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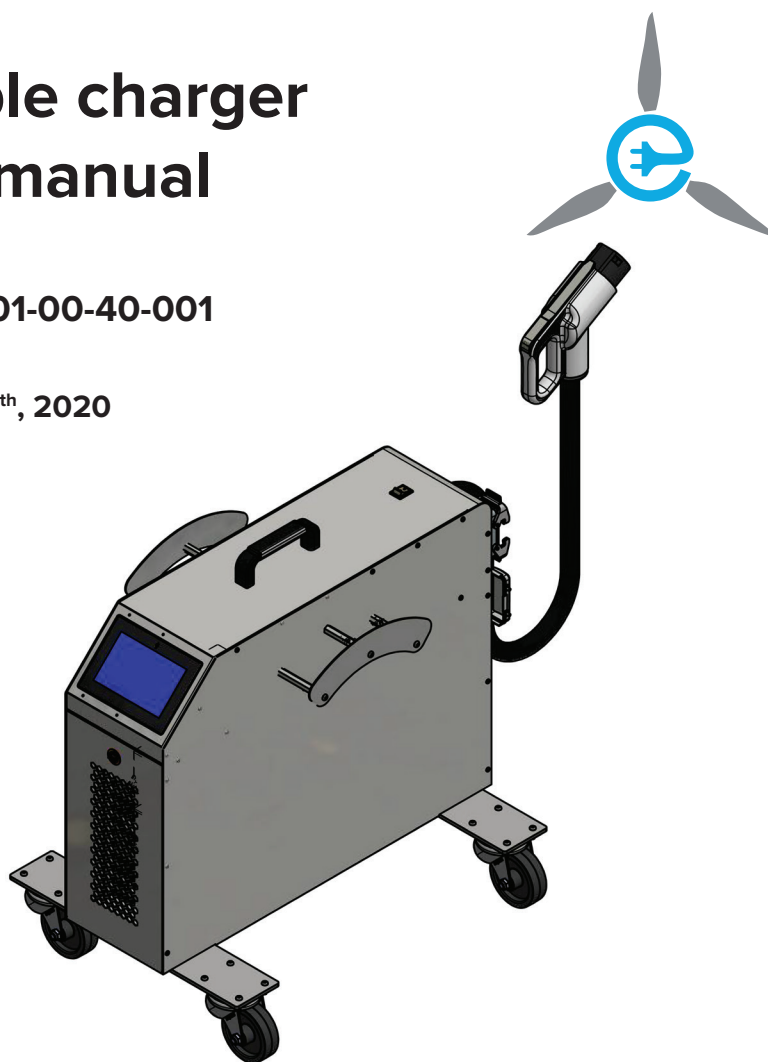
SKYCHARGE

M20 Portable charger instruction manual

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INDEX OF DOCUMENT REVISIONS

The table below shows the revision history of this manual. Revised material is marked with a vertical bar that will extend the full length of new or revised content, added to new or previously existing pages. This marker will be located adjacent to the applicable text in the margin on the outer side of the page.

Document revision	Description	Reason for revision	Affected pages	Date
A00	Initial release	/	ALL	August 14 th , 2020



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LIST OF ABBREVIATIONS

Abbreviation	Description
SOC	State of Charge
HMI	Human Machine Interface



SAFETY INSTRUCTIONS



DANGER, HIGH VOLTAGE! The hazard of electrical shock, fire or death.

- Read the operating instructions carefully before using the SkyCharge M20.
- Do not put your fingers in the SkyCharge M20's plug-in socket holes or any other hole in the device.
- Do not use the SkyCharge M20 if the supply cable is damaged, has damaged insulation or shows signs of improper use.
- Do not use the SkyCharge M20 if the aircraft's charging plug-in socket is damaged in any way. Consult technical support at support@pipistrel-aircraft.com
- Do not use the SkyCharge M20 if it is damaged in any way. Consult technical support at support@pipistrel-aircraft.com
- The SkyCharge M20 must be used with grounded electrical networks.
- If you are not sure whether it is safe to use the SkyCharge M20, immediately disconnect the SkyCharge M20 from the network power supply and contact technical support at support@pipistrel-aircraft.com
Do not use the SkyCharge M20 until the issue is positively identified and resolved.
- The SkyCharge is only intended for use with Pipistrel electric aircraft.



CAUTION! A potentially hazardous situation which could lead to equipment damage or injury.

- Always position the supply cable so that it's not in the way of vehicles or people passing by. Avoid situations that could lead to cable damage, while the SkyCharge M20 is in use.
- When charging is complete always remove and secure the cable to prevent injury to yourself and others.



NOTE: Operating tips additional information.

- Use a wet cloth or a cloth soaked in soap and water solution to clean the SkyCharge M20. Do not use chemical cleaners or solutions. Do not pour water on the SkyCharge M20.
- SkyCharge repairs and maintenance can only be carried out by Pipistrel-authorized personnel. Do not try to repair the SkyCharge M20 by yourself. Contact technical support at support@pipistrel-aircraft.com



SKYCHARGE M20 DESCRIPTION

SkyCharge M20 is a battery charger approved to be used on the ground for charging Velis Electro on-board batteries.

The unit's rack is mounted on wheels for eased mobility and manoeuvrability. A power supply cable and charging cable are supplied with the unit and stored on support brackets on both sides of the charger.



Figure 001
SkyCharger M20 unit

The battery charger power supply is provided with connection to AC grid by means of an IEC60309 three phase plug.



Figure 002
Power supply connection



The L1 phase of the charger is used for powering the 12V auxiliary DC power supply. The 12V DC power supply is internal to the battery charger and is used for powering of the various charger's internal components (charge controller, HMI, contactors, etc...).

All of charger's functions are controlled and monitored by the charge controller. The charge controller communicates with the Velis Electro's system controller and executes it's commands.

DIGITAL DISPLAY

SkyCharge M20 has an HMI in form of a 7" (inch), capacitive touch screen. The screen is used to inform the user of the charger's and aircraft's charging status, issue a start/stop charge command, select charging current/mode and monitor the state of the charging process.

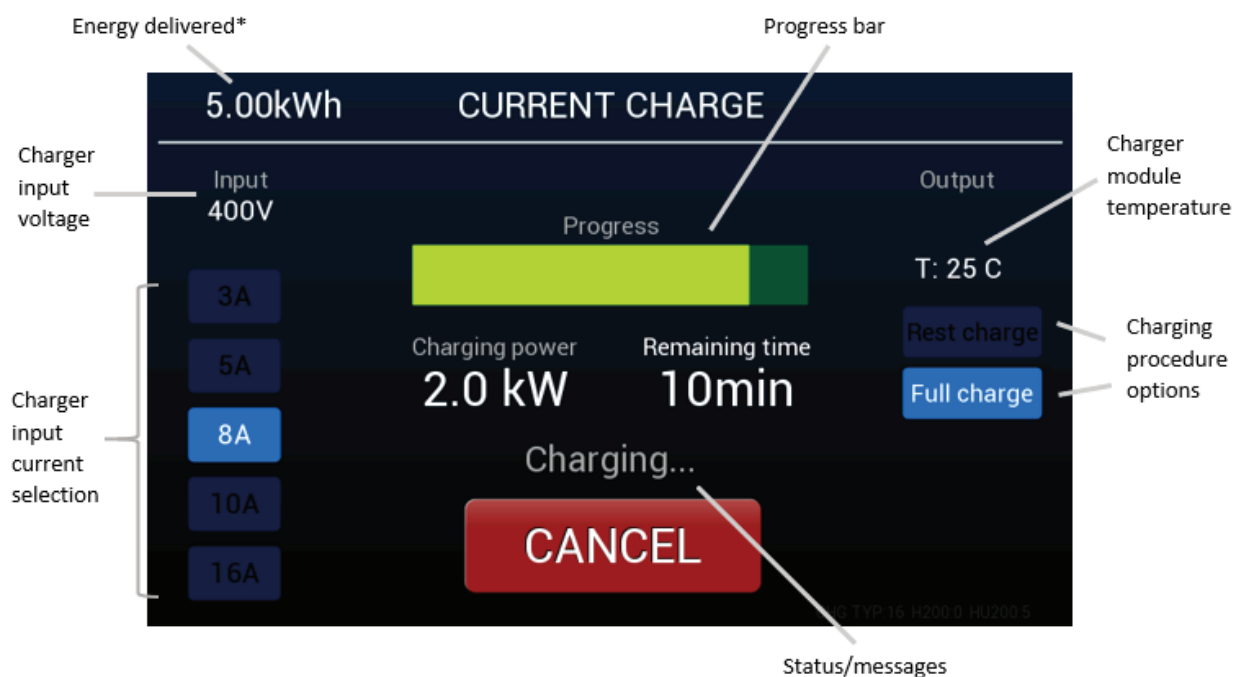


Figure 003
HMI - Digital display

*Parameter indicates the amount of energy transferred since the beginning of the current charging process. It does not represent the total amount of energy in the batteries.



Figure 004
HMI - Digital display

CHARGING INTERFACE

The airplane/charger charging interface consists of a GB/T 20234 plug-receptacle combination, standardized in IEC IEC62196-3. The charging connector is rated for 1000 VDC maximum charging voltage and up to 250A of continuous charging current.

The charger plug is equipped with an electric locking mechanism, which locks the plug into the receptacle during charging. This safety feature prevents unintentional disconnects during charging, which could result in contact arcing and welding.



Figure 005
Charging plug-receptacle interface



TECHNICAL DATA

ELECTRICAL INPUT	
Input power	23 kW max
Input voltage	130 - 400 V _{AC} , three phase
Input current	30 A max.
Input voltage frequency range	45 - 65 Hz
Recommended fuse	32 A
ELECTRICAL OUTPUT	
Maximum output power	20 kW
Output voltage range	150 - 440 V _{DC}
Output current	60 A max.
FUNCTIONAL INTERFACES	
Firmware update	via USB port
OPERATIONAL RATINGS	
Efficiency (max.)	92%
Power factor	≥ 0,99 @ 400 V _{DC} @ Rated Power (THD < 5%)
Ambient operating temperature	From -20°C to +40°C
Cooling	Forced air coling
Lightning protection	No
DIMENSIONS, WEIGHT	
Dimensions	823mm * 530mm * 767mm
Weight	71 kg



DIMENSIONS

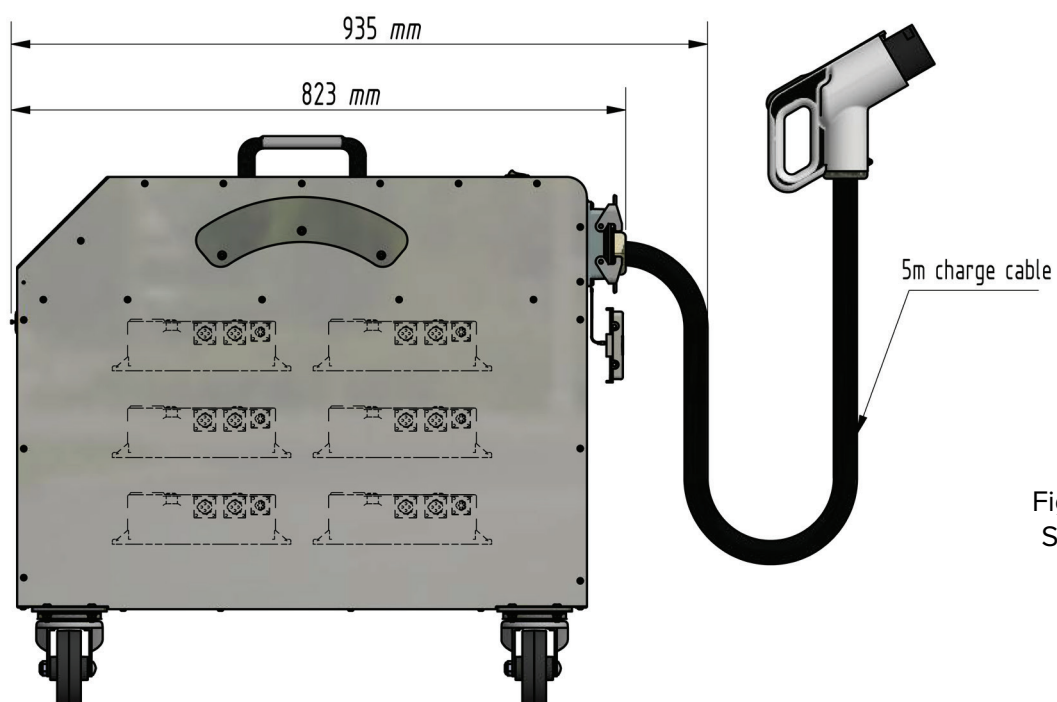


Figure 006
Side view

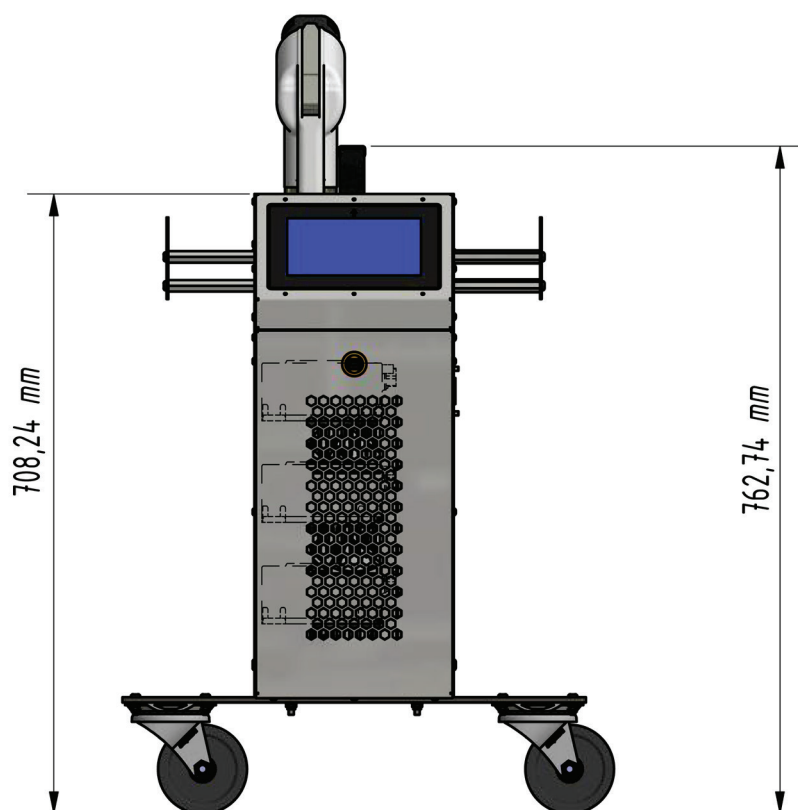


Figure 007
Front view

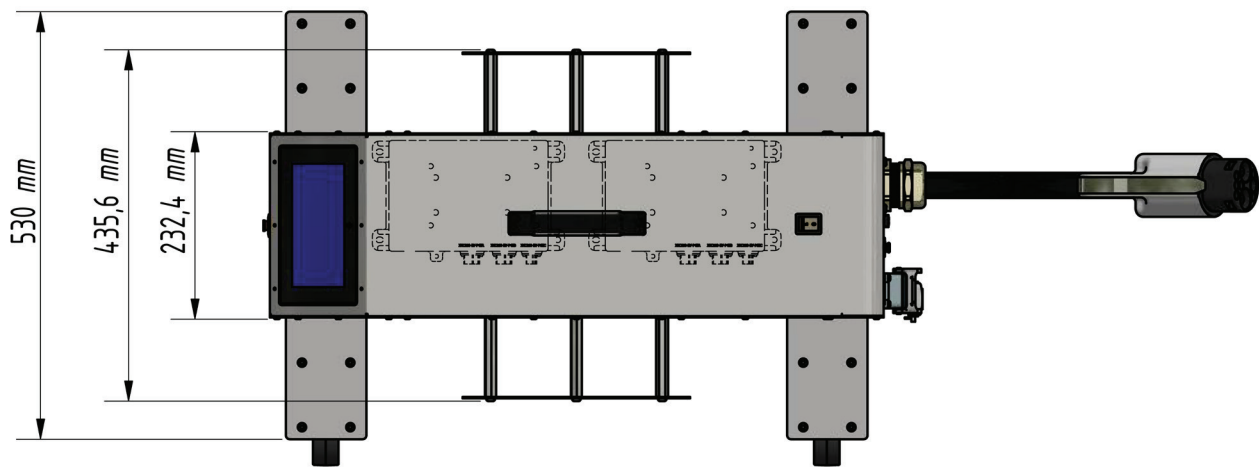


Figure 008
Top view



PLACARDS

The following placards can be found on SkyCharge M20:



Around the main rocker switch



On top of charger



Next to power supply inlet



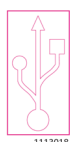
Next to air vent inlet and outlet



Next to diagnostics port



Around the fuse



Next to firmware update port (USB)



DELIVERY

Portable battery charger SkyCharge M20 unit (TC CHARGER 20kW GB T, p/n 7020100000) is delivered together with:

- 5 m charging cable with charging plug (GB/T 20234)
- 10 m power supply cable with three phase plug (IEC 60309)

CHARGING PROCEDURES

SkyCharge M20 offers two modes of charging procedures, FULL CHARGE and REST CHARGE procedure. Both charging modes are given as an option on the charger display.

FULL CHARGE is the standard charging procedure performed before the flight.

REST CHARGE is the procedure used to prepare the batteries for a period of inactivity. This process will charge the batteries to an optimum level for aircraft storage (SOC 70-80% at the end of the rest charge process. SOC range for battery storage is 30-80 %SOC). This feature was introduced for aircraft that gets stored over a long period of time (over winter for example). Storing a 100% may have a negative impact on battery life, therefore only a partial charge is beneficial. The procedure should be repeated every 90 days, during storage period, to maintain the batteries in optimal condition.



DANGER, HIGH VOLTAGE!

Under no circumstances and in any way do not open any part of the SkyCharge M20 during operation.



CAUTION!

Do not touch or disconnect the charging cable from the aircraft plug-in socket while charging.

**FULL CHARGE PROCEDURE (BATTERIES CHARGED 100%)**

1. Park the aircraft and engage parking brake.
2. Connect the charger power supply cable to the power network.
3. Turn the charger rocker switch to ON position.
4. Connect the charging cable plug to the charging port socket on the aircraft.
5. Select “FULL CHARGE” option on the charger display, see Figure 009.
6. Select desired charging current input on the left-side list, see Figure 009.



CAUTION! Power network circuit breaker rating should support the chosen charging current input selected on the charger.



NOTE: Low charging current increases charging time, but reduces battery stress and heating.

7. Press “CHARGE” on the charger display to start the charging procedure, see Figure 009.

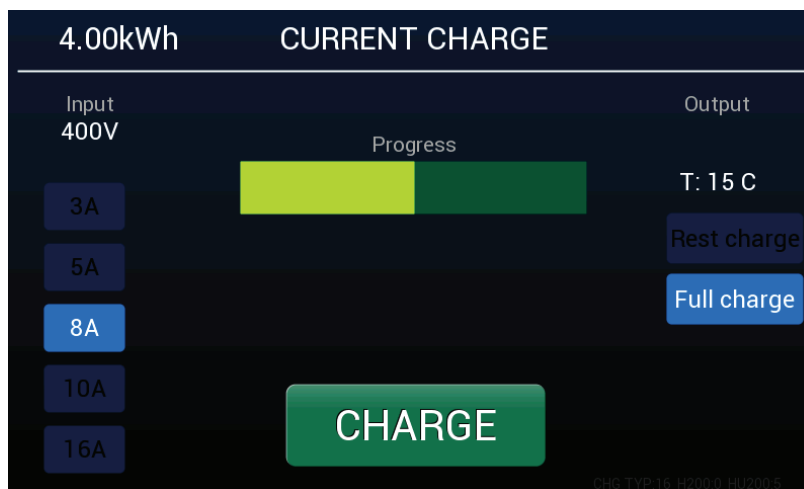


Figure 009

8. Charger display will show charging process, power and remaining time to fully recharge the batteries. Charging procedure can be stopped at any time by pressing “CANCEL” on the charger display, see Figure 010.

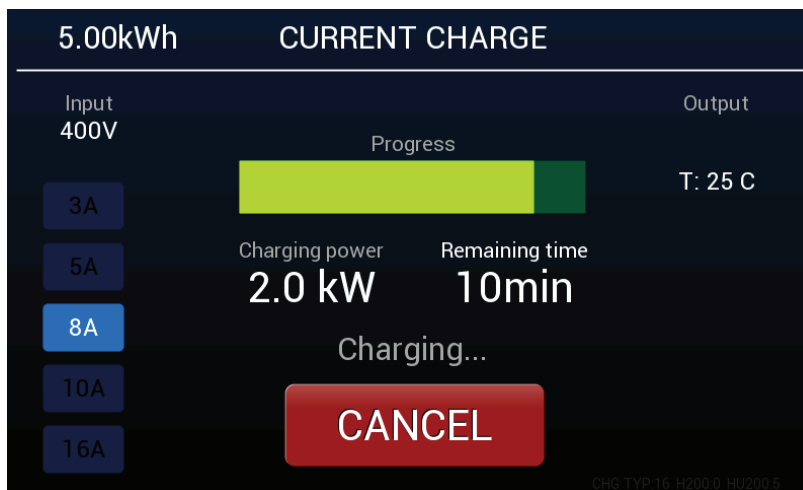


Figure 010

9. When charging process is completed press “CONFIRM” on the display, see Figure 011.

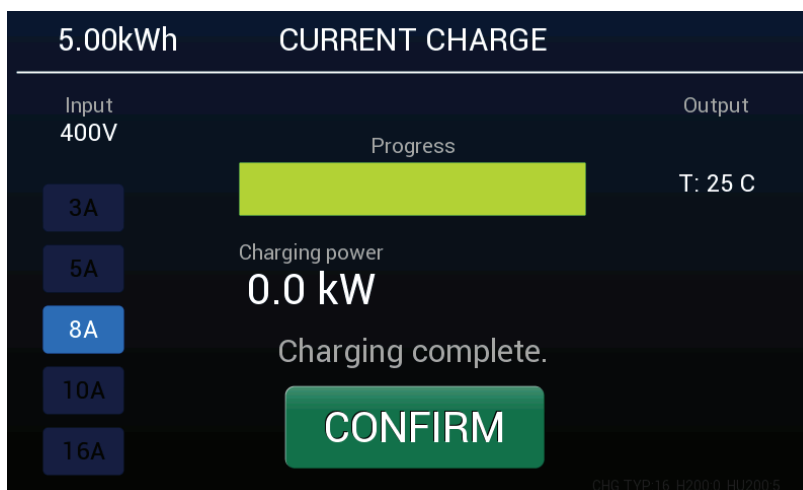


Figure 011

10. Disconnect the charging cable plug from the aircraft charging port.
11. Turn the charger rocker switch to OFF position.
12. Disconnect the charger power supply cable from the power network.



REST CHARGE PROCEDURE (BATTERIES CHARGED UP TO 70-80%)

1. To perform “REST CHARGE” procedure, follow the same procedure as “FULL CHARGE”, but press “REST CHARGE” option at the beginning of the charging process.

TROUBLESHOOTING

In case of an Error message (for example see Figure 012), press “CONFIRM”, abort the charging procedure and contact Pipistrel support team for further assistance at support@pipistrel-aircraft.com

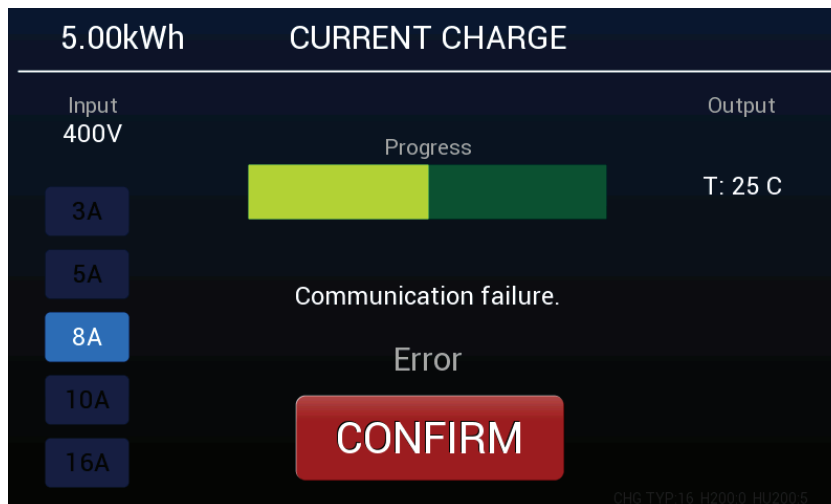


Figure 012

MAINTENANCE, LIFE LIMIT

No maintenance is required for SkyCharge M20.



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