



GPS-3065A

6½ Digit Bench Multimeter

35 ppm DCV · 2500 readings a second · colour display · RS-232, LAN and USB

Operating Manual

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General Polytronic Systems Ltd · 14 Regent Street, Brent, London NW10 5LG
+44 (0) 203 093 0914 · sales@gpslimited.com · www.gpslimited.com

1 Safety

Read this section before connecting the instrument to anything. Every item is here because ignoring it can injure you or damage the instrument.

- Earth the instrument. The mains lead's earth must connect to the protective earth of the outlet. Do not defeat it.
- The inputs are rated CAT II 300 V: mains taken from a socket outlet on a branch circuit, and the equipment plugged into it. Do not connect the HI and LO inputs to permanently installed mains wiring, distribution boards, disconnects or permanently wired motors, whatever the voltage; transients on those circuits can exceed the 2500 V peak the instrument withstands.
- Voltages above 300 V AC may be measured only on circuits isolated from mains. The limit between HI and LO is 1000 V DC or 750 V AC, 1000 V peak, on every range. LO may float to 500 V peak from earth; the SENSE terminals are limited to 200 V peak from any other terminal.
- Use only the test leads supplied or leads of equivalent rating, and inspect them before use. Keep your fingers behind the finger guards. Connect LO first and the live lead second; disconnect in the reverse order.
- Current: use the 12 A terminal for currents from 100 mA to 12 A and the 100 mA terminal below that. Never connect both current terminals into a circuit at once. The 12 A terminal is protected by a 15 A fuse inside the instrument, the 100 mA terminal by the 500 mA fuse on the rear panel; exceeding either blows the fuse.
- Replace fuses only with the type and rating specified. Do not operate the instrument with the cover off or if it is damaged or behaving abnormally; return it for service.
- Not for use in explosive atmospheres.

Select the function before connecting the leads, and disconnect before changing function. Changing function with the leads on a live circuit can damage the input.

2 Introduction

The GPS-3065A is a 6½ digit bench multimeter with a 3.5-inch colour display. It measures DC and AC voltage to 1000 V, DC and AC current to 12 A, two and four wire resistance to 1 GΩ, capacitance to 100 mF, frequency and period to 300 kHz, temperature on platinum RTDs, diode and continuity, and DC:DC ratio. DC voltage is read to 35 ppm of reading plus 5 ppm of range on the 10 V range over a year, and readings run at up to 2500 a second.

The display shows two parameters from one input at once, AC voltage with its frequency, DC voltage with its proportion of range, and can switch to a statistics view with a histogram or a history view with a trend chart, without a computer attached. Maths covers relative, statistics, dB and dBm and a limit test with pass and fail outputs. Readings log to a USB memory stick as CSV.

Remote control is by RS-232, LAN or USB with an SCPI command set compatible with the 34401A family and the Fluke 45; the commands are in the separate GPS-3065A Programming Guide. Inputs are on the front panel. There is no IEEE-488 port on this model.

3 Installation

Unpacking

Check the box contains the instrument, the test lead set with 2 mm probes, a pair of crocodile clips, the mains lead, two spare fuses and this manual. Optional accessories are a rack mounting kit, a Pt100 probe, and RS-232 and USB cables.

Handle

Hold both ends of the carrying handle, pull outward and rotate it. Locked forward and under the instrument it tilts the front panel up for the bench; locked upright it carries.

Mains

1. Check the voltage selector on the rear panel is set for your supply, 110 V or 220 V, before connecting anything. The instrument accepts $\pm 10\%$ of either at 45 to 66 Hz.
2. Connect the mains lead to an earthed outlet.
3. Switch on at the rear-panel mains switch. The front-panel power key then switches the instrument between standby and on.
4. Allow one hour of warm-up before relying on the accuracy figures.

If the instrument does not start, check the lead, the rear switch, and then the mains fuse beside the inlet. Replace it only with the same type and rating.

4 The instrument

Front panel

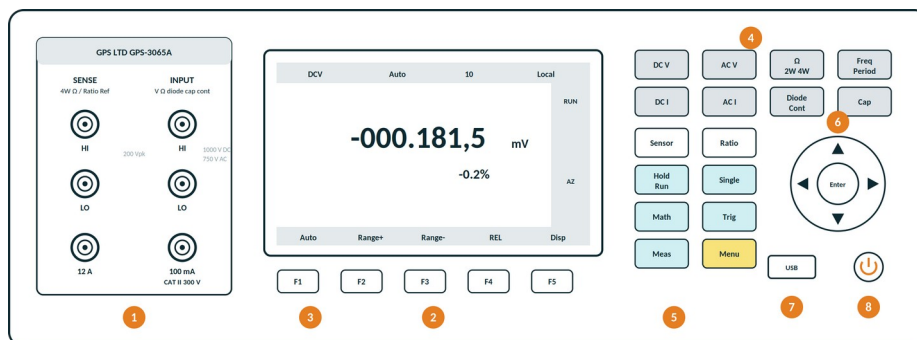


Figure 1 Front panel

- 1 Input terminals. INPUT HI and LO for every function except current; SENSE HI and LO for four-wire resistance and for the reference in ratio measurement; 12 A and 100 mA current inputs, used with LO. Rated CAT II 300 V.
- 2 Display: status bar, main and second readings, status column, and the softkey labels along the bottom.
- 3 Softkeys F1 to F5, taking the function labelled above each on the screen.
- 4 Function keys: DC V, AC V, DC I, AC I, resistance 2W/4W, frequency and period, diode and continuity, capacitance, Sensor and Ratio.
- 5 Setting keys: Hold/Run, Single, Math, Trig, Meas and Menu.
- 6 Arrow keys and Enter: range and resolution on the measurement screen, cursor and values in menus.
- 7 USB host port, for data logging to a memory stick and for firmware updates.
- 8 Power key. Standby and on; the mains switch is on the rear.

Key	What it does
DC V, AC V, DC I, AC I	Select the voltage and current functions. DC V is the function at switch-on.
Ω 2W / 4W	Two-wire resistance; press again for four-wire. Four-wire uses the SENSE terminals and switches auto-zero on.
Freq / Period	Frequency; press again for period. One range covers 3 Hz to 300 kHz; the AC voltage is shown as the second reading.
Cont / Diode	Continuity with a settable beeper threshold; press again for diode test at 1 mA.
Capacitance	Capacitance, 1 nF to 100 mF.
Sensor	Temperature on a platinum RTD: Pt100 and Pt1000 are preset, and a user-defined sensor can be entered.
Ratio	DC:DC ratio of the INPUT voltage to the SENSE voltage.
Hold / Run	Reading hold on the front panel; the Run indicator shows auto trigger.
Single	One trigger, taking the set number of samples. In remote operation, returns the instrument to local control.
Math	Relative, dBm, dB and limit test.
Trig	Trigger source, hold sensitivity, sample count, delay and trigger output.
Meas	The settings of the current function: integration, input impedance, auto-zero, AC filter, gate time, continuity threshold.

Key	What it does
Menu	System: interfaces, command set, display, time, language, buzzer, self-test, information, update, reset to defaults.
Arrows and Enter	Up and down change range; left and right change the resolution. In a menu they move the cursor and edit values.
F1 to F5	Softkeys. Each takes the function shown above it on the screen; a key with no label does nothing.

Rear panel

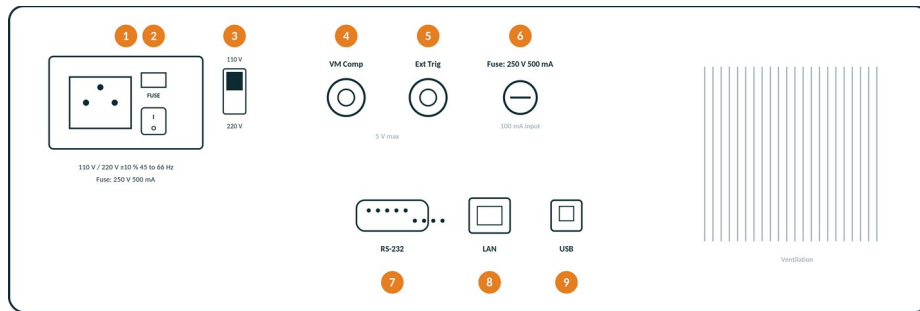


Figure 2 Rear panel

- 1 Mains inlet with the mains fuse holder (2) and the mains switch. 3 Supply voltage selector, 110 V or 220 V; set it before connecting.
- 4 VM Comp output: a negative pulse when each measurement is complete. 5 Ext Trig input: a negative pulse triggers a measurement. Both BNC, 5 V maximum.
- 6 The 500 mA fuse protecting the 100 mA current input.
- 7 RS-232, 8 LAN, 9 USB device: the remote control interfaces. Pins 1, 5 and 9 of the RS-232 connector also carry the limit test outputs.

Display

The status bar across the top shows the function, the ranging mode, the integration in power line cycles, and Local or Remote. The main reading is in the centre, with the second reading below it; on AC functions the second reading is frequency, on DC functions the proportion of range in use, on ratio the two voltages. The right-hand column shows the trigger state, Hold, Relative, the limit result and auto-zero. Press the Disp softkey to step through the three views: the default reading, the statistics view with sample count, maximum, minimum, average and standard deviation over a histogram, and the history view with the trend of recorded readings against sample number.

5 Measurements

Every function follows the same pattern: press the function key, connect the leads as shown, choose the range or leave it automatic, use Relative to null what you do not want in the reading, and press Meas for the settings that apply to that function. The settings themselves are in section 6.

5.1 DC voltage

1. Press DC V. This is also the function at switch-on. Ranges 100 mV, 1 V, 10 V, 100 V and 1000 V.
2. Black lead to INPUT LO, red lead to INPUT HI.
3. Auto-range, or press the Range+ and Range- softkeys or the up and down arrows for a fixed range. The second reading shows the proportion of the range in use.

4. For low-level or high-impedance sources on the 100 mV to 10 V ranges, set the input impedance to greater than 10 G Ω under Meas; see 6.3.

5.2 DC voltage ratio

1. Press Ratio. The instrument shows INPUT voltage divided by SENSE voltage, with both voltages below it.
2. Connect the input to INPUT HI and LO and the reference to SENSE HI and LO. The two LO terminals must share a common reference and be within ± 2 V of each other.
3. Ranging is automatic on both, with auto-zero on: the input to 1000 V, the reference to 12 V.

5.3 AC voltage

1. Press AC V. Ranges 100 mV to 750 V; true RMS, AC coupled. The second reading is the frequency.
2. Leads as for DC voltage.
3. Choose the AC filter under Meas to suit the lowest frequency you will measure; see 6.1. The medium filter, 20 Hz, is the default.

AC coupling means the reading is the RMS of the AC component only. For AC ripple on a DC supply that is what you want. For the true RMS of AC plus DC, combine the AC and DC readings as the square root of the sum of their squares.

5.4 DC and AC current

1. Press DC I or AC I. Low ranges 10 μ A (DC only), 100 μ A, 1 mA, 10 mA and 100 mA use the 100 mA terminal; high ranges 1 A and 12 A use the 12 A terminal.
2. Black lead to LO; red lead to the 100 mA terminal or the 12 A terminal to suit the expected current. Decide before connecting, and never have both current terminals in a circuit at once.
3. Select the terminal in use with the softkey, then range with the arrows or leave it automatic.
4. On AC current the second reading is frequency; choose the AC filter under Meas.

The burden voltage, the drop across the instrument, is under 600 mV on the 12 A range and under 400 mV on 100 mA. On a source whose own resistance is comparable with the instrument's shunt (11 k Ω on 10 μ A, 1 Ω on 100 mA, 0.01 Ω on 1 A and 12 A) move up a range.

5.5 Resistance

1. Press Ω 2W/4W once for two-wire, again for four-wire. Ranges 10 Ω to 1 G Ω .
2. Two-wire: INPUT HI and LO. Four-wire: INPUT HI and LO carry the current, SENSE HI and LO sense the voltage at the resistor, so lead and contact resistance drop out. Four-wire switches auto-zero on.
3. Two-wire lead resistance: short the probes together, press Relative, and the lead resistance is subtracted from every reading until the function is changed.
4. Range with the arrows or leave it automatic. Resistance figures assume four-wire, or two-wire with Relative in use.

The test current is 10 mA on the 10 Ω range falling to 0.5 μ A at 10 M Ω and above. On a thermally sensitive resistor, an RTD for instance, that current heats it; if it matters, move up a range for a lower current.

5.6 Frequency and period

1. Press Freq/Period once for frequency, again for period. 3 Hz to 300 kHz, 3.3 μ s to 0.33 s, on inputs from 100 mV to 750 V.
2. Leads as for AC voltage. The second reading is the AC voltage.
3. One range covers the whole frequency span; the voltage range follows the input. Set the gate time under Meas: 1 s for full resolution, 100 ms or 10 ms for speed.

5.7 Capacitance

1. Press Capacitance. Ranges 1 nF to 100 mF.
2. Discharge the capacitor. Connect INPUT HI to the positive terminal of a polarised capacitor and LO to the negative.
3. Lead capacitance: with the red probe open, press Relative; the lead and fixture capacitance is then subtracted. Reconnect and read.
4. Readings on the large ranges take several seconds to settle; the instrument reads at about two a second on capacitance.

5.8 Continuity and diode

1. Press Cont/Diode once for continuity, again for diode test.
2. Leads to INPUT HI and LO, on a circuit that is switched off and discharged.
3. Continuity: 1 k Ω range at 1 mA. The beeper sounds and the resistance is shown below the threshold; above it the display shows OPEN. Set the threshold under Meas from 1 Ω to 1000 Ω ; the default is 10 Ω and it returns to that at switch-on.
4. Diode: 1 mA test current, red lead to the anode. The forward voltage is shown between 0.3 V and 3 V; above 3 V the display shows OPEN. A good silicon junction reads 0.5 to 0.8 V.

5.9 Temperature

1. Press Sensor. Pt100 and Pt1000 are preset; a user-defined RTD can be entered.
2. Connect the RTD as for resistance, four-wire for best accuracy or two-wire with Relative used on the leads.
3. Select the sensor type with the softkeys or the arrows. The main reading is temperature and the second reading is the sensor resistance.

Accuracy is ± 0.16 °C plus whatever the probe contributes, over -200 to 660 °C. The test current is 1 mA on Pt100 and 100 μ A on Pt1000; in still air the self-heating of a small probe is measurable, so allow it to settle.

6 Measurement settings

Press Meas for the settings that apply to the current function. All of these are held in volatile memory: they return to their defaults at switch-on or on a remote reset.

6.1 AC filter

Three filters trade settling time for low-frequency accuracy on AC voltage and AC current. Slow covers 3 Hz to 300 kHz and settles in 7 seconds; medium, the default, 20 Hz upward in 1 second; fast, 200 Hz upward in 0.1 second. Choose the fastest filter whose lower limit is below the lowest frequency you will measure; below its limit a filter reads low.

6.2 Resolution and integration

Resolution and integration time are one setting seen two ways. Longer integration gives more digits and rejects mains-frequency noise; shorter integration gives speed. Set it with the left and right arrows in any function, or under Meas as an integration time. Only whole cycles, 1, 10 and 100 PLC, reject mains noise fully. AC functions read at $6\frac{1}{2}$ digits regardless; continuity and diode are fixed at $5\frac{1}{2}$ digits fast.

Resolution	Integration	Time at 50 Hz	Readings per second
$4\frac{1}{2}$, fast	0.02 PLC	0.4 ms	2500
$4\frac{1}{2}$, slow	0.1 PLC	2 ms	500
$5\frac{1}{2}$, fast	0.2 PLC	4 ms	250
$5\frac{1}{2}$, slow	1 PLC	20 ms	50

Resolution	Integration	Time at 50 Hz	Readings per second
6½, fast	2 PLC	40 ms	25
6½, medium (default)	10 PLC	200 ms	5
6½, slow	100 PLC	2 s	0.5

6.3 DC input impedance

On the 100 mV, 1 V and 10 V ranges the input impedance can be 10 MΩ, the default, or greater than 10 GΩ. The 100 V and 1000 V ranges are 10 MΩ always. Use the high setting on a source whose resistance is not negligible against 10 MΩ: the loading error is the source resistance divided by the input resistance, so 100 kΩ into 10 MΩ is 1 %, into 10 GΩ it is 0.001 %.

6.4 Auto-zero

With auto-zero on, the default, the instrument takes a zero reading after each measurement and subtracts it, removing its own offset. It halves the reading rate. It applies to DC voltage, DC current and two-wire resistance; four-wire resistance and ratio switch it on regardless. Turn it off under Meas when speed matters more than the last few counts of offset.

6.5 Ranging

Auto-ranging moves down when a reading falls below 10 % of range and up above 120 %; it costs a little time on each change. A fixed range is faster and is set with the up and down arrows or the Range softkeys; Auto returns to automatic. Over-range shows on the display. Every range except 1000 V DC, 750 V AC and 12 A reads to 120 % of its nominal value.

6.6 Gate time and continuity threshold

Gate time, for frequency and period, is 1 s, 100 ms or 10 ms. The continuity threshold is set under Meas on the continuity function, with the arrows and Enter, from 1 Ω to 1000 Ω.

7 Maths

Press Math. A maths function stays on until the instrument is switched off or the function is changed. The statistics view under Disp shows the sample count, maximum, minimum, average and standard deviation for the current function, restarting when the function changes.

Relative

The reading becomes the measured value minus a stored value. Press the Relative softkey on the measurement screen to store the present reading, or set any value up to 120 % of the top range under Math with the arrows; Current takes the present reading and Default resets it to zero. On and Off switch it, and Rel shows in the status column. Available on every function except continuity, diode and ratio.

dBm and dB

dBm expresses a voltage as power into a reference resistance, $10 \log(V^2 / R / 1 \text{ mW})$, with the reference settable from 2 Ω to 8000 Ω and 600 Ω as delivered. dB is the difference between the reading in dBm and a stored reference in dBm, settable from -120 to +120 dBm; Current stores the present reading. Both apply to DC and AC voltage only, and both references clear at switch-off or on a change of function.

Limit test

Set an upper and a lower limit, each up to 120 % of the top range, and switch the test on. The status column shows Pass, High or Low, the beeper sounds once when a reading first goes outside the limits, and the rear RS-232 connector

carries the result as a negative pulse: pin 1 for pass, pin 9 for fail, pin 5 common. The limits reset to 1 and 0 at switch-off. Available on every function except continuity, diode and ratio.

8 Triggering, hold and data logging

Trigger source

Press Trig. Auto trigger, the state at switch-on, takes readings continuously at the rate the settings allow, with Run in the status column. Single takes one trigger from the Single key, and External takes one from a negative pulse at the rear Ext Trig input; each trigger takes the set number of samples. The Sampling indicator flashes for each reading.

Samples and delay

Under Trig, Setup sets the number of readings taken per trigger, 1 to 50,000, and a delay from the trigger to the first reading and between readings, 0 to 3600 s. Use the delay to let a source settle after a switch closes, or to space a series of readings.

Trigger output

With Output on, the rear VM Comp connector gives a negative pulse when each measurement is complete. With Ext Trig it forms the handshake for a scanner or switch unit: the switch settles, triggers the meter, the meter reads, and VM Comp tells the switch to move on.

Reading hold

Press Hold/Run in auto trigger and the display holds a reading once three successive readings agree within the sensitivity band, 0.01 %, 0.1 % (the default), 1 % or 10 % of the reading, set under Trig. A new reading within the band of the held one does not replace it. Hold is a front-panel function only; it is ignored under remote control.

Data logging

The instrument keeps a record of readings for the current function, viewed under the History softkey with the arrows, and cleared when the function changes or the power goes off. With a USB memory stick in the front port, Store writes the record as a CSV file in a measRecords folder on the stick, named by function and a serial number you set, DCV-1.csv for example. Update refreshes the view.

9 Remote interfaces

Press Menu, then Interface. The commands themselves are in the GPS-3065A Programming Guide; this section is the setup. Interface settings are held in non-volatile memory and survive switch-off and reset.

- RS-232: baud rate from 1200 to 256,000, 115,200 as delivered; parity none, odd or even, none as delivered.
- USB: no settings. Connect to a computer and allow a few seconds for the connection to establish.
- LAN: set the IP address, subnet mask and gateway to suit your network. As delivered they are 192.168.1.230, 255.255.255.0 and 192.168.1.1.
- Command set: under Menu, choose the 34401A, 34410A or Fluke 45 command set to match the software talking to the instrument.

Under remote control the status bar shows Remote and the front panel is locked; press Single to return to Local.

10 System

Under Menu: Time sets the clock; Language switches the interface language; Screen sets the brightness; Buzzer turns the beeper on or off; Theme changes the interface colours; Recover restores the default settings. Self-test runs a check of the hardware and reports on screen. Information shows the serial number and software version.

Software update

Firmware updates are supplied by GPS. Copy the update package into an updatefile folder in the root of a USB stick, plug it into the front port, and choose Update under Menu.

Calibration

Every instrument is supplied calibrated. The one-year accuracy figures apply from that calibration; recalibrate annually, or at 90 days where your quality system requires the tighter figures. The instrument has a two-standard calibration routine that needs only a 10 V and a 10 k Ω reference, but it is for calibration laboratories and its use is described in a separate calibration guide; an incorrect calibration makes every reading wrong. Calibration with a traceable certificate is available from GPS.

11 Getting the best from it

Low-level DC

- Thermal EMFs are the largest error at millivolt levels: every junction of dissimilar metals is a thermocouple. The input terminals are copper; use copper-to-copper connections, keep junctions at the same temperature, and let everything settle before reading. Tin-lead solder gives about 5 μ V per $^{\circ}$ C, brass 3, copper oxide 1000.
- Use the greater-than-10 G Ω input on sources above a few kilohms, and 10 PLC or more of integration; only whole power line cycles cancel mains pickup.
- Keep the LO terminal off earth where you can. If the source must be earthed, connect the instrument and the source to the same earth and the same outlet, so that no ground-loop current flows in the leads.
- Twist the leads and keep them still near anything carrying current or switching; a moving lead in a magnetic field is a generator.

Resistance

- Four-wire is the method for anything under about 1 k Ω and for anything at the end of a long cable or a switch; lead and contact resistance drop out. Four-wire lead resistance may be up to 10 % of range on the 100 Ω and 1 k Ω ranges and 1 k Ω per lead above that.
- Two-wire with Relative on the shorted leads is adequate above 1 k Ω . Without either, add 0.2 Ω plus the lead resistance to the figures.

AC

- The figures are for a sine wave above 5 % of range. Between 1 % and 5 % of range add 0.1 % of range; above 50 kHz add 0.13 %.
- Crest factor: the instrument accepts up to 5 at full scale, and a non-sinusoidal waveform adds error with its crest factor, 0.05 % below 2 rising to 0.5 % at 4 to 5, plus a bandwidth term for narrow pulses. A pulse train of crest factor 3 at 20 kHz reads about 1.6 % low in total.
- The AC input is 1 M Ω in parallel with under 100 pF, which is 160 k Ω at 10 kHz and 16 k Ω at 100 kHz. A high-impedance source will be loaded at high frequency.
- AC current bandwidth is 5 kHz for the accuracy figures and 10 kHz at reduced accuracy; AC voltage is specified to 300 kHz with a 1 MHz -3 dB point.

12 Specification

One-year figures at $23 \pm 5^\circ\text{C}$ after one hour of warm-up, at 100 PLC with auto-zero on, as $\pm(\text{ppm of reading} + \text{ppm of range})$ unless stated. 24-hour and 90-day figures, temperature coefficients and the additional errors at shorter integration are in the full tables available from GPS.

DC voltage

Range	Resolution	Input impedance	One year, ppm of reading + ppm of range
100 mV	100 nV	10 M Ω or >10 G Ω	50 + 35
1 V	1 μV	10 M Ω or >10 G Ω	40 + 7
10 V	10 μV	10 M Ω or >10 G Ω	35 + 5
100 V	100 μV	10 M $\Omega \pm 1\%$	40 + 6
1000 V	1 mV	10 M $\Omega \pm 1\%$	40 + 6

DC current

Range	Resolution	Burden voltage	One year, ppm of reading + ppm of range
10 μA	10 pA	<140 mV	500 + 250
100 μA	100 pA	<140 mV	500 + 250
1 mA	1 nA	<160 mV	500 + 60
10 mA	10 nA	<160 mV	500 + 200
100 mA	100 nA	<400 mV	500 + 50
1 A	1 μA	<60 mV	500 + 200
12 A	10 μA	<600 mV	1500 + 200

Resistance, four-wire or two-wire with Relative

Range	Resolution	Test current	One year, ppm of reading + ppm of range
10 Ω	10 $\mu\Omega$	10 mA	100 + 40
100 Ω	100 $\mu\Omega$	1 mA	100 + 40
1 k Ω	1 m Ω	1 mA	100 + 10
10 k Ω	10 m Ω	100 μA	100 + 10
100 k Ω	100 m Ω	50 μA	100 + 10
1 M Ω	1 Ω	5 μA	120 + 10
10 M Ω	10 Ω	0.5 μA	400 + 20
100 M Ω	100 Ω	0.5 $\mu\text{A} \parallel 10\text{ M}\Omega$	8000 + 100
1 G Ω	1 k Ω	0.5 $\mu\text{A} \parallel 10\text{ M}\Omega$	80000 + 100

AC voltage, true RMS, slow filter

Frequency	One year, % of reading + % of range, 1 V to 750 V ranges
3 Hz to 5 Hz	1.00 + 0.04
5 Hz to 10 Hz	0.35 + 0.03
10 Hz to 20 kHz	0.06 + 0.03
20 kHz to 50 kHz	0.12 + 0.05
50 kHz to 100 kHz	0.60 + 0.08
100 kHz to 300 kHz	4.00 + 0.50

The 100 mV range is the same to within a few hundredths of a percent of range. The 750 V range is limited to 100 kHz. Above 100 kHz the typical error at 1 MHz is 30 % of reading.

AC current, true RMS

Frequency	One year, % of reading + % of range, 100 μ A to 1 A ranges
3 Hz to 5 Hz	1.0 + 0.04
5 Hz to 10 Hz	0.3 + 0.04
10 Hz to 5 kHz	0.1 + 0.04
5 kHz to 10 kHz	0.3 + 0.04

The 10 mA and 12 A ranges are $\pm(0.15 \% + 0.06 \%)$ from 10 Hz to 5 kHz.

Other functions and general

Item	Specification
Frequency and period	100 mV to 750 V, 3 Hz to 300 kHz • 100 ppm of reading from 40 Hz to 300 kHz, 200 ppm 10 to 40 Hz, 300 ppm 5 to 10 Hz, 500 ppm 3 to 5 Hz • gate 1 s, 100 ms or 10 ms
Capacitance	1 nF to 100 mF in nine ranges • $\pm(1 \% + 0.3 \%)$ from 10 nF to 10 mF, $\pm(2 \% + 2.5 \%)$ on 1 nF, $\pm(3 \% + 0.2 \%)$ on 100 mF • 1 pF resolution on the 1 nF range • with Relative in use
Temperature	Pt100 at 1 mA, Pt1000 at 100 μ A, -200 to 660 $^{\circ}$ C • ± 0.16 $^{\circ}$ C plus the probe
Continuity	1 k Ω range, 1 mA • threshold 1 Ω to 1000 Ω , 10 Ω default • 300 samples per second
Diode	1 V and 10 V ranges, 1 mA • open above 3 V
DC:DC ratio	Input 100 mV to 1000 V, reference 100 mV to 10 V, both auto-ranged • LO terminals within ± 2 V
AC input	1 M Ω with less than 100 pF • crest factor to 5 • 750 V rms maximum, 8×10^7 V-Hz product
Input protection	1000 V peak HI to LO • 500 V peak LO to earth • 200 V peak on SENSE • 15 A internal and 500 mA rear fuse • CAT II 300 V, 2500 V peak transient
Interfaces	RS-232 (1200 to 256000 baud, 115200 default) • USB device • LAN (default 192.168.1.230 / 255.255.255.0 / 192.168.1.1) • USB host • Ext Trig in, VM Comp out
Power	110 V or 220 V ± 10 % on the rear selector • 45 to 66 Hz • under 20 W

Item	Specification
Environment	Operating -5 to 45 °C, 5 to 85 % RH • storage -20 to 70 °C
Size and weight	265 × 105 × 335 mm • about 2.7 kg

13 Care, supply and warranty

- Clean the case with a damp cloth. Keep liquid out of the connectors and the vents.
- The 500 mA current fuse is on the rear panel; the 15 A fuse and the mains fuse are replaced by GPS or a competent technician with the mains disconnected.
- Supplied with: test lead set with 2 mm probes, crocodile clips, mains lead, two spare fuses, this manual and a calibration certificate.
- Optional: rack mounting kit, Pt100 probe, RS-232 cable, USB cable, GPS-3065A Programming Guide.

One year warranty from the date of purchase, subject to product registration with GPS. It covers defects in materials and workmanship and does not cover damage from inputs beyond the protection limits, blown fuses from misconnected current inputs, or unauthorised repair or calibration.

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