



solo[®]



Compact Smart Charger

CSC 384

User Manual

*For use with Emetric BM 384 HV battery systems
Compatible with single-seat electric glider battery systems*



Table of Contents

Table of Contents.....	2
2. Safety Instructions.....	3
2.1 General Safety Rules.....	3
2.2 Hot Surfaces.....	4
2.3 Connector and Cable Safety.....	4
2.4 Battery Handling.....	4
2.5 Emergency Procedure.....	4
3. Technical Specifications.....	5
4.2 Operating Modes.....	5
5. WeCharge App.....	6
5.1 Creating an Account and Claiming the Charger.....	6
5.2 Dashboard Layout.....	6
Header bar.....	6
Connectivity Status Bar.....	6
Charger Control Card (left).....	6
Action Buttons.....	7
Battery Panels (right side).....	7
Live Performance Panel.....	7
5.3 Starting a Normal Charge Cycle.....	8
5.4 Changing Settings While Running.....	8
5.5 Discharge to a Target SoC.....	8
5.6 Winter Storage Charge.....	8
6. Startup and Self-Test.....	9
6.1 Power-On Sequence.....	9
7. LED Status Indicator.....	9
8. Service Modes.....	11
8.1 Force Full Charge (3× Power Cycle).....	11
8.2 WiFi Setup Mode (5× Power Cycle).....	11
10. Maintenance.....	12
12. Warranty, Compliance, and Disposal.....	13
12.1 Warranty.....	13
12.2 Compliance.....	13
12.3 WEEE Disposal.....	13



1. Introduction

The Compact Smart Charger CSC 384 is a high-performance battery charger designed for use with Emectric BM 384 HV lithium battery systems in electric gliders and motorgliders. It provides intelligent charging, discharging, and winter storage charge management through an integrated WiFi interface and the WeCharge web cockpit at wecharge.swiss-sailplane.ch.

This manual covers safe operation, LED status interpretation, use of the WeCharge app, service modes, troubleshooting, and maintenance. Please read the safety section in full before operating the device.

Single vs. Dual Battery Charging

The CSC 384 can charge one battery at a time when connected externally, or two batteries simultaneously when the batteries are installed in the aircraft and the aircraft's internal wiring connects both batteries to the single charging connector. In dual-battery mode, the charger distributes power between both batteries as directed by the combined BMS state.

2. Safety Instructions

⚡ HIGH VOLTAGE — Do Not Open

This charger contains components operating at voltages up to 406 V DC and 250 V AC. Never open the enclosure. There are no user-serviceable parts inside. Disconnect from the power grid and from the battery before any handling.

⚡ Never Charge Unattended

Do not leave charging batteries unattended. In the event of a fault, unusual smell, heat, or smoke, disconnect the charger from mains immediately. Do not attempt to reconnect without determining the cause.

⚠ Read Before First Use

Read this manual in its entirety before connecting or operating the charger. Failure to follow these instructions may result in damage to the charger, batteries, or aircraft, or personal injury.

2.1 General Safety Rules

- Always connect the charger to a power source protected by a Residual Current Device (RCD / GFCI). This is mandatory for safe operation.
- Use only on circuits rated for the charger's input current (9.5 A at 110 VAC, 9 A at 230 VAC).
- Use only the designated connector and cable supplied with the charger.
- Do not allow the charger to operate outside its rated ambient temperature range (0 °C to 40 °C).
- Keep all ventilation openings clear of obstructions at all times.



- Do not operate in humid or wet conditions beyond the rated range (20–90% non-condensing humidity).
- Ensure all cable connections are secure before starting a charge cycle.
- Never bypass or defeat any interlock or safety mechanism.
- Do not modify the charger hardware or firmware.

2.2 Hot Surfaces

The charger enclosure and cable entry area may become hot during operation. Allow the charger to cool before handling. Keep flammable materials away from the unit during operation.

2.3 Connector and Cable Safety

- Inspect the charging cable before each use. Do not use a cable that shows signs of wear, cuts, kinking, or damaged connectors.
- Never pull the cable by the wire to disconnect. Always grip the connector housing.
- Ensure the connector is fully seated and locked before starting a charging cycle. The charger includes a connector interlock that prevents operation with an unsecured connection.
- Replace damaged cables only with cables approved by Swiss Sailplane GmbH or Solo GmbH.

2.4 Battery Handling

- Use only Emectric BM 384 HV batteries with this charger. Do not attempt to charge other battery types.
- Inspect batteries regularly for damage, swelling, or leakage. Do not charge damaged batteries.
- If the battery is too cold (below 8 °C) or too hot (above 45 °C), the charger will automatically pause and the LED will blink white. Wait for the battery to reach operating temperature before charging.
- Do not short-circuit battery terminals.

2.5 Emergency Procedure

In the event of an emergency: turn off the power switch on the charger, then disconnect the mains cable. If the battery connector cannot be safely disconnected, the charger will cease charging automatically once mains power is removed. Do not service or open the unit after an emergency — contact your supplier.



3. Technical Specifications

Model	CSC 384
Compatible batteries	Emetric BM 384 HV
Input voltage	110–250 VAC, 50/60 Hz
Input current	9.5 A @ 110 VAC 9 A @ 230 VAC
Charging voltage range	230–406 V DC
Charging current range	0–5 A
Charging power (selectable)	100–1200 W in steps of 100 W
Max. charging power	800 W @ 110 VAC 1400 W @ 230 VAC
Min. battery voltage (0 % SoC)	260 V DC
Ambient temperature	0 °C to +40 °C (power derates above 35 °C)
Humidity	20–90 % RH, non-condensing
Protection class	IP65
Connectivity	WiFi 2.4 GHz (802.11 b/g/n)
Battery communication	CAN 2.0A bus (via charging cable)
Dimensions	335 × 165 × 46 mm (without cables)
Weight	4.1 kg

i Power Derating

Charging power is automatically reduced by the firmware when battery cells are balancing, when temperature is outside optimal range, or when the charger exceeds its thermal threshold. The selected power level is a maximum target, not a guarantee.

4.2 Operating Modes

The charger supports four modes, selectable through the WeCharge app:

Mode	Description
Charge	Charges one or both batteries (when installed in the aircraft) to a user-defined SoC target (20–100 %, step 5 %). Power level selectable from 100 to 1200 W.
Discharge	Discharges the battery to a defined SoC target (20–90 %, step 5 %). Useful before storage, maintenance, or to prepare for a winter charge.
Winter Charge	Charges the battery to exactly 30 % SoC for long-term winter storage. Can only be started when current SoC is below 30 %. If SoC is above 30 %, discharge first.
Stop	Halts all charging or discharging immediately. The charger enters a ready/standby state with the LED showing white (solid).



5. WeCharge App

The WeCharge cockpit is accessible at: wecharge.swiss-sailplane.ch

5.1 Creating an Account and Claiming the Charger

Before the charger can be operated, it must be linked to a user account via a one-time claim process.

1. Scan the QR code on the charger label, or open the claim URL provided by your supplier. This opens the WeCharge cockpit at wecharge.swiss-sailplane.ch/claim.
2. Sign in with a Google account, or create an email/password account.
3. The charger is automatically linked to your account. You will be redirected to the main dashboard.

i One Charger per Account

Each charger is linked to one user account via the claim link. The claim URL is unique to your charger. If you need to transfer ownership, contact your supplier.

5.2 Dashboard Layout

The WeCharge dashboard is divided into the following areas:

Header bar

- Displays the app name (WeCharge Cockpit) and your name.
- Logout button: signs out and returns to the login screen.

Connectivity Status Bar

- App online / App offline: shows whether your browser has an active connection to the WeCharge server.
- Charger online / Charger disconnected: shows whether the charger is reachable. The charger is considered online if it has sent a heartbeat within the last 30 seconds.
- Last seen: displayed when the charger is offline, showing the time since the last contact.

Charger Control Card (left)

- Mode selector: choose Charge, Discharge, or Winter Charge. Only active when charger is in a stopped/ready/finished state.
- Pending changes badge: a yellow badge appears whenever slider values differ from the currently applied settings. This badge disappears once you confirm with Start or Set.
- Status pill: shows the current charger state (Ready, Charging, Discharging, Winter Charging, Stopped, Finished).
- SoC slider: sets the target State of Charge. In Charge mode: 20–100 % (step 5 %). In Discharge mode: 20–90 % (step 5 %). Hidden in Winter Charge mode.
- Power slider: sets the maximum charging power. Available in Charge mode only: 100–1200 W in steps of 100 W.



Action Buttons

Button	When it appears / What it does
Start	Visible in Charge/Discharge mode when charger is stopped/ready. Writes the current slider values and starts the charge or discharge cycle.
Start Winter Charge	Visible in Winter Charge mode when SoC < 30 %. Opens a confirmation dialog before sending the command.
Set / Set Discharge Target	Visible while a cycle is running and pending changes exist. Opens a confirmation dialog and applies new targets without stopping the cycle.
Revert	Visible when pending changes exist. Discards draft slider values and restores them to the last confirmed applied values.
Stop	Sends a stop command. Disabled if charger is already in a stopped/ready/finished state.
Switch to Discharge (target 30 %)	Shortcut button shown in Winter Charge mode when battery SoC is \geq 30 %. Switches mode and sets target to 30 % automatically.

Battery Panels (right side)

Two panels display Battery 1 and Battery 2 status side by side. Always visible:

- Status badge: Disconnected, Charging, Discharging, Balancing, or error state.
- SoC gauge: vertical fill bar with percentage label.
- Temperature: displayed in °C with color coding (see Section 9.2).

When a fault is active, one or more error badges appear on the battery panel:

- Charger Error — general fault in the charger
- Permanent Off — charger locked out, will not auto-restart
- Too Cold — battery below minimum charge temperature
- Too Hot — battery above maximum charge temperature
- Chip Overheat — BMS chip temperature too high

Live Performance Panel

An expandable panel at the bottom of the screen shows real-time output metrics:

- Power gauge: 0–1200 W (actual output power)
- Voltage gauge: 0–420 V (average of connected battery voltages)
- Current gauge: 0–5 A (sum of battery currents)
- Charger temperature bar: -10 °C to 80 °C (green up to 50 °C, orange 50 – 60 °C, red above 60 °C)
- Stats row: Power Limit By, Set Power, Estimated remaining time



5.3 Starting a Normal Charge Cycle

1. Confirm the charger is shown as Charger online in the status bar.
2. Confirm the mode selector shows Charge.
3. Set the target SoC using the slider (20–100 %, step 5 %).
4. Set the charging power (100–1200 W, step 100 W).
5. Press Start.
6. The status pill changes to Charging. Monitor the battery cards for SoC, temperature, and balancing state.

5.4 Changing Settings While Running

You can adjust the target SoC and power during an active charge without stopping:

1. Move the SoC slider and/or power slider to the desired new values. A yellow Pending changes badge appears.
2. Press Set (Charge mode) or Set Discharge Target (Discharge mode).
3. Confirm in the dialog box.
4. New values are applied immediately without interrupting the cycle.

✓ Revert Draft Changes

If you move the sliders but change your mind, press Revert to restore the sliders to the last applied values without sending any command.

5.5 Discharge to a Target SoC

1. If the charger is running, press Stop.
2. Select Discharge from the mode selector.
3. Set the target SoC (20–90 %).
4. Press Start.

5.6 Winter Storage Charge

Winter Charge mode charges the battery to exactly 30 % SoC for safe long-term storage. The LED turns yellow during this process.

⚠ Discharge First if SoC \geq 30 %

Winter Charge can only be initiated when the current SoC is below 30 %. If the battery is above 30 %, the app will show a warning. Use the Switch to Discharge (target 30 %) shortcut to discharge to 30 % first, then proceed with Winter Charge.



6. Startup and Self-Test

6.1 Power-On Sequence

When the power switch is turned on, the charger runs an automatic self-test (POST — Power-On Self Test). During this phase the LED shows a purple progress bar. The self-test checks the integrity of all internal circuits, the power stage, and the CAN bus link to the battery.

If the self-test completes successfully, the LED turns solid white and the charger is ready to receive commands via the app or from the battery BMS.

If the self-test fails, the LED will blink purple. In this case, disconnect from the mains, wait at least 30 seconds, and reconnect. If the problem persists, contact your supplier.

7. LED Status Indicator

The CSC 384 has a single multi-color LED on the front panel that communicates the complete system state. The LED is visible from outside the aircraft during ground operation.

LED Pattern	Meaning	Required Action
• No Light — No Mains Power		
Off (no illumination)	Charger has no mains power supply.	<i>Connect mains cable to a live RCD-protected socket.</i>
• Purple — Startup / Reboot State		
Progress bar (sweeping)	Charger is starting up or running self-test.	<i>Normal — wait for self-test to complete.</i>
Progress bar on power-down	Mains disconnected — charger shutting down safely.	<i>Wait for progress bar to complete before reconnecting.</i>
Full blinking (rapid)	Charger requires reboot — firmware or hardware fault.	<i>Unplug mains, wait 30 s, reconnect. If repeats: contact supplier.</i>
• White — Ready / Temperature Alert		
Solid (full brightness)	Charger ready — waiting for command from app or BMS.	<i>Normal standby. Use WeCharge app to start a cycle.</i>
Blinking (slow flash)	Battery temperature out of range (too cold < 8 °C, or too hot > 45 °C).	<i>Wait for battery to reach operating temperature. Charging resumes automatically.</i>
• Blue — Charging in Progress		
SoC bar solid + blinking segments	Charging to target SoC. Blinking segments = current flowing.	<i>Normal — monitor via WeCharge app.</i>



LED Pattern	Meaning	Required Action
SoC bar pulsing (slow pulse)	Charging paused for cell balancing. Will auto-restart.	<i>Normal — no action required. May take several minutes.</i>
SoC bar pulsing + blinking segments	Charging and balancing simultaneously.	<i>Normal — charging will continue once balancing step is complete.</i>
• Green — Charge Complete		
Full bar solid	Battery fully charged (100 %).	<i>Charging complete. Safe to disconnect.</i>
Partial bar solid (SoC level)	Target SoC reached.	<i>Cycle complete. Stays green until battery disconnected.</i>
• Yellow — Winter Charging		
SoC bar + blinking segments	Winter charge in progress — charging to 30 % SoC.	<i>Normal. Do not disconnect until complete.</i>
SoC bar pulsing	Winter charge paused for cell balancing.	<i>Normal — will auto-resume.</i>
Full bar solid (yellow)	Winter charge complete — battery at 30 % SoC.	<i>Ready for long-term storage. Safe to disconnect.</i>
• Orange — Soft Error		
Solid orange	Non-critical error detected. Charger is checking periodically.	<i>Monitor — if error clears, normal operation resumes automatically.</i>
Blinking orange	Soft error persisted — reboot required.	<i>Turn off power switch, wait 30 s, switch back on. If repeats: contact supplier.</i>
• Red — Hard Error		
Solid red	Hard error — serious fault detected.	<i>Turn off power switch immediately. Inspect batteries and charger. Do not continue charging. Contact supplier before reuse.</i>
Blinking red (rapid)	Critical fault — possible thermal runaway detected.	<i>EMERGENCY: Disconnect mains and remove battery from aircraft if safe to do so. Do not reuse until cleared by supplier.</i>



8. Service Modes

The CSC 384 has two service modes that are triggered by power-cycling the power switch in a specific rhythm. Power-cycling means turning the switch OFF and ON again, with each cycle taking approximately 1 second.

8.1 Force Full Charge (3× Power Cycle)

Under normal operation, the charger respects the target SoC set in the WeCharge app. To override this and force a charge to 100 % SoC regardless of the app setting:

5. With the charger connected to the battery and mains, cycle the power switch OFF → ON three times in a ~1 second rhythm.
6. The charger will start a full charge cycle to 100 % SoC.
7. The LED will show blue charging state.

i Use Case

Use this mode if the WeCharge app is unavailable (e.g. no WiFi) and you need to perform a full charge before a flight.

8.2 WiFi Setup Mode (5× Power Cycle)

If WiFi credentials need to be reconfigured, or the charger cannot connect to the stored network:

1. With the charger powered on, cycle the power switch OFF → ON five times in a ~1 second rhythm.
2. The charger enters WiFi setup mode (also called mask mode).
3. Connect your phone or laptop to the WiFi hotspot: SSID: CHARGER, Password: 12345678
4. Open a browser. A setup page will appear automatically (or navigate to 192.168.4.1).
5. Scan for your WiFi network, select it, and enter the password.
6. The charger saves the credentials and restarts. The LED returns to white (solid) when connected.

⚠ WiFi Setup Timeout

If no credentials are submitted within 10 minutes, the charger exits WiFi setup mode and restarts automatically. Power-cycle 5× to re-enter.



10. Maintenance

Symptom	Checks and Actions
LED shows no light	Check mains cable is connected. Check RCD has not tripped. Check power switch is ON.
LED blinks purple	Charger requires full reboot. Turn power switch OFF, wait 30 s, switch back ON. If repeated: contact supplier.
LED blinks white	Battery too cold or too hot. Wait for battery to reach 8–45 °C. Charging resumes automatically.
LED solid orange	Non-critical error. Monitor — resumes automatically if error clears. If it transitions to blinking orange: reboot.
LED blinks orange	Soft error persisted. Turn power switch OFF, wait 30 s, switch back ON.
LED solid red	Hard error. Turn off immediately. Check battery connections and battery health. Do not restart without diagnosing the cause.
LED blinks red	Critical fault / possible thermal event. Disconnect mains. Inspect batteries carefully. Contact supplier.
Charger shows Disconnected in app	Check charger is powered on (white LED). Check WiFi connection — reconfigure if needed (5× power cycle). Ensure your phone/computer has internet.
Cannot change mode or sliders	Settings are only editable when charger is in Ready/Stopped/Finished state (white or green LED). Press Stop first.
Pending changes badge remains	Press Set or Revert to resolve the pending state. If Set is not visible, the charger may not be in a running state — press Start instead.
'MAC address not associated' error	Use the QR code claim URL to link the charger to your account (see Section 5.1).
Charger does not reach target SoC	Check battery cable connection. Check for error badges in battery panel. Cell balancing may be extending charge time — this is normal.
Charging power lower than set	Power is derated automatically when battery temperature is out of optimal range, or when cells are balancing. Check battery panel temperatures.

Firmware Updates

Firmware updates are delivered over the WiFi connection. When an update is available, it can be initiated via a physical button on the charger during startup. The WeCharge app will include a remote update status indicator in a future release. Keep firmware up to date to ensure the latest safety protections.



12. Warranty, Compliance, and Disposal

12.1 Warranty

The CSC 384 is warranted against defects in materials and workmanship under normal use for a period of 24 months from the date of purchase. This warranty covers repair or replacement of the charger unit at the manufacturer's discretion.

The warranty does not cover: damage caused by incorrect use, connection to incompatible batteries or power sources, physical damage, water ingress beyond rated IP65, unauthorized modifications, or normal wear.

For warranty claims or service, contact:

Swiss Sailplane GmbH	Solo GmbH
-----------------------------	------------------

12.2 Compliance

The CSC 384 is designed in accordance with IEC 61851 and applicable safety standards for electrical vehicle charging equipment. Integrated safety features include:

- Ground Fault Circuit Interrupter (GFCI) protection
- Insulation monitoring
- Connector interlock system
- Thermal protection and automatic current limiting
- CAN bus error detection and communication timeout protection
- Power-on self-test (POST) at every startup

12.3 WEEE Disposal

This product is subject to the European WEEE Directive (2012/19/EU). Do not dispose of this device with household waste. Return it to an authorised collection point for electronic equipment recycling. For information on collection points, contact your local municipality or your supplier.