

# CHARGER CHAMP 24 V

**LEAB**  
*mobile energy*



USER MANUAL  
VERSION 5  
13/07/2021

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## 1 About this Manual

Read this manual carefully and keep it in a safe place. This manual is aimed at Skilled workers in the field of automotive electrics.

Any modifications to the product or its components are prohibited and do not conform to its intended use. Only use original LEAB or LEAB-approved accessories.

Throughout the manual, you will be alerted to warnings and safety notices about potential hazards associated with handling the device. The colours and signal words indicate the severity of the hazard:



### Notice

#### Possibility of material damage

The signal word *Attention* indicates that there is a possibility of material damage. To avoid material damage, follow the instruction.

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### ⚠ CAUTION

#### Danger that can lead to minor injuries

Safety instructions with the signal word *CAUTION* indicate a hazard which, if not avoided, can result in minor or moderate injury. Read the safety instructions carefully and follow them to avoid the hazard.

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### ⚠ WARNING

#### Hazards that can lead to severe injuries or death

Safety instructions with the signal word *WARNING* indicate a hazard which, if not avoided, can result in death or severe injury. Read the safety instructions carefully and follow them to avoid the hazard.

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**⚠ DANGER****Danger that will lead to severe injury or death**

Safety instructions with the signal word *Danger* indicate a hazard which, if not avoided, will result in death or severe injury. Read the safety instructions carefully and follow them to avoid the hazard.

You will find useful tips and tricks in certain parts of the manual. These appear as follows:

**TIP****Tips provides additional, useful information.**

Read the tip carefully and follow the instructions where applicable.

## 2 Safety

This manual will help you to handle the device safely. Use the device solely in accordance with its intended use. Observe the safety instructions.

The charger is a trickle and battery charger for permanent installation in vehicles. This charger can be used to charge all types of Lead-acid batteries (wet, gel, AGM).

Any modifications to the device or its components are prohibited and do not conform to its intended use. Keep this manual in a place where it can be accessed quickly.

### 2.1 Intended Use

The charger is designed for permanent installation in vehicles with 12 or 24 V on-board power systems for charging Lead-acid batteries (wet, gel, AGM). It is suitable for charging and trickle charging auxiliary batteries. The device is designed for a temperature range of -30 °C ... 60 °C. Do not charge batteries with this charger outside the specified temperature range. At higher temperatures, the output power of the charger automatically decreases.

**⚠ WARNING****Risk of fire from overheated battery**

Flammable gases can escape if the battery overheats.

1. Always charge batteries in well-ventilated rooms and away from ignition sources.
- 
- 

**⚠ WARNING****Risk of injury from damaged, frozen or deformed batteries**

Damaged, frozen or deformed batteries can cause injuries.

1. Before using the battery, make sure that the battery is undamaged and the electrolyte is not frozen.
- 
- 

**⚠ WARNING****Burns from escaping acid**

Acid can leak out when handling batteries.

1. Wear acid-proof clothing when handling batteries.
- 
- 

**Notice****Device defects from incorrect installation**

Incorrect installation can result in device defects.

1. Install the device in a dry and cool location.
-

### 2.2 Foreseeable Misuse

The charger is designed for permanent installation in vehicles. Do not mount the device outside the vehicle. Only charge lead-acid batteries (wet, gel/AGM) and traction batteries with this charger.

The negative lead of the charger may contain a temperature sensor, do not shorten or lengthen the lead under any circumstances.

Never pinch the leads of the charger to avoid damage. In the event of damage, unplug the charger immediately and contact your dealer or LEAB.

### 3 About this product

The Champ charger is a trickle and battery charger designed for permanent installation in vehicles. With its pre-programmed and fixed charging characteristic, all types of Lead-acid batteries (wet, gel, AGM) can be charged with this charger.

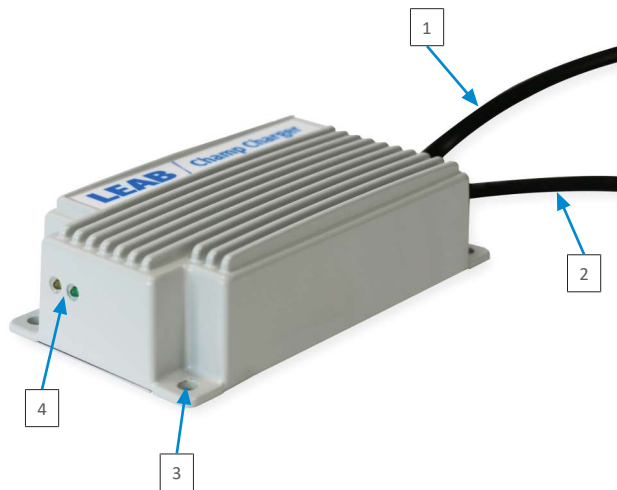


Fig. 1: Champ Charger

1 AC cable	2 DC cable
3 Mounting hole	4 LED status display

## 4 Technical specifications

	Part no. 0101033857	Part no. 0101033851	Part no. 0101033852
Modell	Champ 2412	Champ 2412	Champ 2412
Battery type	Lead (gel/AGM)	Lead (gel/AGM)	Lead (gel/AGM)
Battery capacity	55 Ah ... 170 Ah	55 Ah ... 170 Ah	55 Ah ... 170 Ah
Charging characteristics	IU1U2, pre-programmed, cannot be changed	IU1U2, pre-programmed, cannot be changed	IU1U2, pre-programmed, cannot be changed
Charging current	12 A	12 A	12 A
Ripple	< 3 %	< 3 %	< 3 %
Main charging	28.8 V	28.8 V	28.8 V
Trickle charging	27.6 V	27.6 V	27.6 V
Input voltage	230 V	230 V	230 V
Input values	190 V ... 270 V	190 V ... 270 V	190 V ... 270 V
Input frequency	40 Hz ... 60 Hz	40 Hz ... 60 Hz	40 Hz ... 60 Hz
Switching frequency	100 kHz	100 kHz	100 kHz
Degree of efficiency, max.	88 %	88 %	88 %
Quiescent current (from the battery)	< 2 mA	< 2 mA	< 2 mA
Temperature sensor	Yes	Yes	Yes
AC cable	1.5 m, two-pin earthed plug	1.5 m, two-pin earthed plug	0.2 m; DEFA
DC cable	1.5 m, MagCode Pro	1.5 m, DIN 14690 plug	1.5 m, ring terminal, M8
International Protection (IP class)	IP67	IP67	IP67

	Part no. 0101033857	Part no. 0101033851	Part no. 0101033852
Operating temperature	-30 °C ... +70 °C	-30 °C ... +70 °C	-30 °C ... +70 °C
Protection class	I	I	I
Dimensions (L x W x H)	98 mm x 192 mm x 47 mm	98 mm x 192 mm x 47 mm	98 mm x 192 mm x 47 mm
Weight	1.4 kg	1.4 kg	1.4 kg
	Part no. 0101033864	Part no. 0101043855	Part no. 0101033854
Modell	Champ 2412	Champ 2412	Champ 2412
Battery type	Lead (gel/AGM)	Lead (wet)	Lead (wet)
Battery capacity	55 Ah ... 170 Ah	55 Ah ... 170 Ah	55 Ah ... 170 Ah
Charging characteristics	IU1U2, pre-programmed, cannot be changed	IU1U2, pre-programmed, cannot be changed	IU1U2, pre-programmed, cannot be changed
Charging current	12 A	12 A	12 A
Ripple	< 3 %	< 3 %	< 3 %
Main charging	28.8 V	28.4 V	28.4 V
Trickle charging	27.6 V	27.0 V	27.0 V
Input voltage	230 V	230 V	230 V
Input values	190 V ... 270 V	190 V ... 270 V	190 V ... 270 V
Input frequency	40 Hz ... 60 Hz	40 Hz ... 60 Hz	40 Hz ... 60 Hz
Switching frequency	100 kHz	100 kHz	100 kHz
Degree of efficiency, max.	88 %	88 %	88 %
Quiescent current (from the battery)	< 2 mA	< 2 mA	< 2 mA
Temperature sensor	Yes	Yes	Yes



	<b>Part no. 0101033864</b>	<b>Part no. 0101043855</b>	<b>Part no. 0101033854</b>
AC cable	1.5 m, two-pin earthed plug	1.5 m, two-pin earthed plug	1.5 m, two-pin earthed plug
DC cable	1.5 m, ring terminal lug, M8, 20 A fuse	1.5 m, ring terminal lug, M8, 20 A fuse	1.5 m, ring terminal lug, M8, 20 A fuse
International Protection (IP class)	IP67	IP67	IP67
Operating temperature	-30 °C ... +70 °C	-30 °C ... +70 °C	-30 °C ... +70 °C
Protection class	I	I	I
Dimensions (L x W x H)	98 mm x 192 mm x 47 mm	98 mm x 192 mm x 47 mm	98 mm x 192 mm x 47 mm
Weight	1.4 kg	1.4 kg	1.4 kg

	<b>Part no. 0101033867</b>	<b>Part no. 0101033861</b>	<b>Part no. 0101033351</b>
Modell	Champ 2412	Champ 2412	Champ 2405
Battery type	Lead (gel/AGM)	Lead (wet)	Lead (gel/AGM)
Battery capacity	90 Ah ... 300 Ah	90 Ah ... 300 Ah	55 Ah ... 170 Ah
Charging characteristics	IU1U2, pre-programmed, cannot be changed	IU1U2, pre-programmed, cannot be changed	IU1U2, pre-programmed, cannot be changed
Charging current	12 A	12 A	5 A
Ripple	< 3 %	< 3 %	< 3 %
Main charging	28.8 V	28.4 V	28.8 V
Trickle charging	27.6 V	27.0 V	27.6 V
Input voltage	230 V	230 V	230 V
Input values	190 V ... 270 V	190 V ... 270 V	190 V ... 270 V
Input frequency	40 Hz ... 60 Hz	40 Hz ... 60 Hz	40 Hz ... 60 Hz
Switching frequency	100 kHz	100 kHz	100 kHz

	Part no. 0101033867	Part no. 0101033861	Part no. 0101033351
Degree of efficiency, max.	88 %	88 %	88 %
Quiescent current (from the battery)	< 2 mA	< 2 mA	< 2 mA
Temperature sensor	Yes	Yes	Yes
AC cable	1.5 m, two-pin earthed plug	1.5 m, two-pin earthed plug	1.5 m, two-pin earthed plug
DC cable	3.0 m, DIN 14690 plug	1.5 m, DIN 14690 plug	1.5 m, ring terminal, M8
International Protection (IP class)	IP67	IP67	IP67
Operating temperature	-30 °C ... +70 °C	-30 °C ... +70 °C	-30 °C ... +70 °C
Protection class	I	I	I
Dimensions (L x W x H)	98 mm x 192 mm x 47 mm	98 mm x 192 mm x 47 mm	98 mm x 192 mm x 47 mm
Weight	1.4 kg	1.4 kg	1.4 kg

## 5 Package contents

Name	No.
Battery charger	1x
User manual	1x

## 6 Charging characteristic

Battery charging is fully automatic and micro-processor controlled with a 3-stage IU<sub>1</sub>U<sub>2</sub> characteristic curve for gentle and optimum charging of the batteries.

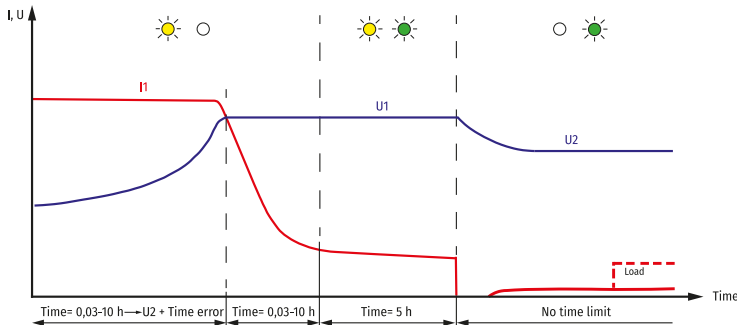


Fig. 2: IU<sub>1</sub>U<sub>2</sub> charging characteristic

### I phase: Charging with constant current

Depending on the battery charge state, the battery is charged with maximum charging current to store as much energy as possible in the battery. After reaching the set main charging voltage, the charger switches to the next charging phase (U<sub>1</sub> phase). If the set main voltage is not reached within max. 10 hours, the device changes to the U<sub>2</sub> phase.

### U<sub>1</sub> phase: Charging with constant current

In the main charging phase, the voltage is kept at a constant value. As the battery increasingly charges, the current decreases continuously and approaches a lower limit.

Battery	Type	Main charge voltage
Gel battery	24 V	28.8 V
Wet cell battery	24 V	28.2 V
AGM battery	24 V	28.8 V

### U<sub>2</sub> phase: Charging with constant current

In this phase, the charging voltage is reduced in order to maintain the battery charge for an unlimited period and counteract self-discharge. Additional connected consumers are supplied via the charger in this phase without loading the battery.

Battery	Type	Charge voltage
Gel battery	24 V	27.6 V
Wet cell battery	24 V	27.0 V
AGM battery	24 V	27.6 V

## 7 Assembly

To assemble the device, proceed as follows:

- ✓ Choose a cool, dry and well-ventilated assembly site.
  - ✓ Do not mount the device directly next to or above batteries.
  - ✓ Optimum cooling is achieved by mounting the unit vertically on a flat surface.
    1. Fasten the device to the 4 mounting holes on the side (3) (Ø 5 mm).
- ⇒ The device is assembled.

## 8 Installation

The Champ charger is designed for permanent installation in vehicles.

### 8.1 Battery connection



#### Notice

##### Device defect from shortening the negative lead.

Do not shorten the negative lead under any circumstances, as it contains a temperature sensor.

To install the device in the vehicle, proceed as follows:

1. Disconnect the battery from the vehicle power circuit.

**⚠ WARNING!** Disconnect the negative lead first.

2. Secure the positive lead of the device as close as possible to the vehicle battery with a suitable fuse.
3. Connect the positive lead of the device to the positive terminal of the battery.
4. Connect the negative lead of the device to the negative terminal of the battery.

**NOTE!** Connect the cable lug directly to the negative terminal of the battery.

5. Connect the vehicle battery to the vehicle power circuit.

⇒ The device is installed.

## 8.2 Connection to the 230 V mains supply

To connect the device to the 230 V mains, proceed as follows:

**NOTE!** The charger is only suitable for connection to fused, earthed 230 V mains supplies.

1. Connect the mains plug to a 230 V mains supply.

⇒ The charger is connected to the 230 V mains supply.

## 8.3 Connection to the 115 V mains supply

To connect the device to the 115 V mains, proceed as follows:




**NOTE!** The charger is only suitable for connection to fused, earthed 115 V mains supplies.

1. Connect the mains plug to a 115 V mains supply.

⇒ The charger is connected to the 115 V mains supply.

## 9 Operation

### 9.1 LED status display

LED display	Item	Meaning
	Yellow LED lights up	The charging process is in the I-phase with maximum current. The voltage drops as soon as the battery is charged.
	Yellow and green LED lights up	The charger is in the main charging phase. The battery is charged with increased voltage.
	Green LED lights up	The charger is in the trickle charging phase. The charger ensures that the battery remains charged.

### 9.2 Charging the battery

To unpack the device, proceed as follows:

- ✓ The device is installed.
- ✓ The battery is connected.
- 1. Connect the mains plug to a 230 V mains supply.
  - ⇒ Charging starts automatically, the yellow LED of the charge status indicator lights up.
  - ⇒ If the charging current is 15% below the maximum value, the yellow and green LEDs of the charging status indicator light up.
  - ⇒ When the battery is fully charged, the green LED on the charging status indicator lights up and indicates the trickle charge.
- ⇒ The battery is charged.

### 9.3 Charging the battery

To unpack the device, proceed as follows:

- ✓ The device is installed.
- ✓ The battery is connected.

1. Connect the mains plug to a 115 V mains supply.
    - ⇒ Charging starts automatically, the yellow LED of the charge status indicator lights up.
    - ⇒ If the charging current is 15% below the maximum value, the yellow and green LEDs of the charging status indicator light up.
    - ⇒ When the battery is fully charged, the green LED on the charging status indicator lights up and indicates the trickle charge.
- ⇒ The battery is charged.

## 9.4 Temperature sensor

Depending on the model, the Champ charger has a temperature sensor located in the negative lead. The temperature sensor corrects the charging voltage as a function of the temperature in order to provide an optimal, effective and gentle battery charge.

## 10 Maintenance

Check the device as follows before using it each time:

- Check the mains cable and mains plug for damage.
- Check charging cables and connections for damage.
- Check the charger for external damage.
- Ensure that the wiring between the charging cable and the charger is secure.



### TIP

#### Battery maintenance

For battery maintenance, refer to the battery manufacturer's instructions.

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## 11 Disposal



Dispose of the device in accordance with the Waste Electrical and Electronic Equipment Regulations (WEEE).

The system must not be disposed of with household waste. Take it to a recycling point or return it to your point of sale.

## 12 EU Declaration of Conformity



The **Champ** charger complies with the requirements of the following directives:

- 2014/30/EU: EMV
- 2014/35/EU: NRL
- 2011/65/EU: RoHS

## 13 Appendix

### 13.1 Information on outdoor use of the PowerSystem 12/24 V

**MagCode** PowerSystems were originally developed for vehicle interiors. However, in Germany, the BGS, DRK, fire brigade, police and THW now use these systems in addition to the DIN plug as an outdoor socket for charge maintenance on their emergency vehicles.

With regard to outdoor use, please note:

#### Port (socket)

When installed with a sealing ring on the front (contacting side to the clip), the port is tight in accordance with IP5K9K. **If the rear of the port comes into contact with water, it must be sealed.**

#### Clip (pick-up/connector)

The clip (IP40) is not waterproof. Keep the clip protected from water.

#### Clip to port connection

This connection is also not waterproof. At best, it is protected against dripping water (IP42).



To prolong the life of the product, the following measures should also be taken:

- After outdoor use, clean the port briefly with a cloth.
- Remove possible deposits of metal chips on the contact side of the port and clip with an adhesive strip from time to time.
- Spray contact spray on port and clip contacts every 1 to 2 months.



### TIP

#### Device defect due to faulty release under load

The MagCode PowerSystemPro 12/24 V has a mechanical bayonet lock. It can be disconnected under load without unlocking, which can damage the system or cause the system to fail completely.

1. Always unlock the system manually.

## 13.2 MagCodePowerPort installation instructions



Fig. 3: MagCode PowerSystems clip and port

**NOTE!** An existing car socket can easily be replaced by a MagCode PowerPort, as both have the same diameter. If installing elsewhere, we recommend visiting a specialist workshop.

To install the **MagCodePowerPort** in place of an existing car socket, proceed as follows:

**⚠ DANGER!** Short circuit hazard - Remove the fuse before starting work.

1. Pull out the existing car socket.

**NOTE!** Note the polarity of the wires.

2. Cut the cable.

OR...

3. Drill a new installation opening ( $\varnothing$  28 mm).

⇒ The installation opening is prepared.

4. Slide the **MagCodePowerPort**, with or without spacer ring, into the installation opening.

5. Screw the **MagCodePowerPort** on the back with a nut (M28).
  6. Connect the cables with each other by soldering, crimping or with connection terminals.
  7. Put the fuse back in place.
- ⇒ The **MagCodePowerPort** is installed.

### 13.3 MagCodePowerClip assembly instructions

To install the device, proceed as follows:

1. Cut off the old connector.

**NOTE!** Note the polarity of the wires.

2. Screw on the **MagCodePowerClip**.
3. Select the appropriate strain relief for the cable thickness.
4. If necessary, shorten the cable grommet by passing the cables through the grommet and the strain relief and attaching the wire end ferrules.
5. Screw the cables into the terminals.

**NOTE!** Note the polarity of the wires.

6. Screw the housing together.

⇒ The device is assembled.



# We make energy mobile.

## **LEAB Automotive GmbH**

Thorshammer 6

DE-24866 Busdorf

Tel: +49 (0) 4621 9 78 60-0

Fax: +49 (0) 4621 9 78 60-260

[info@leab.eu](mailto:info@leab.eu)

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