USB Charger v3

User Manual

Dual-port USB-PD compliant charger designed for light aviation use

Installation instructions are available from the website

harkwood.co.uk/products/chargers

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Document Control

Model	Version	Date	Record of Change
C602-045	1.0	August 2026	Initial release (Harkwood Services Ltd)
	1.1	September 2026	Diagnostic port requires main power to function

1. Introduction

The USB Charger V3 is a dual-port USB Type-C charger supporting the USB-PD standard.

By default, each port can independently output up to 45 W. Ports may also be configured for a lower maximum power output, if required for regulatory or limited available power requirements.

The charger is primarily designed for general and light aviation aircraft but is equally suited to any environment with a suitable DC power supply, including automotive (cars, trucks, etc.) and marine uses.

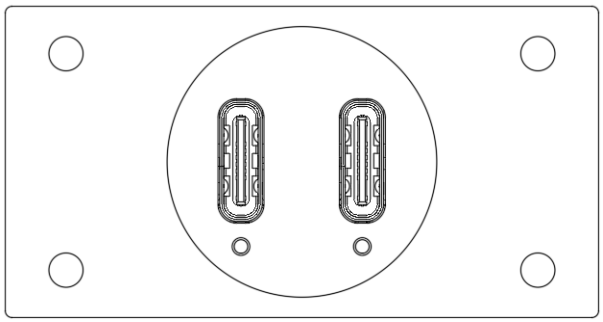
2. Intended use and limitations

The charger provides supplementary DC power for electronic devices. It is not part of, and must not be relied upon as part of, the aircraft's essential electrical system.

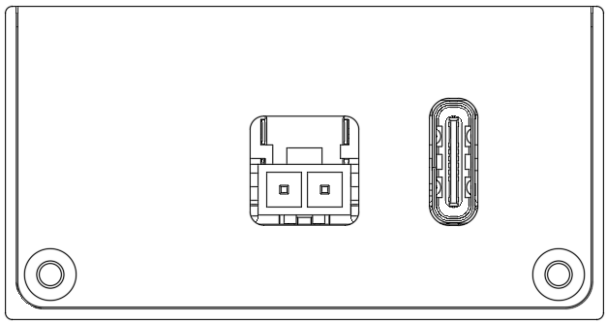
- Do not use this unit to power flight-critical equipment or essential avionics.
- Installation must be carried out strictly in accordance with the applicable approval framework according to applicable regulations.
- Operate the unit only within the limits given in the Technical Specifications section of this manual.

3. Connections

The front of the charger has two USB-C ports, numbered 1 on the left and 2 on the right, when orientated with the status lights on the bottom.



The rear of the charger has the power connector with the positive connection on the left. A USB-C port for configuration and diagnostics. The main power needs to be applied for the port to operate.



4. Power connection

Each charger is supplied with two power connection options.

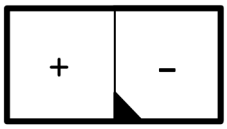
1. A 1m long pre-terminated cable tail
2. A set of crimp connectors and shells, enough to make two power leads

If you make your own leads, use 20 AWG (0.5 mm^2 cross-section) wire suitable for the intended environment and the following Molex connector part numbers:

- 1 x Molex bare connector, part 43645-0200
- 2 x Molex crimp pin, part 43030-0002

Crimp pins should be fitted using a Molex crimp tool, part number 63819-0000.

The polarity of the connector is positive on the left-hand side, as seen when looking at the rear of the unit.



5. Mounting

The charger may be directly panel-mounted without additional hardware. There are 4 x M3 5 mm deep threaded mounting points on the front of the unit. The minimum requirement is to use two mounting points, diagonally opposite.

Adapters are available separately for standard 2 ¼” and 1 ¼” aircraft panel cutouts. An adapter plate is also available to enable the use of an existing mounting cutout and holes for the previous V2 generation of Harkwood Services chargers.

The charger may be mounted in any orientation should the status lights be required at the bottom, top, or to the left or right of the USB-C sockets.

6. Safety Information

- Connect only to a DC power supply protected by an appropriately rated fuse or breaker.
- To prevent overheating, do not operate the unit where the main body is exposed to direct sunlight.
- Protect the unit from direct exposure to rain and moisture.
- The unit will become warm during normal use. This is expected and is not a fault. If it becomes too hot, it will shut down automatically.

7. Operation

- Connect the unit to a suitable DC power supply. On power-up, a self-test is performed, taking a few seconds; the port LEDs will cycle through colours during this process.
- Connect devices to be charged.
- Devices may be connected and disconnected at any time, as required.

8. Technical Specifications

Parameter	Value
Input Voltage	12 - 32 VDC, nominal operating 14 or 28 VDC
Output Voltage per port	Fixed 5, 9, 15, or 20 VDC Variable 5 - 20 VDC Cable drop compensation is applied.
Max. input power	8.25 A @ 12 VDC, 4.13 A @ 24 VDC
Max. output power per port	45 Watts (default; adjustable - see Adjustable Power Output)
Weight	90 grams
Dimensions (W H D)	44 mm x 23 mm x 60 mm (1.73 in x 0.91 in x 2.36 in) (allow 20 mm for cable connection at the rear)
Mounting thread	M3, max length 5 mm
USB output ports	2 x USB-C
USB configuration port	USB-C port on the rear
Power connector	Molex Micro-Fit 3.0
Operating Temperature	0°C - 55°C

Each USB port independently offers the following features:

- Standard USB-PD R3.2 v1.0 support.
- Detection and isolation of any short circuit or fault. If a port fault is detected, the port isolates until the attached device is unplugged.
- Visual status indication of the current state of each port.

9. Diagnostics Port and Charger Manager Application

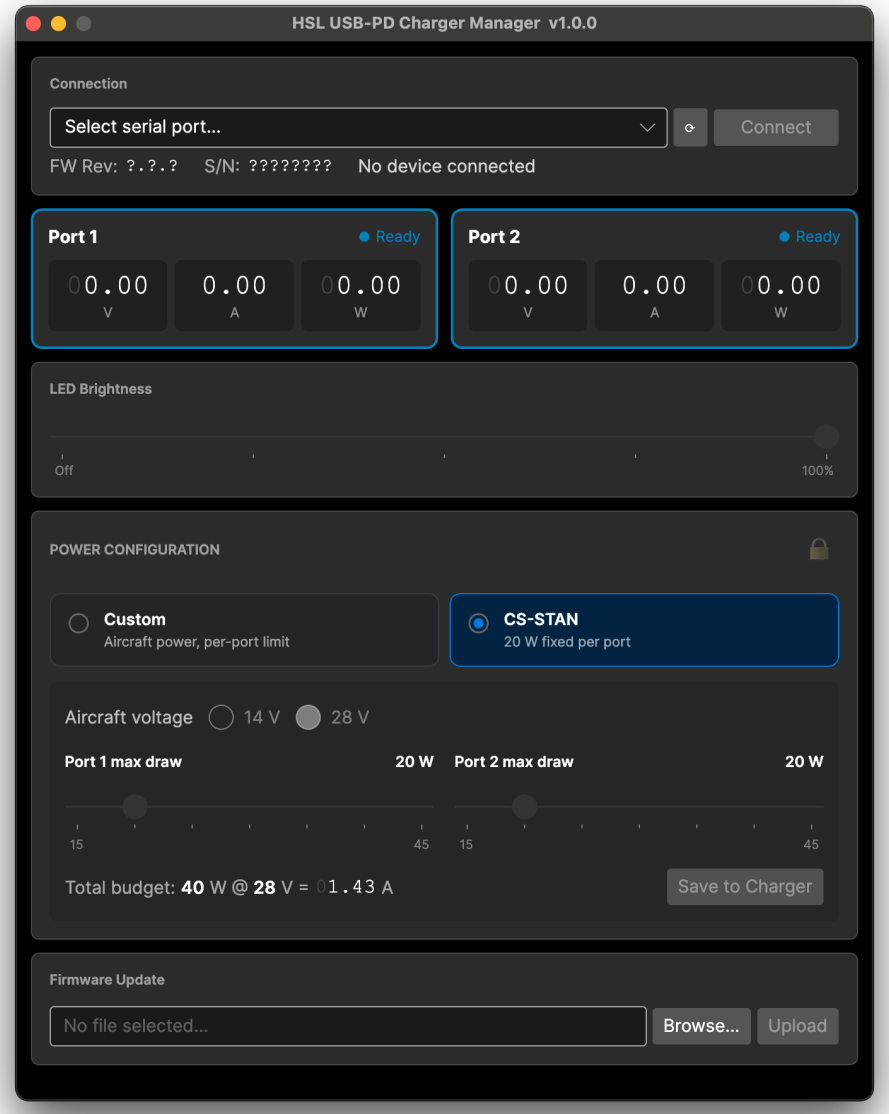
The USB-C socket on the rear is used by a PC-based charger manager application. Apple macOS and Microsoft Windows versions are available.

The application allows you to:

- Review live port status, showing output voltage and current drawn.
- Adjust the brightness of the status LEDs or turn them off.
- Adjust per-port power limits.
- Install firmware updates.

The unit serial number, model, and hardware revision are also provided.

The input voltage selection is used to calculate the power budget, the charger does not need to be configured to any specific voltage.



The port status is real-time and colour matched to the port indication. The voltage is inclusive of any applied cable drop compensation. The LED brightness can be adjusted or switched off and is applied and saved in real-time.

10. Adjustable Power Output

To ensure compliance with regulatory requirements or for use in aircraft with limited power availability, each port's output can be limited to between 15 W and 45 W, in 5 W increments, using the charger manager application.

USB power settings must be configured to match the available aircraft power supply and any applicable regulatory limits (such as CS-STAN or other aviation standards), whichever is lower.

To adjust the power settings, click the icon. Enter the unit serial number to accept that changes must be compliant with any regulatory requirements, then click the unlock button.

Once adjustments are complete as required, click the 'Save to Charger' button. If any devices are connected, they will be requested to renegotiate using the updated power levels.

11. Status Indication

Light	Status	Meaning
Blue	Idle	The port is awaiting the connection of a device.
Green	Charging	A device is attached, and power is being supplied.
Amber (device / cable attached)	Device or cable fault.	A fault has been detected on the device connected to the port, which could relate to either the cable or the device itself. The port resets when the cable is unplugged. Remove the cable and wait for the port to return to idle. If the fault repeats, have the device and/or its cable checked. A device attempting to draw more power than was negotiated will also trigger a fault.
Amber (no device / cable attached)	Port fault	A problem has been detected with the port itself. If this continues after a power cycle, the unit will require inspection and/or repair. See Warranty and Service.
Cyan	Firmware upload	When Cyan is displayed, the unit is expecting firmware to be uploaded. The lights blink whilst firmware is being written. If the unit displays solid cyan lights at power on, the firmware image has failed validation. If updating the firmware with the charger manager does not resolve the issue, the unit will require inspection and/or repair.

12. Maintenance

The unit contains no user-serviceable parts. Do not attempt to disassemble the unit.

13. Warranty and Service

The unit is supplied with a 5-year warranty, covering defects in materials and workmanship. This warranty excludes damage arising from misuse, unauthorised modification, or installation contrary to the installation instructions.

Any repair must be carried out by Harkwood Services Ltd or an authorised service agent.

14. Troubleshooting and Frequently Asked Questions

My device is charging slower than I expected - why?

Charge speed depends on the USB-PD negotiation between the port and the connected device; not all devices request the maximum power available. The charger can supply power up to the configured maximum level, however it is up to the device attached to make use of this.

This is normal and does not indicate a fault.

Can I use a standard USB-C cable that isn't specifically a PD cable?

Yes. Any compliant USB-C cable will work, though a cable rated for the current you need is required to achieve the optimal charge speed.

Can I charge a USB-A device?

Yes, using a suitable USB-C to USB-A cable or adapter. Charging behaviour will then depend on the capability of that adapter and the connected device. The standards permit up to 15W of power to be available.

The charger is getting hot – is this a problem?

The charger will get hot during periods of supplying full power when connected to a 12V supply. If full power is expected for long periods, then ensure the unit is mounted to a metal structure, such as an aircraft panel, and has some airflow around it.

15. Standards compliance

DECLARATION OF CONFORMITY

1. Product / apparatus

USB Charger V3

Model: C602-045

2. Name and address of the manufacturer

Harkwood Services Ltd

8 Green Park, Cambridge, CB4 1SX

United Kingdom

3. This declaration of conformity is issued under the sole responsibility of the manufacturer.

4. Object of the declaration

USB Charger V3, Model C602-045

(DC-input USB power supply/charger intended for use in light aircraft / vehicle electrical systems, 14 V / 28 V nominal)

5. The object of the declaration described above is in conformity with the relevant Union harmonisation legislation:

- Directive 2014/30/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to electromagnetic compatibility (EMC Directive)
- Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS Directive), as amended by Directive (EU) 2015/863

6. References to the relevant harmonised standards used or references to the other technical specifications in relation to which conformity is declared:

- **EN 50498:2010**
  Electromagnetic compatibility (EMC) – Product family standard for aftermarket electronic equipment in vehicles
- **EN IEC 63000:2018**
  Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

7. Additional information

The product has been designed and manufactured in accordance with the essential requirements of the above Directives.