

Dual Solution Starter & GPU



Energy that makes you fly



Choose and combine any of the **ENERCRAFT** units

Enjoy the freedom to work with no limitations



IMPORTANT NOTE

All users must read this entire guide prior to initiating operations of the Dual Solution

Thank you and congratulations for the purchase of your new Ultra-Starter and GPU. You have just joined **ENERCRAFT's** no limits mindset!

This User Guide contains the operating instructions and procedures related to the use of both **ENERCRAFT** units together to power one aircraft, in order to have engine starter and GPU capabilities. Reading this User Guide carefully is needed to safely and efficiently operate these units.

ENERCRAFT's Ultra-Starter units provide 30 ± 0.5 Volt DC electrical ground power for aircraft engine starts.

ENERCRAFT's GPU Lite units provide 28.5 ± 0.5 Volt DC and are mainly used as external continuous energy sources for aircraft maintenance and operational purposes.

In order to always offer the best Ground Support Equipment to all of our customers, and so as to be able to quickly adapt our solutions to any specific need from the wide spectrum of operators worldwide, **ENERCRAFT** is pleased to bring this unique Dual Solution, combining the best of our Ultra-Starters and the best of our GPUs Lite.

Following the right procedures, and being aware of the limitations and best practices to use these equipment, together or separately, will ensure their operating efficiency and will maximize operational capabilities and the final life cycle of the Ultra-Starter and GPU Lite units.

1. INTRODUCTION

The Ultra-Starters and the GPU Lite are limited maintenance-free and sealed units. No repairs by the User are authorized. Warranty will be voided if the units are tampered in any way, or if unauthorized repairs are made. For technical support please contact:

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North America & Europe



CAUTION SHOCK HAZARD POTENTIAL

Improper use or failure to follow instructions contained in this User Guide can result in unit damage and/or injury or death by electrical shock.

Any attempts to open or examine the inside of the Ultra-Starters or GPUs Lite via any tool or any device (borescope, probe, etc...) can result in the unit failure and/or injury by electrical shock. These equipment are maintenance free and should not be opened or disassembled for any reason.

Always protect the units from short circuit.

Shipping Hazards for the Ultra-Starters: The UST-2030 & UST-4030 contain LiFePO4 cell batteries. These equipment must be shipped according to directive UN 3481.

Shipping Hazards for the GPU Lite Family: none.

2. BASIC PRODUCT DESCRIPTION

2.1 Ultra-Starters 28V

UST-2030 & UST-4030 are devices developed by **ENERCRAFT** to improve the engine start of airplanes or helicopters, providing clean energy and extending the life of the engines, being capable of operating in any weather and environmental condition.

The equipment must be connected through the external power connector to the aircraft. The **ENERCRAFT** Ultra-Starter units were developed to offer the latest technology in energy storage, with a unique configuration, by combining the best of Lithium batteries and the best of Ultracapacitors.

2.2 GPU Lite Family

Are devices developed by **ENERCRAFT** to allow energy supply for a long time, mainly for aircraft maintenance or operational purposes, working as a continuous energy source. The equipment must be plugged in (AC cable) and connected to the aircraft through the external DC power connector.

All of the **ENERCRAFT** GPUs Lite are equipped with Switching Power Supplies, which feature higher efficiencies, lighter weight, longer hold up times, and the ability to handle wider input voltage ranges.

The GPU LITE Family has been developed and tested by **ENERCRAFT**, to offer the latest technology in energy management and supply.

2.3 ENERCRAFT Dual Solution

ENERCRAFT is pleased to report that has fully completed all the testing of this new Dual Solution we have been working on for some time. We had a demand from different operators interested in combining the use of the **ENERCRAFT's** Ultra-Starters and GPUs, while maintaining the convenience of using two small individual equipment. In response to this demand, we have developed a dual connector (2 x 3 PIN NATO AN2551) to be able to connect both devices at the same time.

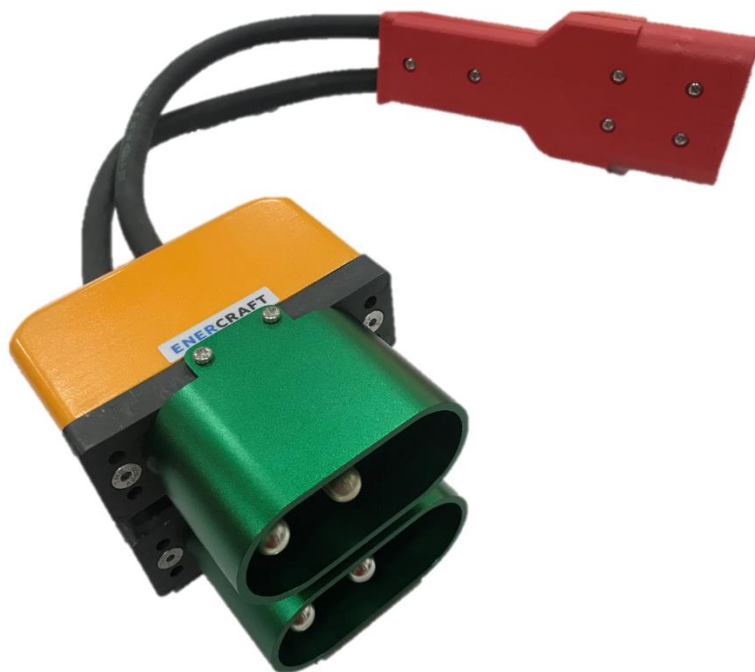
Although our Ultra-Starter units are already designed with an internal power supply to provide enough power for running certain avionics or other electronic equipment (up to 10Amp when the unit is plugged in to be used as a GPU), it is possible that, depending on the type of operation that the customer performs, it may need to power the aircraft at some point with a GPU that provides more continuous power (70 or 130 Amp, for example), and, at the same time, starting the engine, by connecting also the Ultra-Starter.

Our unique Dual Solution enables such operations while retaining the flexibility of having two independent equipment if, in a different situation, the Ultra-Starter unit is required to start an engine and the GPU unit is required for

maintenance tasks on a different aircraft. The individual weight of each unit, or the total weight of the Dual Solution, are the lowest in the market. For example, a 20 Ah (13kg) Ultra-Starter and a 70 Amp (9kg) GPU would weigh only 22kg in two transportable and waterproof cases.

Therefore, operators worldwide will have full flexibility to select the most convenient Ultra-Starter and the most convenient GPU for their specific fleet or specific daily operations, and combine them together, giving complete freedom to our customers.





DUAL CONNECTOR



3. MAIN FEATURES

Please refer to the specific User Manual delivered together with your Ultra-Starter or your GPU Lite units.

4. SPECIFICATIONS AND PERFORMANCE

Please refer to the specific User Manual delivered together with your Ultra-Starter or your GPU Lite units.

A brief summary of the Specifications are shown in the tables below:

4.1 Ultra-Starter units

	UST-2030 (20 Ah)	UST-4030 (40 Ah)
AC Input	Charges from Single Phase 85-264 Vac Freq. 47/63 Hz, 2 amps	
DC Output	28.5 Vdc Peak start: 1,500 amp GPU mode: 10 Amps	28.5 Vdc Peak start: 2,600 amp GPU mode: 10 Amps
Recharging Rate	45 minutes from full discharge @ 25° C	90 minutes from full discharge @ 25° C
Temperature Range	- 40° C ↔ 70° C	
Dimensions	16.9" x 12.9" x 9.3 426 mm x 327 mm x 236 mm	22.0" x 14.0" x 9.0" 558 mm x 355 mm x 228 mm
Weight	13 kg	25 kg

4.2 GPU Lite units

	35 A	70 A	130 A	250 A	500 A
AC Input	Single Phase 90-264 Vac Freq. 47/63 Hz		Single Phase (220V) or Bi Phase (110V) 90-264 Vac. Freq. 47/63 Hz		3 Phase 90-264 Vac Freq. 47/63 Hz
DC Output 28.5Volts	35 Amp Nom. 40 Amp Max.	70 Amp Nom. 80 Amp Max.	130 Amp Nom. 133 Amp Max.	245 Amp Nom. 250 Amp Max.	490 Amp Nom. 500 Amp Max.
Temperature Range	- 20° C ↔ 60° C		- 30° C ↔ 70° C		
Dimensions	15.8" x 12.1" x 6.8" 401 mm x 307 mm x 173 mm	15.8" x 12.1" x 6.8" 401 mm x 307 mm x 173 mm	18.7" x 14.8" x 7.0" 474 mm x 376 mm x 178 mm	18.7" x 14.8" x 7.0" 474 mm x 376 mm x 178 mm	22.0" x 14.0" x 9.0" 558 mm x 355 mm x 228 mm
Weight	7 kg	9 kg	10 kg	13 kg	17 kg

5. PANEL OVERVIEW

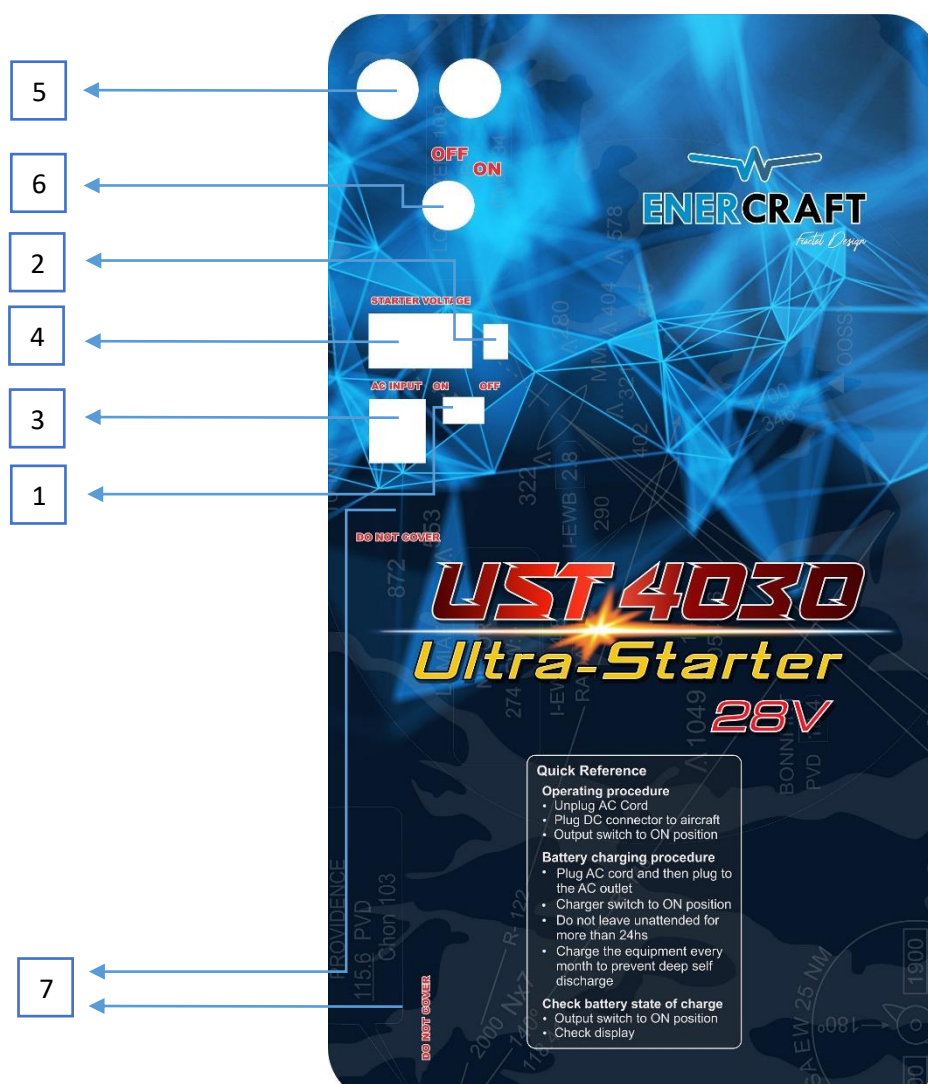
5.1 Ultra-Starter UST-2030

1. AC power / charger switch
2. USB charger connector
3. AC input and fuse w/holder
4. DISPLAY: Battery load level and output voltage indicator
5. DC output
6. DC power / output switch
7. Air inlets



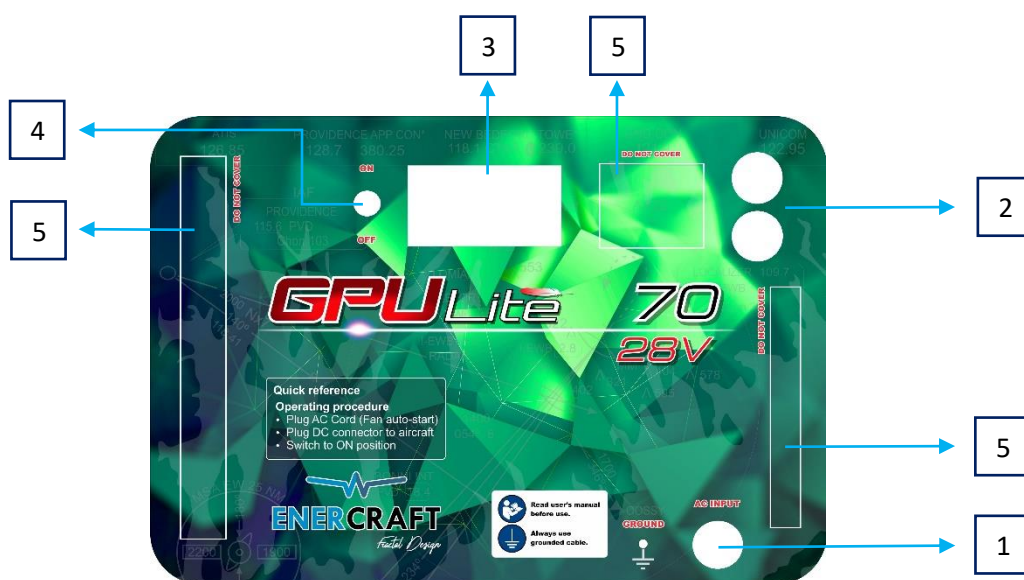
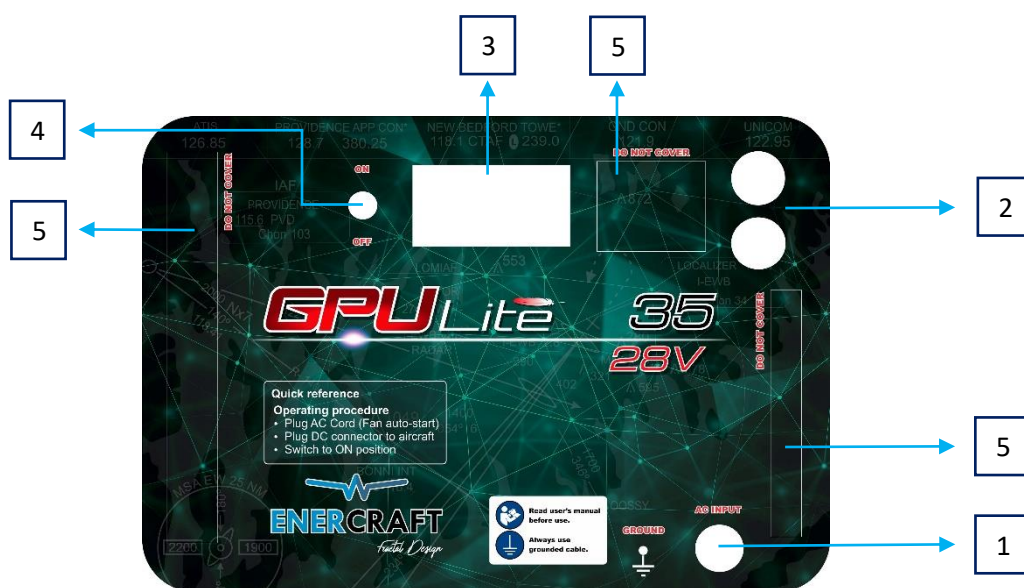
5.2 Ultra-Starter UST-4030

1. AC power / charger switch
2. USB charger connector
3. AC input and fuse w/holder
4. DISPLAY: Battery load level and output voltage indicator
5. DC output
6. DC power / output switch
7. Air inlets



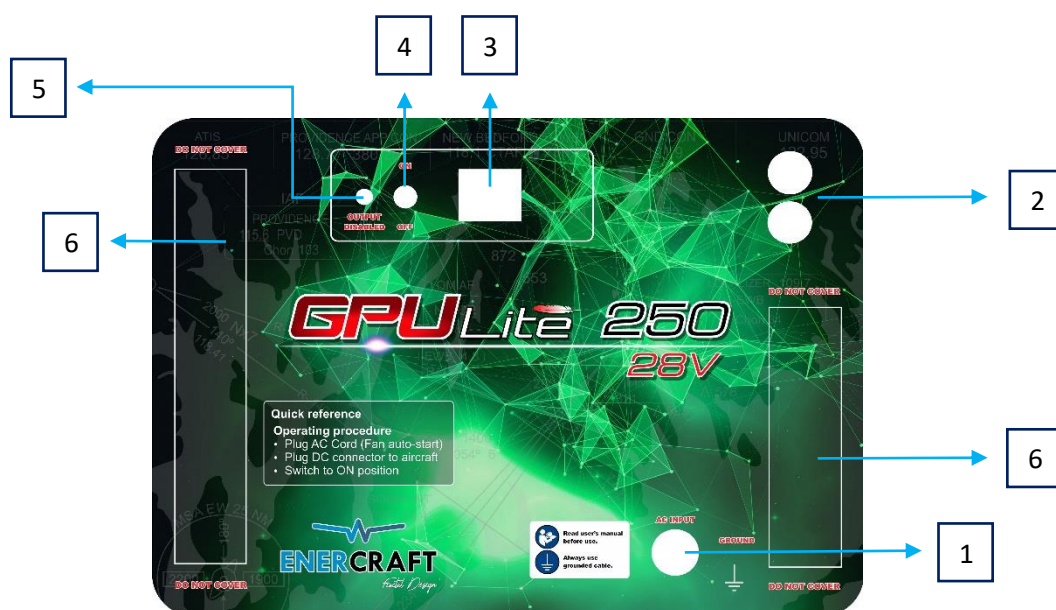
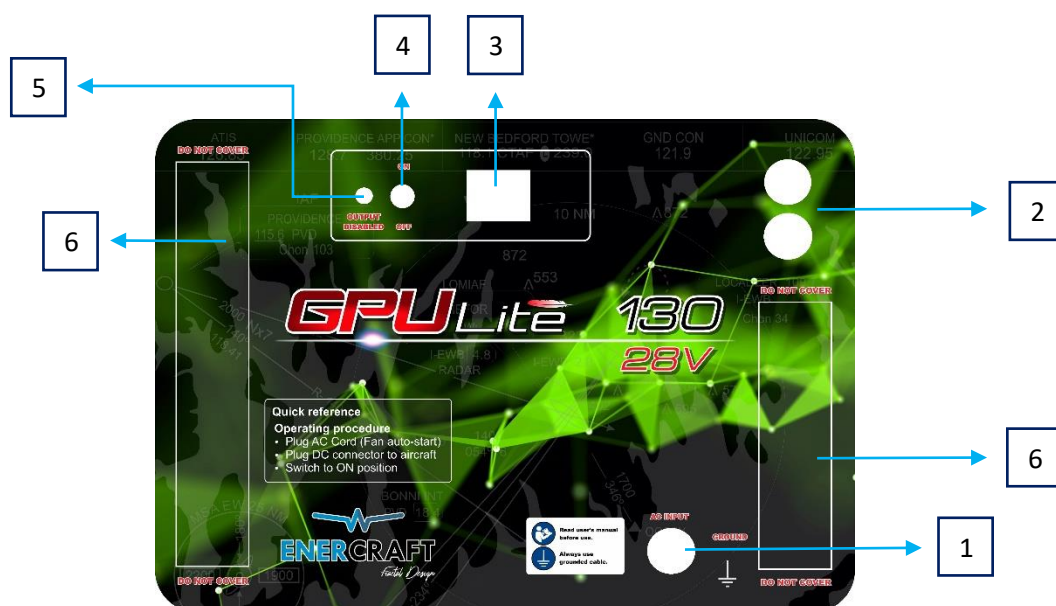
5.3 GPU Lite 35 & 70 Amps

1. AC connector
2. DC output
3. DISPLAY: Voltage and output current
4. Power switch
5. Air inlets



5.4 GPU Lite 130 & 250 Amps

1. AC connector
2. DC output
3. DISPLAY: Voltage and output current
4. Power switch
5. Electric overload LED indicator
6. Air inlets



6. OPERATING PROCEDURE

6.1 Full charging of your Ultra-Starter

Please make sure that the Ultra-Starter unit is fully charged. The display of the unit must show a voltage value above **29.5V**.



Note: As specified in the Ultra-Starter User Manual, the unit can reach a maximum voltage of **30.6V** when is fully charged.

6.2 Use the **ENERCRAFT** Dual Connector provided to connect both units



1. Connect your GPU Lite to the Dual Connector.
2. Connect your Ultra-Starter to the Dual Connector.
3. Plug DC connector to the aircraft.

Note: The Ultra-Starter and the GPU Lite will be connected in parallel.

6.3 Check cables status

Always check the cables to visually detect any possible cuts or damages.

6.4 FIRST: Always switch ON your GPU Lite

Follow the simple steps below, to provide the required continuous power to your aircraft:

- Plug AC Cord to a properly grounded outlet, and the internal fan will start running.
- Switch to ON position.

Important note: Being both units connected in parallel, when the GPU Lite is switched ON, the display of the Ultra-Starter will switch ON too.

6.5 Check voltage of both units

Please check both displays and confirm that the voltage of the GPU Lite and the voltage of the Ultra-Starter are the same.

A voltage of around **28.5 ± 0.5V** should be shown in both displays.

6.6 SECOND: Switch ON your Ultra-Starter

Follow the simple steps below:

- Optional: Unplug AC Cord if the unit is plugged in.
- If the AC Cord is plugged, the Ultra-Starter will contribute with 10 Amp.
- Turn DC power switch to ON position.

6.7 Check voltage of both units

Please check both displays and confirm that the voltage of the GPU Lite and the voltage of the Ultra-Starter are the same.

A voltage between **29.5V** and **30.6V** (depends on the previous charge of the Ultra-Starter as per 6.1 above) should be shown in both displays.

The Dual Solution is ready to be used, and you now have full engine starter capabilities, plus the required continuous power needed to run your avionics, air conditioning or any other electronic equipment onboard your aircraft.



Final note: Any bad connection or procedural error could activate the protections of the GPU Lite. If this occurs, please turn off both units and repeat the operating procedure sequence above, starting from point 6.3.



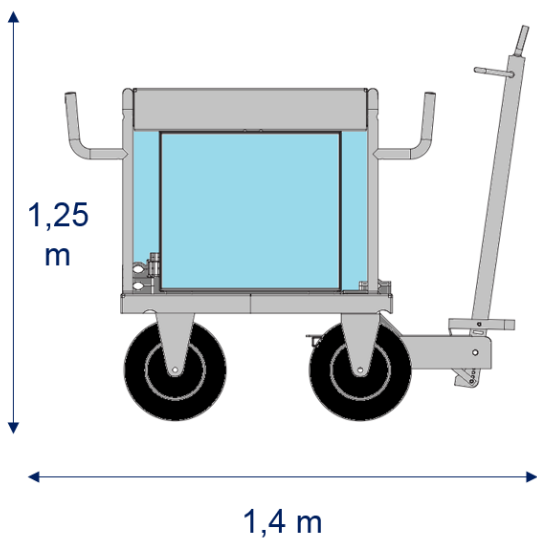
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ATTACHMENT A: ENERCRAFT DUAL SOLUTION POSITIONING

Competitor



COMPETITOR	Specification	ENERCRAFT
400 - 600 Amps	DC OUTPUT	500 Amps
28V @2000 A	Engine Start	28V @2600 A
1	Units	2
NO	Can serve 2 aircraft	YES
NO	Portable on board	YES
240 Kg	Weight	25 + 17 = 42 Kg




ENERCRAFT



ATTACHMENT B: INCREASE YOUR ENGINE STARTING CAPABILITIES

Please, remember that you have full flexibility to combine any of the **ENERCRAFT** units, also two Ultra-Starters if you have a specific requirement and you need additional peak current for starting an unusually powerful engine, or to perform other operational activities, as carrying out compressor washes.

Please read the instructions below carefully.



Enjoy the freedom to work with no limitations

OPERATING PROCEDURE

B.1 Battery charge procedure

Full charging of your Ultra-Starters



Please make sure that both Ultra-Starter units are fully charged before being used together. The displays of the units must show a voltage value above **29.5V**.

Note: As specified in the Ultra-Starter User Manual, the units can reach a maximum voltage of **30.6V** when they are fully charged.

Please follow these instructions to charge both Ultra-Starters

- Turn DC power switch to OFF position.
- Plug AC Cord to a properly grounded outlet.
- Switch charger (AC power switch) to ON position.
- The unit will charge in 45 minutes (UST-2030) or 90 minutes (UST-4030) from full discharge. When the voltage is higher than **30.0V**, then the unit is fully charged again.
- During the charging process, it is normal to feel an electrolyte smell. The 3.2v LiFePo4 batteries of the equipment, are prismatic cells prepared for high currents, and have ventilation that can result in the User perceiving that smell.
- Always charge the Ultra-Starter units on a well ventilated area.

B.2 Check cables status

- Always check the cables to visually detect any possible cuts or damages.

B.3 Check battery status

- Switch DC Output to ON position in both Ultra-Starters.
- **IMPORTANT:** Check the displays after charging, confirming that the voltage of both Ultra-Starters is the same, before proceeding to use them in parallel.

B.4 Use the ENERCRAFT Dual Connector provided to connect both units

1. Connect your Ultra-Starter (1) to the Dual Connector.
2. Connect your Ultra-Starter (2) to the Dual Connector.
3. According to the operational requirements of your specific aircraft type, keep both units ON or turn them OFF, before plugging the DC connector to the aircraft.
4. Plug DC connector to the aircraft.
5. If both Ultra-Starters are OFF, please turn them ON to initiate operations.

Note: The Ultra-Starters will be connected in parallel.

B.5 You are fully set up now to initiate operations

IMPORTANT

At **27.9V**, the first red LED will fade out. If the unit reaches **27.2V**, the last red LED will start flashing, alerting the operator that the unit needs to be recharged **IMMEDIATELY**.



We strongly recommend you to fully recharge the unit when reaching that voltage level (27.2V). If you keep on using the unit beyond that point, the unit and its Lithium cells will enter into **critical voltage levels**.

If that happens, please be aware that the battery life may be compromised, and the Lithium cells can lose their properties. A full repair service and replacement of all the cells may be needed.

IMPORTANT

Keep on always using the same Ultra-Starters together. Because they are working in parallel, both units will behave equally and will discharge in the same way during your operations, and it is important to keep that balance between the units.

To repeat the operation you are carrying out (engine start, compressor wash, etc...), if the voltage level is still acceptable, just repeat this same sequence starting from B.3.

But, if for some reason, you need to disconnect the Ultra-Starters and use one or both of them individually to perform other operations (engine starts, etc...), before connecting the units in parallel again, please repeat the whole sequence starting from B.1, by fully recharging both units to reach the same voltage levels again, and to keep the required balance between the units.



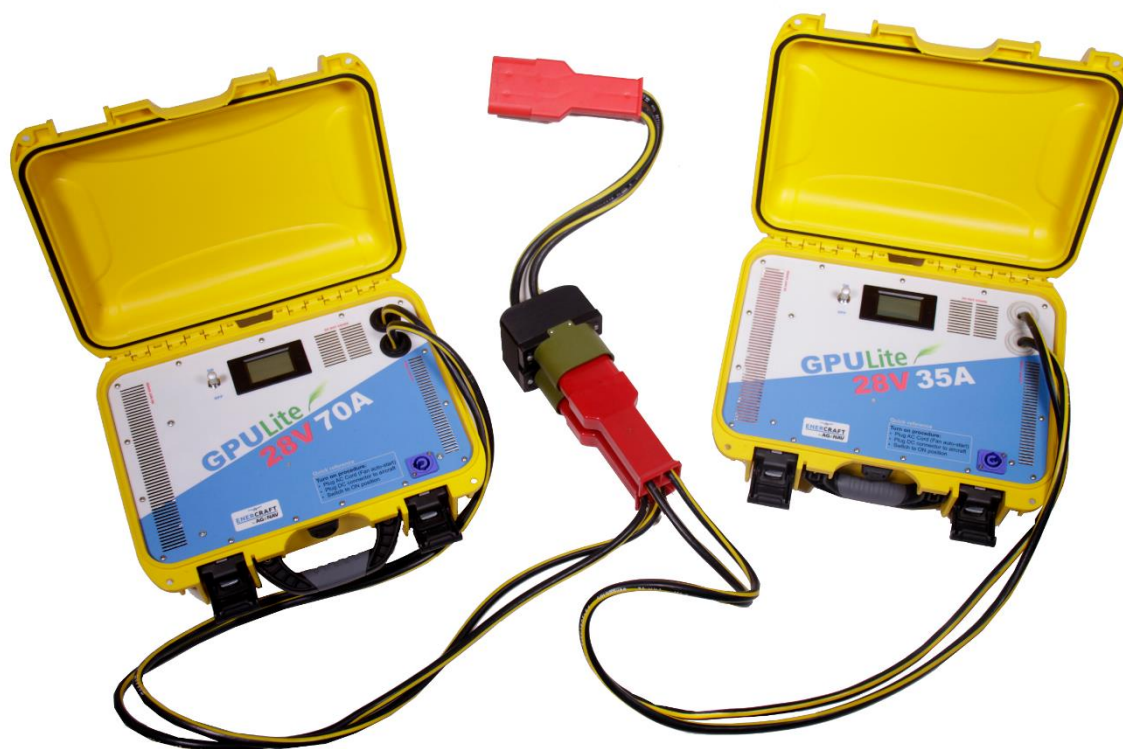
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ATTACHMENT C: INCREASE YOUR GPU CAPABILITIES

Please, remember that you have full flexibility to combine any of the **ENERCRAFT** units, also two GPUs Lite if you have a specific requirement and you need additional continuous power for your maintenance or operational tasks.



Enjoy the freedom to work with no limitations

OPERATING PROCEDURE

C.1 Switch ON

- Connect both GPUs Lite to the Dual Connector
- Plug AC Cord of the GPU Lite # 1 to a properly grounded outlet, and the internal fan will start running.
- Switch the GPU Lite # 1 to ON position.
- Plug AC Cord of the GPU Lite # 2 to a properly grounded outlet, and the internal fan will start running.
- Switch the GPU Lite # 2 to ON position.
- With both GPUs Lite working, plug DC connector to the aircraft.

C.2 Switch OFF

Once you finish using the GPUs Lite, please follow the simple steps below:

- Unplug DC connector from the aircraft.
- Switch the GPU Lite # 1 to OFF position.
- Switch the GPU Lite # 2 to OFF position.
- Disconnect both GPUs Lite from the Dual Connector.
- Unplug AC Cords of both GPUs Lite.



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