CALIBRATION MANUAL · COMPANION APP

Calibrate it yourself

Calibrate your ohmSTAR or ohmSTAR+ at your own bench, with your own meter and the ohmSTAR Companion app. The Companion's calibration bench is tried and true. We recommend calibrating every 2 years.

WHAT YOU'LL NEED

- ☐ **An HP/Agilent/Keysight 34401A multimeter**, the only meter the app supports today. For a traceable result, it must be within its own calibration date, with a calibration traceable to NIST.
- ☐ **An RS-232 connection** from the meter to your computer, usually a USB-to-RS-232 adapter and the right cable for the meter.
- ☐ **A Windows or Mac computer** with the ohmSTAR Companion app, from labmetric.com/software-downloads.
- ☐ **Short, good-quality test leads** between the meter and the box.
- ☐ **A USB cable** for the box: Mini-USB, the older D-shaped plug.
- ☐ **Firmware 7.x or newer**, if you want your serial number, dates and sheet stored on the box. Older firmware can still be calibrated, but the box can't store these, so keep your own records.

> **PLEASE READ THIS FIRST**
> Calibration replaces the values that make your box accurate. A poor meter or bad leads can leave it **less** accurate, and nothing on screen may show it. The app saves the box's earlier values first, so they can be put back.

IN THIS MANUAL

1	Set up	p.2
2	Turn on the calibration bench	p.2
3	Connect	p.2
4	Run the calibration	p.3
5	Read the result	p.3
	Your records	p.4
	Good to know	p.4

STEP 1 Set up

1. Let the box and meter warm up in a stable room, for at least as long as your meter's manual asks.
2. In the meter's I/O menu, select RS-232, 9600 baud, no parity with 8 data bits, and the SCPI language.
3. Connect the meter's resistance input to the box's output terminals, and connect **nothing else** to them.
4. Plug the meter and the box into the computer.

METER I/O MENU

Interface	RS-232
Baud rate	9600
Parity	None, 8 data bits
Language	SCPI

> **Your leads count.** The app measures with two wires, so the resistance of the leads and connections is included in every reading. This matters most at low values, where the limit at 1 Ω is only ±0.1 Ω. Keep leads short, make sure connections are clean and tight, and don't move them during the run.

STEP 2 Turn on the calibration bench

The bench is off until you turn it on.

1. In the Companion app, open **Settings**.
2. Turn on **Calibration bench**, and read the warning.
3. A **Calibration bench** tab appears at the top.

STEP 3 Connect

1. In the bench, go to **Instrument ports** and click **Detect**. The app asks each port what's connected to it.
2. Check that it found the resistance box and the multimeter.
3. Click **Test Connection**.

STEP 4 Run the calibration

1. Under **Calibrate a unit**, check the **Unit model** matches your box.
2. Choose or create a batch under **Filing into**. This is where your records are kept.
3. Check the **Serial number**. On firmware 7.x, a box that has one fills this in itself. If yours is blank, type it in. If what you type doesn't match what's stored, the app stops and asks before changing it.
4. Click **Start**, and leave the leads alone until it finishes. It takes a few minutes.

Test point	Must be within
1 Ω	±0.1 Ω
10 Ω	±1.5 %
100 Ω	±1.5 %
1 kΩ	±1.5 %
10 kΩ	±1.5 %
100 kΩ	±1.5 %
1 MΩ	±1.5 %

WHAT THE APP DOES

1. Saves the box's old values
2. Measures all 31 relay positions and the residual
3. Stores them
4. Reads them back
5. Tests the result at the points in the table

STEP 5 Read the result

Yellow or red relays? During the run, the app compares each relay with a typical box. Yellow means out of spec, and red means way off. This is only a guide and doesn't change the result, but it's a good place to start looking.

PASS	On firmware 7.x, the app stores the serial number, calibration date, due date (2 years on) and a plain-text calibration sheet on the box, then reads them back to check them. You're done.
FAIL	Clean and re-seat the leads and connections, then run it again. If the same relay keeps showing up, the box may need repair, so contact us: email mike@maxmetrix.com or call 602-751-5848.
STOPPED OR DISCONNECTED	The box's calibration may be partly rewritten, so don't use it for measurements yet. Run the calibration again, or put the earlier values back using **Restore** in that unit's record.

Your records

ON YOUR COMPUTER · in the batch

- The full log
- The box's earlier values

On firmware 7.x, the calibration date and sheet are cleared when a run starts and written only after a pass, so a box that didn't finish won't show a valid calibration.

ON THE BOX · firmware 7.x

- Serial number
- Calibration date
- Due date, 2 years on
- Calibration sheet, plain text

Plug the box into any computer with the Companion app to read them, or save the sheet as text or as a PDF to print.

Older firmware can't store these, so keep your own records.

A calibration you do yourself is your own record. It won't carry LabMetric's digital signature, because we didn't perform or check it. You're responsible for your meter, your procedure and whether the result meets your requirements.

Good to know

The Companion says **The calibration bench is using the serial ports**	Go back to the Companion tab first. ohmSTAR Software Guide, chapter 07
Scripts and AI	Python, the HTTP API and AI control can't reach calibration. ohmSTAR Software Guide, chapters 01 and 05
At the box	Menu 3 starts calibration, and Factory Reset replaces it. ohmSTAR Software Guide, chapter 06