

# CHARGER CHAMP PRO 24 V

**LEAB**  
*mobile energy*



USER MANUAL  
VERSION 8  
19/08/2021

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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.

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### **⚠ 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 for permanent installation in vehicles. This charger can be used to charge all types of Lead-acid batteries (wet, gel, AGM). With the Champ charger, the charging characteristic can be adjusted to ensure optimum charging of the battery.



Fig. 1: Champ Pro charger

- |            |            |
|------------|------------|
| 1 Display  | 2 AC cable |
| 3 DC cable |            |

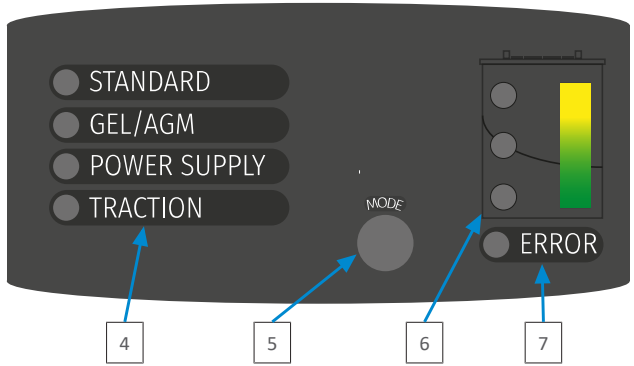


Fig. 2: Champ Pro charger display

- |                                     |                   |
|-------------------------------------|-------------------|
| 4 Charging characteristic indicator | 5 Mode button     |
| 6 Charge status indicator           | 7 Error indicator |



## 4 Technical specifications

	Part no. 0101043982	Part no. 0101043881
Modell	Champ Pro 2412	Champ Pro 2412
Battery type	Lead acid (wet, gel/AGM)/ traction	Lead acid (wet, gel/AGM)
Charging characteristics	Choice of 4 charging characteristics	Choice of 4 charging characteristics
Battery capacity	40 Ah ... 120 Ah	65 Ah ... 200 Ah
Temperature sensor	No	Yes
AC cable	2.0 m, two-pin earthed plug	2.0 m, two-pin earthed plug
DC cable	1,5 m, ring terminal, M8	1,5 m, ring terminal, M8
Charging current	12 A	12 A
Ripple	< 3 %	< 3 %
Main charging	28.4 V/28.8 V	28.4 V/28.8 V
Equalisation charging	32.0 V	32.0 V
Trickle charging	27.0 V/27.6 V	27.0 V/27.6 V
Mains part function	27.4 V	27.4 V
Input voltage	230 V	230 V
Input values	195 V ... 250 V	195 V ... 250 V
Input frequency	40 Hz ... 60 Hz	40 Hz ... 60 Hz
Quiescent current (from the battery)	< 1 mA	< 1 mA
Mains fuse	B16 A or C16 A	B16 A or C16 A
Degree of efficiency, max.	> 88 %	> 88 %
International Protection (IP class)	IP67	IP67
Protection class	I	I
Operating temperature	-30 °C ... +60 °C	-30 °C ... +60 °C
Dimensions (L x W x H)	195 mm x 98 mm x 47 mm	195 mm x 98 mm x 47 mm
Weight	1.5 kg	1.5 kg



	Part no. 0101043891	Part no. 0101043999
Modell	Champ Pro 2420	Champ Pro 2420
Battery type	Lead acid (wet, gel/AGM)/traction	Lead acid (wet, gel/AGM)/traction
Charging characteristics	Choice of 4 charging characteristics	Choice of 4 charging characteristics
Battery capacity	65 Ah ... 200 Ah	65 Ah ... 200 Ah
Temperature sensor	Yes	Yes
AC cable	2.0 m, two-pin earthed plug	1.5 m, two-pin earthed plug
DC cable	1.5 m ring terminal, M8	3 m, ring terminal, M8
Charging current	20 A	20 A
Ripple	< 3 %	< 3 %
Main charging	28.4 V/28.8 V	28.4 V/28.8 V
Equalisation charging	32.0 V	32.0 V
Trickle charging	27.0 V/27.6 V	27.0 V/27.6 V
Mains part function	27.4 V	27.4 V
Input voltage	230 V	230 V
Input values	195 V ... 250 V	195 V ... 250 V
Input frequency	40 Hz ... 60 Hz	40 Hz ... 60 Hz
Quiescent current (from the battery)	< 1 mA	< 1 mA
Mains fuse	B16 A or C16 A	B16 A or C16 A
Degree of efficiency, max.	> 88 %	> 88 %
International Protection (IP class)	IP67	IP67
Protection class	I	I
Operating temperature	-30 °C ... +60 °C	-30 °C ... +60 °C
Dimensions (L x W x H)	195 mm x 98 mm x 47 mm	195 mm x 98 mm x 47 mm
Weight	1.5 kg	1.5 kg

	Part no. 0101056901	Part no. 0101056005
Modell	Champ Pro 2420	Champ Pro 2420
Battery type	Lead acid (wet, gel/AGM)/ traction	Lead acid (wet, gel/AGM)
Charging characteristics	Choice of 4 charging characteristics	Choice of 4 charging characteristics
Battery capacity	65 Ah ... 200 Ah	65 Ah ... 200 Ah
Temperature sensor	Yes	No
AC cable	1.5 m, two-pin earthed plug	1.5 m, Neutrik
DC cable	0.5 m, MTA connector, 3 pin	5.0 m, without plug
Charging current	20 A	20 A
Ripple	< 3 %	< 3 %
Main charging	28.4 V/28.8 V	28.4 V/28.8 V
Equalisation charging	32.0 V	32.0 V
Trickle charging	27.0 V/27.6 V	27.0 V/27.6 V
Mains part function	27.4 V	27.4 V
Input voltage	230 V	230 V
Input values	195 V ... 250 V	195 V ... 250 V
Input frequency	40 Hz ... 60 Hz	40 Hz ... 60 Hz
Quiescent current (from the battery)	< 1 mA	< 1 mA
Mains fuse	B16 A or C16 A	B16 A or C16 A
Degree of efficiency, max.	> 88 %	> 88 %
International Protection (IP class)	IP67	IP67
Protection class	I	I
Operating temperature	-30 °C ... +60 °C	-30 °C ... +60 °C
Dimensions (L x W x H)	195 mm x 98 mm x 47 mm	195 mm x 98 mm x 47 mm
Weight	1.5 kg	1.5 kg

Part no. 0101043981	
Modell	Champ Pro 2420
Battery type	Lead acid (wet, gel/AGM)
Charging characteristics	Choice of 4 charging characteristics
Battery capacity	65 Ah ... 200 Ah
Temperature sensor	No
AC cable	2.0 m, two-pin earthed plug
DC cable	3,0 m, ring terminal, M8
Charging current	20 A
Ripple	< 3 %
Main charging	28.4 V/28.8 V
Equalisation charging	32.0 V
Trickle charging	27.0 V/27.6 V
Mains part function	27.4 V
Input voltage	230 V
Input values	195 V ... 250 V
Input frequency	40 Hz ... 60 Hz
Quiescent current (from the battery)	< 1 mA
Mains fuse	B16 A or C16 A
Degree of efficiency, max.	> 88 %
International Protection (IP class)	IP67
Protection class	I
Operating temperature	-30 °C ... +60 °C
Dimensions (L x W x H)	195 mm x 98 mm x 47 mm
Weight	1.5 kg

### 5 Package Contents

Name	No.
Battery charger	1x
User manual	1x

### Accessories

Name	Part number
Connection cable and sensor (3 m)	1019003005
Connection cable and sensor (4.7 m)	1019003004

## 6 Charging Characteristics

Battery charging is fully automatic and micro-processor controlled with a 3-stage  $I_{U_1}U_2$  characteristic curve for gentle and optimum charging of the batteries. The charging phase of the charger is indicated by the LEDs on the display of the unit (*About this Product* [▶ 7], Fig. 2, no. 7).

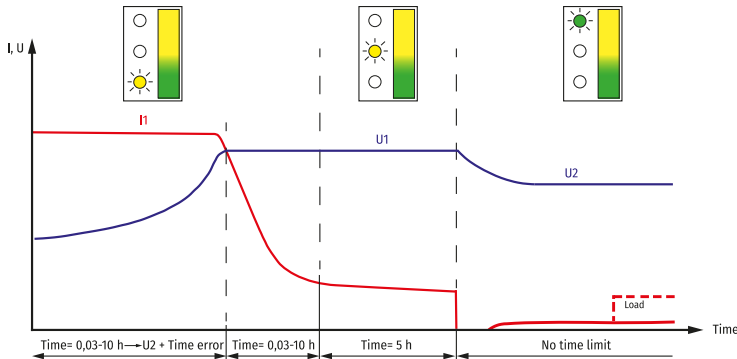


Fig. 3: Charging characteristic of lead-acid battery (wet, gel/AGM)

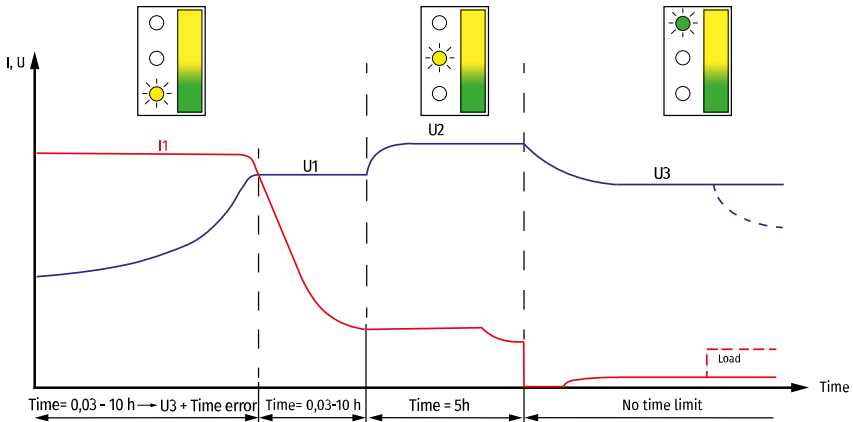


Fig. 4: Charging characteristic of traction battery

### 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 ( $U_1$ ). If the set main voltage is not reached within max. 10 h, the device enters the  $U_2$  phase and reports an error.

**NOTE!** Deep discharged batteries with a voltage below 6 V are not charged for safety reasons.

### $U_1$ phase: Main charging with constant voltage

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/AGM battery	24 V	28.8 V
Wet cell batterie (standard)	24 V	28.4 V

### $U_2$ phase: Trickle charge with reduced voltage

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

Battery	Type	Charge Voltage
Gel/AGM batterie	24 V	27.6 V
Wet cell battery (standard)	24 V	27.0 V

## Charging characteristic: POWER SUPPLY

Champ Pro chargers In the “Power Supply” setting can also be used without the battery connected to supply DC consumers. This setting can be used, for example, when replacing the battery in the vehicle to avoid on board computer and radio data loss due to the loss of power and having to be reprogrammed.

Note that the power required must be no higher than the output power of the charger. In the “Power Supply” setting, the charger gives off a constant voltage of 13.7 V or 27.4 V. The green LED of the charge status indicator is continuously lit. The “Power Supply” setting also allows deeply discharged batteries to be reactivated so that they be identified and recharged by one of the automatic loaders. After reaching the minimum voltage, switch to the appropriate charging characteristic.

## 7 Assembly

To assemble the device, perform the following steps:

- ✓ 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 holes on the side ( $\varnothing$  5 mm)
- ⇒ The device is assembled.

## Setting the charging characteristic for the first time

To select a charging characteristic, perform the following steps:

1. Connect the mains plug to a 230 V mains supply.
  2. Within 3 to 6 seconds, press the Mode button repeatedly until the LED next to the desired charging characteristic is lit on the display (4).
  3. Disconnect the charger from the 230 V mains.
- ⇒ The charging characteristic is set.

## 8 Installation

The charger is designed for permanent installation in vehicles. When installing the charger, note the following:

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### Notice

#### Incorrect installation can damage the device

The negative lead of the unit may contain a temperature sensor.

1. Never shorten or extend the negative cable with a temperature sensor.
- 

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

1. Disconnect the battery from the vehicle power circuit.

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

2. Connect the plug of the DC cable to the connection cable that is connected to the battery. **NOTE!** Use the appropriate connection cable for the connection.

⇒ The device is installed.

### Connection to 230 V mains

To install 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.

⇒ One of the 4 charging LED flashes orange while the device is connecting to the battery. There is no voltage output at this stage.

⇒ After 2 seconds, the LEDs of the charge status indicator flash, the charging process starts.

⇒ The charging progress is indicated in the charge status indicator via the illuminated LEDs.

⇒ If the green LED on the charge status indicator is lit, the charge is complete and the battery can be disconnected from charger.

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



## 9 Operation

### 9.1 Charging the battery

To start the charging operation, 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.

### 9.2 Charging the battery

To start the charging operation, 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.

### 9.3 Change charging characteristic

To change the charging characteristic, proceed as follows:

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

1. Connect the mains plug to a 230 V/115 V mains supply.
    - ⇒ One of the 4 charging characteristic LEDs lights up orange while the unit is establishing a connection to the battery. There is no voltage output yet.
  2. Press the Mode button repeatedly until the LED next to the desired charging characteristic lights up.
    - ⇒ After 2 seconds, the LEDs of the charging status display flashes and the charging process starts.
    - ⇒ The charging progress is indicated in the charging status display by illuminated LEDs.
    - ⇒ If the green LED of the charging status indicator lights up, charging is complete and the battery can be disconnected from the charger.
- ⇒ The charging characteristic has been changed and the battery is being 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 Pro** 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. 5: 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.



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