

Operation Manual

D-IBM2900



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The following installation and safety notes must be followed before commissioning the D-IBM2900-3AC or D-IBM2900-1AC (hereinafter referred to as device).

To recognize existing danger potentials and minimize the risk of personal injury and property damage, important information is provided to the user (also referred to as system integrator).

This document does not raise any claim to completeness and considers the dangers known to the manufacturer.

The device may only be operated by qualified and trained personnel.

The device must be considered as a system component. The system integrator is responsible for the applicability of the device in the application, including risk analysis. The model-specific data sheets must always be considered.








Keep this instruction easily accessible at all times.

The content is valid for the following products:



- D-IBM2900-3AC
- D-IBM2900-1AC


Warnings and Categories

Warnings must always be observed and are therefore marked specially. They include information on personal injuries and property damage so that accidents and damages can be avoided.

Device Labelling		Device and Documentation Labelling	
	Read the operation manual		Information
	Warning of electrical voltage		Note
			General warning sign, describes the imminent danger that can lead to grievous bodily harm or to death.

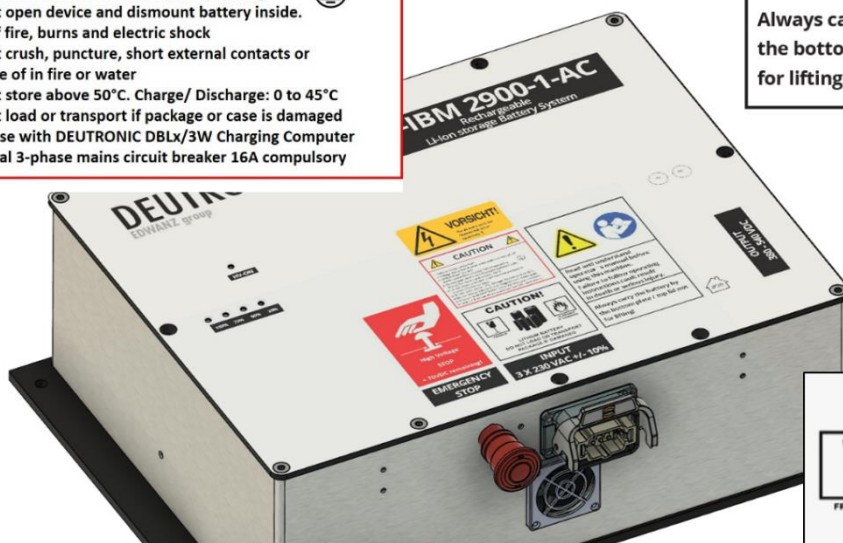
Additional warnings and notes on the device

 **CAUTION** 

- Battery inside connected!
- Voltage also present when main switch is turned off
- High leakage current!
 Earth connection essential before operating 
- Do not open device and dismount battery inside.
 Risk of fire, burns and electric shock
- Do not crush, puncture, short external contacts or dispose of in fire or water
- Do not store above 50°C. Charge/ Discharge: 0 to 45°C
- Do not load or transport if package or case is damaged
- Only use with DEUTRONIC DBLx/3W Charging Computer
- External 3-phase mains circuit breaker 16A compulsory

Read and understand operator's manual before using this machine.
 Failure to follow operating instructions could result in death or serious injury.

Always carry the battery by the bottom plate / top lid not for lifting!



CAUTION!





FRAGILE




FLAMABLE
IF DAMAGED

**LITHIUM BATTERY
 DO NOT LOAD OR TRANSPORT
 PACKAGE IF DAMAGED**

General applicable safety notes

	Use eye protection	 <p>ATTENTION Observe Precautions for Handling Electrostatic Sensitive Devices</p> <p>ACHTUNG Handhabungsvorschriften beachten Elektrostatisch empfindliche Bauelemente</p>	Observe handling instructions
	Use hand protection		

Intended Use

This product is exclusively intended for the product description in this chapter. Each further use is not intended and Deutronic does not assume liability for the damages incurred by this. The risk is borne solely by the user/operator.

Mounting and Installation

- Wear your personal protection equipment
- Mounting and installation of the product only by qualified personnel.
- Mains/DC cables may only be used completely unrolled to guarantee a sufficient cooling!
- Ensure a safe locking of the plug connectors to guarantee operational safety and avoid damages. In case of wear, the cable must be replaced immediately!
- Disconnecting the plug connection during use is prohibited.
- The devices may only be installed in locations that meet the climatic and technical conditions specified by Deutronic (see technical data). D
- **Deutronic is not liable for damage caused by improper handling or incorrect installation.**
- Only carry out works on parts of the device when it is switched off.
- Protect from direct sunlight.
- Protect from heat sources.
- The device must be protected from water and humidity. Water penetration damages the battery.
- The device must be mounted in such a way that an operation is possible and the device status can be read by the user.
- If the operating position is wrong, there is risk of injury from tipping.
- It is forbidden to change the device mechanically such as drilling holes to attach additional mounting points.
- Any modification to the device can lead to life-threatening operating conditions or fire.

Service, Maintenance and Support

Service, maintenance and support are carried out by Deutronic or partners of Deutronic.

Accessory and Spare Parts

Accessories and spare parts are obtained from:

Deutronic Elektronik GmbH
Deutronicstraße 5
D-84166 Adlkofen
Tel: +49 8707 920-0
sales(at)deutronic.com

Environmental Protection

The products by Deutronic are designed with eco-design in mind to minimize their impact on the environment. The following characteristics are considered as standard by Deutronic during the design of our products:

- The products by Deutronic are made out of high-quality materials to maximize their lifespan.
- The product design allows the separation of different materials for reprocessing and efficient recycling.
- Deutronic is always working to further develop its products and to continuously reduce the environmental impact of them.

Deutronic's products serve to use energy more efficiently and thereby reduce the everyday environmental impact. Deutronic tries to mitigate the impact on people and the environment during the entire product cycle and to return as much as possible to the material cycle. It is important that the user handles all products with care and uses them efficiently.

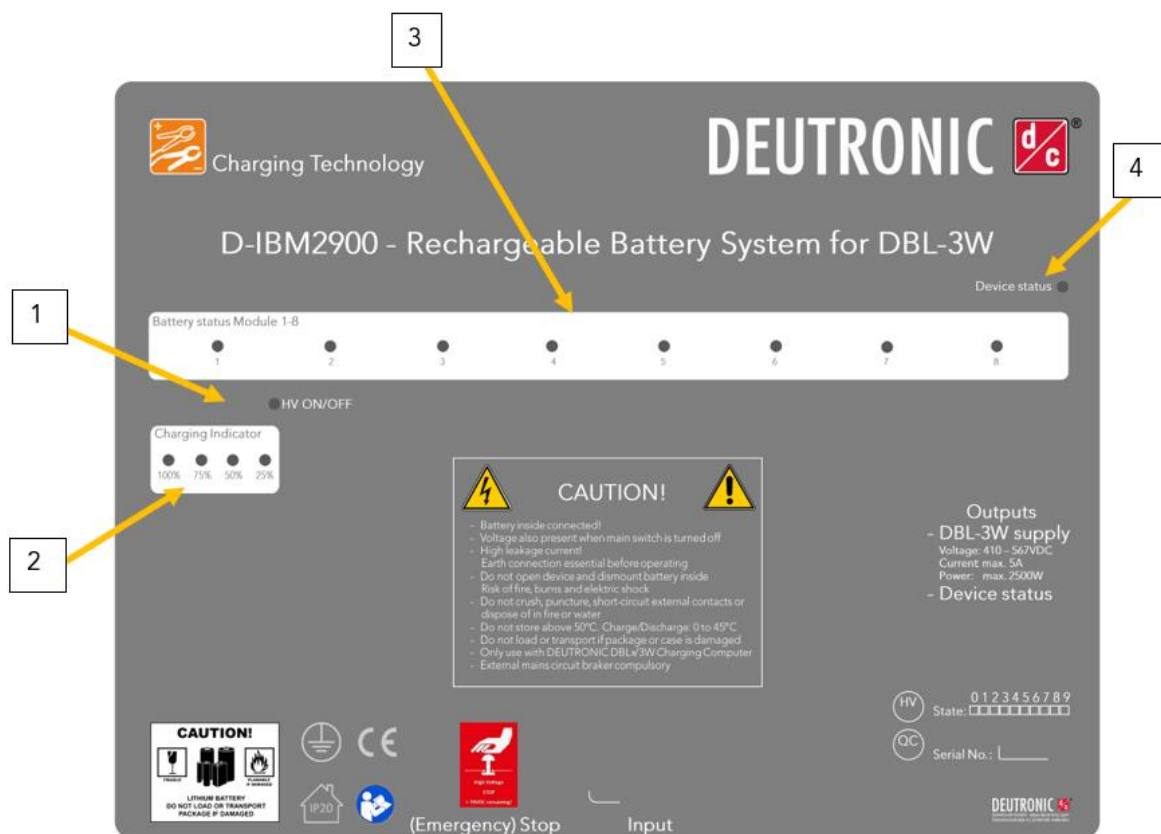
For information on the return and disposal of the products, see chapter Disposal.

Product Description

The device serves as a device that's pre-switched to the Deutronic battery charger to ensure uninterrupted voltage supply in production areas where no conveyor supply is possible. A unit consists of 8 battery modules with 16S1P Samsung INR18650-29E, fused by a 15A BMS. The charging technology for the battery modules is integrated.

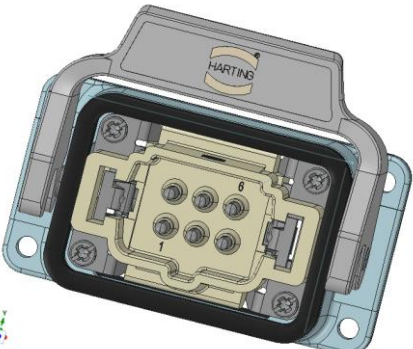
LED-Display:

1. HV ON/OFF (Battery)
2. Charging condition 25%, 50%, 75%, 100%
3. Battery module state (from Gen3)
4. Device error (from Gen3)



Components/Connections to the device:

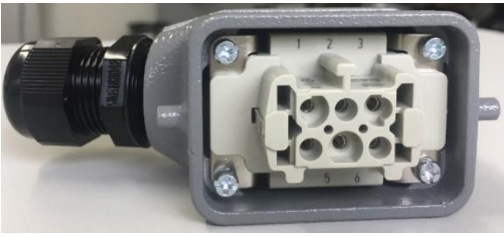
1. (Emergency)Off switch draw release, protection class: IP66/IP69k
2. Fan
3. Input plug connector Harting HAN 6E/B, 6-pole, male
(1AC with HAN 4-pole)

	<p>PIN "1": L1 PIN "2": L2 PIN "3": N (assignment not required) PIN "4": L3 PIN "5": Interlock safety circuit PIN "6": Interlock safety circuit GND: PE (contacts external)</p>
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Assignment of the connection of the center conductor N is not necessary!


Jumper Pin 5 and 6 (safety circuit): A jumper in the supply line between Pin5 and Pin6 ensures that the device cannot be activated if the plug is not properly attached to the device. The jumper must be provided in the supply line.

4. Device output Cable connection with connection socket
Harting HAN 6E/B, 6-pole, female

	<p>PIN "1": + VDC PIN "2": - VDC PIN "3": not assigned PIN "4": not assigned PIN "5": not assigned PIN "6": not assigned GND: PE (contacts external)</p>
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5. Output device error (only 3AC)

CONEC plug 43-0100

	<p>Output device error: PIN "1": brown, center contact / switching contact PIN "2": white, Normally open PIN "3": blue, normally closed</p> <p>Shutdown BMS battery modules PIN "4": black, PLC+24V PIN "5": green/yellow, PLC 0V</p>
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5.1 Device error output:

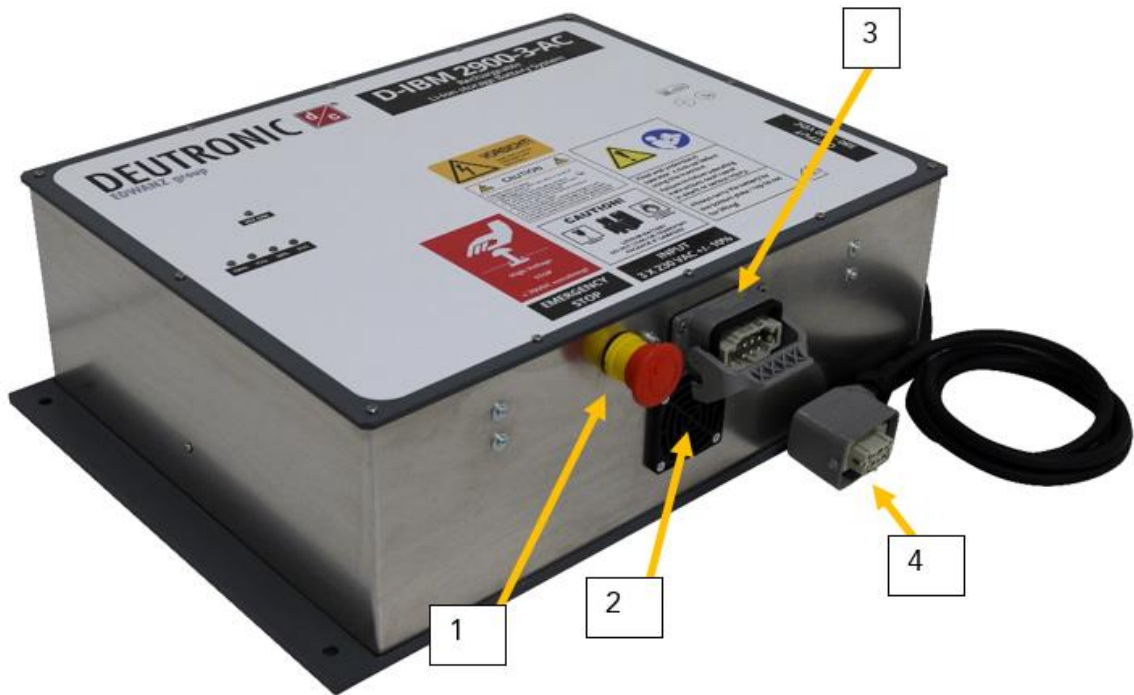
via a NO/NC relay contact, an error evaluation can be carried out via e.g. PLC can be carried out

From D-IBM2900 Gen3 on, the devices are equipped with an error output in the form of a potential-free contact (NO/NC relay contact in the device). This can be used to implement an error evaluation via an external system (e.g. PLC).

When all accumulators have reached the minimum voltage of approx. 58V, the NO contact is closed. The relay is always supplied with voltage as soon as all accumulator modules are in a functional state and charged. It will not open again until one of the battery voltages drops below 51V, the battery is defective or the cell temperature has risen above 70°C.

5.2 Switching off BMS battery modules by additional supply (24VDC)

Starting with D-IBM2900 Gen3, battery modules are disconnected after a defined time when the 24VDC supply is removed. This ensures on the one hand the supply by the D-IBM2900 for the defined time and prevents at the same time a further discharge of the D-IBM2900 after the defined time. The time can be set in 5min steps from 15 - 60min.



Technical Data

	D-IBM2900-3AC
Input	
Input voltage range	320 – 550VAC
Protection class	I
Inrush current::	Inrush current impulse, actively controlled <= 70A +/- 10%
Power consumption during full load	<10A (internal device fuse)
Transient overvoltage protection	EN60335
Input fuse	External 3 pole LS switch 16A, preconnect characteristic B
Idle power (Stand-by):	<60 Watt
	The AC/DC converters feature Power Factor Correction current limiting
Output	
Output voltage:	Battery operation: 410 - 550VDC Mains operation: 430 - 740VDC (rectifier voltage from bypass) Nominal voltage: 460VDC
Length of the output line:	2 m
Output safety circuit fuse	1000VDC 6A IEC60269-4
Overall efficiency	>77%
Operating Conditions	
	Industrial environment
Mechanical Data/ Environmental Influences	
Protection class:	IP20
Operation temperatures:	0 to +45°C
Environment temperature:	0 to +45°C
Storage temperature:	-10 to + 45°C
Cooling:	Active, with fan
Rel. humidity	5 to 95% humidity, non-condensing
Isolation voltage:	1000 VDC of all inputs and outputs against PE
Housing:	Plastic and aluminum
Dimensions:	Ca. 450x550x170 mm

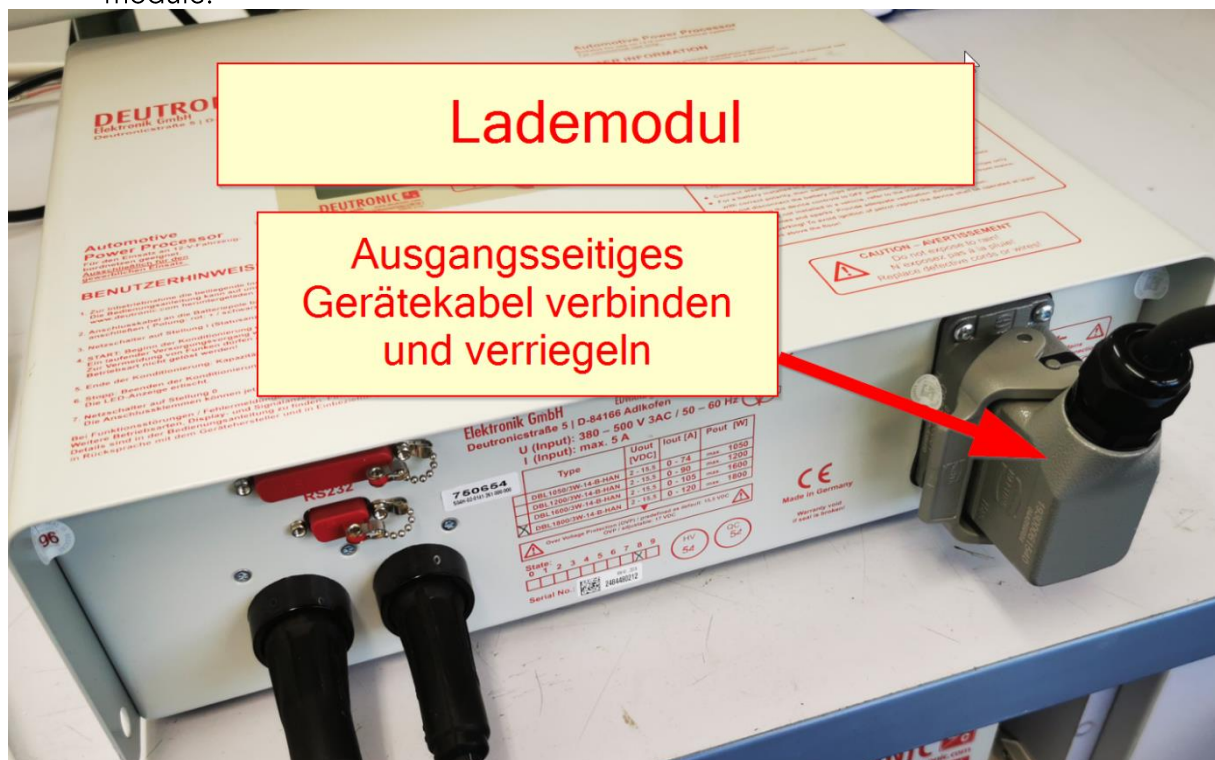
Installation and Commissioning

Check before the initial Commissioning

- Check the delivery immediately after receipt for completeness and any transport damage, e.g. mechanical damage to the device housing, as well as to cables or accessories.
- If there is any damage, the transport company must be notified immediately.
- If damage to the device, cables or accessories is detected or suspected, the installation and commissioning must not be continued under any circumstances.
- In this case, the device must be marked as defective.
- Do not continue to use the device after a hard impact or damage caused by a fall.

Connecting the battery and Commissioning

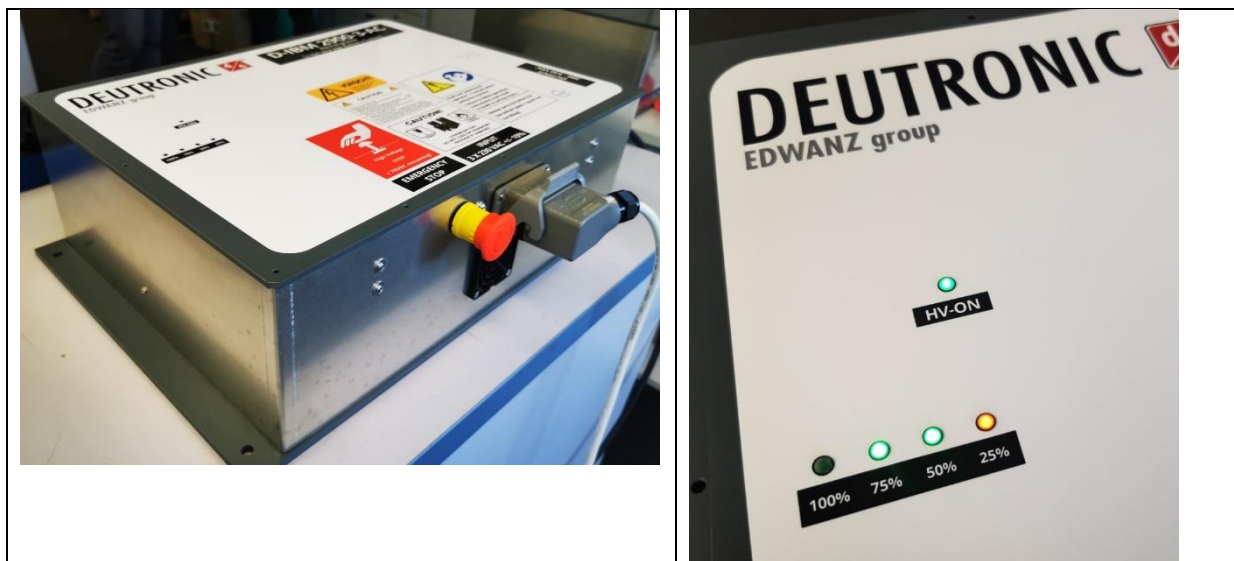
1. Connect and lock the output side (fixed) cable from the device to the charging module.



2. Connect the power cable to the supply mains and lock it.



3. Release the emergency off and check the charging indicator. Charging indicator lights up.



Charging indicator:




1x Green = 50%

2x Green = 75%

3x Green = 100%

All LEDs off means that the device is discharged, no sufficient capacity available which is done automatically.

Transport and Storage

	<p>Possible damages to the internal battery technology due to defects of the housing (visual inspection).</p> <ul style="list-style-type: none">→ Check the device for damages→ Do not commission defective batteries!
	<ul style="list-style-type: none">- The storage of batteries below -10°C and above 45°C can lead to damages.- Humidity during storage must be within 5-95%. Non-condensing.
	<ul style="list-style-type: none">- If the storage takes longer than 2 weeks, it is recommended to disconnect the battery packs from the whole system.

Discharging Time

The following are empirical values for the discharge duration of the D-IBM2900-3AC at the following ambient conditions:

- Ambient temperature 20°C
- Start SOC: 100%
- Start SOH: 100% (as new battery modules)

The Gen2/3 devices are shipped with a SOC of approx. 20% and in "transport mode" (unplugged battery modules) and are discharged in this state after approx. **6 weeks**.

Passive D-IBM2900, Safety Circuit open:

As soon as the D-IBM2900 has been commissioned (battery modules plugged in), the master board with the higher-level BMS is active and constantly monitors the overall system. Therefore, in case of longer standstill times >24 hours and missing voltage supply via the three-phase connection (400VAC) - i.e. in pure battery operation - the safety circuit (see chapter 0- 3. Input connector) PIN 5 and 6 should be opened. This can also be done by actuating the (emergency) off switch (see chapter 0 - 1. (Emergency) off switch). If the safety circuit is opened at a SOC=100%, the discharge duration is approx. **80 hours**.

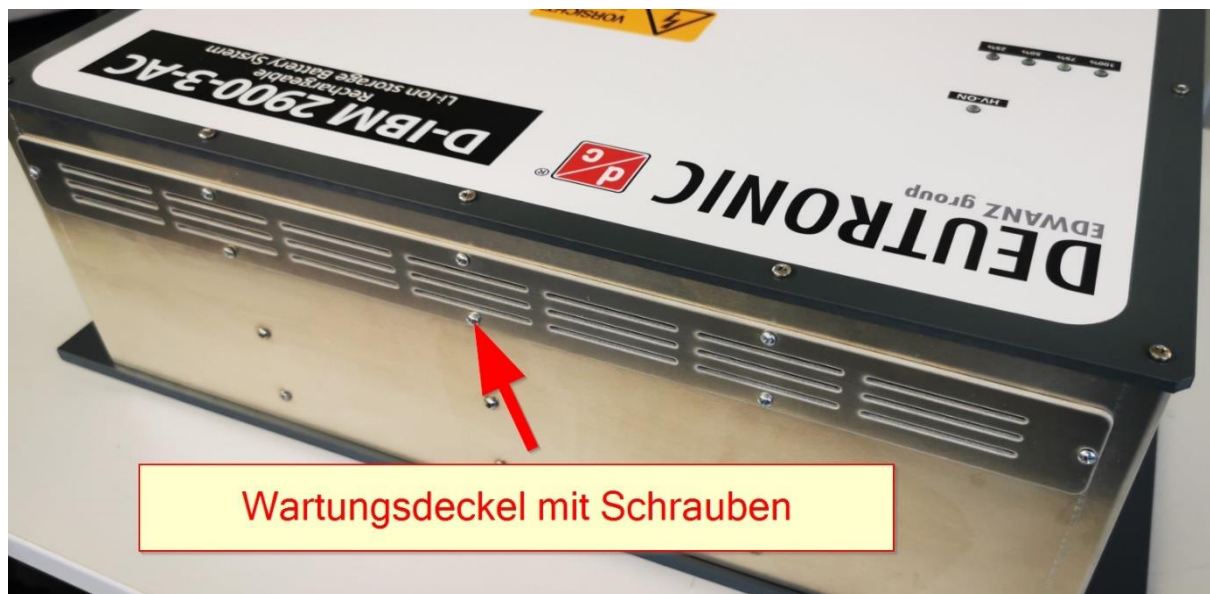
Devices with additional 24V supply for disconnecting BMS battery modules.

With these devices the accumulator modules are disconnected via relays after a defined time after switching off the 24V supply. The accumulator modules are then in the storage state.

Storage over two Weeks

If storage is planned for longer than 2 weeks, we recommend deactivating the individual battery packs within the storage module to prevent deep discharge of the individual modules. The state of charge should ideally be between 50% and 75% before deactivation.

1. make sure that the emergency stop switch is actuated! LED HV ON and SOC (100%, 75%, 50% and 25%) are off.
2. To do this, open the maintenance cover on the rear of the device by loosening the 8 fastening screws.

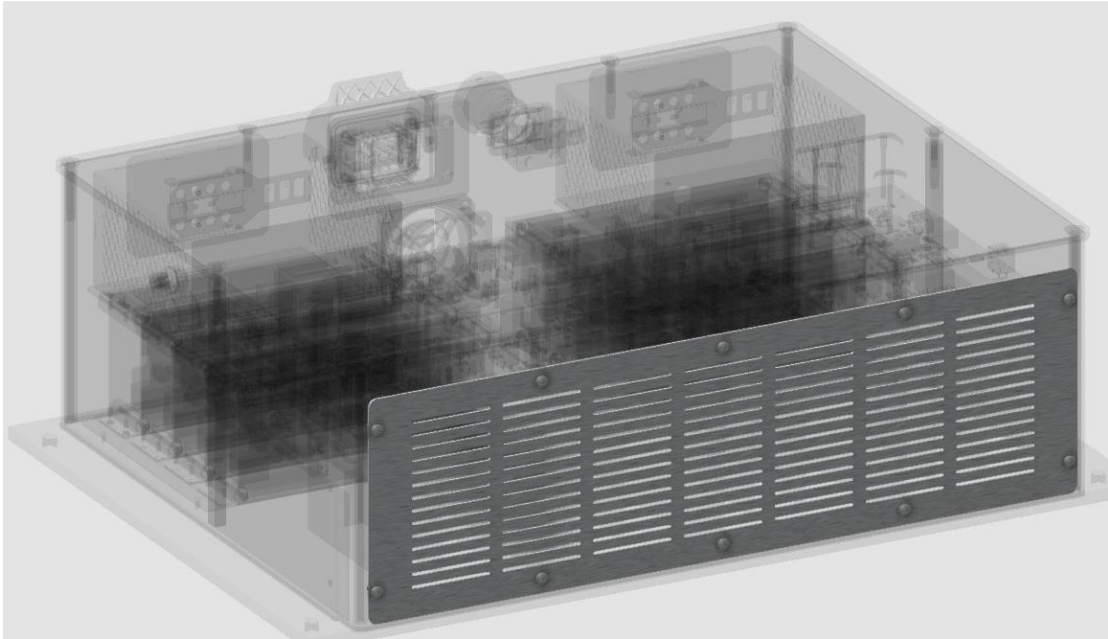


3. Then disconnect the 8 connection terminals and insert them into the dummy plug trays provided for this purpose on the left side of the battery connections.



Exchange Battery Modules

1. Open the maintenance flap on the rear of the device to allow access to the battery modules.



2. Unplug all battery modules such as shown in "Fehler! Verweisquelle konnte nicht gefunden werden."
3. Carefully pull out the battery module to be replaced
4. connect all battery modules
5. Close the maintenance flap

Error Detection

Total device:

As soon as the system is supplied with supply voltage, the charging process starts automatically.

Missing energy is recharged until reaching 100% of the battery condition.

Charging is automatically finished, when the storage is full. The device is designed for the permanent connection. The four LED red (25%) and the three LED green (50%, 75% and 100%) shine. Additionally, the correct function can also be recognized by the HV O LED.

A malfunction is given, if, despite correct connection of the device to the power supply, the HV ON LED does not light up. (The D-IBM 2900 must be replaced)

Consequence: The DBL charging computer is not supplied with voltage and the SOC display remains permanently off.

Deactivate, *by pressing the emergency off button*, the D IBM and disconnect the device connections. Replace the D-IBM and recommission it in reverse order. If the battery charge is below 25% SOC (all LED off), it can take up to 15 minutes until the HV on LED shines and the SOC display displays the charging condition. A full charge will then take approximately 2,5h. As soon as the *HV On LED* lights up, the connected DBL charging computer can be used to its full extent. The charging activity is not affected by this.

Check of the Functionality of the Battery Modules:

1. In case of a longer storage time, the device must be supplied with mains voltage before the check to "wake" the battery modules from sleep mode. **To do this, the emergency off must be unlocked again.** The charging technology supplies the batteries autonomously, so that the functioning modules are charged to be able to be measured.
2. The LEDs of the battery modules (1 to 8) light up insofar as the SOC allows this.
3. If the LED of a battery module does not light up, then it is suspected that it is not functional. In this case the module could be unplugged (see picture below) to check the module voltage (this should be between 51V and 67.2V).
4. If necessary exchange the battery modules.

Overview

Error pattern	Possible Cause	Remedy
No output voltage during battery operation (LED HV ON off)	Press the emergency off button	Unlock the (emergency) off button
	Input plug connector connected	Check whether the input connector is plugged in and locked. There is a jumper of Pin5/Pin6 in the connector, if this is interrupted, the HV output is switched off -> Plug in and lock input connector, check jumper Pin5/Pin6 if necessary.
	Error battery module(s)	Check battery module, if necessary replace
DBL charger at D-IBM2900 without function although LED HV-ON at D-IBM2900 is on	Input plug at the DBL charging device is not locked	Check the connection and lock the plug
	DBL charging device	Change DBL charging device
Malfunction error output	Defective error output	Replace D-IBM2900
SOC display is not working AND HV-ON shines.	Micro controller for the SOC display defective	Replace D-IBM2900
D-IBM2900 is not charged	Missing supply	Upstream fuse, check voltage
	(Emergency) Off switch pressed	Unlock (emergency) off switch

Packaging and Dispatch

Packaging and transport provisions – ADR

The following packaging group, special provisions and packaging instructions are valid for the transport via street (-> ADR):

UN-Number	Description	Dangerous goods class	Packaging class	Special provisions	Packaging instructions
3480	LITHIUM-ION BATTERY	9	II	188,230,310,348,376,377,636	P903, P908, P909, P910, LP903, LP904
3481	LITHIUM ION BATTERY IN EQUIPMENT or PACKAGED WITH EQUIPMENT	9	II	188, 230, 310, 348, 360, 376, 377, 636	P903, P908, P909, P910, LP903, LP904

Cells and batteries IN EQUIPMENT

- Equipment must be packaged in resilient outer packaging that is manufactured in a suitable material (suitable stability and laying).
- Unintentional commissioning during the transport must be prevented.
- the packages do not have to be subjected to type testing.

Transport of damaged lithium batteries

Special provision 376

Damaged or defective lithium batteries are:

- Cells or batteries that are identified as defective due to safety reasons
- Leaking or degassed cells or batteries (pressure relief mechanism activated)
- Cells or batteries with defects that cannot be diagnosed prior to shipment.
- Cells or batteries that have an external or mechanical damage deformed/broken housing, tarnished metal parts, heating in switched off state)
 - ➔ Used batteries or batteries that are no longer in full working order and are in perfect safety condition do NOT count towards this category
 - ➔ Packages must have the sign "DAMAGED/DEFECTIVE LITHIUM ION BATTERIES"

Cells and batteries that tend, under normal transport conditions, to a quick decomposition, dangerous reaction, flame formation or a dangerous emission of poisonous, caustic or flammable gases or vapors, may only be transported under the provisions made by the responsible authority (-> BAM)

Packaging instruction P908:

- ➔ The outer packaging for cells and batteries and equipment that contain cells need to correspond with the requirements of packaging group II:
 - Barrels (1A2, 1B2, 1N2, 1H2, 1D, 1G)
 - Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2)
 - Canister (3A2, 3B2, 3H2)
- ➔ damaged or defective cells or batteries must be packed individually in an inner packaging and placed in an outer packaging.
- ➔ Inner packaging or outer packaging must be dense, to prevent a possible leak of electrolyte.
- ➔ Each inner packaging needs to be enclosed with sufficient not burnable and non-conductive thermal insulation material for the protection against a dangerous heat development.
- ➔ Tightly sealed packaging must be equipped with a venting device if necessary.
- ➔ Suitable measurements to minimize the impacts of vibrations and shocks, and to prevent movements of the cells and batteries inside the packaging

- ➔ Non-combustibility must be determined according to a standard.
- ➔ In the case of leaking cells or batteries, a sufficient quantity of inert absorbent material must be added to soak up any electrolyte that is released.
- ➔ If the net sum >30kg then the outer packaging may only contain one single cell or battery.

Disposal

Do not dispose of this device in household waste! According to the European Directive on Waste Electrical and Electronic Equipment and its implementation in national law, used power tools must be collected separately and recycled in an environmentally friendly manner. Make sure that you return your used device to your dealer or obtain information about a local, authorized collection and disposal systems. Ignoring this EU directive can lead to potential effects on the environment and your health!

The accumulator is hazardous waste!

The lithium battery may only be disposed of at designated points, such as at the GRS Foundation (Common Return System). Under no circumstances may the lithium battery be disposed of with the residual waste.

