

DYNAMIC ENERGY UNIT DEU-ST

MANAGING BRAKING ENERGY

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OPERATION MANUAL

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1.3.4 Symbols

Cross-reference	A cross-reference to another page in this Operation Manual begins with the double arrow symbol "»".
Action and reaction	The symbol "☒" indicates an action taken by personnel, while the symbol "✓" indicates the reaction of the device to this action. Example: ☒ Switch on the main switch. ✓ The lamp lights up.
Image labels and image-text association	Important details in the graphics are identified with numbers (e.g. ①). In the text, this number is located after the description of the detail it identifies.

1.3.5 Definitions

Safety instructions	A safety instruction consists of several parts: <ul style="list-style-type: none"> • A pictogram, • A signal word that indicates the degree of danger, • A text indicating the type of danger and • Information on how to avoid the danger, indicated by the symbol "☒".
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Pictogram	Signal word	Danger	Consequence
	Danger	Indicates an imminent danger to persons (danger to life).	Death or very serious injury.
	Warning	Indicates a potential danger to persons or property (danger of injury).	Damage to health or serious property damage.
	Caution	Indicates a potential danger to property (danger of property damage).	Property damage.



Example of a safety instruction:



WARNING!

Danger of injury!
Touching of hot surfaces may lead to burn injuries.
☒ Before cleaning, switch off the device for at least 30 minutes.

Other notes	Notes regarding events that do not involve personal or property damage are used as follows:
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Pictogram	Note
	Note regarding additional instructions or other useful information.
	Note regarding proper disposal.

Application	In this Operation Manual, "application" refers to a "drive unit with a frequency converter" or a "servo drive".
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2. DESCRIPTION OF THE DEVICE

2.1 Intended use

Device (DEU-ST)	The Dynamic Energy Unit (DEU-ST) is used to store braking energy from applications (drives with a frequency converter or servo drives). The DEU-ST does not require a separate power supply. It is possible to operate multiple DEU-ST in parallel to increase maximum power. To increase the energy storage capacity, it is also possible to connect optional Expansion Modules (DEU-EM). The DEU-ST is delivered on a customer-specific basis and may only be operated under adherence to these specifications.
Expansion Module (DEU-EM)	The Expansion Module (DEU-EM) is connected to the DEU-ST and increases the energy storage capacity of the DEU-ST. If multiple DEU-ST are connected in parallel, the additional DEU-EM units must be distributed symmetrically.
Safeguards	The safeguards (e.g. cover) must not be removed.
Area of use	The area of use of the DEU-ST is inside electrical switching cabinets in industrial facilities. It is not permissible to operate these devices in potentially explosive areas.
Modifications	It is not permissible to modify the device without authorization. Doing so will render the warranty and any liability claims invalid.
Maintenance	Maintenance work may only be performed by the manufacturer.

2.2 Applied regulations

The DEU-ST meets the basic requirements of Low Voltage Directive 2006/95/EC and EMC Directive 2004/108/EC.

2.3 Type designation

Dynamic Energy Unit DEU-ST	CB33257-001
Expansion Module DEU-EM	CB33255-001 (DEU-EM 2.0) CB33255-002 (DEU-EM 4.0)

2.4 Overview



Fig. 1: Overview of the Dynamic Energy Unit DEU-ST

- | | |
|---|---|
| 1 Fastening holes (4 pieces), Ø 6.5 (0.26 in) | 6 Warning labels |
| 2 Connection terminal DEU-EM (X1) | 7 EIA422 communication interface (connector X4) |
| 3 Control LED | 8 Connection terminal for DC link and brake chopper |
| 4 Indicator of installation direction | 9 Ground connection |
| 5 Nameplate | |

2.5 Nameplate

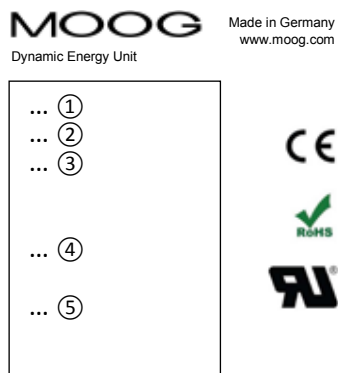





Fig. 2: Nameplate

- | | |
|-----------------------|--|
| 1 Article designation | 4 Production date (calendar week/year) |
| 2 Article number | 5 Technical data |
| 3 Serial number | |

2.6 Labels on the housing

Symbol	Text and meaning
	<p>Text: "Caution! After the DC link is switched off, the capacitor discharge is > 5 minutes. Please read the Operation Manual."</p> <p>Meaning: The converter must be switched off. The energy storage must be discharged. The charge state can be checked using the LED at the top. The blink frequency must decrease as the unit becomes discharged. If in doubt, measure the voltage at the DC link connection terminals "-DC" and "+DC" at the bottom of the DEU-ST. Forced discharge may only be performed with a suitable resistor. The effective discharge resistor of the entire system must be > 22 ohm.</p>
	<p>Text: "Warning! Hot surface."</p>
	<p>Text: "Danger! Risk of electric shock. Dangerous operating voltage levels remain after the power supply is switched off. Please read the Operation Manual."</p> <p>Meaning: High DC voltage levels on live parts are discharged slowly.</p>

2.7 Ambient conditions

Ambient temperature	-10 °C to +85 °C (+14 °F to +185 °F) (transport, storage) 0 °C to +40 °C (+32 °F to +104 °F) (operation)
Relative humidity	≤ 95 % (transport, storage) ≤ 85 % (operation)
Cooling method	Air cooling (convection)
Housing degree of protection	IP20
Contamination class at installation location	2

2.8 Electrical connection values

Maximum continuous DC link voltage	800 VDC
Maximum output power	18 kW
Power loss during standby	< 10 W
Usable storage capacity	Approx. 1.6 kW
Built-in discharge resistor	PTC, 120 ohm, 105 W (see also data sheet "Moog PTC800666")
Overvoltage category	III (erection altitude up to 2,000 m (6562 ft) above sea level) II (erection altitude above 2,000 m (6562 ft) above sea level)
Interference immunity	Industrial area as per IEC/EN 61000-6-2-2005 and IEC/EN 61000-6-4-2007

2.9 Size and weight

Width	100 mm (3.94 in)
Depth	201 mm (7.91 in)
Height	300 mm (11.81 in)
Weight	Approx. 6.9 kg (15.21 lb)

2.10 Noise emissions

The DEU-ST does not create appreciable noise emissions (< 70 dB (A)).

4.5 Installing the DEU-ST



CAUTION!

Property damage!
The DEU-ST must not be installed upside down.
 Install the DEU-ST in an upright position.

Basic information

- The DEU-ST is designed for installation in an electrical switching cabinet.
- The DEU-ST must be protected by the switching cabinet against the penetration of foreign bodies.
- The unit is installed directly on a mounting surface in the switching cabinet or on a base frame supply for this purpose by Moog.
- On account of the length of the connection cable (1 m (3.28 ft) maximum), the DEU-ST must be installed directly next to the application (frequency converter, servo drive).

Distances

- Do not undercut the following distances to other modules when installing the unit:
- Side: 20 mm (0.79 in) minimum
 - Top and bottom: 100 mm (3.94 in) minimum

Installation

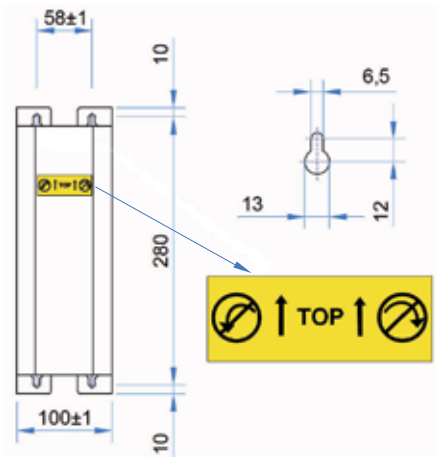


Fig. 3: Drilled hole template

- Install the DEU-ST upright according to the drilled hole template using four screws (M6).
 - ✓ The power connection is at the bottom.
- Check that it is firmly seated.

4.6 Grounding the DEU-ST

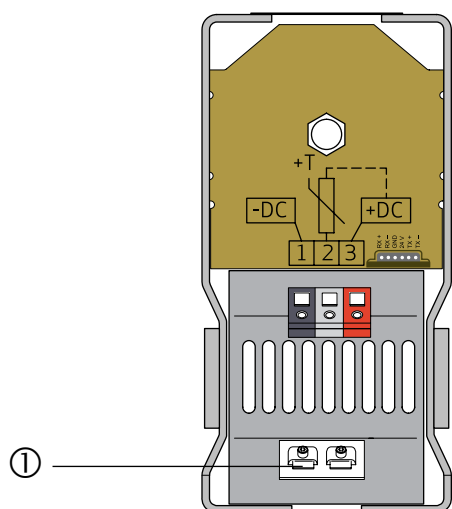


Fig. 4: Ground connection (underside of housing)

- Ground the DEU-ST at the ground connection ① (cross section according to the national standard).
- When using shielded lines, the shield must also be connected to the ground connection.
- Perform a safety check as per BGV A3.

5.4 Connecting the EIA422 communication interface

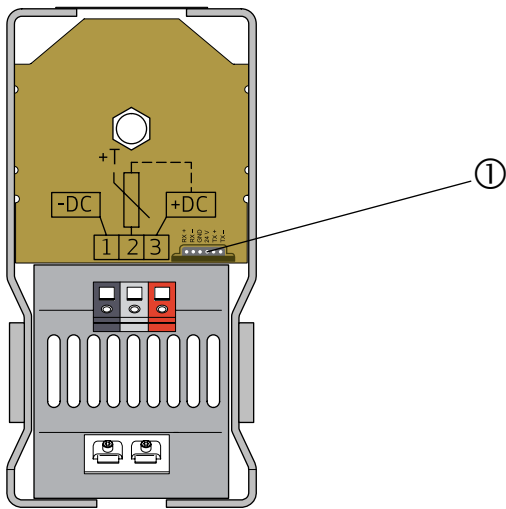


Fig. 8: Underside of housing, EIA422 communication interface X4

Basic information

- The communication interface ① is used to exchange data with the DEU-ST.
- The interface must be connected with an external EIA422 communication interface.

Connector X4 pin assignment

Pin	Signal	Description
1	RX+	Connected with TX+ external interface
2	RX-	Connected with TX- external interface
3	GND	Connected with GND
4	+24V	Connected with power supply +5...26 V
5	TX+	Connected with RX+ external interface
6	TX-	Connected with RX- external interface



Fig. 9: Connector X4 pin assignment and external interface

5.5 Disconnecting the DEU-ST

Basic information

- As long as the energy storage of the DEU-ST (with or without a DEU-EM) is charged with energy, it is **not** permissible to disconnect the DEU-ST from the DC link. This is indicated by the flashing control LED on the top of the housing.
- To rule out that the control LED is malfunctioning, it is essential that you actually see the LED flashing before it goes out. This is the only way to ensure that it is safe to work on the DEU-ST.

Procedure



CAUTION!

Property damage!

The DEU-ST may be destroyed when it is discharged using the supplied discharge bridge.

- ☒ When discharging using the supplied discharge bridge, ensure that the effective resistance in the entire system is $> 22 \text{ ohm}$.

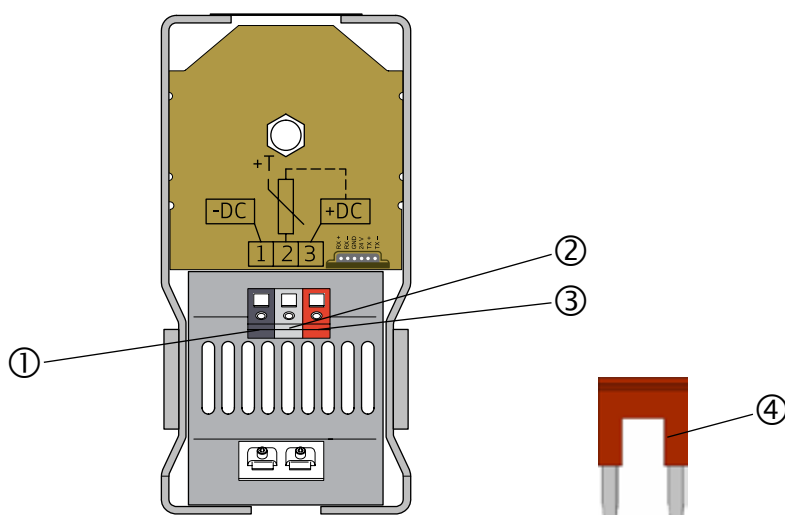


Fig. 10: Discharging the DEU-ST

- ☒ Disconnect the application from the power supply.
- ☒ Connect the discharge bridge ④ between terminals "-DC" ① (black terminal) and "BR" ② (gray terminal) on the DEU-ST.
 - ✓ The DEU-ST is discharged.
 - ✓ After the DEU-ST is fully discharged, the control LED no longer flashes.
- ☒ After it is fully discharged, wait at least another 30 seconds.
- ☒ Using a volt meter, establish that no voltage is applied between terminals "-DC" ① (black terminal) and "+DC" ③ (red terminal).
- ☒ Disconnect the DEU-ST from the DC link.
 - ✓ The discharge bridge remains connected as long as the DEU-ST is disconnected from the DC link.
- ☒ Reconnect the application to the power supply.

6. OTHER ACTIVITIES

6.1 Cleaning the DEU-ST



DANGER!

Danger to life!
Cleaning fluids may penetrate into the housing and cause a short circuit.
 Only clean the housing if it is de-energized.



DANGER!

Danger to life!
Cleaning fluids containing alcohol may lead to explosions.
 Only use cleaning agents that do not contain alcohol.



WARNING!

Danger of injury!
Touching of hot surfaces may lead to burn injuries.
 Before cleaning the DEU-ST, switch off the device for at least 30 minutes.



CAUTION!

Property damage!
Cleaning fluids may penetrate into the housing and cause a short circuit or damage components.
 Wipe down the housing with a moist cloth only.

- Only use cleaning agents that do not contain alcohol.
- Only clean the DEU-ST if it is de-energized.
- Wipe down the DEU-ST with a moist cloth only.

6.2 Servicing the DEU-ST

The DEU-ST does not require servicing.

If the DEU-ST was without voltage for more than one year, it needs to be formed (►► page 19, Section 5.6 "Forming the DEU-ST").

6.3 Repairing the DEU-ST

A faulty DEU-ST can only be repaired by the manufacturer.

6.4 Disposing of the DEU-ST

- Disconnect the DEU-ST (►► page 18, Section 5.5 "Disconnecting the DEU-ST").
- Remove the DEU-ST.
- Send the DEU-ST back to the manufacturer.

7. EXPANSION MODULE DEU-EM (OPTION)

The optionally available Expansion Module (DEU-EM) increases the capacity of the energy storage of the DEU-ST. It is supplied with a connection cable featuring connectors that are protected against polarity reversal.

7.1 Technical data

Ambient conditions	See DEU-ST (▶ Section 2.7, page 8)
Usable storage capacity	Approx. 1.6 kW _s CB33255-001 (DEU-EM 2.0) Approx. 3.2 kW _s CB33255-002 (DEU-EM 4.0)
Width	100 mm (3.94 in)
Depth	201 mm (7.91 in)
Height	300 mm (11.81 in)
Weight	Approx. 4.1 kg (9.03 lb) CB33255-001 (DEU-EM 2.0) Approx. 6.2 kg (13.67 lb) CB33255-002 (DEU-EM 4.0)

7.2 Transport/storage/installation

See DEU-ST (▶ Section 4, page 11)

7.3 Connecting an Expansion Module to the DEU-ST



CAUTION!

Property damage!

If the DEU-ST is connected to the DC link, this may destroy the Expansion Module.

- ☒ Before connecting the Expansion Module, disconnect the DEU-ST from the DC link (▶ page 18, "Disconnecting the DEU-ST").

- ☒ Disconnect the DEU-ST from the DC link (▶ page 18, "Disconnecting the DEU-ST").

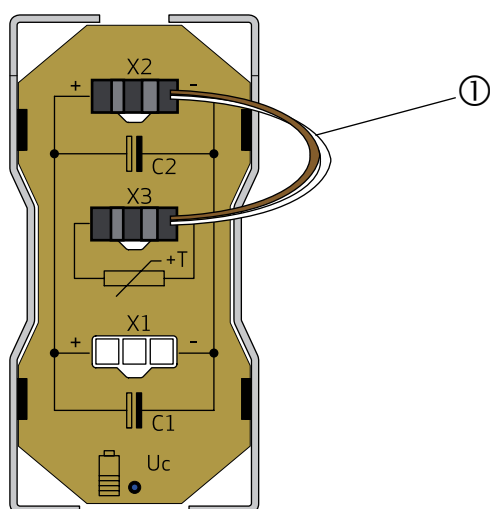


Fig. 12: Discharging the Expansion Module (top of housing)

- ☒ Connect the supplied connection cable ① to X2 and X3 on the Expansion Module and wait approx. 30 seconds.
 - ✓ The Expansion Module is discharged.

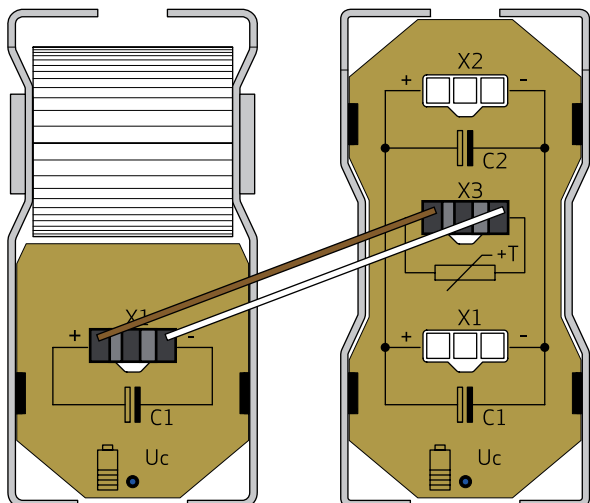


Fig. 13: Discharging the DEU-ST (top of housing)

- ☒ Disconnect the connection cable from X2 on the Expansion Module, connect it to X1 on the DEU-ST and wait approx. 30 seconds.
- ✓ The DEU-ST is discharged.

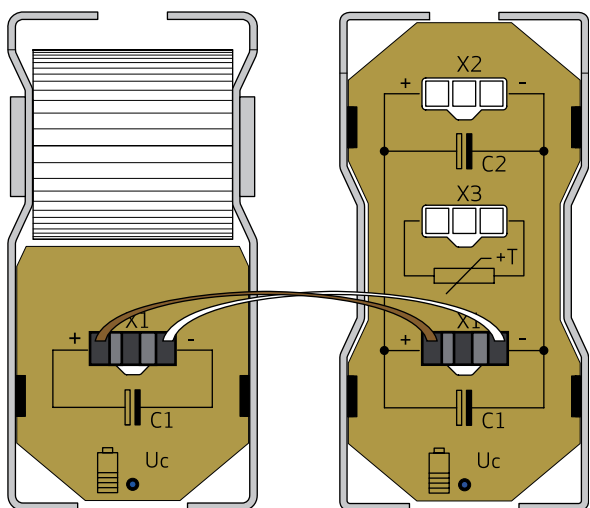


Fig. 14: Connecting the DEU-ST and Expansion Module (top of housing)

- ☒ Disconnect the connection cable from X3 and connect it to X1 on the Expansion Module.
- ✓ The DEU-ST and Expansion Module are connected.

7.4 Connecting an additional Expansion Module

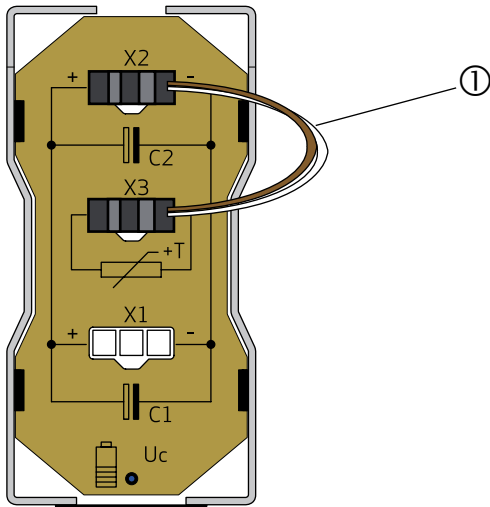


Fig. 15: Discharging the Expansion Module 2 (top of housing)

- ☒ Connect the supplied connection cable ① to X2 and X3 on the Expansion Module 2 and wait approx. 30 seconds.
- ✓ The Expansion Module 2 is discharged.

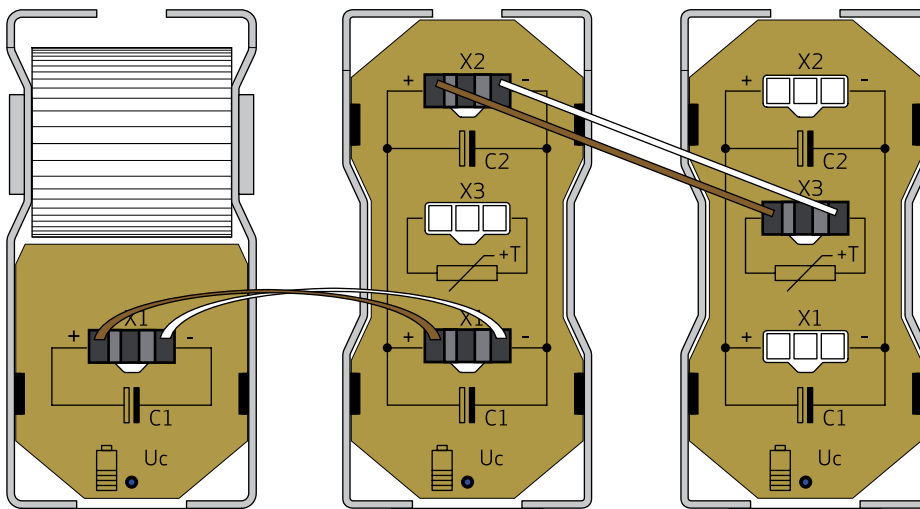


Fig. 16: Discharging the Expansion Module 1 (top of housing)

- ☒ Disconnect the connection cable from X2 on Expansion Module 2, connect Expansion Module 1 to X2 and wait approx. 30 seconds.
- ✓ The Expansion Module 1 is discharged.

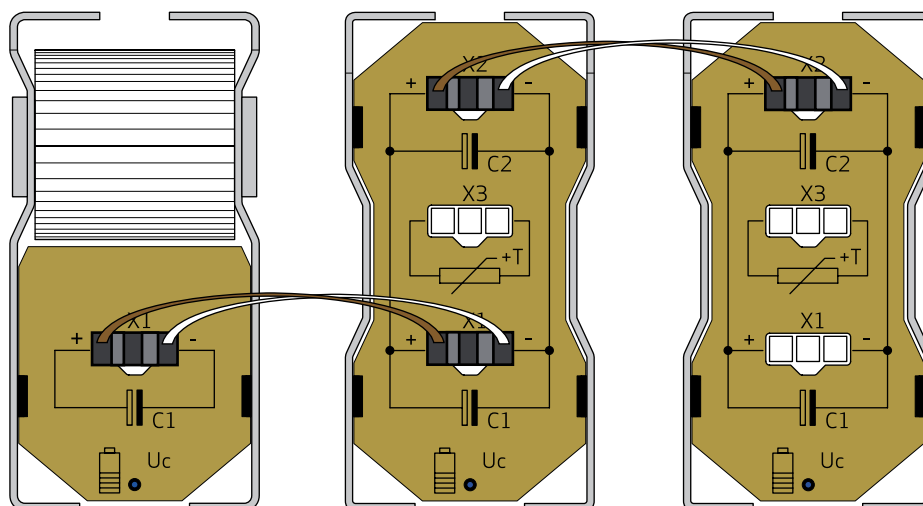


Fig. 17: Connecting the DEU-ST and two Expansion Modules

- ☒ Disconnect connection cable from X3 on the Expansion Module 2 and connect it with X2.
- ✓ The DEU-ST and two Expansion Modules are connected.

7.5 Disconnecting the Expansion Module

See DEU-ST (►► Section 5.5, page 18)

7.6 Other activities

See DEU-ST (►► Section 6, page 20)

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