Components AG and the regional sales and distribution branches.

Liebherr is your partner for joint success: from the product idea to development, manufacture and commissioning right through to customer service solutions like remanufacturing.

components.liebherr.com

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