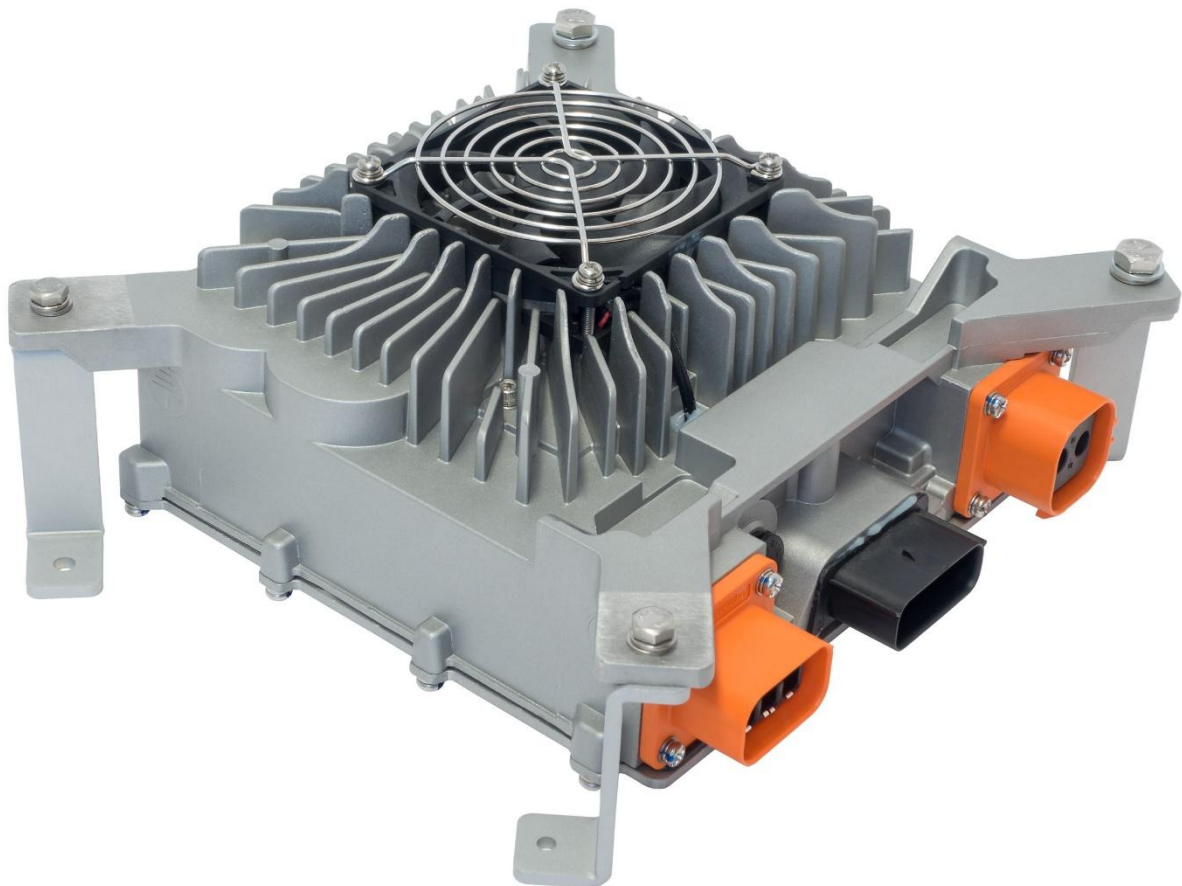




KOP330x Charger System with HV-KOP-CTRL

User Manual



1. Introduction

The KOP3301 and KOP3302 are battery charging power modules. As such, they must be connected to an HV-KOP-CTRL control unit to function. These highly efficient, vibration-resistant power modules are designed for both stationary and mobile use in vehicles. They maximize the utilization of a 16 A socket, delivering 3.3 kW of output power with up to 93% efficiency. With charging currents reaching 32 A, they enable fast charging while optimizing the lifespan of compatible batteries.

An HV-KOP-CTRL control unit can operate one or two power modules of the same type (either KOP3301 or KOP3302). Mixing different power module types on a single control unit is not permitted. For increased power, two identical power modules can be connected in parallel via an HV-KOP-CTRL, achieving a combined output of up to 6.6 kW without sacrificing efficiency.

**Please read the safety instructions carefully before using
them for the first time and keep the instructions for future
queries.**

Important Safety Notice:

The HV-KOP-CTRL is the dedicated control unit for the KOP3301 and KOP3302 chargers. This control unit is battery-specific and supports Li-Ion batteries only. Adaptation of the HV-KOP-CTRL to the specific battery configuration is achieved by adjusting its internal parameters using dedicated programming software. It is crucial to understand that the HV-KOP-CTRL cannot be interchanged or replaced without reprogramming by a qualified technician. Attempting to use the HV-KOP-CTRL with an incompatible battery system (including non-Li-Ion types or without proper programming) can result in severe damage to the battery, the power modules, or pose a risk of personal injury. Always ensure the HV-KOP-CTRL is configured by a qualified technician for your specific Li-Ion battery system. The programming manual for the HV-KOP-CTRL is provided as a separate document.

Liability and Manual Information:

The manufacturer accepts no liability for any consequences resulting from inappropriate, negligent, or incorrect installation or adjustment of the optional operating parameters of the equipment.

The contents of this guide are believed to be correct at the time of printing. However, due to our commitment to continuous development and improvement, the manufacturer reserves the right to change the specification of the product, its performance, or the contents of this guide without prior notice. All rights reserved. No part of this guide may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, recording, or any information storage and retrieval system, without written permission from the publisher.

Software Considerations:

This product is supplied with the latest software version. If integrating this charger system into a new or existing system with other chargers, be aware that software differences may exist. These differences could cause this product to function differently from other chargers in the system.

2. Safety and Usage Instructions

- Only use the supplied connection cable. Do not modify, extend, or connect it to other wires.
- To prevent damage or hazards, always disconnect the charger from the mains power outlet before disconnecting the battery cable from the battery.
- Do not attempt to charge non-rechargeable batteries with this charger.
- This charger is not designed for permanent installation in caravans.
- Regularly inspect the charger, including cables, plugs, and housing, for any signs of damage. Do not use a defective charger.
- Protect the charger from direct sunlight, dust, moisture, and rain.
- While the charger can remain connected to the mains after charging if consumers are drawing power from the battery, it is generally recommended to disconnect it from the mains when charging is complete and no consumers are active.

3. Specifications

Model	KOP3301	KOP3302
Type	10832	31210
Min output voltage	50 V	110 V
Max output voltage	161 V	450 V
Nominal charging current	32 A	10 A
Line voltage	90 - 265 V / 45 – 65 Hz	
Max input current	Max. 14 A (limited)	
Power factor	>0.99 at 50% load or more	
Efficiency	>93% at 50% load or more	
Output power	Max. 3300 W	
Dimensions (L x W x H)	288 x 250 x 100mm	248 x 225 x 100 mm
Weight	4.8 kg	4.5 kg
Protection	IP67 protection	

4. Mounting the charger

- **Secure Mounting:** The charger must be securely mounted on a stable, flat surface to prevent movement and potential damage.
- **Orientation Recommendations:**
 - **Stationary Applications:** Vertical mounting is recommended to optimize airflow and cooling.
 - **Mobile Applications:** Horizontal mounting is generally preferred for stability within vehicles. Ensure the mounting location can withstand vibrations.
- **Ventilation:** Ensure adequate free space around the charger to allow for proper air circulation and cooling. Do not obstruct ventilation openings.
- **Environmental Considerations:**
 - **Dry Environment:** Mount the charger in a dry, well-ventilated area. Avoid locations where it could be exposed to moisture or condensation.
 - **Distance from Batteries:** Ideally, mount the charger away from the batteries to minimize the risk of exposure to battery fumes or acid.
- **Ventilation Requirements:** The installation location must be well-ventilated to prevent overheating of the charger.
- **Housing Integrity:** Do not drill any holes in the charger housing. Drilling can damage internal components and compromise the safety and functionality of the device.



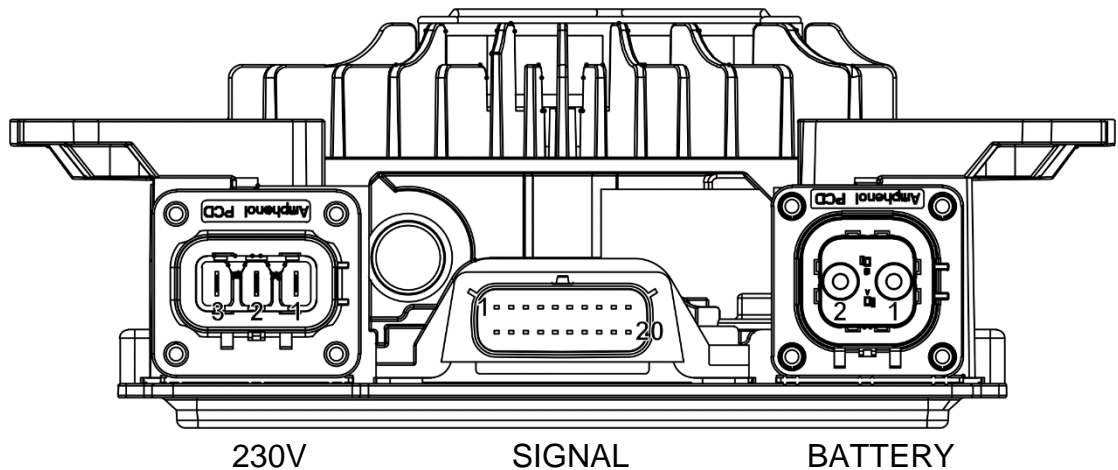
5. Protection features

This charger incorporates the following protection mechanisms for safe and reliable operation:

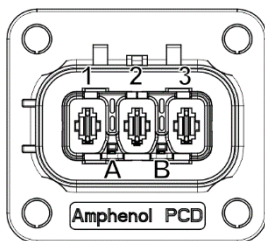
- **Internal Fuses (Non-User Replaceable):**
 - **Mains Fuse:** Integrated fuses in both live wires protect against overcurrent conditions on the input side. These fuses are not intended to be replaced by the user.
 - **Output Fuse:** An internal fuse on the output side protects against overcurrent conditions. This fuse is not user-replaceable.
- **Electronic Protection:**
 - **Overload Protection:** Automatically limits output current to prevent damage due to excessive load.
 - **Short-Circuit Protection:** Immediately shuts down the output in case of a short circuit.
 - **Over-Temperature Protection:** Reduces output power if the internal temperature exceeds safe limits, preventing thermal damage.
 - **Overvoltage Shutdown:** Disconnects the output if the output voltage exceeds a safe threshold.

- **Undervoltage Shutdown:** Disconnects the output if the input voltage falls below a critical level.
- **Safety Features:**
 - **No Sparking on Connection:** Designed to prevent sparking when the charger is plugged into the mains.
 - **Charge Time Limitation:** Includes a safety mechanism to limit the maximum charging duration.

6. KOP3301 Connectors

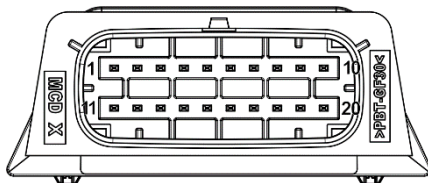


230V connection



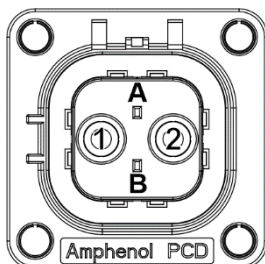
1	Neutral conductor (N)
2	Protective earth conductor (PE)
3	Line conductor (L)
A	HVIL signal 1
B	HVIL signal 2

Signal connection



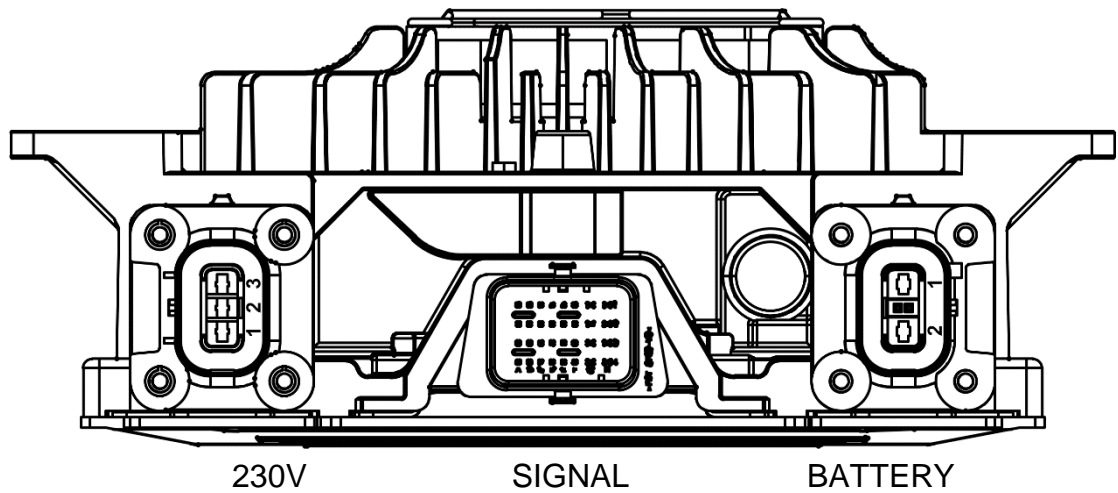
10	12 V / 5 output
11	CANH
12	CANL
13	HVIL 1
14	HVIL 2
17	GND
Other	Not connected

Battery connection

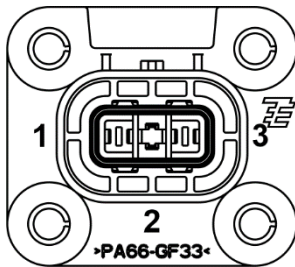


1	Positive battery connection
2	Negative battery connection
A	HVIL signal 1
B	HVIL signal 2

7. KOP3302 connectors

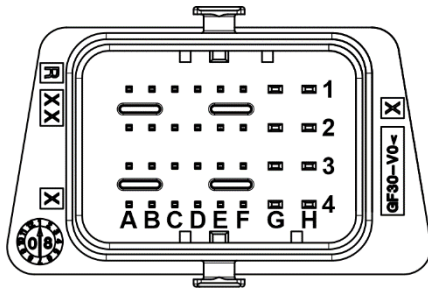


230V connection



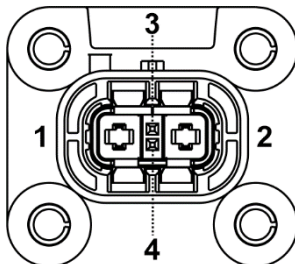
1	Line conductor (L)
2	Protective earth conductor (PE)
3	Neutral conductor (N)

Signal Connector



2H	12 V / 5 output
4A	CANH
4B	CANL
4G	GND
Other	Not connected

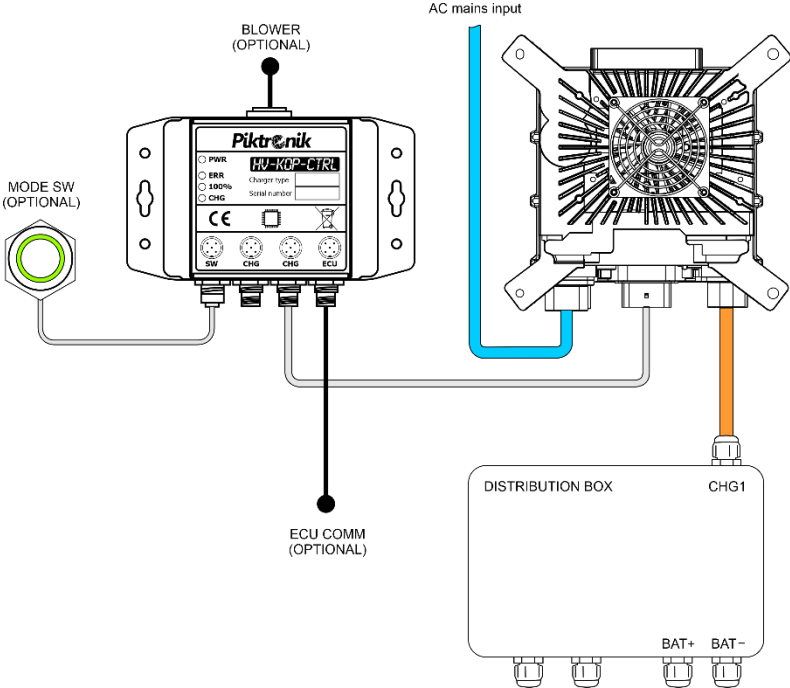
Battery connection



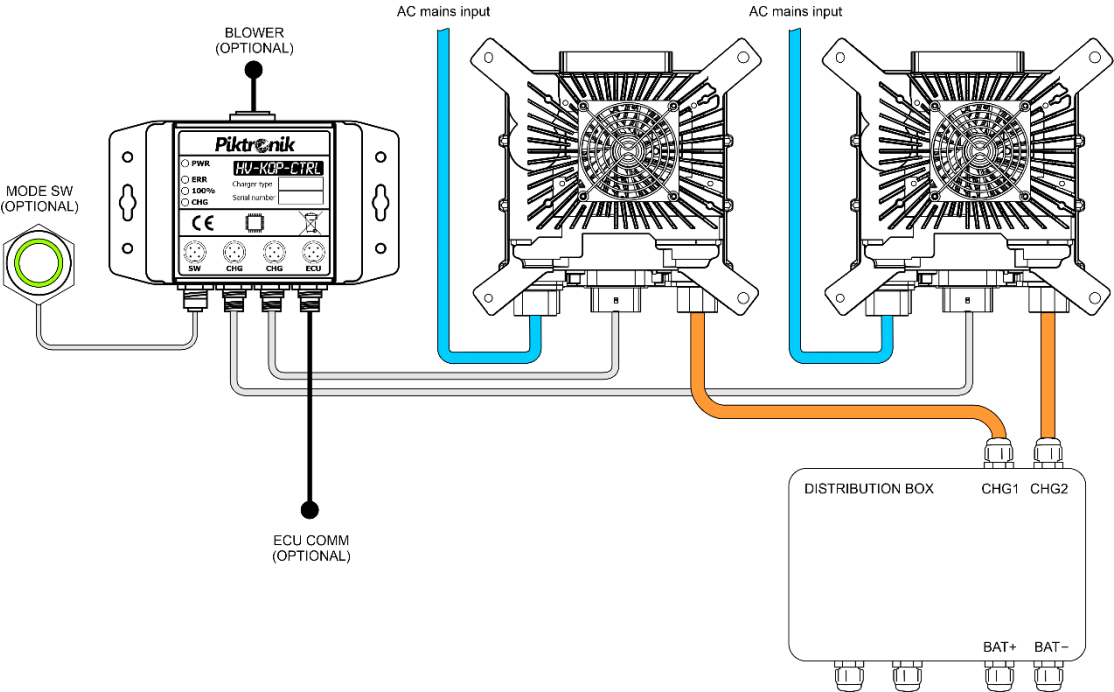
1	Positive battery connection
2	Negative battery connection
3	HVIL signal 1
4	HVIL signal 2

8. Connection to control unit

One power module



Two power modules



9. HV-KOP-CTRL unit LEDs

The HV-KOP-CTRL unit is equipped with four status indicator LEDs that provide a quick visual overview of the charger's operation and any potential issues. The following table details the function of each LED and its various states:

LED				
PWR	ERR	100%	CHG	Function
off	off	off	off	Off - charger disconnected from mains
on	off	off	flashing	Battery detection phase
on	off	off	on	Charging in progress
on	off	on	off	Charging completed
on	flashing	off	off	Error (see error list)

9.1. Error list

Number of error LED flashes	Error description
1	Charging timeout or charged Ah exceeded Battery disconnected during charging
2	Charger CAN check failed or CAN timeout
3	Battery not detected (check fuses and protection devices) Battery voltage too low or too high
4	Charger temperature too high
5	Charger AC current limiting problem
6	Charger AC input error (e. g. missing phase) or AC phase dropout
7	Charging voltage too high or too low during charging
8	Charger power module error
9	Parameters checksum error, parameters not in limits or system error

10. Warnings



COOLING	<p>Do not cover the case and protect the charger from heat or direct sunlight. At elevated temperatures, the charging current is reduced and the charging time is extended accordingly.</p> <p>The built-in fan must be able to cool the electronics well. The speed of the fan depends on temperature and charging current.</p>
CONNECTION	<p>Output currents are very high. Select the output line with the correct conductor cross-section, use ferrules, keep contact points clean and connect them correctly to the output terminals.</p>
FUSES	<p>The fuse in the charger is not sufficient protection for the battery line to the charger. An appropriate fuse must be installed in the immediate vicinity of the battery terminal.</p>
MAINS CONNECTION	<p>The mains current is electronically limited. Please check whether the socket and the mains fuse are designed for this current.</p>
BATTERY TYPE AND SIZE	<p>Use this charger only for the pre-set battery type. In the event of a fault, the battery cannot be fully charged or the battery can get damaged. Battery life would be significantly reduced if charged incorrectly.</p>
LITHIUM BATTERIES	<p>Lithium batteries are very sensitive to overcharging and overtemperature. The charger can only regulate the total voltage, but it cannot detect the states of individual cells. Therefore, the charger may only be used together with the battery management system.</p>
LEAD-ACID BATTERY GASSES	<p>During the charging of lead-acid batteries, highly explosive, highly flammable oxyhydrogen gas can be generated. The room in which the lead-acid batteries are located during charging must be well ventilated. Cigarettes or any open fires or sparks may cause an explosion. Keep all ignition sources away from the battery.</p>
ACIDS	<p>The acids in lead-acid batteries are corrosive and harmful. In a case of acid spillage, clean the affected areas abundantly with water. If the acid gets into the eyes, rinse immediately with water and quickly contact a doctor.</p>
TOXIC SUBSTANCES	<p>Lead and some battery additives are toxic. Clean hands thoroughly after work. The batteries must be disposed of in accordance with the legal regulations.</p>