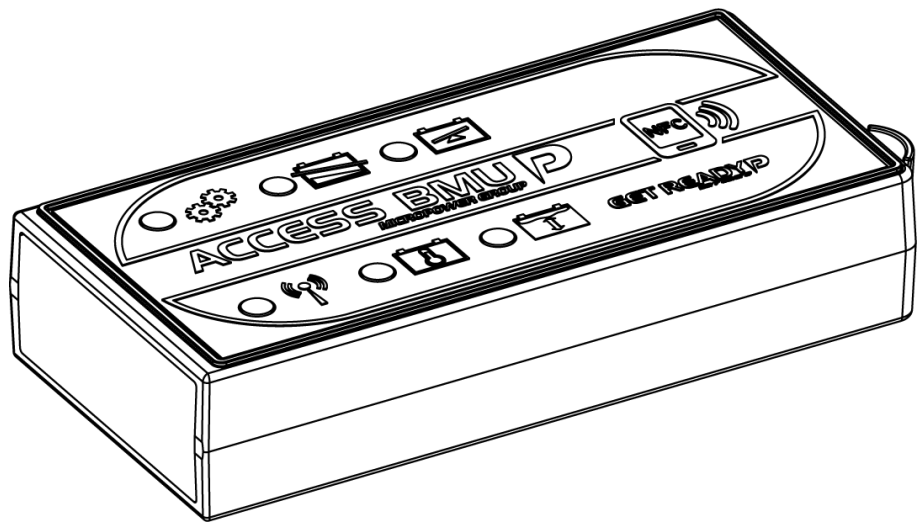


BATTERY MONITORING UNIT 2 USER MANUAL

ACCESS BMU GENERATION 2



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General

This manual is valid for the following models:

- BMU Pro
- BMU Pro with separate current sensor cabling
- BMU Basic
- BMU Basic Dry
- BMU Pro UL
- BMU Basic UL

Access™ BMU Pro, BMU Pro with separate current sensor cabling, BMU Pro UL, BMU Basic, and BMU Basic UL is designed for monitoring vented lead-acid batteries. The unit is mounted on the battery and monitors voltage, temperature and electrolyte level. BMU Pro, BMU Pro with separate current sensor cabling, and BMU Pro UL also monitor current and voltage balance.

Access™ BMU Basic Dry is designed for monitoring vented and valve-regulated lead-acid batteries. The unit is mounted on the battery and monitors voltage and temperature.

The functions in Access™ BMU are activated, deactivated and adapted using the PC software Access™ Service tool or the GET APP and the NFC interface. Information about the charging and discharging process, the battery status and deviations are stored internally in the unit. Access™ BMU communicates wirelessly with other Access™ units.

Access™ BMU is permanently mounted on the battery or used as a temporary instrument for troubleshooting or operating analysis.

When using Access™ BMU together with the Access™ battery charger, the battery charger is sent battery specific parameters from the battery monitoring unit for optimal charging of the battery. The status of the battery can be read on the charger's display.

Information concerning the product's part number, serial number and rating can be found on the rear of the unit.

Safety

Warning information

Hazardous situations and precautions are presented in the text as follows.

WARNING

Indicates a potentially dangerous situation. Death or serious injury may occur if appropriate precautions are not taken.

CAUTION

Indicates a situation where damage or injury could occur. If it is not avoided, minor injury and/or damage to property may result.

NOTE

General information not connected to safety for person or the product.

General



Always keep the manual in the vicinity of the product.
The manual contains important information about safety and user instructions.

Read and understand these instructions, the instructions supplied by the battery manufacturer with the battery and the employer's safety instructions before the product is used, installed or serviced.

Only qualified personnel may install, use or service this product.

ELECTRIC SHOCK



The battery may deliver voltages on a level that may cause personal injury



WARNING

Disconnect the charger or vehicle before installation, maintenance, servicing or disassembly.

Do not touch uninsulated battery terminals, connections or other live parts.

EXPLOSIVE GASES



Hydrogen gas is produced when charging lead acid batteries; this can cause an explosion.



Do not smoke, cause sparks or use an open flame in the vicinity of batteries.



WARNING

RISK OF EXPLOSION!

Do not smoke, cause sparks or use a naked flame in the vicinity of batteries.

Ensure that the charging parameters have been set correctly according to the battery manufacturer's specification.

Do not use the battery if the battery monitoring unit or its cabling are damaged.

Use insulated tools designed for working on batteries.



Only perform charging in a well ventilated environment.

Acceptance

On delivery, visually check the unit for signs of physical damage.

Contact your supplier if anything is missing, see *Contact information*.

Description

Access™ BMU

See Access™ BMU

1. Indication of high battery temperature (red)
2. Indication of low electrolyte level (red) (BMU Pro, BMU Pro UL, BMU Basic and BMU Basic UL)
3. Indication for the specified time and date (green)
4. Indication of the network status (green)
5. Indication of voltage imbalance (red) (BMU Pro and BMU Pro UL)
6. Indication of state of charge (BMU Pro and BMU Pro UL)
7. NFC symbol

Access™ BMU Pro and BMU Pro UL installed on the battery

See Access™ BMU Pro installed on the battery and Access™ BMU Pro UL installed on the battery

1. Positive terminal, battery
2. Cable (red), positive terminal for powering Access™ BMU and for the supply of battery voltage between the battery's positive terminal and the current sensor (grey area in figure).
3. Electrolyte level and battery temperature sensor (black)
4. Access™ BMU
5. Positive terminal, cell
6. Negative terminal, cell
7. Negative terminal, battery
8. Cable (black), negative terminal for measuring the battery voltage between the current sensor and the negative battery terminal (white area in figure)
9. Current sensor

Access™ BMU Pro with separate current sensor cabling installed on the battery

See Access BMU Pro with separate current sensor cabling installed on the battery

1. Positive terminal, battery
2. Cable (red), positive terminal for powering Access™ BMU and for the supply of battery voltage between the battery's positive terminal and the current sensor (grey area in figure)
3. Electrolyte level and battery temperature sensor (black)
4. Access™ BMU
5. Positive terminal, cell
6. Negative terminal, cell
7. Negative terminal, battery
8. Cable (black), for measuring of battery midpoint voltage
9. Current sensor
10. Current sensor connector (black)

Access™ BMU Basic and BMU Basic UL installed on the battery

See Access™ BMU Basic installed on the battery and Access™ BMU Basic UL installed on the battery

1. Positive terminal, battery
2. Cable (red), positive terminal for powering Access™ and measuring battery voltage
3. Electrolyte level and battery temperature sensor (black)
4. Access™ BMU
5. Cable (black), negative terminal for measuring the battery voltage
6. Negative terminal, battery

Access™ BMU Basic Dry installed on the battery

See *Access™ BMU Basic Dry installed on the battery*

1. Positive terminal, battery
2. Cable (red), positive terminal for powering Access™ BMU and measuring battery voltage
3. Access™ BMU
4. Battery temperature sensor (black)
5. Negative terminal, battery
6. Cable (black), negative terminal for measuring the battery voltage

Access™ BMU Pro Lion installed on the battery

See *ACCESS BMU PRO LION installed on battery*

1. Positive terminal, battery
2. Cable (red), positive terminal for powering Access™ and measuring battery voltage
3. Access™ BMU
4. Battery temperature sensor (black)
5. Cable (black), negative terminal for measuring the battery voltage
6. Current sensor

Battery, cross section

BMU Pro, BMU Pro UL, BMU Basic and BMU Basic UL, see *Battery, cross section*

1. Seal, electrolyte level and battery temperature sensor
2. Lead probe, electrolyte level and battery temperature sensor
3. Electrolyte
4. Lead plate, battery

Installation

**WARNING**

Electrolyte is corrosive!

If electrolyte comes into contact with the eye, damage can occur very quickly.

Rinse the eye immediately and thoroughly for at least 10 minutes, seek medical attention.

Wear protective equipment such as safety glasses and gloves to avoid contact with the electrolyte.

NOTE

Installation may only be performed by a qualified service partner.

Follow the battery supplier's instructions for handling batteries.

The BMU is solely designed for use up to 96 V nominal DC voltage. The nominal DC voltage is between the current sensor and the positive terminal on "Pro, Pro EU and Pro UL". Consult the manufacturer regarding all other usage.

Ensure that the BMU is installed by a qualified installer in accordance with the instructions. The BMU must be well protected against mechanical damage during daily use, servicing and maintenance.

Instructions

Installation of the threaded inserts (BMU Pro UL and BMU Basic UL)

A threaded insert must be installed to connect Access™ BMU on the lead terminals of the battery and cells.

1. Drill a 5.5 mm (0.219 inch) hole in the appropriate lead terminal. The depth of the hole must be at least 7.7 mm (0.302 inch).
2. Knock the supplied threaded insert into the hole.
3. Secure the cable lug. Use the supplied washers and screws.

Installation of BMU (BMU Pro, BMU Pro UL, BMU Pro dry, BMU Basic, BMU Basic UL, BMU Basic dry)

1. Locate the installation position for the current sensor (**BMU Pro, BMU Pro UL**).
 - On a 24 V battery, locate cell no 4 counted from negative terminal.
 - On other battery types, locate the two midmost cells of the battery. Example: On a 48 V battery it is cells no 12 and 13.
2. Connect the current sensor:

BMU Pro UL

- a. Install threaded inserts on the cell interconnection.
- b. Connect the current sensor.

After the installation is completed, the current sensor of BMU Pro UL is calibrated. This is done via Access™ battery charger or Access™ Service tool.

BMU Pro

- a. Disconnect the negative cell connection between the battery's two midmost cells.
- b. Connect the current sensor on the negative terminal of the cell, according to current sensor marking.

BMU Pro Lion

- a. Disconnect the battery minus cable.
 - b. Connect the current sensor on the battery minus with the disconnected bolt.
 - c. Tightening torque 25 Nm.
 - d. Connect the secondary minus cable with current sensor, use only the supplied 16 mm bolt.
 - e. Tightening torque 15 Nm.
3. Install the disconnected cell connection on the current sensor. Use only the supplied 16 mm bolt.
(BMU Pro, BMU Pro UL, BMU Pro dry, BMU Basic, BMU Basic UL, BMU Basic dry)

Tightening torque 25 Nm.

BMU UL has no limitations in continuous charging current.



WARNING

Higher tightening torque could damage the current sensor.

Do not overtighten.



WARNING

Use only the supplied 16 mm screw.

Other lengths cause poor contact in the connection.



WARNING

Fire hazard!

Incorrect use can cause heat and fire.

The current sensor has a limited current capacity.

Maximum continuous charging current is 300 A.

BMU Pro with separate current sensor cabling has maximum continuous charging current 150 A for 35 mm² and 260 A for 95 mm².

Ensure that these levels are not exceeded.

BMU UL has no limitations in continuous charging current.

4. Installation of Access™ BMU:

- Install the battery monitoring unit and its cables in a dry place on the battery.
- Make sure the control panel is fully visible.
- The battery monitoring unit is installed so the control panel is fully visible.

5. Connect to the battery's negative terminal:

(BMU Pro, BMU Pro UL, BMU Pro dry, BMU Basic, BMU Basic UL, BMU Basic dry)

BMU UL

- a. Install threaded insert on the battery's negative terminal.
- b. Connect the battery monitoring unit cable.

BMU

- a. Press the battery monitoring unit's nail into the cable to the battery's negative terminal.
- b. Secure the connection with supplied cable tie.



CAUTION

Supplied cable ties are acid proof (polypropylene).

Ensure that only acid proof cable ties are used.

6. Install the temperature sensor:

BMU Basic Dry, BMU Pro Lion

- a. Install the battery temperature sensor so that the battery's internal temperature is reflected in the best possible way.

WARNING

The battery temperature sensor for BMU Basic Dry must not be immersed in the battery's electrolyte.
This can damage the sensor and battery.

BMU Pro, BMU Pro UL, BMU Basic, BMU Basic UL, and BMU Pro with separate current sensor cabling

- a. Locate where the electrolyte level and battery temperature sensor is to be installed.

NOTE

This electrolyte level sensor may only be used on vented batteries.

For BMU Basic and BMU Basic UL the sensor must be installed at least 3 cells from the battery's negative terminal in order for the sensor to work correctly.

For BMU Pro, BMU Pro UL, and BMU Pro with separate current sensor cabling must the electrolyte level and battery temperature sensor be installed at least ± 3 cells from the current sensor's connection point in order for the sensor to work correctly.

- c. Drill a 12 mm (0.472 inch) hole in the top of the battery cell for the electrolyte level and battery temperature sensor.
- d. Fit the sensor's seal (*Battery, cross section pos 1*).
- e. Cut the sensor's lead probe (*Battery, cross section pos 2*) and the plastic casing so that the sensor trigger an alarm well in advance of the electrolyte falling below a critical level for the battery.

If the electrolyte level is (*Battery, cross section pos 3*) below the lead probe the low electrolyte level indicator comes on .

The battery's lead plates (*Battery, cross section pos 4*) must be covered with electrolyte.

- f. Install the electrolyte level and battery temperature sensor. Make sure the seal closes tightly against the hole.
7. Connect to the battery's positive terminal:

BMU UL

- a. Install threaded inserts on the battery's positive terminal.
- b. Connect the battery monitoring unit's cable.

BMU LION

- a. Connect the nail to the BMS positive output, not directly to battery positive terminal.

BMU

- a. Press the battery monitoring unit's nail into the cable to the battery's positive terminal.
Secure the connection with supplied cable tie.

All indications on the battery monitoring unit's control panel come on briefly.

8. Check and rectify any indications. Indications are described in *Status indicator on the control panel*.
9. Secure Access™ BMU and its cables using the supplied cable ties.
10. Check all the battery's interconnections.

BMU UL

- a. Check that all the battery's soldered joints are correct.

WARNING

Risk of fire!

A poorly soldered joint can damage the battery, resulting in heat development and fire.

Check all soldered joints.

BMU

- a. Check that all the battery's loosened cell interconnections have the right tightening torque in accordance with the manufacturer's recommendation.

WARNING

Risk of fire!

A faulty tightened interconnection can damage the battery and BMU, resulting in heat development and fire.

Use the tightening torque according to the manufacturer's recommendation.

Connecting to a network

On delivery, new Access™ BMU is connected to a factory set network.

The charging parameters and other settings in Access™ BMU must be set correctly for the battery in question. The settings made in the Access™ Service tool or the NFC app which must be connected to the appropriate Access™ BMU.

Settings of charging parameters can also be made using the menu system in the Access™ battery charger when they are connected to each other.

CAUTION

Incorrect charging parameters can damage the battery.

Always check the charging parameters prior to start of charging.

Connect BMU to existing network with Access™ Battery charger

1. Set the charger's charging parameter **Source** in the menu **Service/Charging parameter** to **BMU** or another BMU option.
2. Connect the charger to the battery that has the relevant |Access™ BMU fitted.
3. If charging starts within 1 minute the |Access™ BMU has succeeded in connecting to the network. Battery ID is shown on the Access™ battery charger's display.

Status indicator

Status indicator on the control panel

Indication	Status	Cause	Action
	Flashes	The battery is too warm.	1. Allow the battery to cool. 2. Reduce the workload on the battery. 3. In Access™ Service tool or the NFC app, check that the battery's temperature level for alarm indication corresponds with the battery manufacturer's recommendation. Adjust temperature level for alarm indication if needed.
	Flashes	1. Low electrolyte level. 2. The electrolyte level and battery temperature sensor is installed incorrectly. 3. Electrolyte level sensor is missing (Only BMU Basic Dry).	1. Top up the battery water. 2. Check the installation of the electrolyte level and battery temperature sensor, see <i>Installation</i> step 6b 3. Check that the electrolyte level sensor is deactivated in Access™ Service tool or the NFC app.
	Flashes	Voltage imbalance between the battery's cells. (Only BMU Pro and BMU Pro UL)	1. Equalize charge the battery. 2. Check the condition of the battery cells. 3. Check that the black cable <i>Access™ BMU Pro installed on the battery- Access BMU Pro with separate current sensor cabling installed on the battery</i> pos 8 is connected. 4. Check the set parameters for the current sensor position and indication level in Access™ Service tool or the NFC app.
	Flashes	State of charge is below the set value.	Charge the battery or check the set alarm level in the parameters.
	Flashes	Time and date set incorrectly.	Set the time and date in Access™ Service tool or the NFC app.
	Flashes slowly	Time and date are set correctly, unit works.	
	Flashes	The battery monitoring unit is connecting to a network.	
	Lit	The battery monitoring unit is connected to a network.	
All indicators	Flashes	An identification request has been sent from the Access™ Service tool or the NFC app.	The indicators go out automatically after the requested identification time has elapsed, normally 10 seconds.
	Flashes shortly	Software in Access™ BMU is updating.	Wait until the Access™ BMU starts up, this normally takes 15-30 seconds. Do not disconnect the supply voltage.
No indicators lit		No supply voltage.	Check the battery monitoring unit's connections. Check the fuse on the cable between the battery monitoring unit and the battery's positive terminal.

Operation

Measurement values and events

Measurement values and events are stored during operations for service and analysis purposes.

The structure of the information is described in the technical manual for Access™ BMU. The information is read using the PC software Access™ Service tool or the NFC app.

GET Ready

Micropower Group GET App



The unit has Near Field Communication (NFC) and can communicate with compatible iOS-/Android devices.

1. Download the Micropower Group GET App from Google Play Store or App Store.
2. Activate NFC on the current iOS-/Android device.
3. Put the iOS-/Android device on the unit's NFC symbol.

For further information, refer to GET App information on the Micropower Support Center. (<https://docs.micropower-group.com/>)

GET Cloud

Connect wirelessly to GET Cloud for fleet management and additional smart services. For further information about the GET system, see Micropower Support Center, or contact your local Micropower Representative.

Maintenance



CAUTION

Maintenance may only be performed by qualified service personnel.



WARNING

Risk of corrosive damage!

Batteries contain corrosive electrolyte.

Use requisite protective clothing when working on batteries.



WARNING

RISK OF ELECTRIC SHOCK!

Do not use the battery if the battery monitoring unit or its cabling are damaged.

Do not touch uninsulated battery terminals, connections or other live parts.

Contact a service technician.



WARNING

The BMU must not be cleaned with a high pressure washer.

1. Check that the battery monitoring unit's cables and current sensor (if available) are free of faults, in good condition and show no signs of mechanical damage.
2. Check and rectify any indications on the battery unit's control panel.
3. Check that the battery monitoring unit and its cables are secured firmly on the battery.
4. Check that there is no grime or battery acid on the Access™ BMU. Clean if necessary.

Recycling

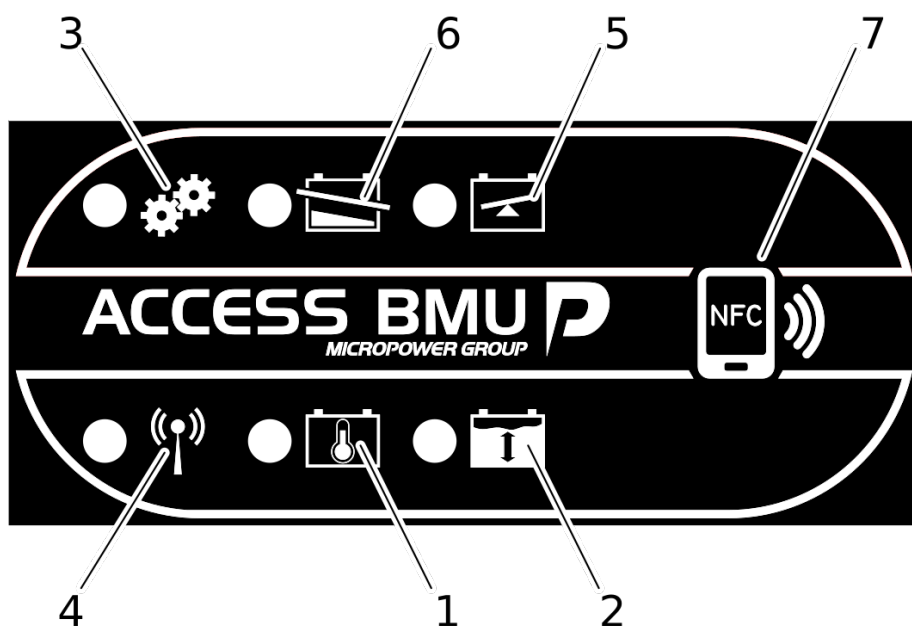
The product is recycled as electronic scrap. Local regulation apply and should be followed.

Contact information

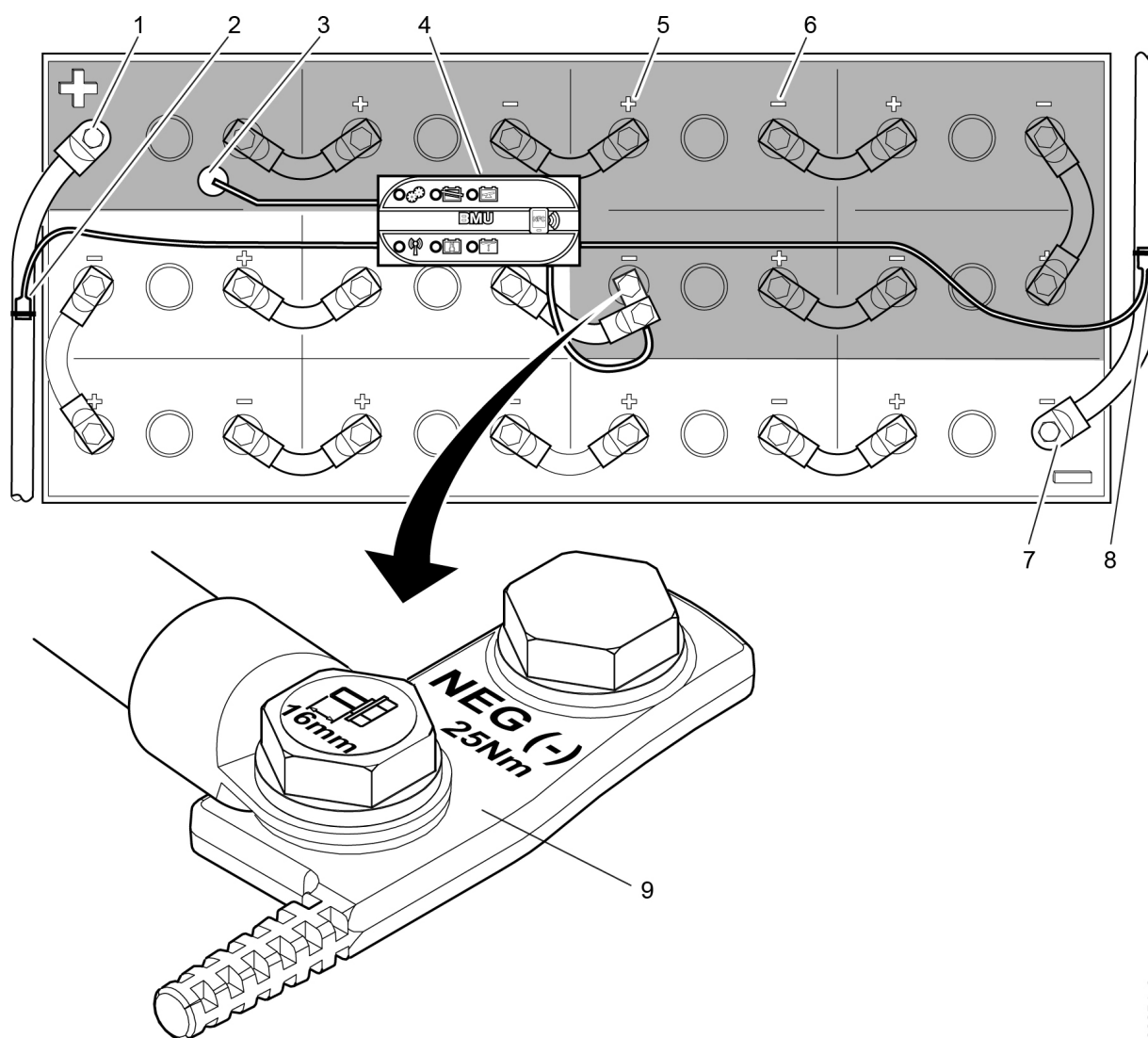
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Phone: +46 (0)470-727400
e-mail: support@micropower.se
www.micropower-group.com

Figures

Access™ BMU

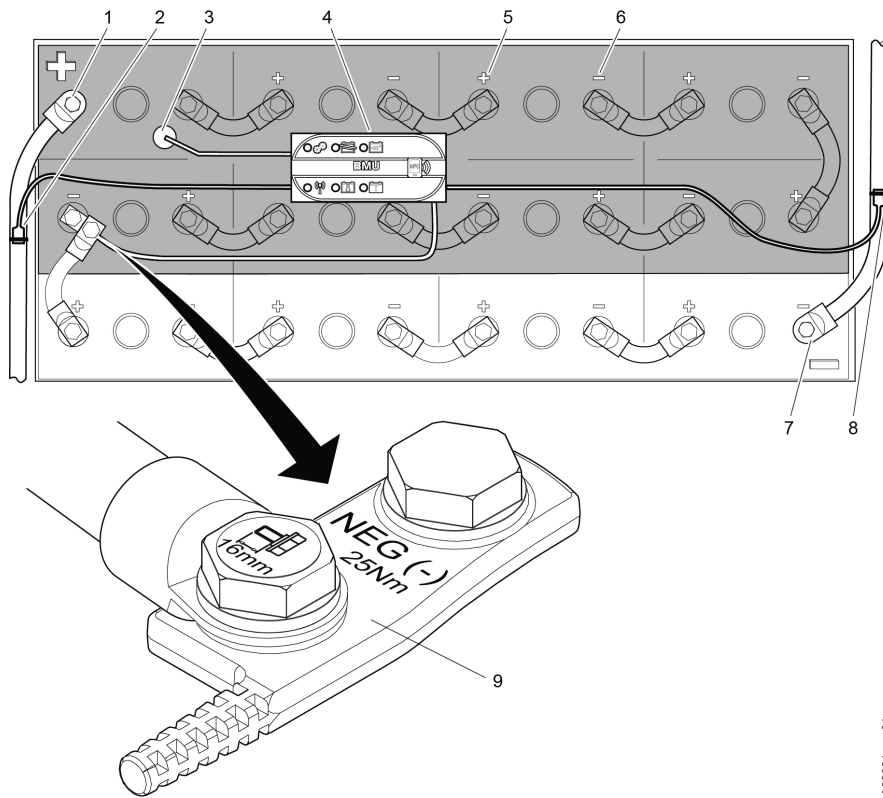


Access™ BMU Pro installed on the battery

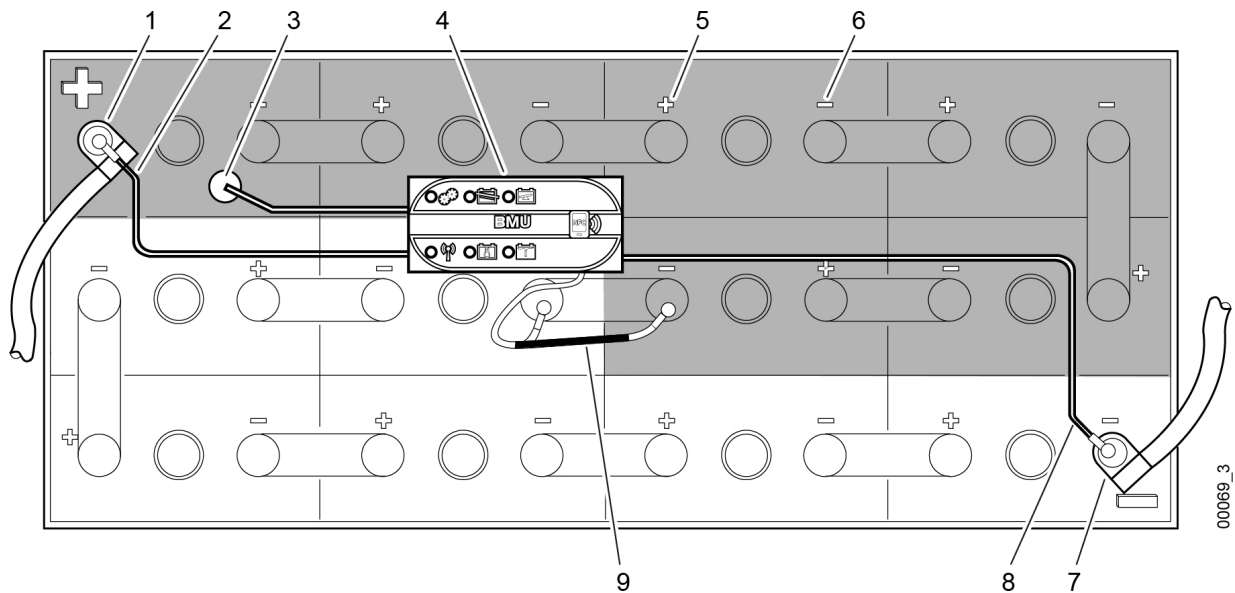


00054_3

ACCESS BMU PRO installed on 24V battery



Access™ BMU Pro UL installed on the battery



The diagram illustrates the assembly of the EMU battery pack. It shows a rectangular battery pack with a grid of cells. A central EMU unit is connected to the pack via a cable. The EMU unit has a label 'EMU' and a small speaker icon. The battery pack has positive (+) and negative (-) terminals. The diagram is labeled with numbers 1 through 9, corresponding to the following components:

- 1: Positive terminal on the left side of the battery pack.
- 2: Positive terminal on the top row of the battery pack.
- 3: Positive terminal on the top row of the battery pack.
- 4: Positive terminal on the top row of the battery pack.
- 5: Positive terminal on the top row of the battery pack.
- 6: Positive terminal on the top row of the battery pack.
- 7: Negative terminal on the right side of the battery pack.
- 8: Negative terminal on the bottom row of the battery pack.
- 9: Negative terminal on the bottom row of the battery pack.

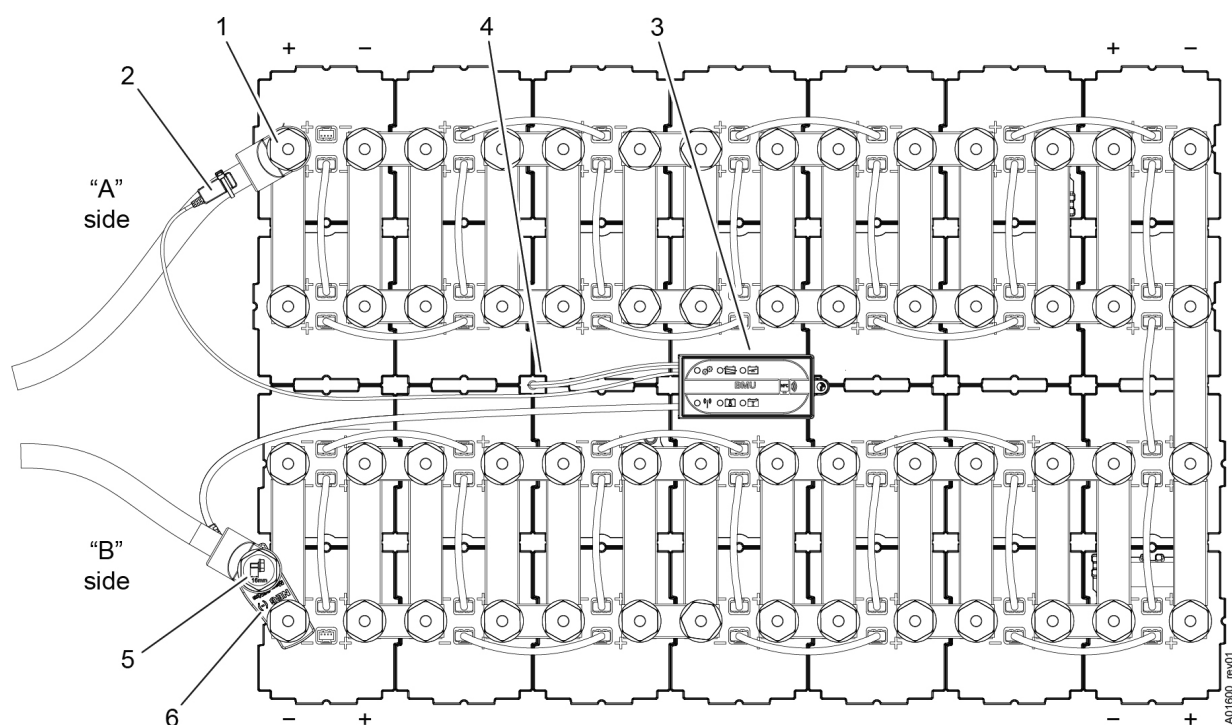
The diagram is labeled 'A02022_rev01a' in the bottom right corner.

The diagram shows a battery pack with a central BMU (Battery Management Unit). The BMU is labeled with 'BMU' and has several status indicators. The battery cells are arranged in a grid, with positive (+) and negative (-) terminals. The callouts are as follows:

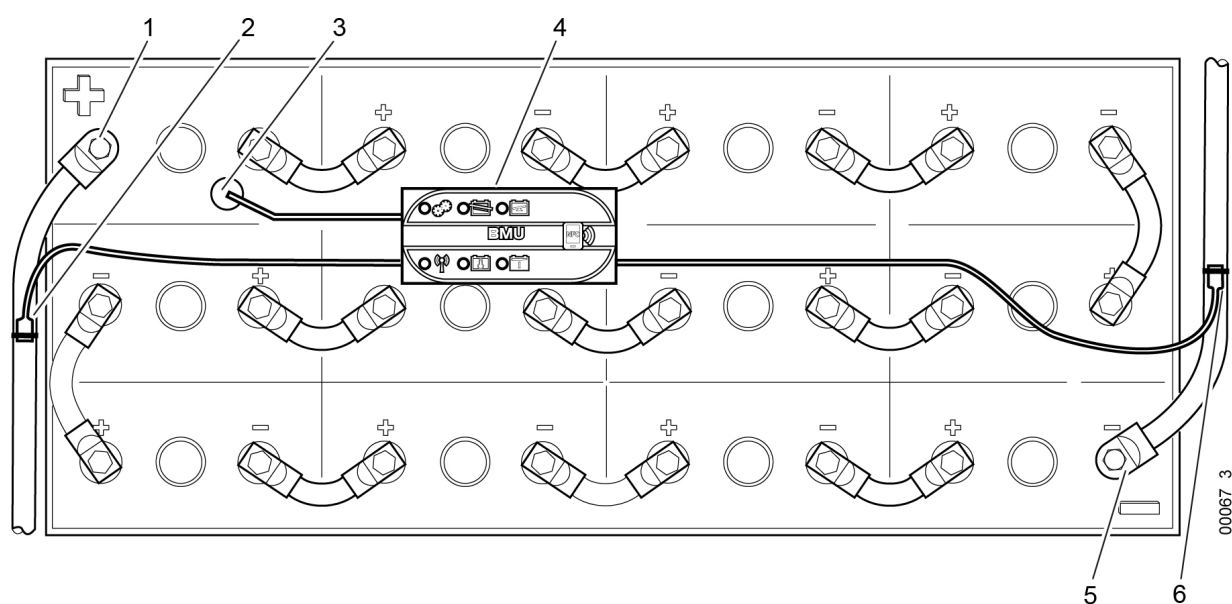
- 1: Positive terminal of the first cell.
- 2: Negative terminal of the first cell.
- 3: Positive terminal of the second cell.
- 4: Negative terminal of the second cell.
- 5: Positive terminal of the third cell.
- 6: Negative terminal of the third cell.
- 7: Positive terminal of the fourth cell.
- 8: Negative terminal of the fourth cell.
- 9: Positive terminal of the fifth cell.
- 10: Negative terminal of the fifth cell.

The BMU is connected to the positive and negative terminals of the battery cells. The diagram also shows the connection of the battery pack to a power source (labeled '00098_1').

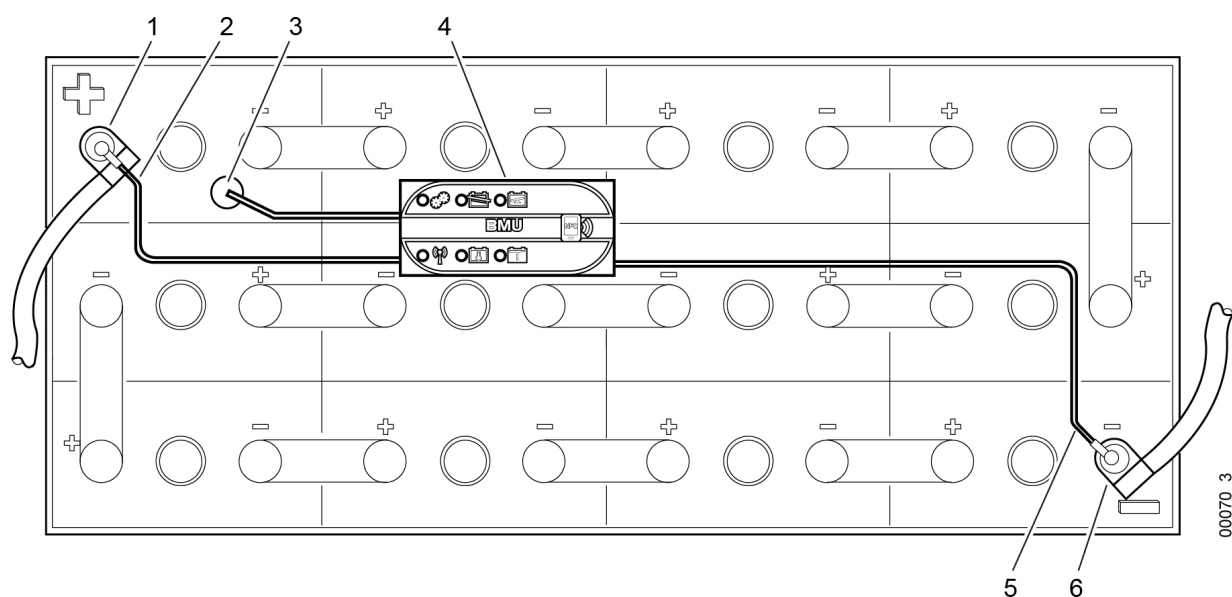
ACCESS BMU PRO LION installed on battery



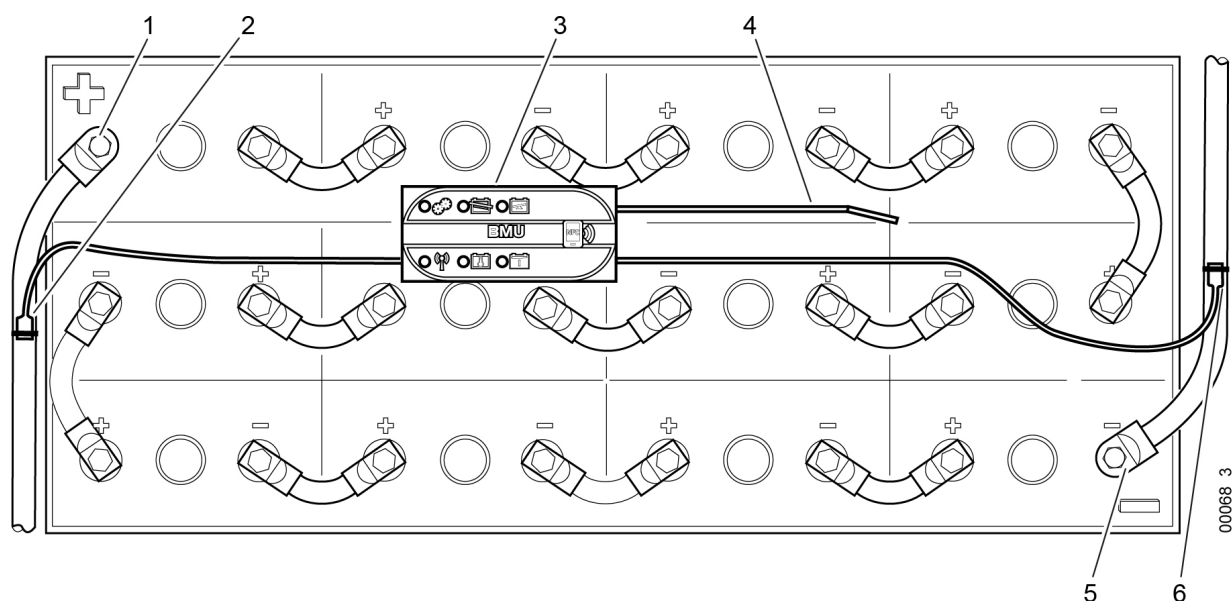
Access™ BMU Basic installed on the battery



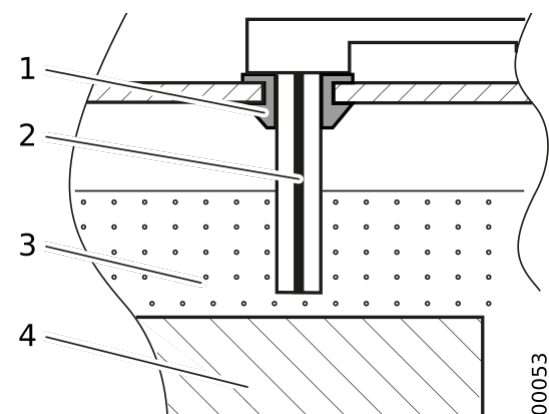
Access™ BMU Basic UL installed on the battery



Access™ BMU Basic Dry installed on the battery



Battery, cross section



Approvals

FCC/IC information

The product is FCC/IC registered and contains FCC ID: Z7H-EMB2538PA, IC: 21487-EMB2538PA.

WARNING

Changes/modifications not approved by the responsible party could void the user's authority to operate the equipment. This transmitter must not be relocated or operated in conjunction with any other antenna or transmitter. This equipment complies with FCC and IC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated keeping the radiator at least 20 cm or more away from person's body (excluding extremities: hands, wrists, feet and ankles).

WARNING

Les changements/modifications non approuvés par le parti responsable pourraient invalider l'autorité de l'utilisateur à faire fonctionner l'équipement. Cet émetteur ne doit pas être relocalisé ou être utilisé avec une autre antenne ou émetteur. Cet équipement est conforme aux limites d'exposition de émissions de IC, FCC résentées pour un environnement non contrôlé. Cet équipement devrait être installé de façon à ce que l'antenne soit éloigné de 20 centimètres ou plus du corps humain (en excluant les extrémités : les mains, les poignets, les pieds et les chevilles).

Declaration of Conformity

DECLARATION OF CONFORMITY

Manufacturer

Micropower E.D. Marketing AB, Idavägen 1, 35246 Växjö, Sweden, tel +46 (0) 470-727400

Model number

Access BMU Pro, Access BMU Basic, Access BMU Lion.

The following directives and standards have been applied:

- Machinery directive 2006/42/EC
 - EN 60 204-1:2007/A1:2009
- EMC directive 2014/30/EU
 - EN 61000-6-2:2005, EN 61000-6-3:2007/A1:2011
- RED directive 2014/53/EU²
 - ETSI EN 301489-1:2011, ETSI EN 301489-17:2009
- EU RoHS Directive 2011/65/EU¹
- CE Marking Directive 93/68/EEC

Note 1: Except the electrolyte level sensor made from lead, which should be treated as hazardous material.

As manufacturer we declare under our sole responsibility that the equipment fulfils essential requirements for CE conformity according to applied directives and standards.

Date
2017-04-13

Signature


Position
R&D Manager

Henrik Litsin