



GPS-3004

Four-Channel Programmable DC Power Supply

4 × 0 to 32 V at 0 to 10 A · 384 W shared

Quick Start Guide

Part number 523004 · Issue 1

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1 Safety

Read this section before connecting the instrument. Every item in it is here because ignoring it can injure you or destroy what you are working on.

- Use the supplied three-core mains lead and make sure the instrument is earthed. Do not defeat the earth connection.
- Only a person competent in electrical work should connect and use this instrument.
- Do not exceed the rating of any channel, and use leads whose cross-section suits the current. At 10 A a thin lead is a hazard as well as a voltage drop.
- Place the instrument on a level surface in free air, and keep at least 100 mm clear behind it for the fan.
- There are no user-serviceable parts inside. Disconnect the mains lead and return the instrument to GPS or to a qualified engineer if it behaves abnormally.

Voltages above 30 V rms, 42 V peak or 60 V DC are hazardous to touch. All four channels in series reach 128 V, which is well above that. Switch the output off before changing any connection, and treat the terminals as live whenever the instrument is on.

When channels are connected in series or in parallel, switch them all on together. If a load draws its full current the moment it is connected, bringing channels up one at a time puts the whole of it through the first channel.

This guide covers setting up the instrument, the menu, and the basic operating procedures. Full key sequences for every menu function, the SCPI and MODBUS command reference and the arbitrary waveform editor are in the separate documentation, available from GPS on request.

2 Introduction

The GPS-3004 is a four-channel programmable linear DC power supply. Each channel delivers 0 to 32 V at up to 10 A, and all four are galvanically isolated and float free of the chassis, so they can be stacked in series to 128 V, bundled in parallel to 40 A, or paired about a common point for a matched positive and negative supply.

Each channel crosses over between constant voltage and constant current automatically according to the load. The channel keys show which mode a channel is in: green for constant voltage, red for constant current, blue while a setting is being made.

Beyond holding a rail, the instrument will run one. A list sequence steps through programmed values, synchronous mode moves every channel together in proportion, and a battery charging curve can be simulated. Electronic fuses, soft limits and warning bands protect what is connected.

3 Power: two figures that apply together

This is the part of the instrument most likely to catch you out, so it comes before the specification rather than after it.

Each channel is bounded by 160 W

A channel is not a rectangle. The full 10 A is available anywhere up to 16 V, and above that the 160 W rating governs, so 32 V comes with 5 A rather than 10. Multiply the volts by the amps for any rail you plan and check it against 160 W.

The four channels share 384 W

Four channels at 160 W would be 640 W. The instrument provides 384 W, and it is yours to divide as the job needs: all of it to one demanding rail and three light ones, or spread evenly across four.

Add your rails up against the 384 W before you rely on the instrument. If the total is exceeded it switches the output off and displays a warning, which is better than a brown-out but is worth avoiding altogether.

4 Specification

Setting and readback accuracies apply at 25 °C ± 5 °C.

Outputs

Item	Specification
Channels	Four, identical, galvanically isolated and floating
Voltage, per channel	0 to 32 V
Current, per channel	0 to 10 A
Power, per channel	Up to 160 W in any voltage and current pairing · the full 10 A to 16 V, and 5 A at 32 V
Power, whole instrument	384 W shared across the four channels
Series	Up to 128 V with all four in series
Parallel	Up to 40 A with all four in parallel

The instrument

Item	Specification
Setting accuracy, voltage	Not more than 0.05% of reading + 5 mV
Setting accuracy, current	Not more than 0.1% of reading + 5 mA
Readback accuracy, voltage	Not more than 0.05% of reading + 5 mV
Readback accuracy, current	Not more than 0.1% of reading + 2 mA
Resolution	1 mV and 0.2 mA
Line and load regulation	Voltage not more than 0.01% + 2 mV · current not more than 0.01% + 250 µA
Ripple and noise	Voltage not more than 1.5 mV rms · current not more than 1 mA rms, 20 Hz to 20 MHz
Remote sensing	Compensates up to 1 V of drop along the load leads
Electronic fuse	Response under 10 ms · delay 0 to 250 ms

Item	Specification
Over voltage protection	Per channel, preset 32.5 V
Memory	Ten instrument setups, and three arbitrary waveforms per channel
Interfaces	RS-232 and USB fitted, LAN fitted during manufacture only • SCPI or MODBUS • 4800 to 115200 baud
Mains input	110 V or 220 V $\pm$ 10%
Operating conditions	5 °C to 40 °C, relative humidity below 80%
Storage conditions	-20 °C to 70 °C, relative humidity below 80%
Dimensions and mass	285 × 136 × 405 mm (w × h × d), 14.0 kg
Part number	523004

5 Front panel

Power

Mains switch. The instrument starts in the state it was left in, and whether the outputs come up live is set by Power On Status in the menu.

Ch1 to Ch4, and Output

The channel keys select which channels a setting applies to, and show each channel's mode by colour. The Output key switches on every channel that is selected.

Voltage and Current

Press Voltage or Current, then a channel key, then set the value with the knob or the keypad. Confirm with Enter, or wait for the key fallback time to apply it.

Track

Links channels so that a change to one moves the others by the same amount, holding whatever difference you had set between them.

Fuse

Enables the electronic fuse on the selected channel. The delay and any linking between channels are set in the menu.

Store and Recall

Ten complete instrument setups, held in locations 0 to 9.

Menu and Remote

Menu opens the list in section 6. Remote switches between front panel and computer control; the key is lit while the instrument is under remote control.

Terminals

Positive, negative and a pair of sense terminals for each channel at the front, with the same outputs repeated at the rear. The rear connection has the lower resistance and is the one to use when a channel is working hard.

Do not connect the front and rear terminals of the same channel at once.

6 The menu

Press Menu, turn the knob to move, press it to enter, and use the left arrow to go back.

Menu item	What it does
Fuse Linking	Links the electronic fuses of chosen channels, so that a fuse tripping on one switches off all of them
Fuse Delay	Delays the fuse from 0 to 250 ms, so an inrush is tolerated and a fault is not
Over Voltage Protection	Sets the trip voltage per channel, preset to 32.5 V, referenced either to the measured voltage or to the value set
Arbitrary	Edits, saves, transfers and runs a programmed voltage and current sequence - the dwell time per step is 10 ms or more, and a cycle count of 000 repeats indefinitely

Menu item	What it does
Interface	Chooses USB, LAN or RS-232, and sets baud rate, device address, command set and line ending
Display & Key	Brightness, contrast, and how long before the display dims
Beeper	Off, on every key, or on errors only
Power On Status	Whether the outputs come up live at switch-on
Voltage Limit	Caps the voltage adjustment range on a channel, so it cannot be turned past what the load will take
Current Limit	Caps the current adjustment range in the same way
Voltage Warning Range	An upper and lower voltage for a channel • the display shows VL or VH when the output leaves the band
Current Warning Range	The same for current, shown as AL or AH
Information	Model, firmware version and the internal temperature
Reset Device	Restores the factory settings

7 Operation

Setting a rail

Switch the output off, set the voltage, then set the current limit, then connect the load and switch the output on. Setting before connecting protects the load from whatever the controls were left at.

Setting a current limit deliberately

Set the voltage first with the output off. Short the channel's terminals with a lead rated for the current you intend to draw, switch the output on, and set the current until the ammeter reads the limit you want. The channel key turns red. Switch the output off, remove the short and connect the load.

Remote sensing

Run a pair of light wires from the channel's sense terminals to the load, alongside but separate from the current-carrying leads. The instrument then regulates at the load and compensates up to 1 V of drop. At 10 A that is the difference between the voltage you set and the voltage the board sees.

Series

Set every channel to the same voltage and the same current limit, then link the positive of one channel to the negative of the next. Take the output from the outer pair. Switch all the channels on together.

Four channels in series reach 128 V. Earth at most one point of the chain, and switch the output off before changing any connection.

Parallel

Set every channel to the same voltage, divide the current you need between them, and connect all the positives together and all the negatives together, using leads of the same type and length so the current shares evenly. Switch all the channels on together.

8 Care and maintenance

- Clean the case with a dry or barely damp cloth. Do not use solvents, and do not clean inside the instrument.
- Keep 100 mm clear behind the instrument so the fan can work.
- If the instrument is to be stored for a long period, disconnect the mains lead and keep it dry.
- Recalibration and repair are available from GPS. Contact us with the model and part number.

9 Supplied with the instrument

- GPS-3004 power supply
- Mains lead, USB cable and RS-232 cable
- Sense leads and four test leads
- This guide

The LAN interface is fitted during manufacture and cannot be added later, so it has to be specified with the order. Rack mounting and calibration are available from GPS.

10 Warranty

One year from the date of purchase, subject to product registration with GPS. The warranty covers defects in materials and workmanship and does not cover damage caused by operation outside the rated conditions, by unauthorised repair, or by connection to a supply outside the stated input range.

For service, calibration or technical support contact GPS at sales@gpslimited.com or +44 (0) 203 093 0914.