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C7 Operating Instructions





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Introduction

The following pictograms/symbols are used in these operating instructions/and product:



Never dispose of electrical equipment together with household refuse.



Keep children and others away from the battery charger when in operation.



Heed the warnings and safety instructions



For indoor use only.



**Caution: Risk of electric shock
Hazardous voltage – Risk of fatal injury**



Dustproof, watertight



Danger of explosion!



Danger of acid burns!



Fire hazard!



Consult the operating instructions

Carefully study the operating instructions with the illustrations page folded out. The operating instructions should be kept in a safe place and submitted together with the device in the event of this changing hands.

The Bosch C7 is suitable for the charging and trickle charging of 12 V and 24 V lead batteries with liquid electrolyte, AGM or gel. Only operate the charger in a well ventilated area.

The manufacturer cannot accept any liability for damage arising from improper use. The device is not intended for commercial applications.

Scope of delivery:

- 1 Charger
- 1 Power cord with mains connector
- 2 Terminals (1 red, 1 black)
- 1 Charging cable with 2 cable lugs
- 1 Set of operating instructions
- 1 Wall mount

List of parts

- 1 Charger
- 2 Mounting bracket
- 3 Power cord with mains connector
- 4 Charging cable with cable lug (red and black)
- 4a Fuse
- 4b Plug
- 5 (+) Terminal (red)
- 6 (-) Terminal (black)
- 7 Standby / power indicator
- 8 Mode selection button
- 9 Reverse polarity protection
- 10 Charge status
- 11 Charge status “ok” (lit)
Charge maintenance (flashing)
- 12 Mode 1 | 12 V (motorcycle / car charging)
- 13 Mode 2 | 12 V (winter charging, AGM)
- 14 Mode 3 | 12 V (power back-up)
- 15 Mode 4 | 12 V (regeneration)
- 16 Mode 5 | 24 V (truck charging)
- 17 Mode 6 | 24 V (winter charging, AGM)

Secondary

Rated output voltage:	12 V $\overline{---}$ 24 V $\overline{---}$
Charging voltage:	28.8 V / 29.4 V (± 0.6 V), 14.4 V / 14.7 V (± 0.25 V), 13.6 V / 16.5 V (± 0.25 V)
Charging current:	7 A (± 0.7 A), 5 A (± 0.5 A), 3,5 A (± 0.35 A), 1,5 A (± 0.3 A)
Rated output current:	3.5 A / 7 A
Ripple ¹ :	max. 150 mV
Backflow current ² :	< 5 mA (no AC input)
Degree of protection:	IP 65 (dustproof, water-tight)
Battery type:	12 V + 24 V lead acid battery (AGM, GEL, open and VRLA)
Battery capacity:	12 V: 14 Ah – 230 Ah / 24 V: 14 Ah – 120 Ah
Fuse (internal):	10 A
Noise level:	< 50 dBA

Technical data

Primary

Rated input voltage:	230 V ~ 240V / 50 Hz
Starting current:	< 50 A
Rated input current:	max. 1.2 A (rms value)
Power input:	135 W

Ambient

temperature:	0 to + 40 °C
Dimensions:	197 x 108 x 65 mm (L x W x H)

Safety

Notes on safety



Caution: There is a danger of fatal injury from electric shocks if a power cord is damaged.

- ▶ Never operate the device if the cable, power cord or mains connector is damaged.
- ▶ Damaged power cords are only to be repaired by appropriately qualified specialists.



Keep children and others away from the battery charger when in operation.

- ▶ Children should be kept under supervision to make sure they do not play with the unit.
- ▶ Children are not able to judge the possible hazards associated with electrical equipment.
- ▶ This unit is not intended for use by anyone (including children) with physical, sensory or mental disabilities or lacking in experience and /or the appropriate knowledge unless they are supervised by a person responsible for their safety or receive instruction from this person on how to use the device.



Risk of injury!

- ▶ In the case of batteries permanently fitted in a vehicle, make sure the vehicle is not in operation. Switch off the ignition and set the vehicle to the parked position, with the parking brake applied (e. g. passenger vehicles) or the rope made fast (e. g. power boats).
- ▶ Use screwdrivers and wrenches with an insulated grip when fixing the charger in position.



Danger of explosion: Guard against highly explosive electrolytic gas reactions.

- ▶ Hydrogen gas (electrolytic gas) may escape from the battery during charging and trickle charging. Electrolytic gas is an explosive mixture of hydrogen gas and oxygen. Contact with naked flames, hot surfaces or sparks will cause an electrolytic gas reaction.
- ▶ Always perform charging and trickle charging in a sheltered, well ventilated area.
- ▶ Avoid naked flames, hot surfaces and sparks during charging and trickle charging.



Danger of explosion and fire hazard!

- ▶ Never attempt to charge dry or non-rechargeable batteries with the charger.
- ▶ Make sure there is no risk of explosive or flammable substances, e. g. gasoline or solvent, being ignited whilst using the charger.
- ▶ The charging cable must never make contact with any fuel pipes (e. g. gasoline pipes).
- ▶ Ensure adequate ventilation whilst charging.
- ▶ During the charging process, place the removed battery on a well ventilated surface.
- ▶ The charger is not to be used for the charging and trickle charging of damaged or frozen batteries.
- ▶ Prior to connection to the mains, make sure the mains current is the specified 230 V ~ 50 Hz and that the system is provided with a grounded neutral conductor, a 16 A fuse and an r.c.c.b. (residual-current-operated circuit breaker).
- ▶ Keep the charger away from naked flames and sources of heat and do not expose to temperatures in excess of 50 °C for a lengthy period.
- ▶ Never cover the charger when the unit is in operation.
- ▶ Protect the electric contact surfaces of the battery against short circuits.

- ▶ Never place the charger on or directly next to the battery.
- ▶ Set up the charger as far away from the battery as the charging cable allows.



Danger of acid burns!

- ▶ **Always wear safety goggles. Always wear protective gloves.** In the event of contact with electrolyte, rinse the eyes or skin immediately with copious amounts of clean running water and consult a doctor without delay.



Danger of electric shocks!

- ▶ Never disassemble the charger. Incorrect assembly of the charger can lead to the risk of fatal electric shocks.
- ▶ Make sure the mains current has been disconnected before performing battery charger installation, maintenance and upkeep work.
- ▶ Only touch the insulated part of the terminals **(-)** and **(+)**.

- ▶ Never touch both terminals at the same time when the charger is in operation.
- ▶ Always disconnect the power cord from the socket before connecting the charging cable to the battery or disconnecting it from the battery.
- ▶ On completion of charging and trickle charging for a battery permanently connected in the vehicle, always start by disconnecting the terminal **(-)** (black) of the charger from the **(-)** terminal of the battery.
- ▶ In the event of malfunctions and damage, always disconnect the charger from the mains current immediately.
- ▶ The charger is only to be repaired by qualified specialists.
- ▶ Disconnect the charger from the mains current and the battery when not in use.

Product description

This unit is designed for charging open as well as a wide range of closed lead acid batteries used for passenger cars, motorcycles and certain other vehicles – e. g. WET batteries (with liquid electrolyte), GEL batteries (with electrolyte in gel form) or AGM (absorbent glass mat) batteries. The battery capacity ranges from 12 V (14 Ah) to 12 V (230 Ah) or from 24 V (14 Ah) to 24 V (120 Ah).

The special device concept permits re-charging up to virtually 100% of the battery capacity.

The charger features a total of 6 charging modes for different batteries in various states. This makes charging more efficient and reliable.

In contrast to conventional products, the charger has a special function (pulse charging) which permits the re-charging of more or less flat batteries. Trickle charging: The charger can be left permanently connected to maintain the full battery charge. After charging, the charger switches automatically to the trickle charge mode.

Stringent precautions to prevent incorrect usage and short circuits guarantee safe working. Thanks to an integrated circuit, several seconds elapse after selecting the charging mode before the charger starts the charging process. This means that the sparks frequently encountered during the connection process can be avoided.

In addition, the battery charger is controlled by an internal MCU (micro-computer unit).

Operation

Prior to start-up

- ▶ Read the battery operating instructions before connecting up the charger.
- ▶ Observe the vehicle manufacturer's recommendation if the battery is still connected to the vehicle.
- ▶ Clean the battery terminals. When doing so, do not allow the dirt to come into contact with your eyes or mouth.
- ▶ Ensure adequate ventilation. Hydrogen gas (electrolytic gas) may escape from the battery during charging and trickle charging.

Connection

- ▶ Connect the **(+)** terminal (red) **(5)** of the charger to the **(+)** terminal of the battery.
- ▶ Connect the **(-)** terminal (black) **(6)** of the charger to the **(-)** terminal of the battery.
- ▶ The **(-)** terminal (black) **(6)** can also be connected to the car body, however well away from fuel pipes.

Note: Make sure the **(+)** and **(-)** terminals are firm.

- ▶ Only then is the power cord to be connected to the mains current.

As soon as the charger has been connected to the mains current, it switches automatically to standby mode. The "Power" indicator will light up.

Note: The charger is provided with reverse polarity protection. The LED **(-)(+)** **(9)** will light up if the **(+)** and **(-)** terminals **(5)** **(6)** are interchanged on connection.

Disconnection

- ▶ Switch the charger to standby by pressing the Mode selection button.
- ▶ Always start by disconnecting the power cord from the mains current.
- ▶ Disconnect the **(-)** terminal (black) **(6)** of the charger from the **(-)** terminal of the battery.
- ▶ Disconnect the **(+)** terminal (red) **(5)** of the charger from the **(+)** terminal of the battery.

Memory function

If the C7 charger is disconnected from the mains during charging, the unit stores the mode implemented. On re-connection to the mains and if the battery is of the same type (12 V or 24 V), the unit starts up automatically in the last mode. In the case of a different type of battery (12 V and 24 V), it switches to standby.

Caution: If mode 2 or 6 was last implemented (cold battery or AGM battery) and a WET or GEL battery is then connected, this may result in overcharging and damage to the battery. In such cases the mode is always to be set appropriately for the battery to be charged. **There is no memory function with modes 3 and 4.**

Mode selection

- ▶ Select the required mode by pressing the mode selection button **(8)**.
- ▶ The LED for the desired mode will light up.

The following modes are available:

Mode 1 | 12 V (14.4 V / 7 A)

Suitable for batteries with a capacity of more than 14 Ah in normal state. Charging mode for WET batteries and the majority of GEL batteries.

Press the mode selection button **(8)** to select Mode 1. The LED **(12)** will light up. If no further action is taken, then charging will automatically start after a few seconds and the LED **(10)** will also light up. After successful charging of the battery, the LED will light up **(11)** and **(10)** go out.

After a short delay the unit switches automatically to trickle charge mode and the LED **(11)** flashes.

Mode 2 | 12 V (14.7 V / 7 A)

Suitable for batteries with a capacity of more than 14 Ah in cold state or for many AGM batteries.

Press the mode selection button **(8)** to select Mode 2. The LEDs **(12+13)** will light up. If no further action is taken, then charging will automatically start after a few seconds and the LED **(10)** will also light up. After successful charging of the battery, the LED will light up **(11)** and **(10)** go out.

After a short delay the unit switches automatically to trickle charge mode and the LED **(11)** flashes.

Mode 3 | Back-up mode / Power supply unit

Back-up mode

Suitable for providing back-up. On certain vehicles it is essential not to disconnect the vehicle electronics from the power supply on battery replacement. In such cases, the C7 can be used to power the vehicle electronics whilst changing the battery.

Connection to battery in vehicle

Press the mode selection button **(8)** to select Mode 3 and the LED **(14)** flashes.

Note: In back-up mode, switch off all electrical equipment (e. g. ignition, radio, lights).

Note: In back-up mode, as soon as the circuit is interrupted, the charger switches automatically to standby mode.

Caution: To avoid possible destruction, never charge the battery for a lengthy period in this mode.

Power supply unit

Without connection of battery

Keep the mode selection button **(8)** pressed for approx. three seconds. The supply LED **(14)** will light up as soon as the integrated switch is triggered. Power is supplied at a level of 13.6 V (± 0.25 V) / 5 A (± 10 %).

Note: Suitable as power supply unit for 12 V equipment e. g. refrigerator.

Note: The charger is provided with overload protection in this mode (max. 6.0 A).

Note: There is no reverse polarity protection in this mode (refer to "Connection").

Caution: Voltage is applied to the terminals in this mode even when no electrical equipment is connected.

Mode 4 | Regeneration mode (16 V boost)

Suitable for the regeneration of batteries after short-term extreme discharge. The battery should be disconnected from the vehicle electrical system. For batteries with a capacity of more than 14 Ah.

Press the mode selection button **(8)** to select Mode 4. The LEDs **(12+15)** will light up. If no further action is taken, then regeneration mode starts automatically after several seconds and the LED **(15)** flashes. If the battery is more or less completely flat, the LED **(15)** may flash for up to 3 hours. During this period, a constant current level of 1500 mA flows into the battery to restore its capacity. Regeneration mode is deactivated after a maximum of four hours. If the battery has still not been fully charged, the charger switches to a normal charging mode. After successful charging of the battery, the LED will light up **(11)** and **(10)** go out.

After a short delay the unit switches automatically to trickle charge mode and the LED **(11)** flashes.

Note: This mode is only suitable for 12 V batteries

Note: In this mode the battery must be completely charged! Do not interrupt the charging process prematurely.

Mode 5 | 24 V (28.8 V / 3.5 A)

Suitable for batteries with a capacity of more than 14 Ah in normal state. Charging mode for WET batteries and the majority of GEL batteries.

Press the mode selection button **(8)** to select Mode 5. The LED **(16)** lights. If no further action is then taken, charging starts automatically after a few seconds and the LED **(10)** will also light up. After successful charging of the battery, the LED will light up **(11)** and **(10)** go out.

After a short delay the unit switches automatically to trickle charge mode and the LED **(11)** flashes.

Mode 6 | 24 V (29.4 V / 3.5 A)

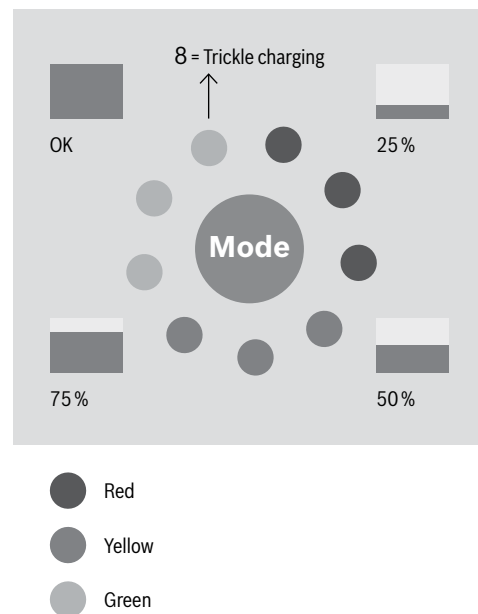
Suitable for batteries with a capacity of more than 14 Ah in cold state or for many AGM batteries.

Press the mode selection button **(8)** to select Mode 6. The LEDs **(13+16)** will light up. If no further action is then taken, charging starts automatically after a few seconds and the LED **(10)** will also light up. After successful charging of the battery, the LED will light up **(11)** and **(10)** go out.

After a short delay the unit switches automatically to trickle charge mode and the LED **(11)** flashes.

Charge status

The charge status of the connected battery is indicated as follows on the charger.



Pulse charging

This is an automatic charger function which cannot be selected manually. If the battery voltage at the start of charging is between 7.5 V (± 0.5 V) and 10.5 V (± 0.5 V) in 12 V mode and between 16 V (± 0.5 V) and 21 V (± 1.0 V) in 24 V mode, the charger switches automatically to pulse charging. On attaining a battery voltage above 10.5 (± 0.5 V)/ 21 V (± 1.0 V), the charger switches automatically to the charging mode previously selected. This enhances the charging process.

Appliance protection function

The charger switches to standby mode in the following abnormal situations.

- ▶ Regeneration process > 7 hours
- ▶ Charging > 41 hours
- ▶ Battery voltage < 7.5 V (12 V batteries)
- ▶ Battery voltage < 16 V (24 V batteries)
- ▶ Open circuit
- ▶ Reverse polarity

In the event of reverse polarity, the LED (9) will also light up. If no other setting is made, the system remains in standby mode.

In the event of a short circuit at the charging cable, fuse (4a) prevents damage to the device and the electrical system. Check fuse (4a) if Mode selection is not possible.

Overheating protection

If the unit becomes excessively hot during charging, the output power is automatically reduced to avoid damaging the unit.

Maintenance and upkeep

Always unplug the mains connector before working on the charger.

The unit is maintenance-free.

- ▶ Switch off the unit.
- ▶ Use a dry cloth to clean the plastic surfaces of the unit.
- ▶ Never use solvents or other aggressive cleaning agents.

Disposal

Only for EC countries:



Never dispose of electrical equipment together with household refuse.

According to the European Guideline 2002/96/EC for Waste Electrical and Electronic Equipment and its implementation into national law, power tools that are no longer usable must be collected separately and disposed of in an environmentally correct manner.

The packaging is made of ecological materials which can be disposed of at local recycling facilities.

Information

Service

The equipment is only to be repaired by qualified specialists using genuine spare parts so as to maintain operating reliability.

Important note: Consumer protections

If you have purchased your product in Australia, you should be aware that:

This warranty is provided in addition to other rights and remedies held by a consumer at law. Our goods come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and for compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.

If you have purchased your product in New Zealand, you should be aware that:

This warranty is supplemental to any other rights and remedies you have under the Consumer Guarantees Act 1993 NZ, unless your purchase is made for commercial purposes, in which case Bosch excludes all consumer guarantees implied in the Consumer Guarantees Act 1993 NZ in respect of your product.

Warranty

This unit is supplied with a 2 year warranty as of the date of purchase. It is manufactured with due care and checked diligently prior to delivery.

Please retain the receipt as proof of purchase.

In the event of any warranty claims please contact your sales agent to ensure return of the article free of charge.

This warranty is only valid for the initial purchaser and is not transferable.

The warranty applies only to material defects or manufacturing errors and not to wearing parts or damage to fragile components, e. g. switches. The product is intended solely for private use and not for commercial applications.

The warranty is rendered invalid by incorrect, inexpert handling, the application of force and tampering with the device.

- ¹ The noise factor describes the current and voltage noise values.
- ² The backflow current is the current consumed by the charger from the battery when there is no mains current connected.