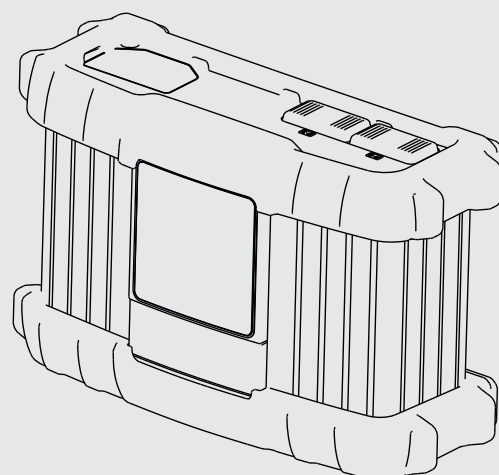


## Acctiva Professional 35 A Acctiva Professional 35 A UCN

Operating Instructions

EN

Battery charging system





# Dear reader,

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## **Introduction**

Thank you for the trust you have placed in our company and congratulations on buying this high-quality Fronius product. These instructions will help you familiarise yourself with the product. Reading the instructions carefully will enable you to learn about the many different features it has to offer. This will allow you to make full use of its advantages.

Please also note the safety rules to ensure greater safety when using the product. Careful handling of the product will repay you with years of safe and reliable operation. These are essential prerequisites for excellent results.



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# Safety rules

## Explanation of safety symbols



**DANGER!** Indicates immediate and real danger. If it is not avoided, death or serious injury will result.



**WARNING!** Indicates a potentially dangerous situation. Death or serious injury may result 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!** Indicates a risk of flawed results and possible damage to the equipment.

**IMPORTANT!** Indicates tips for correct operation and other particularly useful information. It does not indicate a potentially damaging or dangerous situation.

If you see any of the symbols depicted in the "Safety rules" chapter, special care is required.

## General



The device is manufactured using state-of-the-art technology and according to recognised safety standards. If used incorrectly or misused, however, it can cause:

- injury or death to the operator or a third party,
- damage to the device and other material assets belonging to the operating company,
- inefficient operation of the device.

All persons involved in commissioning, operating, maintaining and servicing the device must:

- be suitably qualified,
- read and follow these operating instructions carefully.

The operating instructions must always be at hand wherever the device is being used. In addition to the operating instructions, attention must also be paid to any generally applicable and local regulations regarding accident prevention and environmental protection.

All safety and danger notices on the device

- must be in a legible state,
- must not be damaged,
- must not be removed,
- must not be covered, pasted or painted over.

For the location of the safety and danger notices on the device, refer to the section headed "General information" in the operating instructions for the device.

Before switching on the device, rectify any faults that could compromise safety.

**This is for your personal safety!**

---

## Proper use



The device is to be used exclusively for its intended purpose. Any use above and beyond this purpose is deemed improper. The manufacturer is not liable for any damage, or unexpected or incorrect results arising out of such misuse.

Proper use includes:

- carefully reading and obeying all operating instructions and safety and danger notices
- performing all stipulated inspection and maintenance work
- following all instructions from the battery and vehicle manufacturers

Proper handling of the device is essential for it to function correctly. The device must never be pulled around by the cable.

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## Environmental conditions

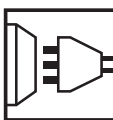


Operation or storage of the device outside the stipulated area will be deemed as "not in accordance with the intended purpose". The manufacturer shall not be liable for any damage resulting from such improper use.

For exact information on permitted environmental conditions, please refer to the "Technical data" in the leaflet.

---

## Mains connection




Devices with a higher rating may affect the energy quality of the mains due to their current input.

This may affect a number of device types in terms of:

- connection restrictions
- criteria with regard to the maximum permissible mains impedance <sup>\*)</sup>
- criteria with regard to the minimum short-circuit power requirement <sup>\*)</sup>

<sup>\*)</sup> at the interface with the public grid  
see "Technical data"

In this case, the plant operator or the person using the device should check whether the device may be connected, where appropriate by discussing the matter with the power supply company.

 **NOTE!** Ensure that the mains connection is earthed properly

---

## Dangers from mains current and charging current



Anyone working with chargers exposes themselves to numerous dangers e.g.:

- risk of electrocution from mains current and charging current
- hazardous electromagnetic fields, which can risk the lives of those using cardiac pacemakers



An electric shock can be fatal. Every electric shock is potentially life threatening. To avoid electric shocks while using the charger:

- do not touch any live parts inside or on the outside of the charger.
- under no circumstances touch the battery poles
- do not short-circuit the charger lead or charging terminals

All cables and leads must be secured, undamaged, insulated and adequately dimensioned. Loose connections, scorched, damaged or inadequately dimensioned cables and leads must be immediately repaired by authorised personnel.

---



**Dangers from acid, gases and vapours**



Batteries contain acid which is harmful to the eyes and skin. During charging, gases and vapours are released that can harm health and are highly explosive in certain circumstances.

- Only use the chargers in well ventilated areas to prevent the accumulation of explosive gases. Battery areas are not deemed to be hazardous areas provided that a concentration of hydrogen of less than 4 % can be guaranteed by the use of natural or forced ventilation.
- Maintain a distance of at least 0.5 m (19.69 in.) between battery and charger during the charging procedure. Possible sources of ignition, such as fire and naked lights, must be kept away from the battery
- The battery connection (e.g. charging terminals) must not be disconnected for any reason during charging



- On no account inhale any of the gases and vapours released
- Make sure the area is well ventilated.
- To prevent short circuits, do not place any tools or conductive metals on the battery



- Battery acid must not get into the eyes, onto the skin or clothes. Wear protective goggles and suitable protective clothing. Rinse any acid splashes thoroughly with clean water, and seek medical advice if necessary.



**General information regarding the handling of batteries**



- Protect batteries from dirt and mechanical damage.
- Store charged batteries in a cool place. Self discharge is kept to a minimum at approx. +2 °C (35.6 °F).
- Every week, perform a visual inspection to ensure that the acid (electrolyte) level in the battery is at the Max. mark.
- If any of the following occurs, do not start the device (or stop immediately if already in use) and have the battery checked by an authorised workshop:
  - uneven acid levels and/or high water consumption in individual cells caused by a possible fault.
  - heating of the battery over 55 °C (131 °F).

**Protecting yourself and others**



While the charger is in operation, keep all persons, especially children, out of the working area. If, however, there are people in the vicinity,

- warn them about all the dangers (hazardous acids and gases, danger from mains and charging current, etc.),
- provide suitable protective equipment.

Before leaving the work area, ensure that people or property cannot come to any harm in your absence.

---

## Safety measures in normal operation



Chargers with a ground conductor must only be operated on a mains supply with a ground conductor and a socket with a ground conductor contact. If the charger is operated on a mains supply without a ground conductor or in a socket without a ground conductor contact, this will be deemed gross negligence. The manufacturer shall not be held liable for any damage arising from such usage.

- Only operate the charger in accordance with the degree of protection shown on the rating plate.
- Never operate the charger if there is any evidence of damage.
- Arrange for the mains cable to be checked regularly by a qualified electrician to ensure the ground conductor is functioning properly.
- Any safety devices and parts that are not functioning properly or are in imperfect condition must be repaired by a qualified technician before switching on the charger.
- Never bypass or disable protection devices.
- After installation, an accessible mains plug is required.

---

## EMC Device Classifications



Devices in emission class A:

- Are only designed for use in industrial settings
- Can cause line-bound and radiated interference in other areas

---

Devices in emission class B:

- Satisfy the emissions criteria for residential and industrial areas. This is also true for residential areas in which the energy is supplied from the public low-voltage mains.

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EMC device classification as per the rating plate or technical data.

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## EMC measures

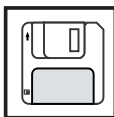


In certain cases, even though a device complies with the standard limit values for emissions, it may affect the application area for which it was designed (e.g. when there is sensitive equipment at the same location, or if the site where the device is installed is close to either radio or television receivers).

If this is the case, then the operating company is obliged to take appropriate action to rectify the situation.

---

## Data protection



The user is responsible for the safekeeping of any changes made to the factory settings. The manufacturer accepts no liability for any deleted personal settings.

**Maintenance and repair**



Under normal operating conditions, the device requires only a minimum of care and maintenance. However, it is vital to observe some important points to ensure it remains in a usable condition for many years.

- Before switching on, always check the mains plug and cable as well as charger leads and charging terminals for any signs of damage.
- If the surface of the device housing is dirty, clean with a soft cloth and solvent-free cleaning agent only

Maintenance and repair work must only be carried out by authorised personnel. Use only original replacement and wearing parts (also applies to standard parts). It is impossible to guarantee that bought-in parts are designed and manufactured to meet the demands made on them, or that they satisfy safety requirements.

Do not carry out any modifications, alterations, etc. to the device without the manufacturer's consent.

**Warranty and liability**



The warranty period for the charger is 2 years from the date of invoice. However, the manufacturer will not accept any liability if the damage was caused by one or more of the following:

- Use of the charger "not in accordance with the intended purpose"
- Improper installation and operation
- Operating the charger with faulty protection devices
- Non-compliance with the operating instructions
- Unauthorised modifications to the charger
- Catastrophes caused by the activities of third parties and force majeure

**Safety inspection**



The manufacturer recommends that a safety inspection of the device is performed at least once every 12 months.

A safety inspection should be carried out by a qualified electrician

- after any changes are made
- after any additional parts are installed, or after any conversions
- after repair, care and maintenance has been carried out
- at least every twelve months.

For safety inspections, follow the appropriate national and international standards and directives.

Further details on safety inspections can be obtained from your service centre. They will provide you on request with any documents you may require.

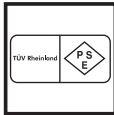
**Safety symbols**



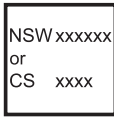
Devices with the CE mark satisfy the essential requirements of the low-voltage and electromagnetic compatibility directives.



Devices displaying this TÜV test mark satisfy the requirements of the relevant standards in Canada and USA.



Devices displaying this TÜV test mark satisfy the requirements of the relevant standards in Japan.



Devices displaying this TÜV test mark and the mark on the rating plate satisfy the requirements of the relevant standards in Australia.

---

## Disposal



Do not dispose of this device with normal domestic waste! To comply with the European Directive 2002/96/EC on Waste Electrical and Electronic Equipment and its implementation as national law, electrical equipment that has reached the end of its life must be collected separately and returned to an approved recycling facility. Any device that you no longer require must either be returned to your dealer or given to one of the approved collection and recycling facilities in your area. Ignoring this European Directive may have potentially adverse effects on the environment and your health!

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## Copyright



Copyright of these operating instructions remains with the manufacturer.

The text and illustrations are all technically correct at the time of printing. We reserve the right to make changes. The contents of the operating instructions shall not provide the basis for any claims whatsoever on the part of the purchaser. If you have any suggestions for improvement, or can point out any mistakes that you have found in the instructions, we will be most grateful for your comments.

# Safety rules - required for USA, Canada and Australia

## General and electrical risks

- 1 KEEP THESE INSTRUCTIONS CAREFULLY - This guide contains important safety and operating instructions for these charger types (for model, see first page of this document)
- 2 Do not expose the charger to rain or snow
- 3 The use of accessories not sold or recommended by the charger manufacturer can lead to fire, electric shock or personal injury

Minimum AWG size of an extension cable			
25 ft (7.6 m)	50 ft (15.2 m)	100 ft (30.5 m)	150 ft (45.6 m)
AWG 16	AWG 12	AWG 10	AWG 8

- 4 To reduce the risk of damage to plugs and cables, always unplug the charger by pulling at the plug rather than the cable
- 5 Only use an extension cable if it is absolutely necessary. The use of an incorrect extension cable can lead to fire and electric shock. If an extension cable must be used, make sure that
  - the pins of the extension cable plug are of the same number, size and shape as those of the charger plug
  - the extension cable is correctly wired and in good electrical condition
  - the cable size is large enough for the AC amperage of the charger, as indicated above
- 6 Do not use the charger with a damaged cable or plug - replace the cable or plug immediately
- 7 Do not use the charger if it has been subjected to heavy impact, dropped or otherwise damaged; hand it over to a qualified service technician
- 8 Do not dismantle the charger; hand it over to a qualified service technician if maintenance or repair is required. Incorrect reassembly can result in fire and electric shock
- 9 To reduce the risk of an electric shock, unplug the charger from the socket before carrying out any maintenance or cleaning. This risk cannot be reduced by setting controls to the "Off" position

## Warning - Risk of Explosive Gases

It is dangerous to work in close proximity to a lead acid battery. Batteries generate explosive gases during normal battery operation. For this reason it is extremely important to read this guide before using the charger and to follow the instructions precisely.

- 1 To reduce the risk of battery explosion, follow these instructions, the battery manufacturer's instructions and those of the manufacturers of any accessories that you plan to use in the vicinity of the battery. Observe warning signs on these products and on the engine.

## Personal safety precautions

There must be another person within hearing range of you or close enough to come to your assistance when you are working in the vicinity of a lead acid battery.

- 1 Make sure there is sufficient fresh water and soap nearby in case battery acid comes into contact with the skin, clothing or eyes
- 2 Complete eye protection and protective clothing must be worn. Do not touch your eyes when working in the vicinity of a lead acid battery

- 3 If skin or clothing comes into contact with battery acid, wash the acid immediately with soap and water. If acid gets into the eye, rinse the eye immediately with running cold water for at least 10 minutes and seek immediate medical assistance.
  - 4 NEVER smoke or allow sparks or naked flames close to the battery or engine
  - 5 Be especially careful to avoid the risk of a metal tool falling onto the battery. This might create sparks or short-circuit the battery or other electrical components, thereby causing an explosion.
  - 6 Remove personal metal objects such as rings, bracelets, necklaces and watches before working with a lead acid battery. A lead acid battery can cause a short-circuit current high enough to melt a ring or similar, thereby leading to a fire.
  - 7 Use the charger only to charge a LEAD ACID battery. It is not suitable for transferring power to an electrical low-voltage system other than a starter motor application. Do not use the charger to charge dry cell batteries, which are used mainly for home appliances. Such batteries can burst, causing injury to people and damage to property
  - 8 NEVER charge a frozen battery
- 

### Preparing for charging

- 1 If it is necessary to remove the battery before charging, always detach the earth connection first. Make sure all vehicle equipment is switched off to prevent arcing
  - 2 Ensure that the area around the battery is well-ventilated while the battery is being charged. The released gas can be effectively dispersed using a piece of cardboard or other non-metallic object such as a fan
  - 3 Clean the battery terminals. Be careful to ensure that corrosion residues do not come into contact with the eyes
  - 4 Top up each cell with distilled water until the battery acid reaches the level specified by the manufacturer. This helps to purge surplus gas out of the cells. Do not overfill. In the case of a battery without cell caps, follow the manufacturer's charging instructions carefully
  - 5 Study all battery-manufacturer-specific safety precautions, such as the removal or non-removal of cells caps during charging and the recommended charging parameters
  - 6 With the help of the vehicle manual, determine the battery voltage and ensure that it matches the output of the charger
- 

### Charger set-up location

- 1 Place the charger as far away from the battery as the cables will allow
  - 2 Never place the charger directly above the battery being charged; battery gases may corrode and ruin the charger
  - 3 When measuring acid density or topping up the battery, never allow battery acid to drip onto the charger
  - 4 Do not operate the charger in an enclosed area or where there is limited ventilation
  - 5 Do not place the battery on the charger
- 

### Precautions for DC connection

- 1 Only connect or disconnect the DC terminals when all controls on the charger are set to the "Off" position and the mains cable has been unplugged from the mains. Never allow the terminals to touch one another
- 2 Attach the terminals to the battery and chassis as indicated in points 5 and 6 of the next section and points 2 and 4 of the section after that
- 3 Attach the terminals to the battery poles and turn them to and fro several times to ensure a good connection. This will prevent the terminals from slipping off the battery poles and reduces the risk of sparks.

### Steps to follow with battery installed in vehicle

Follow these steps if the battery is installed in the vehicle. A spark near to the battery can cause the battery to explode. To reduce the risk of sparks near the battery:

- 1 Arrange AC and DC cables in such a way that they cannot be damaged by bonnets, doors or moving parts of engines
- 2 Keep clear of fan blades, belts, rollers and other parts that pose a risk of personal injury
- 3 Check the polarity of the battery terminals. The POSITIVE (POS, P, +) battery pole usually has a larger diameter than the NEGATIVE (NEG, N, -) pole
- 4 Determine which battery pole is connected to the chassis (earthed). If the negative pole is connected to the chassis (as on most vehicles), go to point 5. If the positive pole is connected to the chassis, go to point 6
- 5 On a negatively earthed vehicle, connect the POSITIVE (RED) charging terminal to the POSITIVE (POS, P, +) unearthed pole of the battery. Clip the NEGATIVE (BLACK) charging terminal to the chassis or engine block far away from the battery. Do not attach the terminal to the carburettor, fuel pipes or body panels, but rather to a solid metal part of the chassis or engine block
- 6 On a positively earthed vehicle, connect the NEGATIVE (BLACK) charging terminal to the NEGATIVE (NEG, N, -) unearthed pole of the battery. Clip the POSITIVE (RED) charging terminal to the chassis or engine block far away from the battery. Do not attach the terminal to the carburettor, fuel pipes or body panels, but rather to a solid metal part of the chassis or engine block
- 7 When disconnecting the charger, switch the controls to the "Off" position, unplug the mains cable, remove the charging terminal from the chassis and then remove the charging terminal from the battery
- 8 For information about the required charging period, refer to the operating instructions

### Steps to follow with battery outside the vehicle

Follow these steps if the battery is located outside the vehicle. A spark near to the battery can cause the battery to explode. To reduce the risk of sparks near the battery:

- 1 Check the polarity of the battery terminals. The POSITIVE (POS, P, +) battery pole usually has a larger diameter than the NEGATIVE (NEG, N, -) pole
- 2 Connect an insulated 6-gauge (AWG) battery cable, not less than 24 inches (609.5 mm) long, to the NEGATIVE (NEG, N, -) battery pole
- 3 Connect the POSITIVE (RED) charging terminal to the POSITIVE (POS, P, +) pole of the battery
- 4 Move yourself and the free end of the cable as far away as possible from the battery, then connect the NEGATIVE (BLACK) charging terminal to the free end of the cable
- 5 Do not face the battery when making the last connection
- 6 Disconnect the charger in reverse order to the connection process, making the first disconnection as far away as possible from the battery
- 7 A (marine) boat battery must be taken out and charged on dry land. Charging the battery on board requires special equipment designed for use at sea

### Instructions for connecting the mains cable including earthing

The charger must be earthed to reduce the risk of electric shock. The charger has a mains cable with integrated earth conductor and an earthed plug.

- 1 Connect the plug to a socket that has been installed and earthed in accordance with all local rules and regulations

**DANGER** - Never change the supplied mains cable or its plug - if it does not fit the socket, have a proper socket installed by a qualified electrician. An improper connection may create the risk of electric shock.

This device is designed for more than 15 amperes and must be operated on a circuit with a nominal voltage of 120 volts. The device is equipped in the factory with a specific mains cable and mains plug to allow connection to a suitable circuit.

- 1 Ensure that the charger is connected to a socket having the same configuration as the plug. Never use the charger with an adapter

The device is not intended to be used by children or infirm people, unless they are supervised by a responsible person to ensure safe use of the device.

Children must be supervised to ensure that they do not play with the device.

---

**30A + 50A battery  
chargers in USA**



**NOTE!** This equipment has been tested and found to comply with the limits for a Class A device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

This equipment generates, uses and can radiate radio frequency energy and, if it is not installed and used in accordance with the operating instructions, may cause harmful interference to radio communications.

Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.



# General information

## Principle

The main feature of the new Active Inverter Technology is intelligent charging. This means that the charging behaviour adapts itself automatically to the age and state of charge of the battery. This innovation extends the battery's service life and reduces the amount of maintenance required, while at the same time improving efficiency.

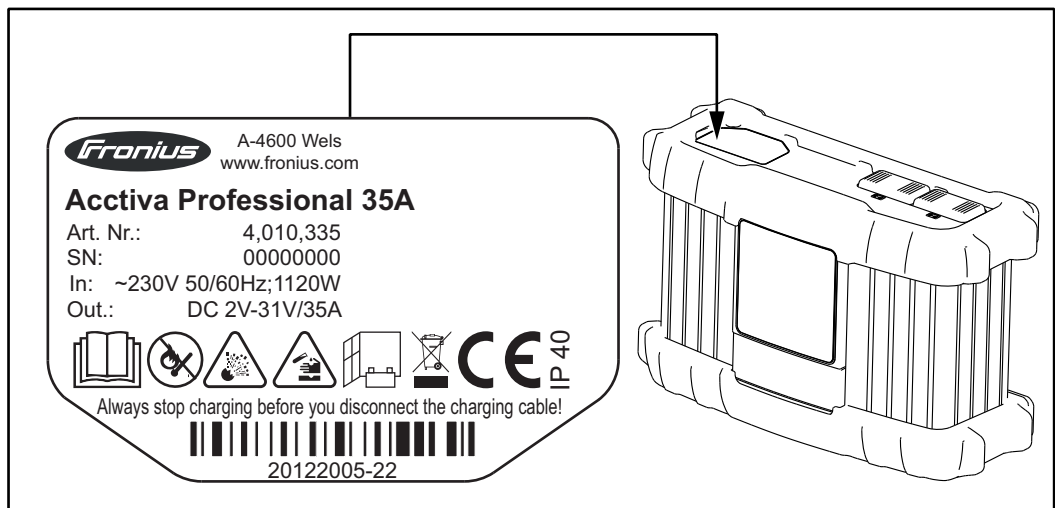
Active Inverter Technology is based on an inverter with active rectification and an intelligent safety cut-out. The charging current and voltage are held constant by a digital control that is not affected by any fluctuations in the mains voltage.

## Device concept

The compact design reduces space requirements and makes portable use considerably easier. In addition to its many existing features, the charger is also of modular design, making it perfectly capable of accommodating future requirements. A wide range of options is available. A 14.4 V voltage limit provides optimum protection for the vehicle electronics.

## Warning notices on the device

A number of safety symbols can be seen on the charger's rating plate. The safety symbols must not be removed or painted over.



Do not use the functions until you have fully read all the operating instructions.



Possible sources of ignition, such as fire, sparks and naked lights, must be kept away from the battery.



Risk of explosion! Detonating gas is generated in the battery during charging.



Battery acid is corrosive and **MUST** be kept away from eyes, skin and clothes.



Ensure an adequate supply of fresh air during charging. Fit charger at least 50 cm above the floor.



Do not dispose of used chargers with domestic waste. Dispose of them according to safety rules.

# Start-up

---

## Safety



**WARNING!** Incorrect operation may result in serious injury or damage. Do not use the functions described here until you have thoroughly read and understood the following documents:

- Operating instructions
- All the operating instructions for the system components, especially the safety rules
- Battery and vehicle manufacturers' operating instructions and safety rules

---

## Proper use

The charger is designed to charge the batteries listed below. Any other use or use beyond this purpose is deemed improper. The manufacturer shall not be held liable for any damage arising from such usage. Proper use includes:

- complying with all the operating instructions
- regular checking of the mains and charger leads



**WARNING!** Charging dry batteries (primary cells) and non-rechargeable batteries can cause serious injury or damage, and is therefore prohibited.

The following batteries may be charged:

- Wet batteries:  
sealed batteries with a liquid electrolyte (recognisable by the vent plugs) and low-maintenance/maintenance-free wet batteries (MF)
- Gel batteries:  
sealed batteries (VRLA) with immobilised electrolyte (sealant)
- Gel batteries:  
sealed batteries (VRLA) with immobilised electrolyte (gel)

---

## Mains connection

The rating plate, which is located on the housing, contains information about the permitted mains voltage. The charger is designed for this mains voltage only. The fuse protection required for the mains lead can be found in the "Technical data" section. If there is no mains lead or mains plug on your device, fit one that conforms to national standards.



**NOTE!** Inadequately dimensioned electrical installations can cause serious damage. The mains lead and its fuse must be dimensioned to suit the local power supply. The technical data shown on the rating plate applies.

---

## Safety features - standard protective equipment

The following safety features are provided as standard with the Active Inverter:

- Voltage-free and spark-free terminals protect against explosions
- Reverse polarity protection prevents the charger from being damaged or destroyed
- Short-circuit protection provides effective protection for the charger. The fuse does not need to be replaced in the event of a short circuit
- A charging time monitor provides effective protection against overcharging and destruction of the battery
- Due to the high degree of protection, there is a lower rate of contamination in adverse conditions. This adds to the charger's reliability.
- Overtemperature protection through derating (charging current reduced if the temperature rises above the permitted level)

# Control elements and connections

## General remarks



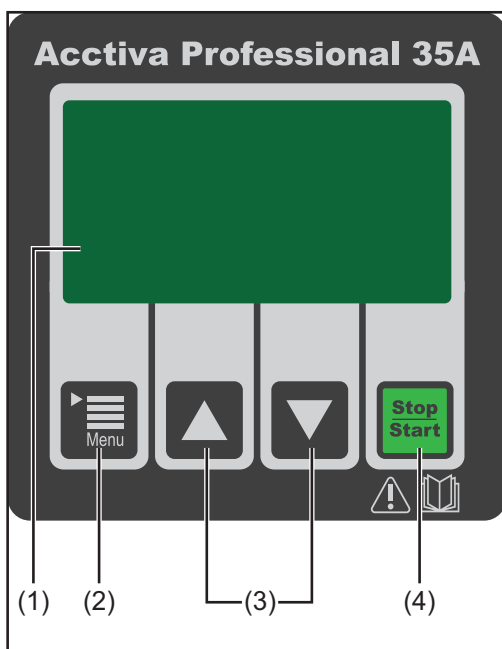
**NOTE!** As a result of firmware updates, you may find that there are functions available on your unit that are not described in these operating instructions or vice versa. Certain illustrations may also differ slightly from the actual control elements on your device. However, these controls function in exactly the same way.



**WARNING!** Operating the equipment incorrectly can cause serious injury and damage. Do not use the functions described until you have thoroughly read and understood the following documents:

- these operating instructions
- all the operating instructions for the system components, especially the safety rules

## Control panel



No.	Function
(1)	<b>Graphic display</b>
(2)	<b>Menu key</b> - Select the desired setting, e.g. Ah
(3)	<b>Up/Down keys</b> - Select the desired operating mode, e.g. 'Charging' or 'Battery changing' - Alter the setting that has been selected by the Menu key (2) - After connecting to a new battery: ability to manually select the charging voltage from 6, 12 or 24 V

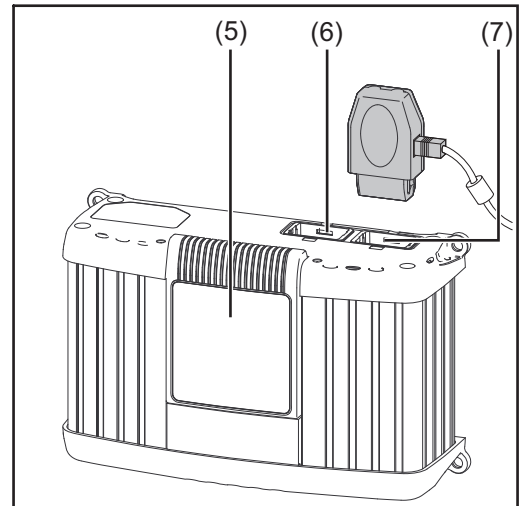
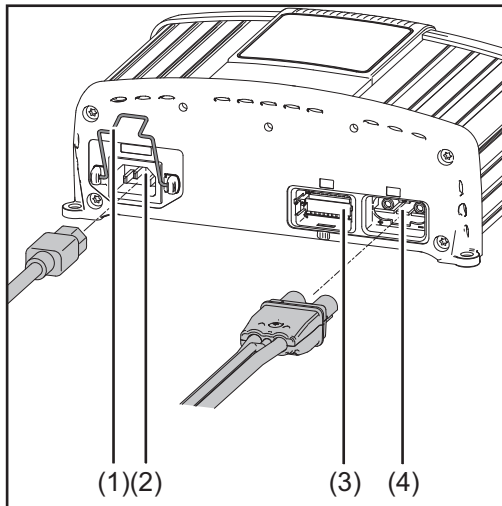
(4)	<b>Stop/Start key</b> - For interrupting and resuming charging - Confirming selections, e.g. after the charging voltage has been selected from 6, 12 or 24 V using the Up/Down keys
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## Plugging in options



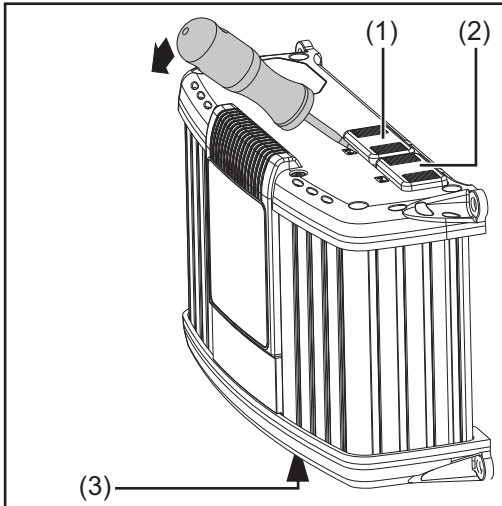
**NOTE!** Danger of damage to charger and accessories. Only plug in options and system add-ons when the mains plug is unplugged and the charging cables are disconnected from the battery.

## Connections



No.	Function
(1)	<b>Mains cable safety clip</b>
(2)	<b>AC input - mains socket</b>
(3)	<b>Connection P2 - I/O port - no function, can be retrofitted however</b> for connecting the options: <ul style="list-style-type: none"> <li>- Immobiliser</li> <li>- Common error message</li> <li>- Immobiliser and common error message</li> </ul>
(4)	<b>Connection P1 - charger lead socket</b> used to connect the charger lead also for connecting the temperature-controlled charging or external Start/Stop options
(5)	<b>Removable display</b>
(6)	<b>Connection P3 - visual port</b> for connecting the internal display
(7)	<b>Connection P4 - multiport</b> for connecting the options: <ul style="list-style-type: none"> <li>- Status lamp</li> <li>- Software update via USB connection</li> </ul>

**Removing covers for connections and options**



If necessary, use a screwdriver to remove:

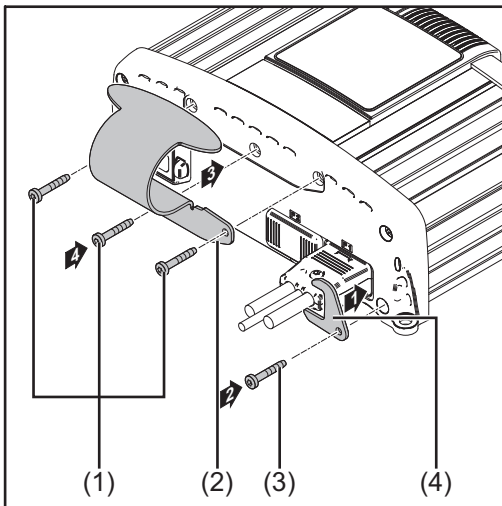
- Cover (1) for connection P3 - visual port
- Cover (2) for connection P4 - multiport
- Cover (3) for connection P2 - I/O port

Leave covers (1), (2) and (3) in place on unused P2, P3 and P4 connections.

**USB update option**

The USB update option allows the charger to be updated directly via the USB interface.

**Fitting the optional bracket and strain relief device for the charger lead**



**IMPORTANT!** The torque for all screws is 2.5 Nm.

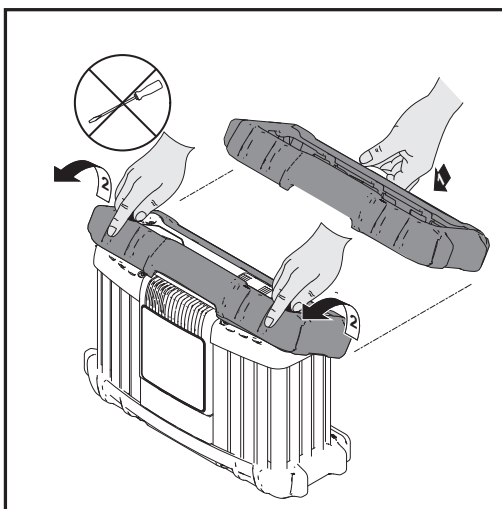
To fit the bracket:

- Undo screws (1)
- Fit bracket (2) using the previously removed screws

To fit the strain-relief device:

- Undo screw (3)
- Fit charger lead strain relief device (4) using the previously undone screw

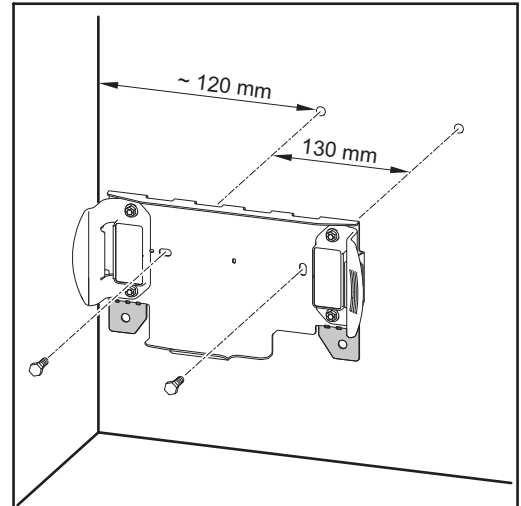
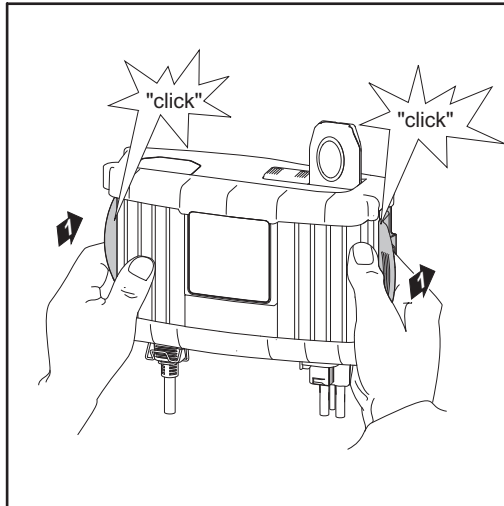
**Edge guard option**



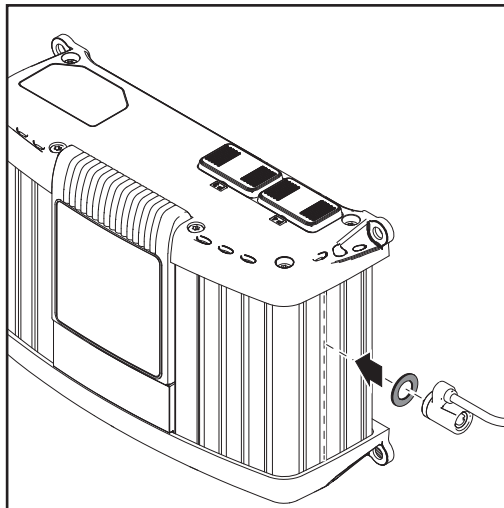
The edge guard removal process is the reverse of the fitting process.

The bracket cannot be fitted if the edge guard is already in place.

## Wall bracket option



## Preparations for security lock



The security lock is not contained in the scope of supply.

A security lock can only be attached

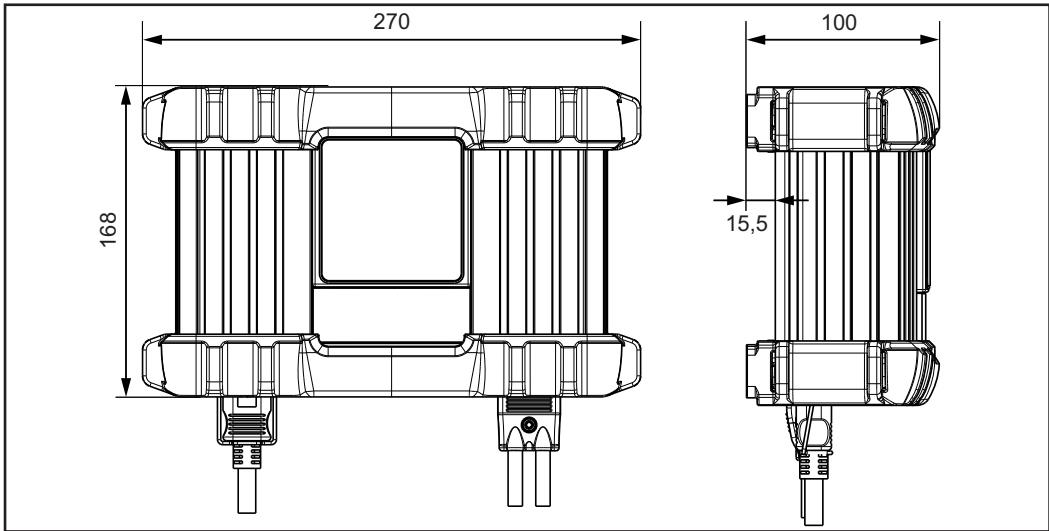
- to the groove on the housing as shown
- to the groove on the housing that is exactly opposite
- using spacer M8 DIN 125 or DIN 134, located as shown

## Installation

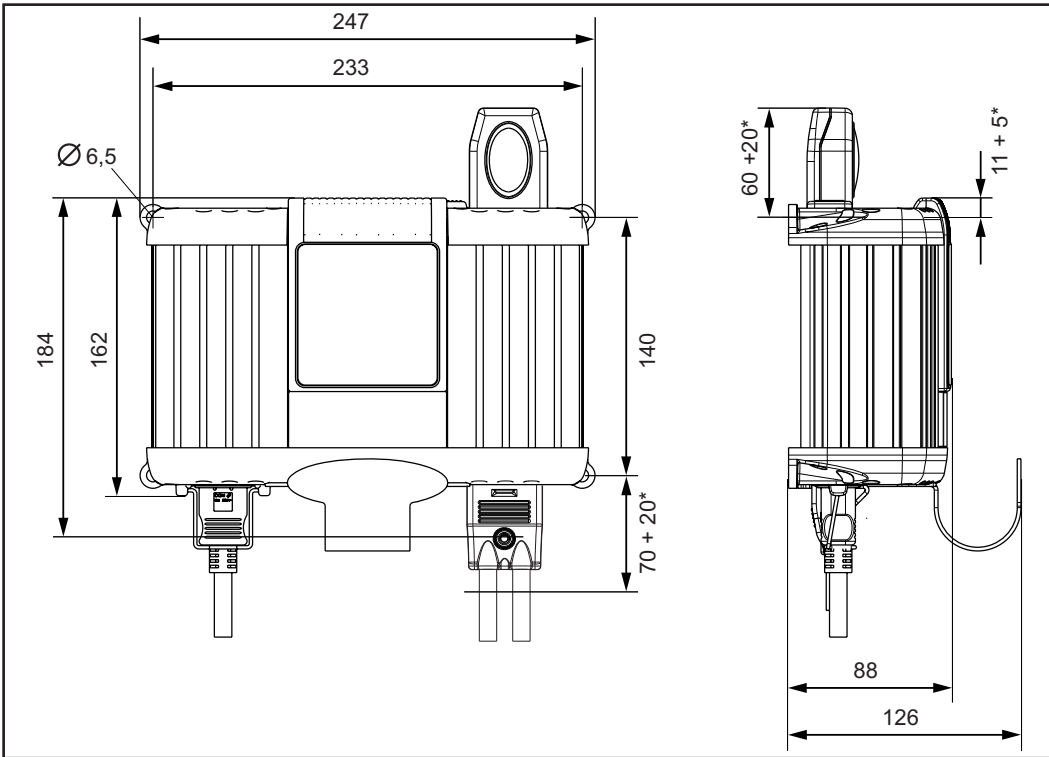


**NOTE!** If the charger is installed in a switch cabinet (or a similar separate area), then forced-air ventilation must be provided to ensure adequate heat dissipation. There must be a clearance of 10 cm all around the charger.

The space requirement measurements in mm illustrated below are given to ensure that there is easy access to the plug connections:



Space requirements with edge guard



Space requirements without edge guard, and space requirements with signal lamp and bracket options (\* space for installation/removal)

# Operating modes

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**General information** The charger is suitable for all 6/12/24 V lead acid batteries (wet, MF, AGM and GEL).

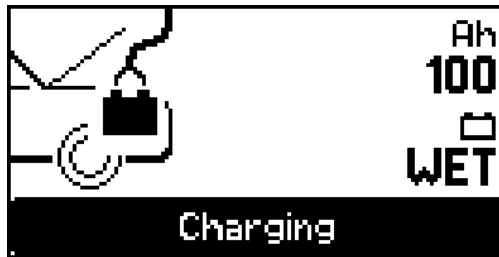
---

**Available operating modes** The following operating modes are available:

- Charging
- Buffering (Trickle) mode during vehicle diagnosis or software updates
- Refresh
- Power supply mode
- Battery changing
- Device options

---

**Selecting the operating mode** **1** Connect mains cable to charger and plug into mains



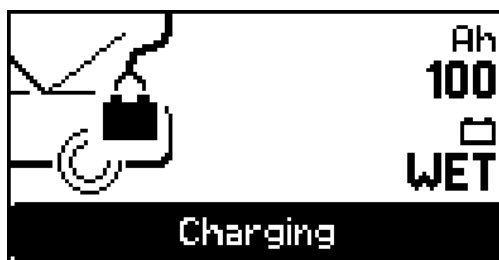
The charger is on standby - 'Charging' mode is displayed.



**2** Select other operating modes using the Up/Down keys

---

**Charging mode**



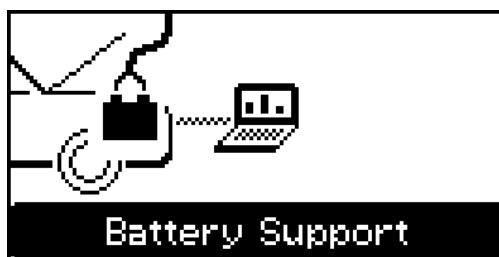
Charging mode is used for:

- Charging or conservation charging with the battery either fitted or removed
- Charging while vehicle consumers are switched on

Charging mode is automatically started after the charger is connected to the mains.

---

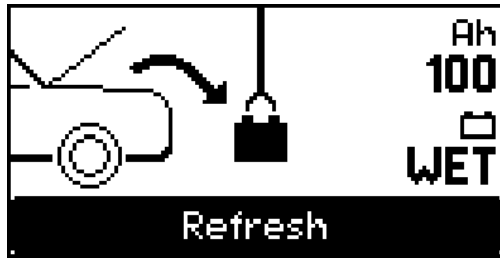
**Buffering (Trickle) mode**



Buffering (Trickle) mode relieves the vehicle battery while vehicle diagnosis or a software update is being performed.

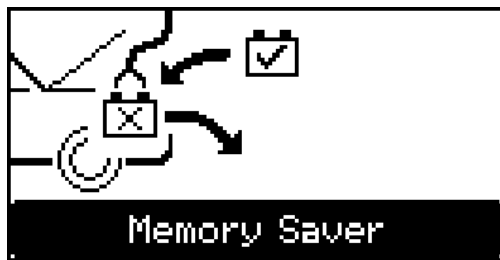


**Refresh mode**



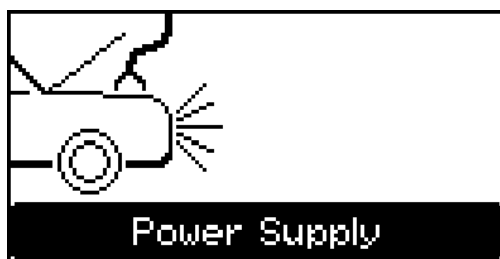
Refresh mode reactivates deeply discharged or sulphated batteries. Refresh charging of batteries must be carried out either in the open or in a well-ventilated area.

**Battery changing mode**



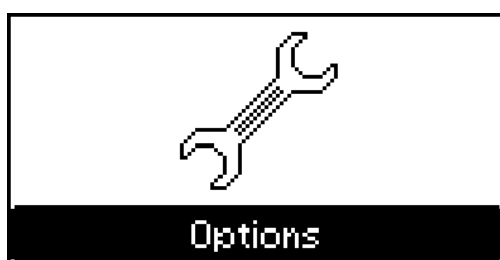
Battery changing mode provides a continuous power supply to the vehicle electronics while the battery is being changed.

**Power Supply mode**



Power supply mode provides the vehicle with power while repairs are being carried out with the battery removed.

**Device options**



The charger can be configured in a number of ways using the device options, as follows:

- Language
- Graphic display contrast
- Configure an individual standard
- Restore factory settings
- Activate/deactivate Expert mode
- Information on the hardware and software version

# Charging mode

## General information

Charging mode is used for:

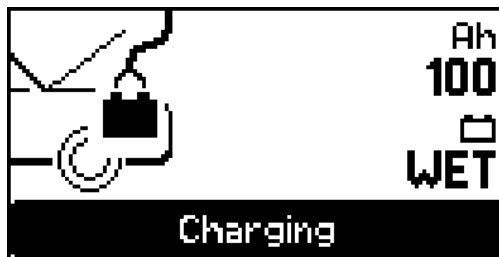
- Charging or conservation charging with the battery either fitted or removed
- Charging while vehicle consumers are switched on

## Charging the battery



**CAUTION!** Risk of damage when attempting to charge a faulty battery. Before charging, ensure that the battery to be charged is fully functional.

- 1 Plug in charger mains plug



Charging mode is automatically started after the charger is connected to the mains.

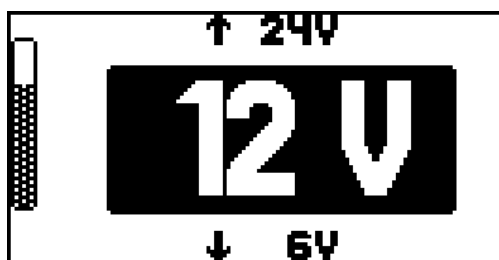


- 2 Use the Menu key to select the 'Ah' or 'Battery type' setting.



- 3 Use the Up/Down keys to enter the required value (e.g. 100 Ah or 'Wet' battery type).

- 4 Connect the battery, observing the correct polarity. Because the charging terminals are de-energised, there is no danger of sparks when connecting to the battery, even if the charger is already connected to the mains supply.
  - Connect the red charger lead to the positive pole (+) of the battery
  - Connect the black charger lead to the negative pole (-) of the battery



The charger automatically identifies the battery, e.g. 12 V, and starts the charging process after 5 seconds.

If the battery voltage is not correctly identified (e.g. in the event of a deeply discharged battery), you have 5 seconds to enter the correct battery voltage, as follows:



**CAUTION!** Risk of damage if the wrong voltage is set. Always ensure that the correct battery voltage is set.



- 5 Set the correct battery voltage using the Up/Down keys (6V / 12V / 24V).



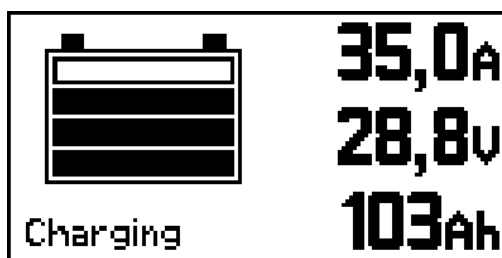
6 Confirm the selection using the Stop/Start key

If the battery voltage selection window does not open, then the battery is in a state of extreme deep-discharge (less than 2 V). In this case, it is advisable to use Refresh mode to reactivate the deep-discharged battery. For more information, see the "Refresh mode" section.

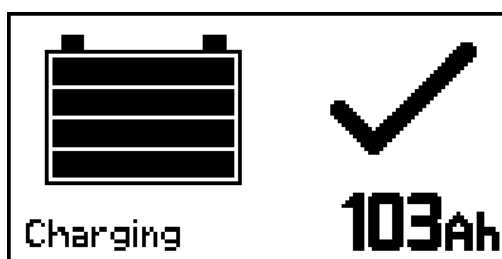
- A corresponding warning appears

If Charging mode is still required despite the battery being in a state of extreme deep-discharge


- Acknowledge the warning via the OK button using the Stop/Start key.
- Use the Up/Down keys to select the correct battery voltage in the subsequent selection window.
- Confirm the selection using the Stop/Start key



- A set of four bars shows the state of charge of the battery (e.g. three bars represent a state of charge of 80%).



- All four bars are continuously displayed.
- The state of charge is 100%.
- The battery is ready to use.
- The battery may remain connected to the charger for any length of time.
- Conservation charging counteracts battery self-discharge.

 **CAUTION!** Risk of sparks if the charger leads are disconnected too soon. Before disconnecting the charger leads, press the Stop/Start key to finish charging.



7 To end charging:  
- Press the Stop/Start key

- 8 Disconnect the charger
- Disconnect the black charger lead from the negative pole (-) on the battery
  - Disconnect the red charger lead from the positive pole (+) on the battery

**Interrupting charging**



**NOTE!** Danger of damage to connection sockets and plugs. Do not disconnect or unplug charger leads while charging.



2 Press the Stop/Start key while charging  
- The process is interrupted

---

**Restarting charging**

- 1 Press the Stop/Start button to continue charging



# Buffering (Trickle) mode

## General information

Buffering (Trickle) mode is intended exclusively for relieving the battery during a vehicle diagnosis or software update. The power used over an extended period of time must be less than the charger's maximum output current (35 A), otherwise the battery will be drained. Buffering (Trickle) mode is not suitable for fully charging the battery.

## Buffering the battery

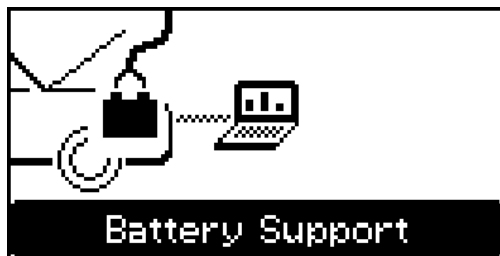


**CAUTION!** Risk of damage when attempting to charge a faulty battery. Before buffering, ensure that the battery is fully functional.

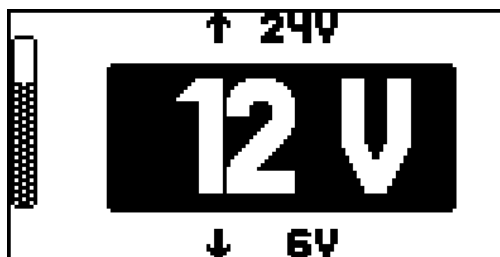
- 1 Plug in charger mains plug



- 2 Select Buffering mode using the up/down keys.



- 3 Connect battery - the de-energised charger leads mean there are no sparks when connecting to the battery, even if the charger is already connected to the mains supply.
  - Connect the red charger lead to the positive pole (+) on the battery
  - Connect the black charger lead to the negative pole (-) on the battery



The charger automatically identifies the battery, e.g. 12 V, and starts the buffering process after 5 seconds.

If the battery voltage is not correctly identified (e.g. in the event of a deeply discharged battery), you have 5 seconds to enter the correct battery voltage, as follows:



**CAUTION!** Risk of damage if the wrong voltage is set. Always ensure that the correct battery voltage is set.



- 4 Set the correct battery voltage using the up/down keys (6 V / 12 V / 24 V).



- 5 Confirm the selection using the Stop/Start key

If the selection window for the battery voltage does not open, then the battery is in a state of extreme deep-discharge (less than 2 V). In this case, buffering is not permitted. We recommend the battery be replaced.



**CAUTION!** Risk of sparks if the charger leads are disconnected too soon. Before disconnecting the charger leads, press the Stop/Start button to finish buffering.



- 6** To cancel Buffering (Trickle) mode:  
- Press the Stop/Start key

- 7** Disconnect the charger  
- Disconnect the black charger lead from the negative pole (-) on the battery  
- Disconnect the red charger lead from the positive pole (+) on the battery

---

### Interrupting Buffering (Trickle) mode



**NOTE!** Danger of damage to connection sockets and plugs. Do not disconnect or unplug charger leads while buffering.



- 2** Press the Stop/Start key during buffering  
- The process is interrupted

---

### Resuming buffering



- 3** Press the Stop/Start key  
- Buffering is resumed

# Refresh mode

## General information

Refresh mode is used to charge the battery if it is suspected that the battery has been in a state of deep-discharge over a long period (e.g. battery sulphated)

- Battery is charged to maximum acid density
- Plates are reactivated (degradation of sulphate layer)



**WARNING!** Risk of injury and damage from overheated batteries. Only charge the battery under supervision! Monitor the battery temperature and interrupt the charging process if necessary. Do not charge the battery to be reactivated in an ambient temperature exceeding 30°C. "Refresh" mode can cause the battery temperature to rise to up to 45°C. Immediately disconnect the charger if the battery temperature exceeds 45°C.



**CAUTION!** Refresh charging may damage the vehicle electronics. Disconnect and remove the battery from the vehicle before carrying out a refresh charge.

The success of refresh charging depends on the degree of sulphation of the battery.



**NOTE!** Use Refresh mode with caution, as refresh charging can cause fluid loss or drying-out. Also ensure that

- the battery is at room temperature (20 - 25°C)
- the battery capacity has been correctly set
- the battery has been disconnected from the vehicle electrical system
- refresh charging is carried out on batteries removed from the vehicle, either in the open (without being exposed to direct sunlight) or in well-ventilated areas



**CAUTION!** Risk of injury. Wear eye protection and suitable protective clothing when handling battery acid. Rinse any acid splashes thoroughly with clean water, and seek medical advice if necessary. On no account inhale any of the gases and vapours released.

Refresh mode may be used on the following batteries:

- Wet batteries:  
sealed batteries with a liquid electrolyte (identifiable on the vent plugs)  
After reactivating, check the acid level and top up with distilled water if necessary.
- AGM batteries:  
sealed batteries (VRLA) with immobilised electrolyte (sealant) and maintenance-free wet batteries (MF)
- Gel batteries:  
sealed batteries (VRLA) with immobilised electrolyte (gel)

## Reactivating batteries

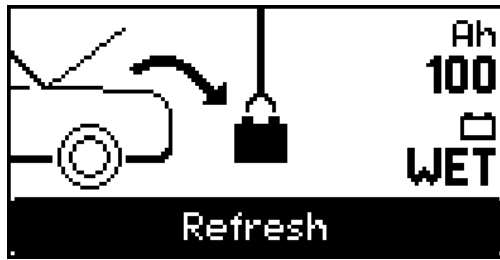


**CAUTION!** Deeply discharged batteries are liable to freeze at temperatures of 0°C and below. Risk of damage when battery is frozen. Before starting refresh charging, ensure that the acid in the battery to be refreshed is not frozen.

**1** Plug in charger mains plug



**2** Select Refresh mode using the up/down keys.

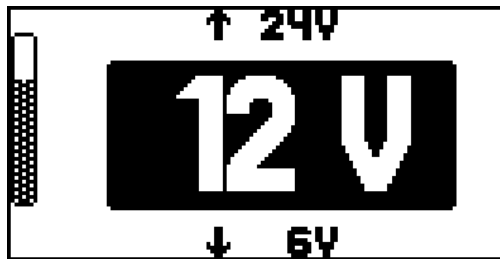


3 Use the Menu key to select the 'Ah' or 'Battery type' setting.



4 Use the Up/Down keys to enter the required value (e.g. 100 Ah or 'Wet' battery type).

- 5 Connect battery - the de-energised charger leads mean there are no sparks when connecting to the battery, even if the charger is already connected to the mains supply.
- Connect the red charger lead to the positive pole (+) of the battery
  - Connect the black charger lead to the negative pole (-) of the battery



The charger automatically identifies the battery, e.g. 12 V, and starts the charging process after 5 seconds.

If the battery voltage is not correctly identified (e.g. usually the case if a battery is deeply discharged), you have 5 seconds to enter the correct battery voltage as follows:

**CAUTION!** Risk of damage if the wrong voltage is set. Always ensure that the correct battery voltage is set.



6 Set the correct battery voltage using the Up/Down keys (6V / 12V / 24V).



7 Confirm the selection using the Stop/Start key.

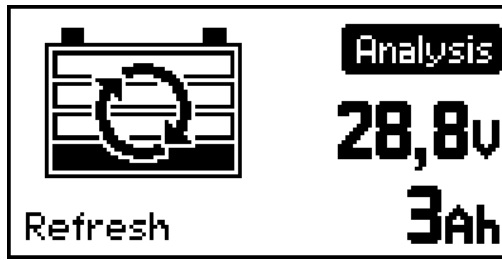
If the battery voltage selection window does not open, then the battery is in a state of extreme deep-discharge (less than 2 V).

- A corresponding warning appears

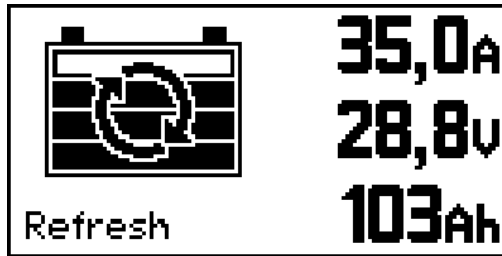
If Refresh mode is still required despite the battery being in a state of extreme deep-discharge

- Acknowledge the warning via the OK button using the Stop/Start key.
- Use the Up/Down keys to select the correct battery voltage in the subsequent selection window.
- Confirm the selection using the Stop/Start key





During the analysis phase, the charger monitors the battery voltage and the result is used in the subsequent charging process.



- A set of four bars shows the state of charge of the battery (e.g. the third bar represents a state of charge of 80%).



- All four bars are continuously displayed.
- The state of charge is 100%.
- The battery is ready to use.
- The battery may remain connected to the charger for any length of time.
- Conservation charging counteracts battery self-discharge.

**CAUTION!** Risk of sparks if the charger leads are disconnected too soon. Before disconnecting the charger leads, press the Stop/Start key to finish charging.



**8** To terminate Refresh charging:  
- Press the Stop/Start key

**9** Disconnect the charger  
- Disconnect the black charger lead from the negative pole (-) on the battery  
- Disconnect the red charger lead from the positive pole (+) on the battery

**Interrupting re-  
fresh charging**



**NOTE!** Danger of damage to connection sockets and plugs. Do not disconnect or unplug charger leads while reactivating.



**2** Press the Stop/Start key while reactivating  
- Refresh charging is interrupted

**Resuming refresh  
charging**



**3** Press the Stop/Start key  
- Refresh charging is resumed

# Battery changing mode

## General information

Battery changing mode supplies the vehicle electronics with power while the battery is replaced. Before disconnecting the old battery from the vehicle electronics, the charger leads must be connected to the vehicle battery leads. This connection must remain in place until the new battery is connected.

## Battery changing

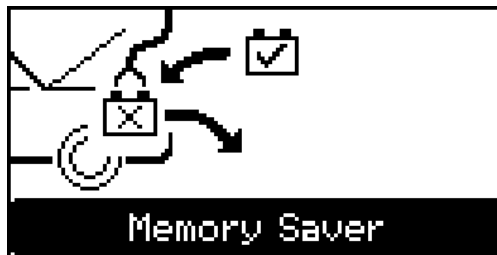


**CAUTION!** If the voltage is set incorrectly, this can result in severe damage to the vehicle electronics. Always set the correct voltage after connecting the charger to the vehicle battery leads.

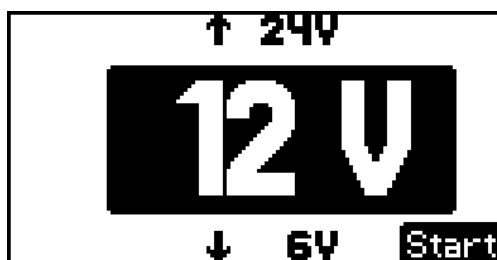
- 1 Plug in charger mains plug



- 2 Select Battery changing mode using the up/down keys.



- 3 Connect the charger leads to the vehicle battery leads as described below - the de-energised charger leads mean there are no sparks when connecting the battery, even if the charger is already connected to the mains supply.
  - Connect the red charger lead to the positive (+) vehicle battery lead
  - Connect the black charger lead to the negative (-) vehicle battery lead



The charger automatically identifies the battery, e.g. 12 V, and starts powering the vehicle electronics after 5 seconds.

If the battery voltage is not correctly identified (e.g. usually the case if a battery is deeply discharged), you have 5 seconds to enter the correct battery voltage as follows:



**CAUTION!** Risk of damage if the wrong voltage is set. Always ensure that the correct battery voltage is set.



- 5 Set the correct battery voltage using the up/down keys (6 V / 12 V / 24 V).



- 5 Confirm the selection using the Stop/Start key.

If the battery is in a state of extreme deep-discharge (under 2 V), a warning appears instructing the user to disconnect the battery.

Batteries in a state of extreme deep-discharge must be replaced without using Battery changing mode.

**6** Install and connect a new battery



**CAUTION!** Risk of sparks if the charger leads are disconnected from the vehicle battery leads too early. Before disconnecting the charger leads from the vehicle battery leads, press the Stop/Start key to terminate the back-up process.



**7** To cancel Battery changing mode:  
- Press the Stop/Start key

**8** Disconnect the charger

- Disconnect the black charger lead from the negative (-) vehicle charger lead
- Disconnect the red charger lead from the positive (+) vehicle charger lead

# Power supply mode

## Requirements

In Power supply mode, the charger leads are connected directly to the battery leads or the vehicle jump start points. It ensures that the vehicle electronics are supplied with power while the battery is removed during repair work. As only the vehicle battery leads are connected to the charger, the battery voltage recognition function is not available.

## Power Supply mode

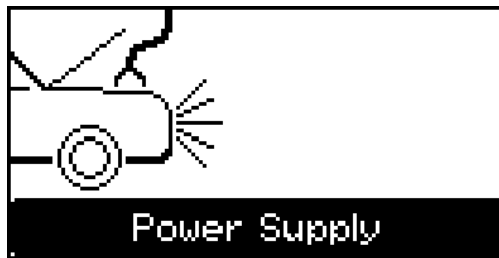


**CAUTION!** If the vehicle-specific voltage setting is incorrect, this can result in severe damage to the vehicle electronics. Before connecting the charger to the vehicle battery leads, ensure that the correct voltage has been set.

- 1 Plug in charger mains plug



- 2 Select Power Supply mode using the up/down keys



- 3 Use the Menu key to select the vehicle power supply voltage (6 V / 12 V / 24 V).

- 4 Connect the charger leads to the vehicle battery leads as described below - the de-energised charger leads mean there are no sparks when connecting the battery, even if the charger is already connected to the mains supply.
  - Connect the red charger lead to the positive (+) vehicle battery lead
  - Connect the black charger lead to the negative (-) vehicle battery lead
  - A safety message appears on the display asking whether the charger leads are connected correctly.



- 5 Use the Stop/Start key to confirm the safety message and start supplying the vehicle electronics with power.



**CAUTION!** Risk of data stored in the vehicle being lost. Before disconnecting the charger leads, press the Stop/Start key to cancel Power Supply mode.



- 6 To cancel Power Supply mode:
  - Press the Stop/Start key

- 7 Disconnect the charger
  - Disconnect the black charger lead from the negative (-) vehicle battery lead
  - Disconnect the red charger lead from the positive (+) vehicle battery lead

# Device options

## General information

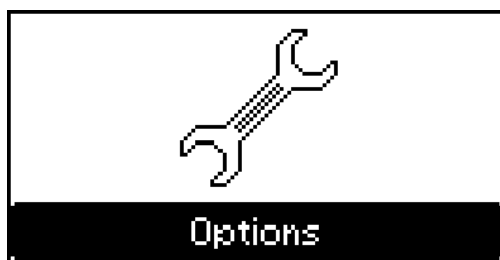
The device options allow the following to be configured:

- Language  
Selection of language for user guide
- Graphic display contrast
- Configuration  
an individual standard may be set
- Factory default  
to restore all device options to the factory settings
- Activate/deactivate Expert mode
- Info  
provides information on the hardware and software version  
total Ah charged  
total operating time

## Selecting device options



1 Use the up/down keys to select the device options



## Configuration



**CAUTION!** Risk of damage when selecting and using individual charger lead lengths. The user accepts full responsibility for shortening the charger leads supplied and making the appropriate settings to reflect the individual charger lead lengths. The manufacturer shall not be held liable for any damage arising from such actions.

The following parameters can be configured to create an individual standard:

Charger lead length:

- 1 m - 10 m, adjustable in 0.5 m stages
- The following lengths may be requested in the scope of supply: 2,5 m / 5 m

Initial values:

- Start mode (charging/buffering mode)
- Battery capacity (3 – 350 Ah)
- Type of battery (WET, GEL and AGM)
- Voltage selection  
automatic  
optionally set permanently to 6 V, 12 V or 24 V

Charging parameters:

- Boost (on/off), factory setting: on  
 Boost on: shorter charging time resulting in the battery being fully charged sooner. The full 35 A of power available from the device is applied if parallel consumers are detected (car radio, etc.).  
 Boost off means that a conventional workshop charging process is followed (fixed charging current of 20 A per 100 Ah of specified battery capacity). Parallel consumers (car radio, etc.) are not detected in this case.
- Expert (on/off)  
 Enter the following to activate Expert mode (Expert on):  
**Code number 1511**  
 Expert mode (Expert on) allows a user application to be specified for WET, GEL and AGM batteries when the device is in charging mode. The following may be configured:  
 Final charging voltage  
 Conservation charge voltage
- Buffering mode  
 Constant voltage may be adjusted
- Refresh  
 Enter the following to alter the Refresh setting:  
**Code number 1511**  
 Final charging voltage and duration may be adjusted
- Power Supply mode  
 Constant voltage may be adjusted

# Synergic lines

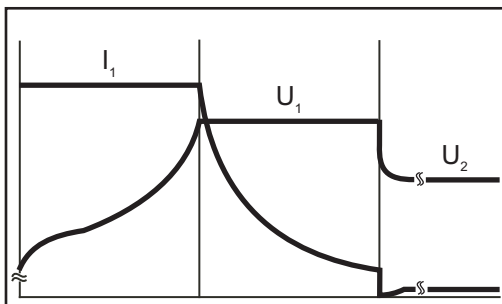
## Safety

**WARNING!** Operating the equipment incorrectly can cause serious injury and damage. Follow the battery manufacturer's instructions. The battery must not be connected to the charger when setting parameters.

## Available characteristics

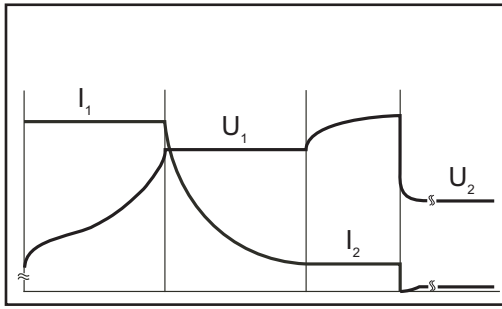
Operating mode	Battery	Characteristic	I <sub>1</sub>	U <sub>1</sub> [6/12/24V]	I <sub>2</sub>	U <sub>2</sub> [6/12/24V]	Ex.
Charging	WET	IUoU	35*	7.2/14.4/28.2	-	6.75/13.5/27	Yes
	AGM					6.84/13.68/27.36	
	GEL					7.05/14.1/28.2	
	USER					1.9-29.9	
Buffering (Trickle) mode	All	IU	35	6.75/13.5/27	-	-	Yes
Refresh	WET	IUIoU	35*	7.2/14.4/28.8	4	6.75/13.5/27	No
	AGM				2	6.84/13.68/27.36	
	GEL				7.05/14.1/28.2		
	USER	IUa	35**	2-34	-	-	Yes
Power supply mode	None	IU	35	6.75/13.5/27	-	-	Yes
Battery changing	All	IU	35	6.75/13.5/27	-	-	No

- I<sub>1</sub> Main charging current [A]  
maximum device current: 35 A
- \* 20 A per 100 Ah of specified battery capacity
- \*\* 10 A per 100 Ah of specified battery capacity
- U<sub>1</sub> Final charging voltage [V]
- I<sub>2</sub> Recharging current [A per 100 Ah of specified battery capacity]
- U<sub>2</sub> Conservation charging voltage [V]  
Automatic switchover to pulse charge conservation after 12 hours, apart from user application in Expert mode
- Ex. Adjustable final charging voltage and conservation charging voltage in Expert mode. For trained professionals only



Charging characteristic IUoU:

- I<sub>1</sub> = Main charging current
- U<sub>1</sub> = Final charging voltage
- U<sub>2</sub> = Conservation charging voltage




Refresh characteristic IUIoU:

- $I_1$  = Main charging current
- $U_1$  = Final charging voltage
- $I_2$  = Recharging current
- $U_2$  = Conservation charging voltage




# Troubleshooting


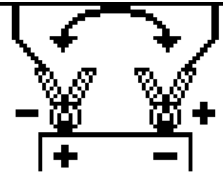
## Safety

 **WARNING!** An electric shock can be fatal. Before opening the device:

- Unplug the device from the mains
- Disconnect battery connection
- Put up an easy-to-understand warning sign to stop anybody inadvertently switching it back on again
- Using a suitable measuring instrument, check to make sure that electrically charged parts (e.g. capacitors) have been discharged

 **CAUTION!** Failure to connect a correctly-dimensioned earth lead may result in serious injury or damage. The housing screws provide a suitable PE conductor connection for earthing (grounding) the housing and must NOT be replaced by any other screws that do not provide a reliable PE conductor connection.

## Protective equipment


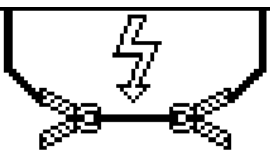
 

**Reverse Polarity**

Charger leads connected to wrong poles, reverse polarity protection has tripped

Remedy:

- Connect battery poles correctly




 

**Short Circuit**

Short circuit in the charging terminals or charger lead, short-circuit detection active

Remedy:

- Check charger leads, contacts and battery poles



  

**Supply Error**

Mains fault - mains voltage outside the tolerance range

Remedy:

- Check mains conditions

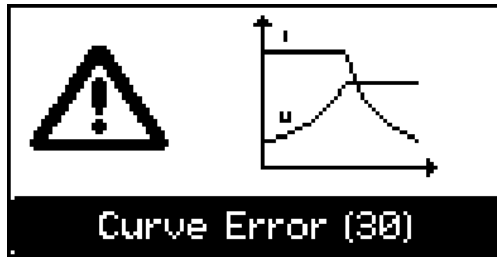
**Overvoltage**

Battery overvoltage

Remedy:

- Set the correct operating mode and voltage

## Charging errors



No. 30: Timeout in the corresponding charging phase

Remedy:

- Set Ah to correct value
- Check for parallel consumers (car radio, etc.)
- Battery temperature too high

No. 31: Too many Ah charged, too few Ah set

Remedy:

- Set Ah to correct value
- Check for parallel consumers (car radio, etc.)
- Replace battery if it appears to be faulty

No. 32: Optional external temperature sensor has tripped due to undertemperature

Remedy:

- Charge the battery in a more suitable area

No. 33: Optional external temperature sensor has tripped due to overtemperature

Remedy:

- Allow battery to cool, or charge battery in a more suitable area

No. 34: Battery voltage set too high

Remedy:

- Set the correct battery voltage

No. 35: Voltage below target voltage after 2 h - Refresh mode in analysis phase

Remedy:

- Check for parallel consumers (car radio, etc.)
- Replace battery if it appears to be faulty

No. 36: Cell short circuit

Remedy:

- Check for parallel consumers (car radio, etc.)
- Replace battery if it appears to be faulty

No. 37: Conservation charge current too high

Remedy:

- Check for parallel consumers (car radio, etc.)



No. 50: Device output fuse defective

Remedy:

- Contact After-Sales Service

No. 51: Secondary temperature out of range

Remedy:

- Contact After-Sales Service

No. 52: Current regulator defective

Remedy:

- Contact After-Sales Service

No. 53: External temperature sensor defective

Remedy:

- Replace external temperature sensor

Contact After-Sales Service in the event of the following charger faults (no. 60 onwards):

No. 60: Device fault - invalid characteristic number

No. 61: Device fault - invalid characteristic block

No. 62: Device fault - incorrect calibration values checksum

No. 63: Device fault - incorrect device type

# Technical data

## Electrical data input 230V

Mains voltage	~ 230 V AC, +/- 15 %
Mains frequency	50 / 60 Hz
Mains current	max. 9 A eff.
Mains fuse protection	max. 16 A
Efficiency	max. 96 %
Effective power	max. 1120 W
Power consumption (standby)	max. 2.4 W
Protection class	I (with PE conductor)
Maximum permitted mains impedance at the interface (PCC) to the public grid	None
EMC emission class	A
Marks of conformity	CE

## Standards 230V

IEC 60068-2-6	Sine oscillations (10 - 150 Hz; 1.5 h / axis)
IEC 60068-2-29	Repetitive shock (25 g / 6 ms / 1000 shocks)
EN 60335-1	EN 60335-2-29
EN 61000-6-2	
EN 61000-6-3	(Class A)
EN 62233	EMF Standard

## Electrical data input 120 V

Mains voltage	~ 120 V AC ±15%
Mains frequency	50/60 Hz
Mains current	max. 16 A eff.
Mains fuse	max. 20 A
Efficiency	max. 94.5%
Effective power	max. 1120 W
No-load power consumption	max. 7.8 W
Protection class (with ground conductor)	I
Maximum permitted mains impedance at the interface (PCC) to the public grid	none
Mark of conformity	cTÜVus
EMC device class	A

## Standards 120V

UL1236	
C22.2 No 107.1-01	
FCC CFR 47 Part 15	(Class A)

IEC 60068-2-6	Sinusoidal vibration (sine 10-55 Hz; 20 cycles / axis; acceleration 5 g)
IEC 60068-2-29	Repetitive shock (25 g / 6 ms / 1000 shocks)

**Electrical data output**

Nominal output voltage	6 V / 12 V / 24 V DC
Output voltage range	2 V - 34 V
Output current	35 A at 28.8 V DC 35 A at 14.4 V DC 35 A at 7.2 V DC
Battery return current	< 1 mA

**Battery data**

6 V / 12 V / 24 V DC	3 - 350 Ah
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**Technical data**

Cooling	Convection and fan
Dimensions l x w x h	270 x 168 x 100 mm
Weight (without cable)	2 kg

**Environmental conditions**

Operating temperature	-20 °C - +40 °C (>30 °C derating)
Storage temperature	-40 °C - +85 °C
Climate class	B
Degree of protection	IP40





# Fronius Worldwide - [www.fronius.com/addresses](http://www.fronius.com/addresses)

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Under <http://www.fronius.com/addresses> you will find all addresses of our sales branches and partner firms!