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For safe and optimum performance, Modul-Connect Battery Charger DC-DC 30A must be used properly. Carefully read and follow all instructions and guidelines in this manual, and give special attention to the CAUTION and WARNING statements.

PLEASE KEEP THIS MANUAL FOR FUTURE REFERENCE

DISCLAIMER

While every precaution has been taken to ensure the accuracy of the contents of this manual, Modul-System assumes no responsibility for errors or omissions. Note as well that specifications and product functionality may change without notice.

IMPORTANT

Please be sure to read and save the entire manual before using your battery charger. Misuse may result in damage to the unit and/or cause harm or serious injury. Read manual in its entirety before using the unit and save manual for future reference.

PRODUCT NUMBERS

21500-03 Battery charger DC-DC 30A

21510-03 Remote voltage monitoring and temperature probe

1. INTRODUCTION

Thank you for purchasing the Modul-Connect Battery Charger DC-DC 30A. This battery charger unit allows you to charge an auxiliary battery from a vehicle starter battery.

The unit is suited for all light commercial vehicles, including vehicles with Euro 5 and Euro 6 engines, smart alternators, regenerative braking technology and start/stop functionality.

This battery charger unit is configured for optimum operation with any AGM or lead acid battery. Please read and follow these instructions and precautions carefully.

IMPORTANT SAFETY INFORMATION

This section contains important safety information for the Modul-Connect Battery Charger DC-DC 30A. Each time, before using the product, READ ALL instructions and cautionary markings on or provided with the charger, and all appropriate sections of this guide.

The battery charger contains no user-serviceable parts. See Warranty section for how to handle product issues.

WARNING: FIRE AND/OR CHEMICAL BURN HAZARD

Do not cover or obstruct any air vent openings and/or install in a zero-clearance compartment.

WARNING: FAILURE TO FOLLOW THESE INSTRUCTIONS CAN RESULT IN DEATH OR SERIOUS INJURY

When working with electrical equipment or lead acid batteries, have someone nearby in case of an emergency.

- Study and follow all the battery manufacturer's specific precautions when installing, using and servicing the battery connected to the battery charger.
- Wear personal protective equipment including eye protection (that protects eyes from all angles) and gloves.
- Avoid touching your eyes while installing the battery charger.

Keep fresh water and soap on hand in the event battery acid comes in contact with eyes. If this occurs, cleanse right away with soap and water for a minimum of 15 minutes and seek medical attention.

- ALWAYS remove personal metal items (such as rings, bracelets, necklaces and watches) when working with a battery. A short circuit through one of these items can melt it, causing a severe burn.
- Batteries produce explosive gases. **DO NOT** smoke or have an open spark or fire near the system.
- ALWAYS keep flames, matches, lighters, cigarettes or other ignition sources away from battery.

- Keep the battery charger away from moist or damp areas.

Avoid dropping any metal tool or object on the battery. Doing so could create a spark or short circuit, which goes through the battery or another electrical tool, that may create an explosion.

- DO NOT put flammable material on, under or near the battery to be charged.
- ALWAYS remove grounded terminal from battery first.
- Some sealed, maintenance free batteries have a battery condition indicator. A light or bright coloured dot indicates low water. Such a battery needs to be replaced, not charged or jump started.
- Charge battery with caps in place. Most batteries are made with flame arresting caps. DO NOT pry caps off sealed batteries.
- Make sure the area around the battery is well ventilated before and during charging process.
- NEVER position face near battery.
- ALWAYS keep other people away from the battery.
- Avoid contact with battery acid.
- Battery posts may have acid corrosion. DO NOT get corrosion in your eyes. Avoid touching eyes while working near battery.
- In very cold weather a discharged battery may freeze. NEVER charge a frozen battery. Gases may form,

cracking the case, and spray out battery acid.

- DO NOT modify the charging system circuitry without written confirmation from Modul-System.
- If a fuse needs replacing, only use the same rating as removed.
- Locate the leads so that they will not be stepped on, tripped over, or otherwise subject to damage or stress. DO NOT lay the leads on the battery. DO NOT operate the system with damaged cables or plugs – have them replaced immediately.
- This system is designed specifically for charging automotive lead-acid batteries. DO NOT use with dry-cells that are commonly used with home appliances, flashlights, etc. These batteries may burst and cause injury to persons and damage to property.
- This system is not intended to supply low-voltage power for applications other than battery charging.

WARNING: SHOCK HAZARD. KEEP AWAY FROM CHILDREN!

- The battery charger's internal components are potted to cope with lower temperatures. It is advisable to avoid moisture.
- Never expose unit to snow, water etc.

WARNING: EXPLOSION HAZARD!

- DO NOT use the Modul-Connect Battery Charger DC-DC 30A in the vicinity of flammable fumes or gases (such as propane tanks or large engines).
- AVOID covering the ventilation openings. Always operate unit with a minimum of 30mm 'free air gap' around the unit.
- Prolonged contact to high heat or freezing temperatures will decrease the working life of the unit.

CE EMC INFORMATION

This equipment has been tested and found to comply with the limits for CE EMC standard. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment can radiate radio frequency energy and, if not installed and used in accordance

with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Consult the dealer or an experienced radio/TV technician for help.

LIMITATIONS ON USE

Do not use in connection with life support systems or other medical equipment or devices.

2. PRODUCT DESCRIPTION

The Modul-Connect Battery Charger is a 30A, 3-stage DC-DC charger with enhanced battery charging capabilities for charging of an AGM type auxiliary battery or batteries. The charger will work on all light commercial vehicles, including vehicles with Euro 5 and Euro 6 engines, smart alternators, regenerative braking technology and/or start/stop functionality.

The Modul-Connect Battery Charger package (21500-03) includes the items listed below.

- Battery Charger DC-DC 30A
- Connection pack
- Owner's manual

3. INSTALLATION

WARNING:

Modul-System recommends that all wiring be done by a certified technician or electrician to ensure adherence to the applicable electrical safety wiring regulations and installation codes. Failure to follow these instructions can damage the unit and could also result in personal injury or loss of life.

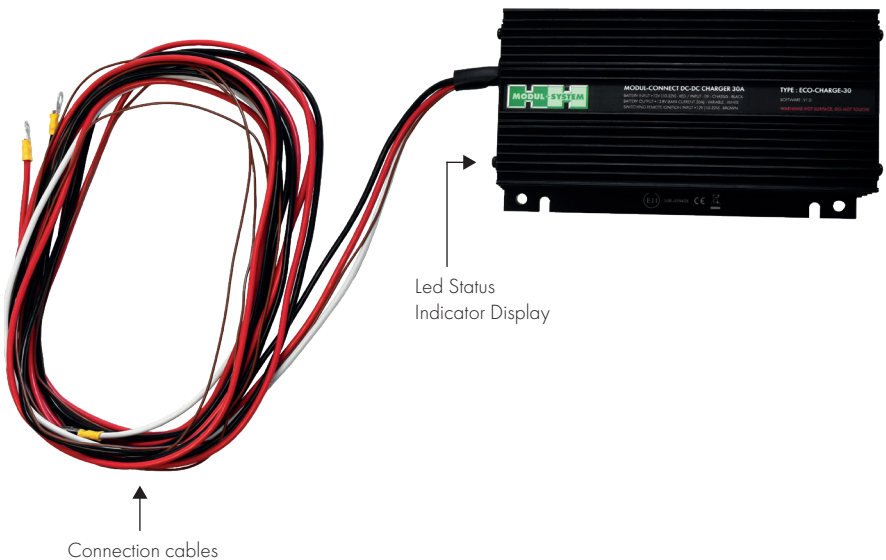
CAUTION:

Before beginning your installation, please consider the following:

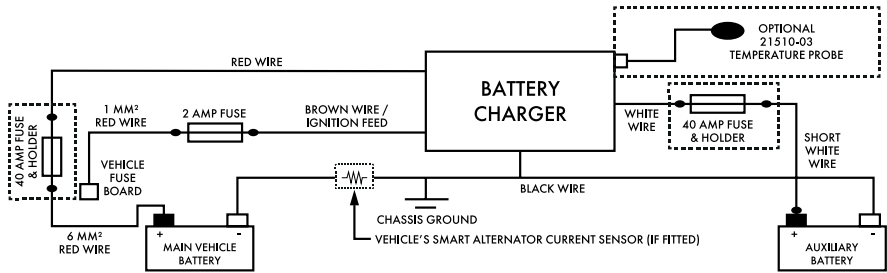
- The Modul-Connect Battery Charger should be used or stored in an indoor area, away from direct sunlight, heat, moisture or conductive contaminants.
- When installing the unit, allow a minimum of 30 mm of space around the unit for optimal ventilation.

3.1. UNDERSTANDING THE UNIT FEATURES

AC Output Front Panel



Material to prepare for installation



NOTE! Charger has to be installed between the vehicle **STARTER** and **AUXILIARY** battery

- The use of an AGM battery is highly recommended for the second auxiliary battery.
- For battery size, you need to identify how much you will be using them between charges. Modul-System recommends you purchase as much battery capacity as possible.

Fuse or Circuit Breaker:

- DC-rated fuse or DC-rated circuit breaker connected along both of the DC positive lines are required.
- The battery charger is supplied with 2 off 40A fuses for the starter and auxiliary battery connection and a 2A mini blade fuse for the ignition sensing cable.
- Never replace a fuse with one that has different amperage than the original.

DC Input, Output and ignition positive cables:

- Use of low resistance wire is required for all the DC connections between the battery charger and the battery bank.
- The battery charger is supplied with input (red) and output (white) 6mm² cables, with a length of 4 meters on the input and 1 meter on the output.
- The input (red) and output (white) 6mm² cables can be cut down to length to suit the installation.
- If the input (red) 6mm² cable needs to be extended beyond 4 meters it should be suitably joined near the battery charger and replaced by 10mm² cable (up to a maximum total length of 7 meters).
- If the output (white) 6mm² cable needs to be extended beyond 1 meter it should be suitably joined near the battery charger and replaced by 10mm² cable (up to a maximum total length of 4 meters).

- The 1mm² ignition positive (+) (brown) cable can be extended beyond 4 meters by the same 1mm² cable, as this cable draws very little load.

Modul-Connect Battery Charger Installation:

- Choose an appropriate mounting location.
- All fuses, fuse holders and connecting cables are supplied with the product.
- This battery charger shall be mounted and connected as close to the auxiliary battery (which is being charged) as possible.
- The battery charger has to be securely mounted on a metal or non-combustible surface.
- Use a mounting template to mark the positions of the mounting screws.
- The battery charger has 4 off fixing holes (6.5mm diameter) and 4 off fixing slots (6mm x 10mm) for ease of mounting.
- It is recommended to use a minimum of 4 off M5 fixings to secure the battery charger.
- Drill the 4 mounting holes, place the charger in position and fasten it to the mounting surface.

IMPORTANT:

Connection Procedure / Power up sequence to ensure normal operations:

1. Remove all fuses from the fuse holders.
2. Connect the auxiliary battery positive cable (white) to the charger output via a 40A fuse holder.
3. Connect the charger negative cable (black) to the battery negative or chassis earth.
4. Connect the charger input cable (red) to the starter battery via a 40A fuse holder.
5. Connect the positive remote input cable (brown) to the ignition supply using supplied cables and fuse holder.
6. Insert 40A auxiliary battery fuse.
7. Insert 40A starter battery fuse.
8. Insert the 1A fuse into the ignition feed.

If this order is not followed the unit may flash amber for up to 10 minutes at key on (even if the auxiliary battery is fully charged).

After the elapsed time the Modul-Connect Battery Charger will resume normal function.

3.2 BATTERY CHARGER DC INPUT CONNECTION

CAUTION: Reversing the DC Input terminal will damage the unit and cannot be repaired. Damage caused by reverse polarity connection is NOT covered by the warranty.

Ignition Supply (brown 1mm² cable)

The ignition supply cable (brown) is a positive (+) signal supply to the battery charger. The charger will operate when this cable is powered. This cable has to be fused (2A) to protect the charger and the cable run.

The Modul-Connect Battery Charger DC-DC 30A is supplied with 3 options of connection:

- Option 1: A mini blade 'ignition jumper' fuse.
- Option 2: A Ford (>07-2016) 'in-line' fuse.
- Option 3: Installer option.

OPTION 1:

Most manufactures use mini blade fuses in their OEM fuse boxes.

The mini blade 'ignition jumper' fuse can be located in the fuse box of the vehicle to 'piggy back' from an ignition (+) circuit without cutting into any cables on the vehicle.

The mini blade 'ignition jumper' has two circuit slots on one side and a fuse plug on the other. When plugged into one of the vehicle's circuit slots, the fuse tap provides space for an additional fuse.

The mini blade 'ignition jumper' **MUST NOT be used to replace the fuse in any primary vehicle safety system.** i.e. ABS, EBD, airbag, fuel system control, vehicle ECU or BCM feeds.

The mini blade 'ignition jumper' is rated at a maximum of 10A and the removed ignition feed fuse must not be rated at more than this.

The mini blade 'ignition jumper' has to be inserted into the fuse box in the correct orientation.

If a fuse is removed it has to be inserted from the fuse box into the 'ignition jumper' to make the circuit.

The Jumper **MUST** have the OEM fuse and accessory fuses fitted.

After fitting, make sure that the circuit which the OEM fuse was protecting is still functioning correctly.

OPTION 3:

Connect to a vehicle positive (+) ignition supply via the supplied 2A fuse using OEM vehicle manufactures recommendations.

Further connection information for vehicle makes and models is available from Modul-System.

4. UNIT OPERATION

- The Modul-Connect Battery Charger DC-DC 30A operates with an input voltage between 9-32V.
- The battery charger is turned on and off with the vehicle ignition.
- The output current is limited to 30A for the charger.
- In case of a low input voltage (<9V), the output voltage is reduced to prevent damage to the charger.
- The charger is protected against overheating and resumes normal operation when it cools down.
- The 3-colour status LED on the battery charger end panel shows the status of the charger. In 'normal' operation the LED will either be off (ignition key off), flashing amber (charging) or green (charged).
- The 3-colour status LED also shows the status of the charger as follows:

LED status colour	Status LED output	Mode	Note
Off	Off	Off	Ignition off. The charger is switched off.
Red	Flashing	Fault mode	Refer to the codes below for the number of short flashes followed by number of long flashes.
Amber	Constant flashing	Charging	Current/boost charging.
Green	Constant flashing	Charging	Float charging.

4.1. UNDERSTANDING THE ERROR CODE

LED status colour	Short flashes	Long flashes	Fault
Red	3	0	Force idle (check connection and fuses to starter battery and auxiliary battery)
Red	3	1	Starter battery voltage below 9 volts (<9V)
Red	3	2	Starter battery voltage over 36 volts (>36V)
Red	3	3	Starter battery voltage over 33 volts (>33V)
Red	3	4	Internal charge controller temperature MT over 70°C
Red	3	5	Internal charge controller temperature FT over 115°C
Red	3	7	Thermistor disconnected
Red	3	8	Damaged battery detected

5. ACCESSORIES

Remote voltage monitoring and temperature probe (Optional)

Additional part number: 21510-03

In an environment where extremes of temperature (below -10°C) are encountered, it is advised to use a temperature sensor to vary the charging voltage with respect to battery temperature.

The Remote voltage monitoring and temperature probe further optimises the charging voltage to the battery temperature to ensure optimum charging in all conditions with no risk to the battery life or performance.

The Remote voltage monitoring and temperature probe also compensates for long cable runs and should be used if the secondary battery is positioned more than 1 meter from the charger.

- Connect the Remote voltage monitoring and temperature probe to the positive (+) terminal of the auxiliary battery. The Remote voltage monitoring and temperature probe has 4 meters of connecting cable.
- Remove the front plate of the Modul-Connect Battery Charger DC-DC 30A and plug into the 3-way connector inside.
- Route the cable out of the battery charger.
- Reattach the front plate of the battery charger.



6. TROUBLESHOOTING

To troubleshoot the Modul-Connect Battery Charger DC-DC 30A, please note the LED display and review the "Understanding the Error Codes" in section 4.1.

Also:

- Check that the voltage at the output pins is the same as the batteries and that the polarity is correct.
- Check that all the fuses are OK.
- Check LED flashes status as the power is applied to the ignition feed (brown wire).
- If the battery charger LED flashes AMBER but the battery voltage is not increasing, wait 10 minutes and re-check your readings.

7. TECHNICAL SPECIFICATION

PERFORMANCE	
DC input voltage operating range	9-32 Vdc
DC output voltage operating range	0-14.1 Vdc
Maximum DC output	30A
Boost charge	14.1 Vdc
Float charge	13.8 Vdc
SAFETY AND ENVIRONMENTAL	
Conformance	CE EMC & LVD EN61204-3:2000 EN61000-4-2:2009 EN61000-4-3:2009 + A1:2008 + A2:2010 EN61000-4-5:2014 EN61000-4-6:2014 CISPR16-2-3:2006 EN50581:2012
Agency markings	CE
Operating temperature	-20°C to 70°C (32°F to 158°F) ambient
Storage temperature	-20°C to 70°C (-4°F to 158°F)
Relative humidity	5-90% non-condensing
Operating altitude	Up to 3000 meters (9,843ft) above sea level
IP Rating	IP60 in any mounting position
	IP65 mounted vertically with the cables exiting the charger from the bottom
DIMENSIONS AND WEIGHTS	
Weights	21500-03 2.0 kg
	21510-03 0.1 kg
Dimensions	21500-03 210x46x123 mm (WxDxH)
	21510-03 4 meters long M8 battery terminal

Note! Specifications are subject to change without notices.

8. WARRANTY

TWO YEAR LIMITED WARRANTY

The limited warranty program is the only one that applies to this unit, and it sets forth all the responsibilities of Modul-System. There is no other warranty, other than those described herein. Any implied warranty of merchantability of fitness for a particular purpose on this kit is limited in duration to the duration of this warranty.

This unit is warranted, to the original purchaser only, to be free of defects in materials and workmanship for two years from the date of purchase without additional charge. The warranty does not extend to subsequent purchasers or users.

Manufacturer will not be responsible for any amount of damage in excess of the retail purchase price of the unit under any circumstances. Incidental and consequential damages are specifically excluded from coverage under this warranty.

This warranty does not apply to damage to units from misuse or incorrect installation/connection. Misuse includes wiring or connecting to improper polarity power sources.

LIMITATION:

This warranty does not cover connected accessories, such as adapters and batteries, damage or defects result from normal wear and tear (including chips, scratches, abrasions, discoloration or fading due to usage or exposure to sunlight), accidents, damage during shipping to our service facility, alterations, unauthorised use or repair, neglect, misuse, abuse, failure to follow instructions for care and maintenance, fire and flood.

If your problem is not covered by his warranty, contact our Customer Service Department at info@modul-system.com or +46 31 746 87 00 for general information if applicable.

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