

Managing DC Link Energy



Dynamic
Energy Storage

DES



Dynamic Energy Storage DES

A new option to process braking energy: the Dynamic Energy Storage DES. A solution that is independent of the mains. One device that can be used on almost all converters and servo controllers with a maximum DC link voltage of 800 VDC. The DES is an opportunity to increase the energy efficiency of various applications, to save resources, protect the power grid and even the users nerves.

Active buffer module for DC links

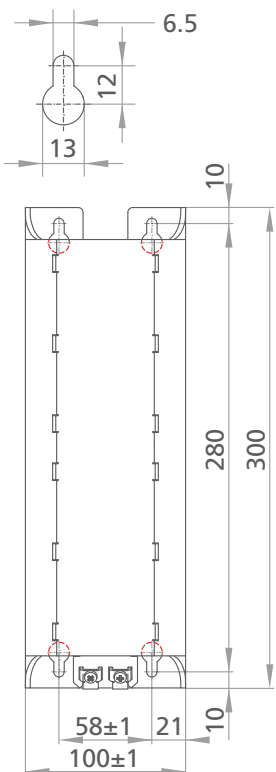
- > for single axis and multi axes systems
- > independent adjustment (Black Box)
- > no displays or any kind of control elements
- > shorter cycle times result in increased efficiency



www.brakeenergy.com/des



Installation dimensions and mounting-holes (mm)



The operation – savings without circuit feedback

Unlike the direct DC link capacity expansion of converters, the active DES does not have any contact with the input side of the mains. The DES is only energised and charged in the event of braking. This feature leads to one of the most important characteristics: the DES does not cause any circuit feedbacks.

The DES independently sets the range of its working voltage level. This range is defined by two values from the voltage level of the DC link: the maximum voltage level of the DC link and the minimum voltage level of the DC link. From now on the DES starts absorbing energy from the DC link once the voltage level reaches the defined maximum value (e.g. in case of braking). As soon as the voltage level in the DC link reaches the defined minimum value (e.g. in case of accelerating) the DES returns its stored energy to the DC link. This is the moment when energy is being saved, because instead of using power from the grid the converter is driven by electrical energy from the DES!

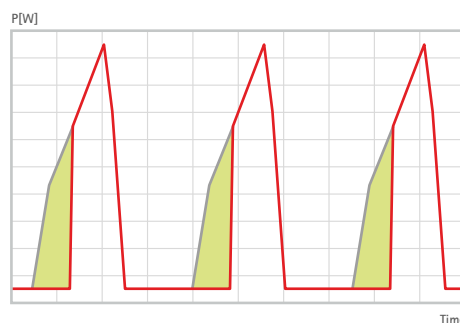
The DES stops supplying energy once the voltage level in its capacitor reaches the dynamically established charging level / minimum voltage level and waits for the next braking event which recharges the capacitor. Charging, discharging, charging, etc. can take place in fractions of a second without causing any power circuit feedbacks.

Technical specifications of the DES

Parameter	Value
Useful energy approx.	1,600 Ws
Continuous voltage of the DC link	800 VDC max.
Output	18 kW max.
Built-in PTC discharge resistor	+
Dimensions H x W x D	300 x 100 x 201 mm
Weight approx.	6.9 kg
Protection class	IP 20

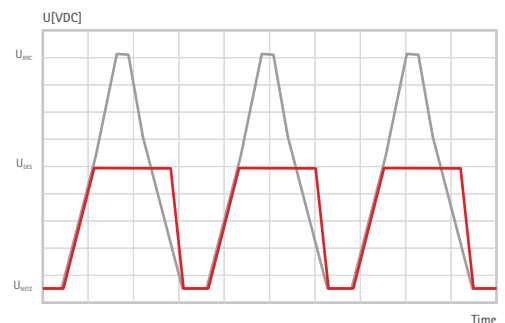
Energy savings with the DES

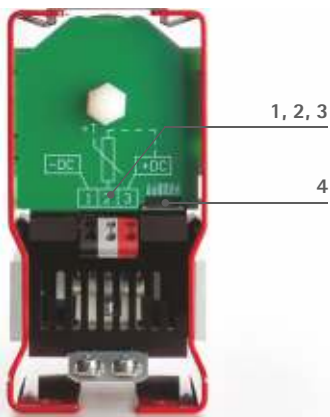
- with the DES
- without the DES
- Energy savings



Voltage characteristics of the DC link

- without the DES
- with the DES





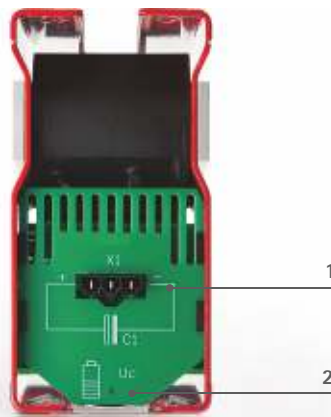
1, 2, 3

4

Simple connections I (bottom side)

With only three cables, the DES is extremely easy to connect.

1. Negative terminal of the DC link
2. Braking transistor (braking chopper)
3. Positive terminal of the DC link
4. Connection of the RS422 interface



1

2

Simple connections II (top side)

1. Reverse polarity protected interface to connect extension modules
2. Safety-relevant LED: flashes as long as the unit is charged



The small built-in PTC braking resistor safely absorbs expected and unexpected energy peaks

Just give it a try

Based on its concept the DES can easily be tested in an existing system as a retrofit solution. To be installed the DES has to be connected in parallel to the existing braking resistor of the converter of the drive system. After a few cycles the collected data in the processor can be read out and evaluated. Based on the analysis of these data the suitable DES solution can be chosen – Can it get any easier than this?

Control cabinet solutions

If (e.g. in case of retrofitting) the control cabinet of the machine does not provide enough space for our DES, we can also supply equipped, standardised control cabinets ready for mounting and connection. Individual solutions are possible.



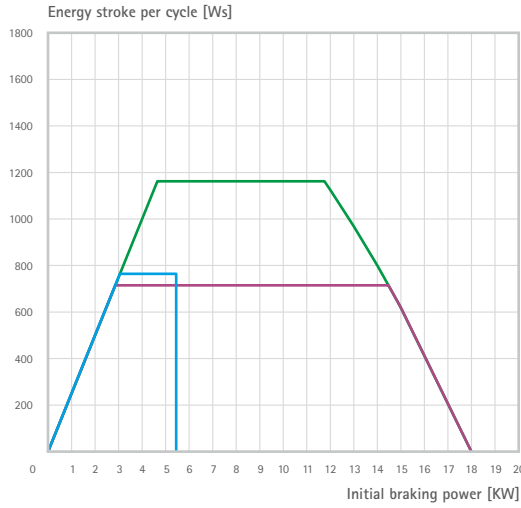
DES Maximum Energy Stroke/ Initial Braking Power

The diagrams show the capability of the most common DES types DES 2.0B, DES 2.0F and DES 3.0F for braking ramps and braking blocks in relation with cycle times of 1, 2 and 4 seconds. The term cycle time defines the process time that is required to

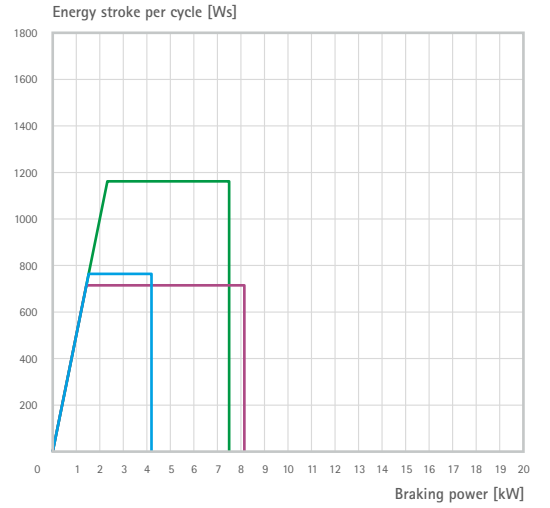
DES
 $U_{BRCmax} = 800$ VDC
1s-cycle

- DES 2.0 B
- DES 2.0 F
- DES 3.0 F

Braking ramp

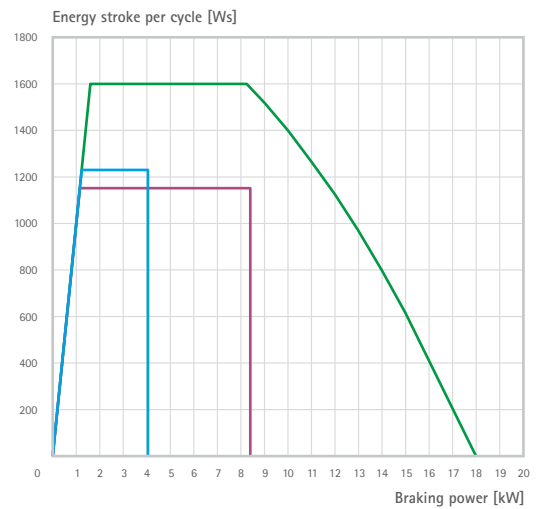
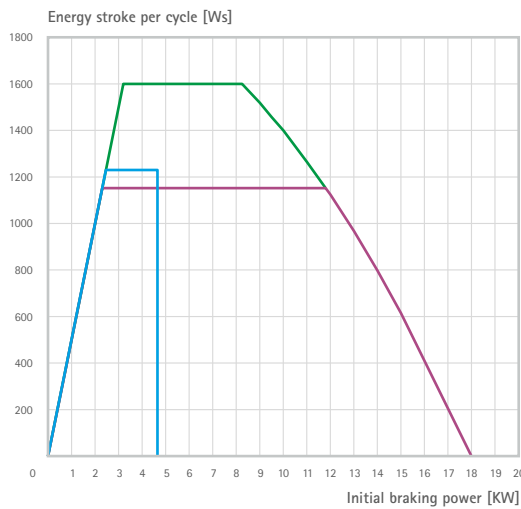


Braking block



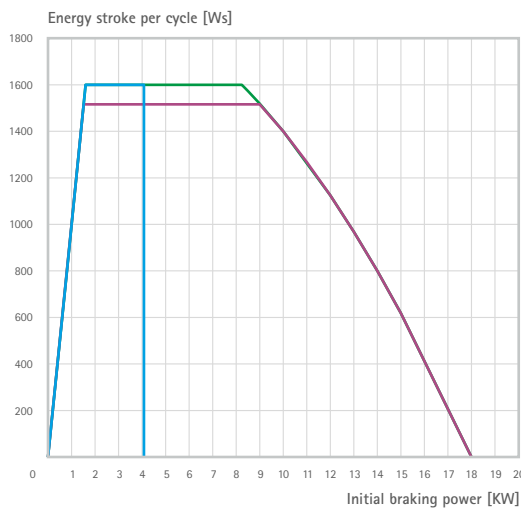
DES
 $U_{BRCmax} = 800$ VDC
2s-cycle

- DES 2.0 B
- DES 2.0 F
- DES 3.0 F



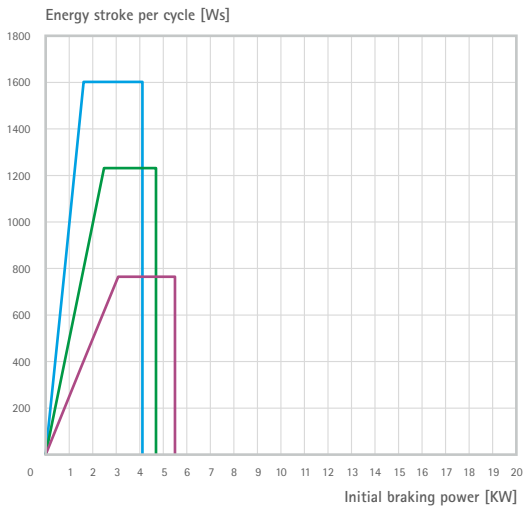
DES
 $U_{BRCmax} = 800$ VDC
4s-cycle

- DES 2.0 B
- DES 2.0 F
- DES 3.0 F

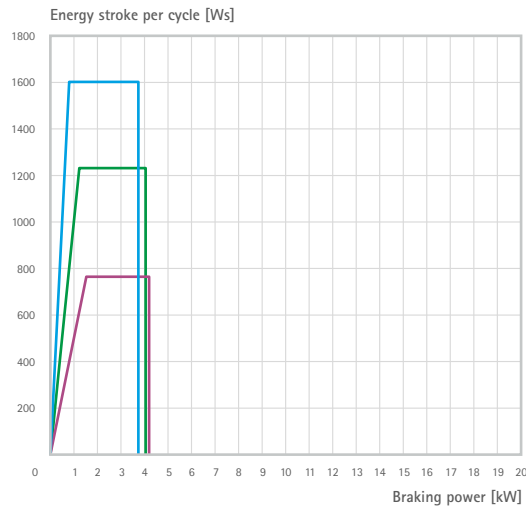


absorb and release the stated energy by the device (energy stroke). We can design a system that suits your requirements based on accurate application data (initial braking power, form and duration of braking, cycle time and voltage level in the DC link). Kindly contact our sales team for this purpose.

Braking ramp

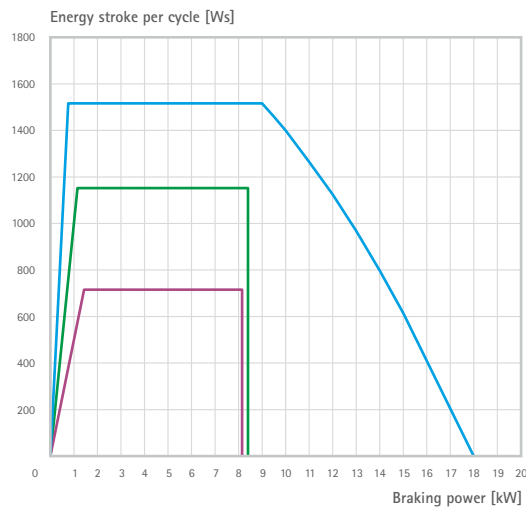
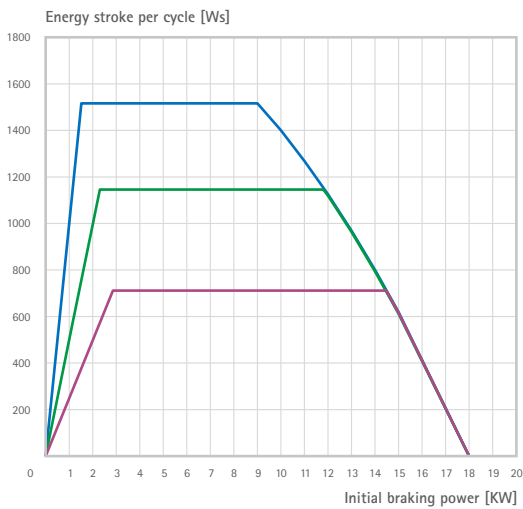


Braking block



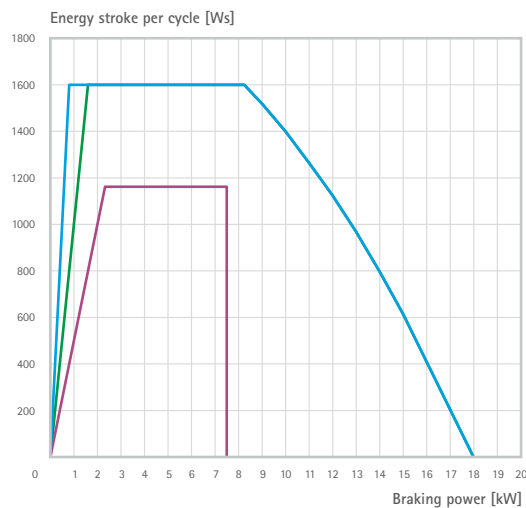
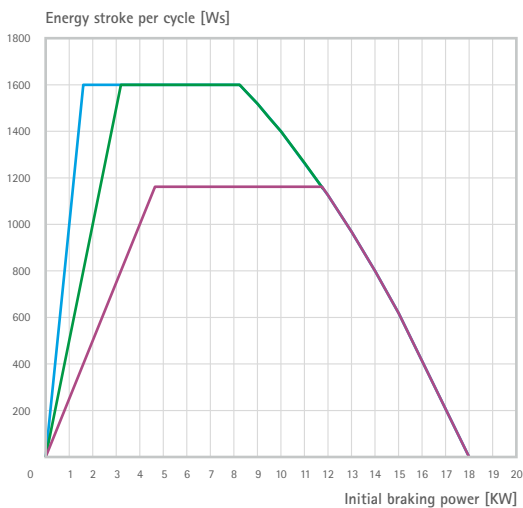
DES 2.0 B
 $U_{BRCmax} = 800 \text{ VDC}$

- 1s-cycle
- 2s-cycle
- 4s-cycle



DES 2.0 F
 $U_{BRCmax} = 800 \text{ VDC}$

- 1s-cycle
- 2s-cycle
- 4s-cycle



DES 3.0 F
 $U_{BRCmax} = 800 \text{ VDC}$

- 1s-cycle
- 2s-cycle
- 4s-cycle

DES Maximum Energy Stroke/ Initial Braking Power with parallel connection

Dynamic Energy Storage can easily be connected in parallel since they synchronise independently due to their self-learning feature. When connecting devices in parallel, higher initial braking powers or currents can be processed. The number of devices connected in parallel is not limited. The following diagrams show the characteristics of a single DES as well as two and three devices connected in parallel for ramp and block braking.

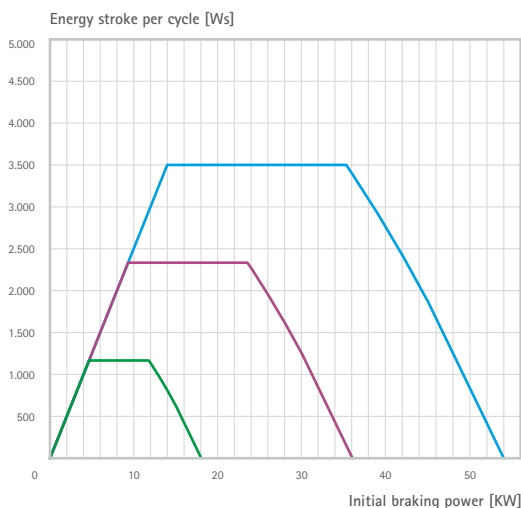
DES 3.0F

$U_{BRCmax} = 800\text{ V}$

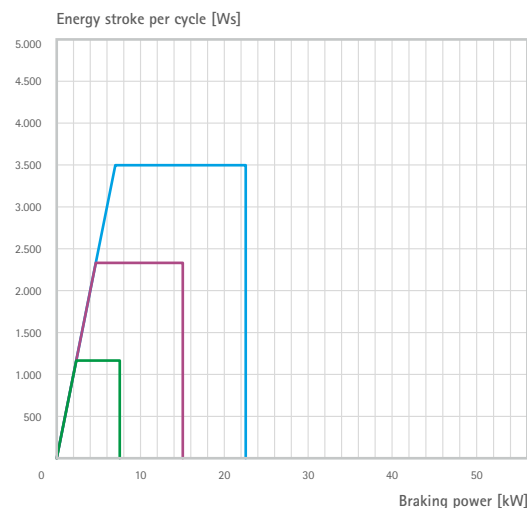
1s-cycle

- 3 DES 3.0F devices in parallel
- 2 DES 3.0F devices in parallel
- DES 3.0F

Braking ramp



Braking block



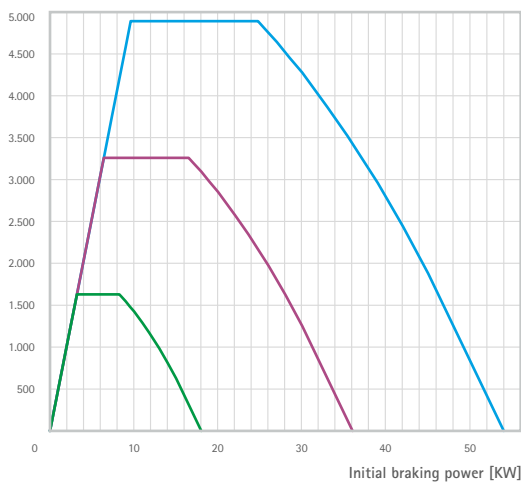
DES 3.0F

$U_{BRCmax} = 800\text{ V}$

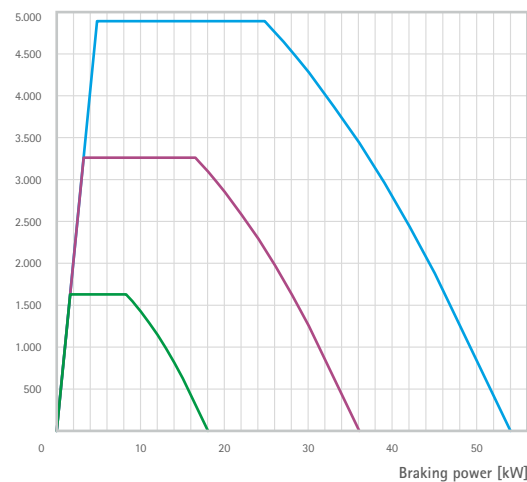
2s-cycle

- 3 DES 3.0F devices in parallel
- 2 DES 3.0F devices in parallel
- DES 3.0F

Energy stroke per cycle [Ws]



Energy stroke per cycle [Ws]



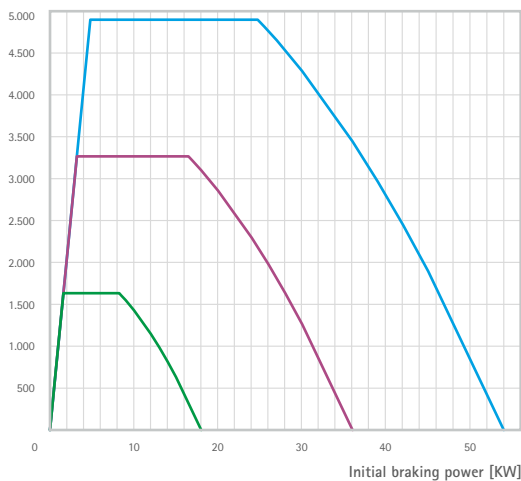
DES 3.0F

$U_{BRCmax} = 800\text{ V}$

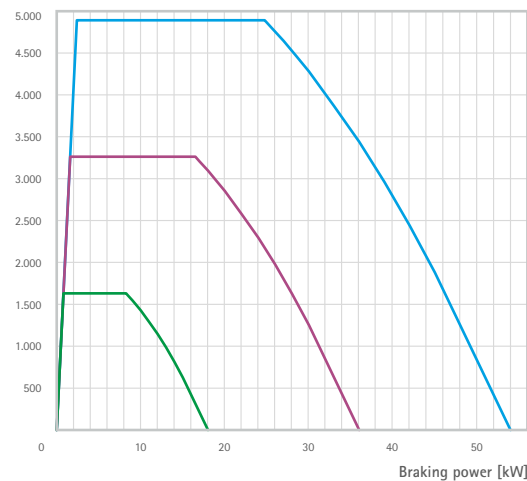
4s-cycle

- 3 DES 3.0F devices in parallel
- 2 DES 3.0F devices in parallel
- DES 3.0F

Energy stroke per cycle [Ws]



Energy stroke per cycle [Ws]



Extension module DES + EM

If the storage of the DES is not sufficient it can easily be increased with Extension modules. Those modules only need to be connected with the DES via the accompanying cable with polarity protected plugs. Done!

Before connecting with the DES the capacitors of the EM are safely discharged via the internal discharge resistor in the extension modules. The number of connected extension modules and thus the level of the storable energy is adapted to the requirements of the application.



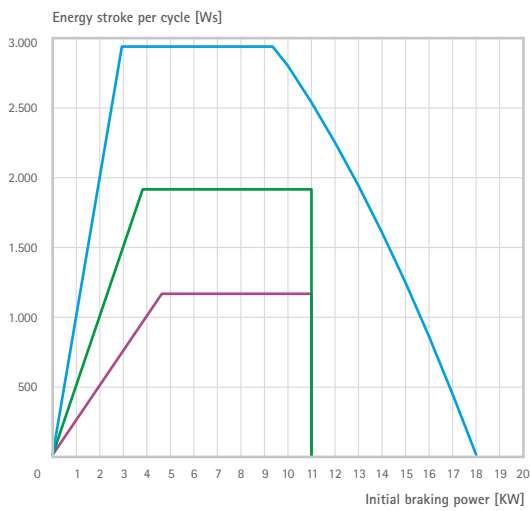
Storage extension for the DES

- > Multiplying the stored energy
- > easiest connection via plugs
- > neither configuration nor commissioning effort required
- > Integrated discharge resistor

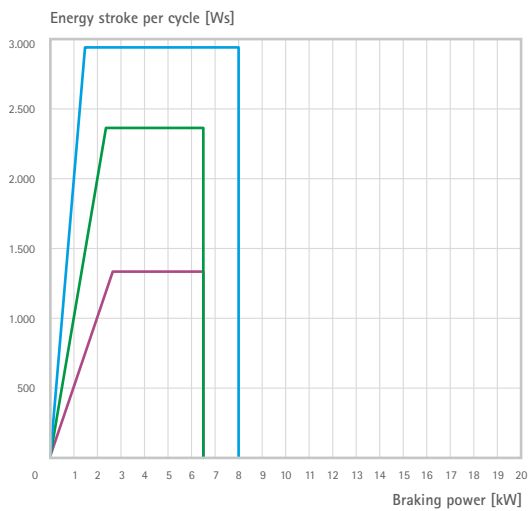
Technical specifications

Parameter	EM 2.0A20	EM 2.0A2020
Usable storage capacity approx.	1,600 Ws	3,200 Ws
Built-in PTC discharge resistor	+	+
Dimensions H x W x D	300 x 100 x 201 mm	300 x 100 x 201 mm
Weight approx.	4.1 kg	6.2 kg
Protection Class	IP 20	IP 20

Braking ramp

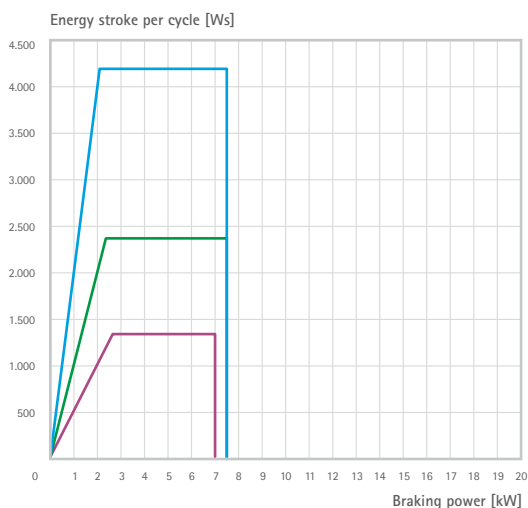
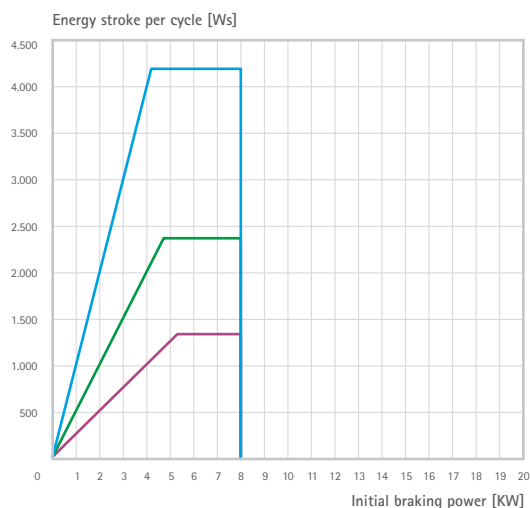


Braking block



**DES 3.0F
with EM2.0A20**
 $U_{BRCmax} = 800 V$

- 1s-cycle
- 2s-cycle
- 4s-cycle



**DES 3.0F
with EM2.0A2020**
 $U_{BRCmax} = 800 V$

- 1s-cycle
- 2s-cycle
- 4s-cycle

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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We look forward to hearing from you!



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