



Energy-Recovery-System (ERS)

ENERGY-RECOVERY-SYSTEM

The Energy Recovery System

"Using energy, instead of burning it" is the motto these days! Why should the braking energy be transformed into heat, when it cannot be fed directly back into the system network? It is precisely this basic idea which has induced us to develop a system with which the energy can be "reused" again.

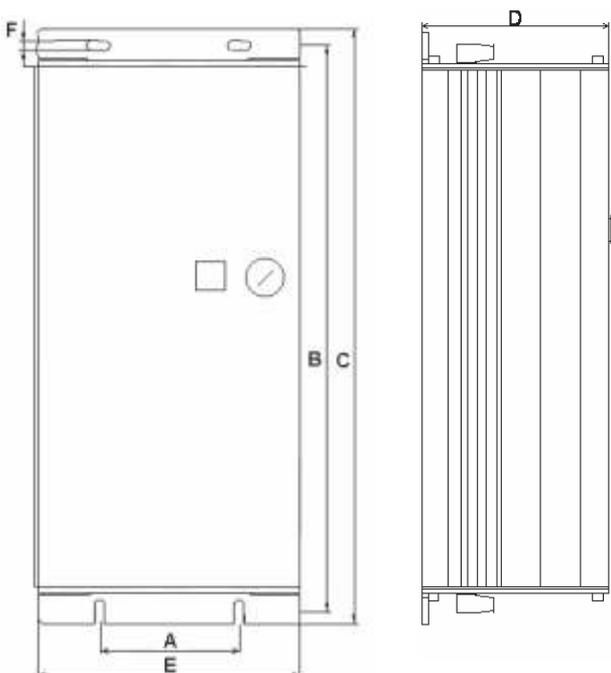
During braking of three-phase motors or servomotors regenerative energy is released. This flows into the intermediate circuit of the drive controller and must be converted into heat through the corresponding braking resistors and destroyed. In applications where potential energy from lifting, lowering and braking movements is converted into heat loss through braking resistors, the Energy-Recovery-System can utilize this potential energy. With the installation of the system, the regenerative energy of your servo or standard drive is no longer lost. The ERS acts as a centralized or decentralized energy recovery unit and feeds the energy back into the system network via the connected drive controller.



Specifications

Connection voltage	3x350-480Vac 50Hz / 60Hz, Clockwise rotating field
Capacity	Peak capacity: 5kW (2 - 9A) @ ED35% (S3 mode)
	Continuous output: 2kW @ ED100% (S1 mode)
Switch-on threshold	Can be adjusted in the device
Safety braking resistor during power failure	Integrated
Status LED	Operational readiness / synchronisation / feeding mode / excess current / excess temperature
Protection degree	IP20 (optional Ip54)
Digital output	Operational / Collective fault signal / feeding mode
Monitoring functions	Intermediate circuit voltage / Device temperature / Current Feedback
EMC measures	Integrated - no EMC measures necessary on the customer side
Connectible drives	Three-phase drive or servo drives
Ambient temperature	0°C to +40°C
Housing dimensions (LxWxH)	312 x 112 x 90mm / aluminium housing
Weight	2.1kg

Dimensions

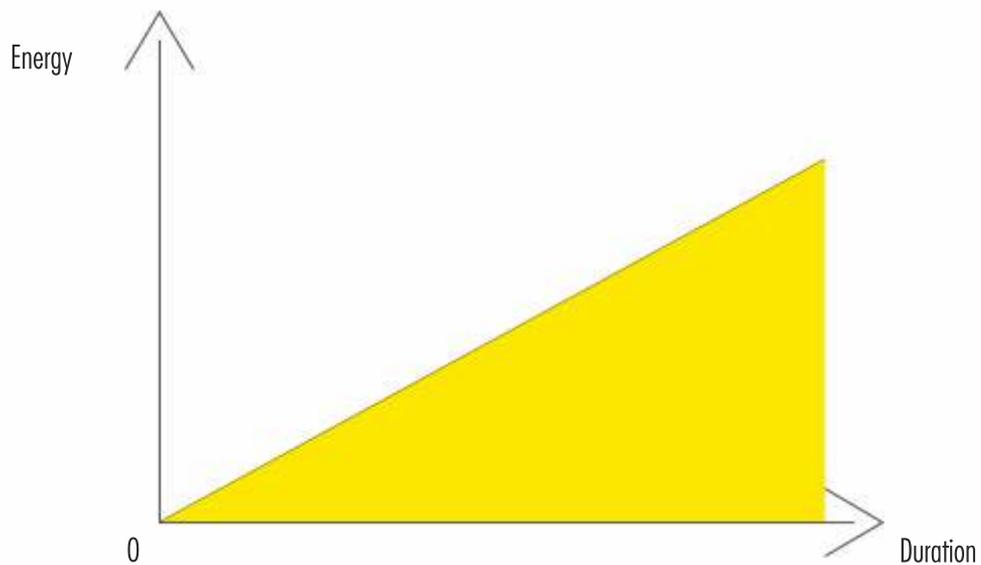
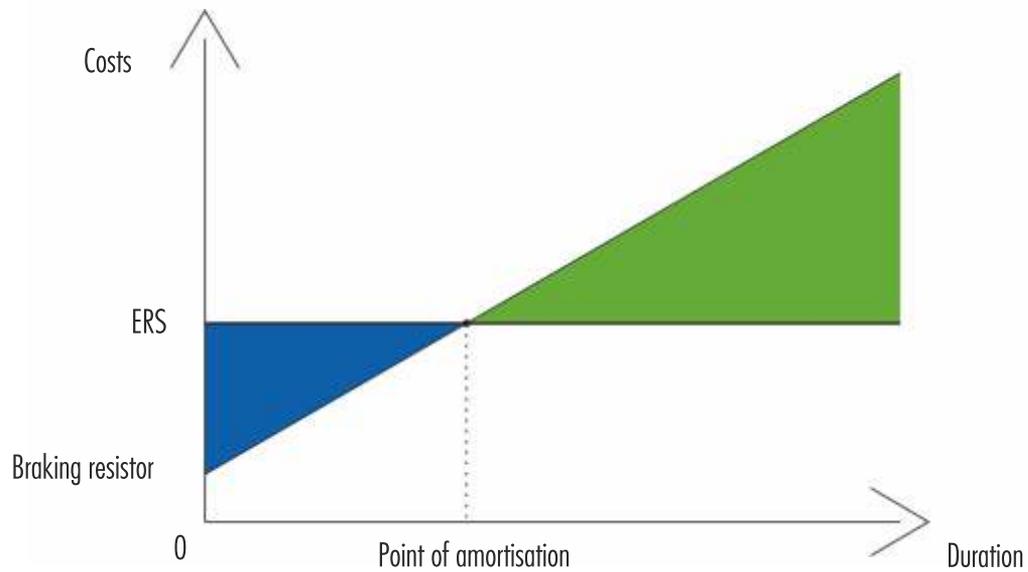


Dimension	ERS IP20	ERS IP54
A	65 mm	65 mm
B	290 mm	370 mm
C	312 mm	392 mm / 434 mm**
D	90 mm / 92 mm *	90 mm / 92 mm*
E	112 mm	112 mm
F	5 mm	5 mm

* Height incl. cover for the selector switch

** Length incl. cable glands above and below

Costs and energy savings

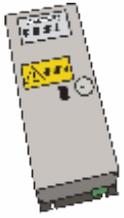


Case study: **Winding machine with 2 kW continuous energy recovery capacity**

24/7 production mode

$2\text{kW} \times 24\text{h} \times 365\text{Days} = 17.520\text{kWh} \times 0,20\text{EUR/kWh} = 3.504\text{EUR}$ (Annual savings through recycled energy)

Benefits



- light weight
- compact Design
- direct energy recovery without intermediate storage
- suitable for frequency inverters and servo controllers
- Plug and Play
- self-synchronizing
- without parameterisation
- without auxiliary voltage



- for upgrading of existing systems or retrofitting
- for installation in new systems
- easy and quick commissioning
- optional: can be used in parallel with a braking resistor



- does not convert excess braking energy into heat, but rather leads the energy directly into the system network
- supports the environment
- supports sustainability
- ISO 50001 appropriate



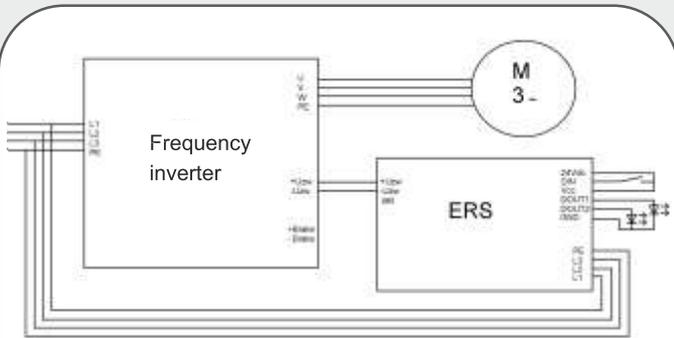
- reduces energy costs
- ROI is reached more quickly
- no additional costs, since no external filters and chokes are required



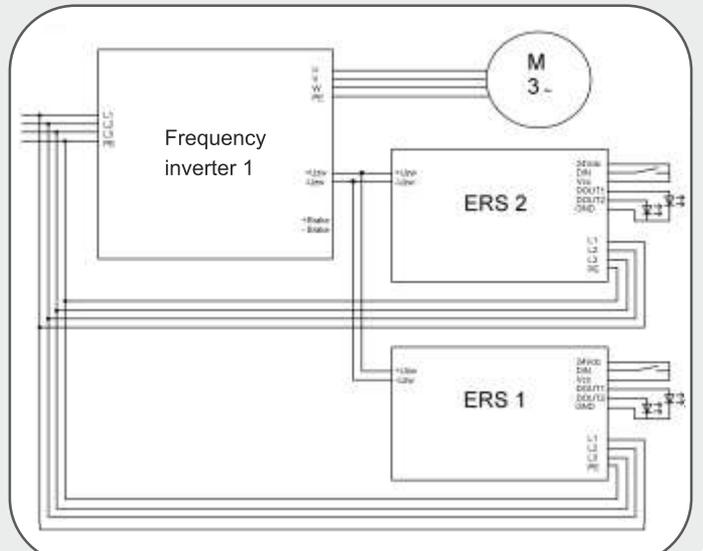
- high level of efficiency of 98%
- high duty cycle (35%)
- high number of application possibilities

Connection

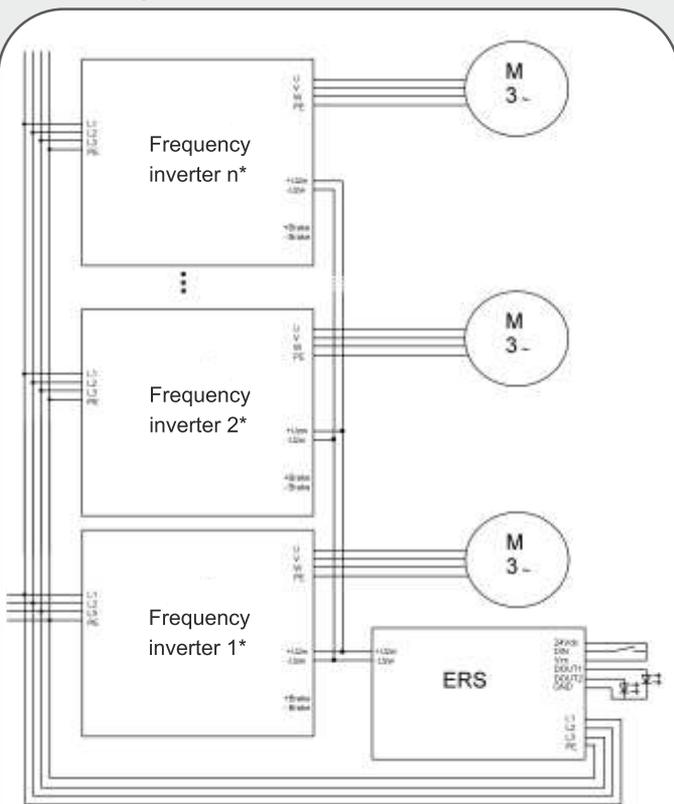
1. Connection example frequency inverter with ERS



2. Connection example with several ERS

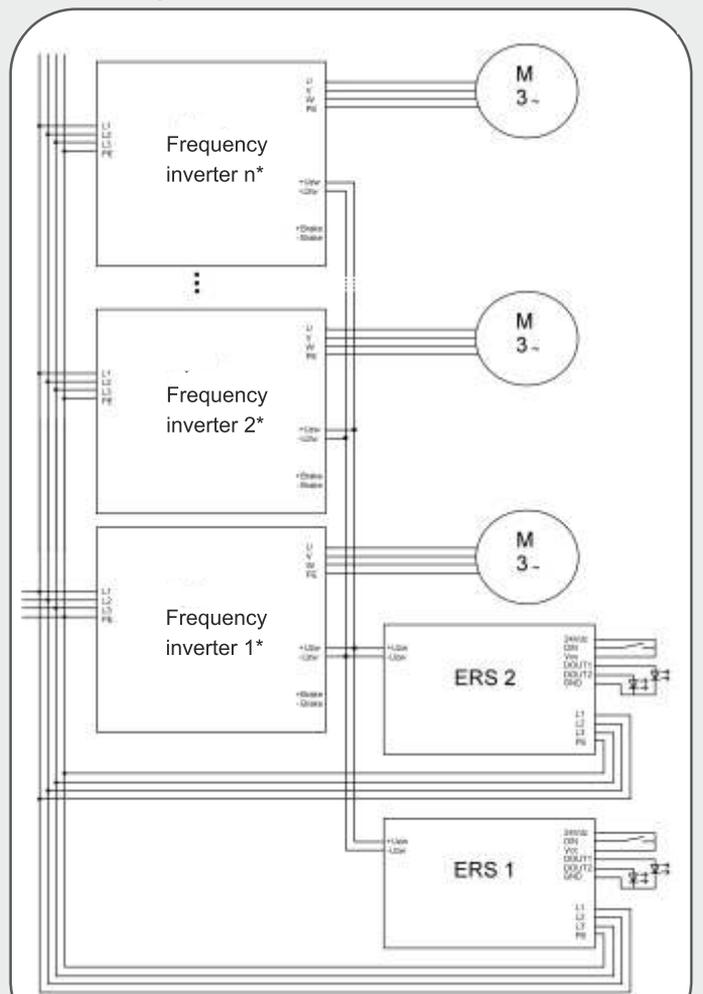


3. Connection example frequency inverter - DC link system with an ERS



* frequency inverter must be suitable for DC link system

4. Connection example frequency inverter - DC link system with several ERS



* frequency inverter must be suitable for DC link system

Areas of Application

The Energy Recovery System can be used anywhere where a braking resistor is used. Energy-Recovery-System is suitable for all lifting, braking and lowering applications. This covers all areas where excess braking energy is converted into heat. Thus, the ERS has a lasting and energy saving impact on these areas. The system

has been designed such that it starts saving energy from the very first regenerative cycle, providing the user with a significant benefit. Thus machine manufacturers and customers can be downgraded to a low energy level.



Lifts



Intralogistic systems



Winding machines



Linear drives



Escalators



Packaging systems

FAQ - Frequently Asked Questions:

1. Which network configuration is required for the Energy Recovery System?

The Energy Recovery System is designed for operation on a 3-phase sinusoidal network.

2. Can the Energy Recovery System be operated on a power grid in which the power supply is between 380Vac-480Vac?

Yes. Thanks to the innovative circuit technology and the latest semiconductor technology, the ERS can operate over a wide voltage range between 380Vac to 480Vac.

3. Are additional components such as EMC filters, chokes or the like required for the use of the ERS in order to comply with EMC standards?

No. Thanks to the innovative circuit technology and the latest semiconductor technology, no additional components such as EMC filters, sine filters, chokes or the like are required to comply with the EMC standards. Only the intermediate circuit of the frequency inverter or the servo controller and the energy recovery line must be connected to the ERS.

4. How high is the power loss of the Energy Recovery System?

In stand-by mode the ERS has a (not energy recovery mode) 4 Watt rate of power loss. In energy recovery mode the ERS has a max. power loss of 40 watts.

5. Can the Energy Recovery System be operated even at ambient temperatures of above 40°C?

Yes, with 'derating' of the technical specification.

6. Is the excess load capacity of the Energy Recovery System thermally limited?

Yes. The temperature is monitored internally and detected with warning messages and shut-down.

7. Are there short-term excess load capacities?

The peak capacity is limited to 5 kW, and is internally monitored and controlled.

8. Does the Energy Recovery System have an integrated emergency braking resistor?

Yes. The ERS has an integrated emergency braking resistor. In case of a power failure due to malfunction, triggering of the emergency stop or other events the power grid is not available, using the integrated emergency braking resistor the ERS can still discharge the energy remaining in the motor controller through this emergency braking discharge and thereby bring the last process cycle to an end. Please refer to the technical data in the operating instructions for the resistor value.

9. Do the power providers, both a private and a commercial power connection, allow the energy recovery using ERS?

Yes. Thanks to the innovative circuit technology, the latest semiconductor technology and all integrated EMC measures the public net work is not interrupted.

10. Is decentralized installation of the Energy Recovery System in the machine possible?

Yes. The ERS can be supplied as a control cabinet unit with Protection Class IP20 as well as a decentralized unit with a Protection Class of IP54.

11. Can the Energy Recovery System be operated on frequency inverters or servo controllers from other manufacturers?

Yes. The ERS can be operated with all frequency inverters or servo controllers which feature a separately wired intermediate circuit and the intermediate circuit voltage is generated via an uncontrolled rectifier (B6U).

12. When will the use of Energy Recovery System start to pay off?

The use starts to pay off right from the first hours of operation since you start saving energy with the first energy recovery cycle.

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