



GPS-3000 Series

Single-Output Regulated DC Power Supplies

GPS-3303S · GPS-3305S · GPS-3020S

User Manual

Part numbers 510120, 510080 and 510902 · Issue 1

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1 Safety

Read this section before connecting the instrument. It is short, and 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.
- Do not exceed the rated output. Do not short the output terminals together while the instrument is delivering current.
- Place the instrument on a level surface in free air. Leave the ventilation slots on both sides clear, and do not stand anything on top of it.
- Do not use the instrument above 40 °C, in a damp atmosphere, or where flammable or corrosive material is stored.
- 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.

The GPS-3020S has no output on/off switch. Its terminals are live whenever the instrument is powered and the voltage control is above zero. On that model, set the controls before connecting anything and switch off at the POWER button before changing connections. The GPS-3303S and GPS-3305S have an output switch and can be set up with the output disabled.

2 Introduction

This manual covers the three single-output supplies in the GPS-3000 series: the GPS-3303S at 90 W, the GPS-3305S at 150 W and the GPS-3020S at 600 W. All three deliver 0 to 30 V and differ in current, and all three are the same instrument in operation.

Output voltage and current are continuously adjustable from zero to the rated value, and the instrument crosses over between constant voltage and constant current operation automatically according to the load.

The triple-output models in this series, the GPS-3303D, GPS-3306D and GPS-3603D, are covered by a separate manual. They add a second adjustable channel, a fixed logic rail and series and parallel tracking, and are operated differently.

Linear regulation is the reason to choose it over a switching supply: ripple and noise stay below 1 mV rms across the audio band and beyond, which matters when the supply is feeding an analogue circuit, a sensor or anything else where the noise on the rail ends up in the measurement.

Voltage and current are shown on separate three-digit LED meters. Constant voltage and constant current lamps show which mode the instrument is in at any moment. Cooling is by fan.

3 Specification

Figures apply after thirty minutes of operation at an ambient temperature of $20\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$.

What differs between the three

Item	GPS-3303S	GPS-3305S	GPS-3020S
Output voltage	0 to 30 V	0 to 30 V	0 to 30 V
Output current	0 to 3 A	0 to 5 A	0 to 20 A
Output power	90 W	150 W	600 W
Output on/off switch	Yes	Yes	No
Rear output terminals	—	—	Yes, for currents above 10 A
Remote sensing	—	—	Yes, S+ and S- on the rear
Dimensions, w × d × h	260 × 150 × 145 mm	260 × 150 × 145 mm	280 × 255 × 185 mm
Mass	4.0 kg	4.0 kg	20.0 kg
Part number	510120	510080	510902

Common to all three

Item	Specification
Operating modes	Constant voltage and constant current, automatic crossover
Adjustment	Voltage and current continuously adjustable from zero to the rated value
Line regulation, CV	Not more than $1 \times 10^{-4} + 3\text{ mV}$
Load regulation, CV	Not more than $2 \times 10^{-4} + 3\text{ mV}$
Ripple and noise, CV	Not more than 1 mV rms, 5 Hz to 1 MHz
Line and load regulation, CC	Not more than $2 \times 10^{-3} + 3\text{ mA}$
Ripple, CC	Not more than 1 mA rms
Recovery time	Not more than 100 μs for a fifty per cent load change
Meters	Three-digit LED, voltage and current
Protection	Adjustable current limit, short circuit, over temperature
Insulation	Chassis to terminal not less than 20 M Ω at 500 V DC
Mains input	220 V $\pm$ 10%, 50/60 Hz
Operating conditions	0 $^{\circ}\text{C}$ to 40 $^{\circ}\text{C}$, relative humidity below 80%
Storage conditions	-10 $^{\circ}\text{C}$ to 40 $^{\circ}\text{C}$, relative humidity below 70%
Warranty	One year, subject to product registration with GPS

4 Front panel

The three models share a panel layout. Where the GPS-3020S differs it is noted.

POWER

Mains switch. Pressed in is on. The meters light when the instrument is powered.

OUTPUT (GPS-3303S and GPS-3305S only)

Disconnects the terminals from the regulator without switching the instrument off, so the voltage and current can be set and read on the meters before anything reaches the load. The GPS-3020S has no such switch.

VOLTAGE

Sets the output voltage in constant voltage operation. One control covers the whole range from 0 to 30 V.

CURRENT

Sets the current limit. In constant voltage operation this is the point at which the instrument crosses over to constant current; in constant current operation it sets the output current directly.

C.V. and C.C. lamps

Show which mode the instrument is in. The instrument decides, not you: it holds the voltage you set until the load draws the current you set, and from that point it holds the current and the voltage falls.

Output terminals

Positive, ground and negative. The output floats: neither the positive nor the negative terminal is connected to earth unless you link one of them to the centre ground terminal with a lead.

The output is floating by design, which is what allows it to be used as a negative supply. It also means neither terminal is at earth potential unless you make it so. Bond one terminal to the ground post if your circuit needs a defined reference.

Rear panel, GPS-3020S only

The two smaller models bring everything out at the front. The GPS-3020S adds two things on the rear, because 20 A through a front binding post and a long thin lead is not practical.

High-current output terminals, marked + and –, are provided for currents above 10 A. Use these rather than the front terminals when drawing more than that, with leads of adequate cross-section.

Remote sensing terminals, marked S+ and S–, let the instrument regulate against the voltage at the load rather than at its own terminals. Connect a pair of light wires from these to the load when the load is at the far end of a long lead, and the supply will compensate for the drop along the current-carrying leads.

The mains fuse rating is marked on the rear panel. Replace it only with a fuse of the same type and rating, and disconnect the mains lead before doing so.

5 Operation

Setting a voltage

On the GPS-3303S and GPS-3305S, switch on with the OUTPUT switch off, set the voltage on the meter, connect the load and enable the output. Setting the output before connecting anything does two things: it protects the load from whatever the controls were left at, and it avoids drawing an arc at the terminals as the connection is made.

On the GPS-3020S there is no output switch, so set the voltage with nothing connected, switch off at POWER, connect the load and switch on again.

Setting a current limit

Set the voltage first with nothing connected. Switch off, short the output terminals with a lead rated for the current you intend to draw, switch on, and turn the CURRENT control until the ammeter reads the limit you want. The C.C. lamp will be lit. Switch off, remove the short and connect the load.

The instrument now behaves as a voltage source up to that current, and as a current source beyond it. This is what protects a load you are unsure of: set the limit to a little above the expected current and a fault draws the limit rather than whatever the supply can deliver.

Using it as a current source

Set the voltage control to the highest voltage the load may safely see, then set the current with the CURRENT control. An LED string, a plating cell or a battery under charge is driven this way.

At 20 A the voltage drop along the connecting leads is significant. Use leads of adequate cross-section and keep them short. The meters read at the terminals, not at the load.

6 Care and maintenance

- Clean the case with a damp cloth and a mild detergent. Do not use solvents or abrasives.
- Keep the ventilation slots clear. Blow accumulated dust out of them periodically with dry air.
- 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.

7 Supplied with the instrument

- GPS-3303S, GPS-3305S or GPS-3020S regulated DC power supply
- Mains lead
- This manual

Test leads, rack mounting and calibration are available separately. The declaration of conformity is supplied with any quotation on request.

8 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.