USB Charger v2

User Manual

USB Chargers v2 are microcontroller controlled universal USB chargers that supports the BC 1.2 specification, Chinese telecommunications standard YD/T 1591-2009, and can emulate a number of manufacturer specific chargers.

For installation into EASA registered non-complex motor-powered and any ELA2 aircraft under CS-STAN Issue 4 please refer to the Charger v2 Installation Instructions available from the website.

Part	Version	Date	Record of Change
C5000000-M	1.0	January 2021	Initial release (Harkwood Services Ltd)
	1.1	June 2023	Updated with USB-C Support

Introduction

The charger is a microcontroller controlled universal USB charger to enable you to charge devices from a low voltage DC power supply. They conform to the Battery Charging specification 1.2 (BC 1.2), Chinese telecommunications standard YD/T 1591-2009, and can also emulate a wide variety of manufacturer specific chargers to ensure your device is handled correctly at its optimal charging rate.

The USB Chargers have been primarily designed for use in General / Light Aviation aircraft, although it can be used anywhere where there is a suitable DC power supply such as automotive (Car, truck etc.) and marine (canal / narrow boats, inshore craft, sailing boats etc.).

Power connection

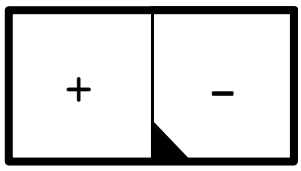
The simplest connection is by using the supplied power lead, if you require additional leads they may be purchased from the website.

If you make your own lead use 20 AWG (0.5mm^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

The pins should be crimped using a Molex crimp tool, part number 63819-0000

The polarity of the connector is +ve on the left hand side, as seen when looking at the back the unit.



Important Notes

Connect only to a DC power supply, which should be protected by a fuse or breaker rated at 5 amps.
For USB-C versions, when all ports are supplying full power, a minimum of a 12v supply is required.

To prevent overheating the body of the units should not be operated or stored in direct sunlight. The units should be protected from direct exposure to rain.

The units will become warm when in use, this is normal and should not be a cause for concern. If they become too hot, they will shut down automatically.

Use only the original or original manufacturer approved cables when charging devices, some third party cables are of poor quality and may cause problems when connecting your devices. Do not use any form of “cheater” cable or adapter cable when connecting your devices, they are not required and will interfere with the correct operation of the ports.

Operation

- Connect the unit to a suitable DC power supply, when power is enabled a self-test is performed which takes a few seconds, after which the ports lights will pulse green then red.
- Connect devices to be charged
- Devices can be added and removed, as required

Technical Specifications

USB Charger

	2 Port	4 Port	4 Port (USB-C)
Input Voltage	11v - 30v DC		
Nominal Output Voltage	5.20v - 5.25v DC		
Max Input Power	2.3A (@ 11v) 0.9 (@ 30v)	4.7A (@ 11v) 1.7A (@ 30v)	5.0A (@12v) 2.0A (@30v)
Max Output Power per port	12.5W		12.5W (Type A) 15W (USB-C)
Weight	104 grams	121 grams	125 grams
Dimensions (W H D)	55mm x 23mm x 80mm		
USB Output Port	Type A		2 x Type A 2 x USB-C
Operating Temperature	0 ^{o}C - 55 ^{o}C		

All USB ports each independently offer the features below;

- Thermal overload shutdown
- USB charging voltage regulation is maintained within the defined standards, which prevents damage to devices under charge
- Detection and isolation of any short circuit/fault, with auto recovery once the fault is removed (i.e. damaged cable/faulty device)
- Universal device support, without the need to resort to cheater cables
- Software controlled device recognition means new devices/charging requirements can be accommodated via custom charging profiles
- Status indication of what is happing on each port

Diagnostics Port

On the rear of the charger is a mini-USB socket which gives additional information over the status lights.

Access to this port is via a Windows based Charger Manager application, which may be downloaded from the website. This gives real time data on port status and current draw, plus management of port profiles.

Custom profiles

To support USB Type-A devices that do not confirm to the standards, custom profiles can be uploaded via the management software. Each Type-A port may have a different profile assigned.

A port may also be switched from automatic to a generic static profile within the management software.

Status Lights

Light	Status
Off	Idle
Green	Charging
Red (with devices / cable attached)	Device / Cable Fault
Red (with no devices / cable attached)	Port fault
Red Flashing (Port 1 and 2)	Firmware fault

Idle
The port is awaiting the connection of a device.

Charging
A device has been detected and charging is active.

Device / Cable Fault
A fault has been detected on the device connected to the port, which could be either the cable or device itself. Remove the device and wait for the fault to clear. If the fault repeats have the device and/or its cable checked. A device attempting to draw power in excess of the ports rated capacity will also trigger a fault condition.

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.

Firmware Fault
The firmware self-test has failed, if the fault persists after following the upgrade firmware procedure the unit will require inspection and/or repair. Details of the upgrade procedure are on the website.

Standards Compliance

EU Electromagnetic Compatibility Directive 2004/108/EC
EU RoHS 2 Directive 2011/65/EU

For additional support or information please visit the website charge4.harkwood.co.uk
The USB Chargers are designed and manufactured in Cambridge, UK, by Harkwood Services Ltd.