

SigmaBoss™

AG1 User manual



READ THIS FIRST

Security is a strategy – not a product for sale. Please don't make the mistake of mindlessly delegating your precious metal buying decision to an electronic meter. The SigmaBoss DUO1 provides an estimation of conductivity, which can be faked with certain copper alloys. You can only be reasonably sure of alloy purity if you can verify **both the conductivity and density** of your sample.

Quickstart Guide

① Put batteries in the device. You'll need 3×AA 1.5V – either alkaline or LiFePO₄. Note you can't use NiMH 1.2V batteries – the voltage will be insufficient to power the analog circuitry.

② Turn on the SigmaBoss AG1 device. Make sure the sensor is clear of anything conductive so it can calibrate correctly. The red light turns on to indicate that battery voltage is adequate, and blinks when calibration is complete.

③ Put your 1oz+ silver coin or bar on the sensor as indicated by the app (ensure it covers the sensor area completely!). If its conductivity is at least as good as 995+ purity silver, the green LED will light. If the green LED doesn't light, take a hard look at the sample – it has a high probability of being fake.

④ If you don't get the result you expect, it's worth testing a few times because the digital filtering and processing are prone to minor variations caused by electronic noise. You should recalibrate by removing all your sample, and toggling the power switch.

⑤ Finally, remember that conductivity depends on temperature, if the device detects that the sensor's temperature has changed since last calibration, it will flash both LEDs repeatedly to inform you that you need to restart the device so that it can recalibrate.



Sigma*Boss* AG1 User Manual

The SigmaBoss AG1 is a conductivity meter for silver, the most conductive metal. You simply place a silver bar or coin of 995 millimes or finer on the sensor, and the green LED lights if the conductivity is within expected tolerance.

How does it work?

SigmaBoss devices work by inducing circulating currents in your precious metal sample, then measuring the currents and the magnetic coupling. This data is then processed and converted to a conductivity reading.

It can measure silver through 1.5mm thick plastic packaging. Note the further away the sample is from the sensor, the smaller the currents that are induced and the more uncertain the reading will be. You will always get a more precise reading if you can place the sample bare on the sensor without packaging.

Copper's conductivity is very close to silver's, and falls with the tolerances that the AG1 measures. Most 9999 copper rounds will cause the green LED to light, so check the density of your sample to be sure that your sample isn't silver-plated copper.

The SigmaBoss AG1 can read slabbed coins through their packaging, but please note that slab cases maintain the coin a significant distance from the sensor, so the coin in question must be large and thick enough to induce sufficient current that the device sensor can "perceive" it.

The AG1 is not suited for testing jewelry, as you need a relatively flat, solid mass of metal in close proximity to the sensor so currents can circulate without being impeded by holes, links, and ornamentation.

Care and maintenance

The sensor is very sensitive to changes in conductivity, and you'll probably know that one of the big factors that changes conductivity is heat. When the device starts, it measures a calibration value of the sensor, and if you keep it in your pocket, and then take it out and try to measure as it cools down from body temperature to ambient air temperature, it won't return a consistent reading and will constantly require recalibration until it reaches a stable temperature.

Your device is a sensitive analog instrument; store it in a cool dry place.

Avoid getting scammed

When buying, as well as testing with your SigmaBoss device, consider:

- Do I trust the source? APMEEX is a lot less likely to sell fake Perth mint bars than some guy in a parking lot.
- Does the counterparty have a good reason for selling? If they're trying to fleece you with fakes or fence stolen coins, and you choose to play that game, you'll likely lose your money. Why do business with someone seeking to defraud you? If you doubt their story, walk away.

- Is the price too low, especially for gold? No-one sells precious metals without looking at the spot price, and no-one looks at the spot price and then chooses to sell for several hundred dollars less “for a quick sale”. Selling fakes on Craigslist under spot because the guy “doesn’t have time to go to the local coin shop” is a common scam.
- Testing with a magnet. No precious metal alloys are magnetic, but many fakes are iron or nickel alloy.
- Are they selling minted bars and won’t remove them from the assay packaging? Plated brass or iron bars are the most common fake bullion, because the vendor counts on you not being able to test the weight and dimensions. It’s a mug’s game to determine if bullion is real by how nice the packaging is.
- If you’re buying government bullion, get a known good sample from a reliable source. It’s easy to tell if the American Silver Eagle in your left hand is fake when you have a real one in your right.

Troubleshooting

- If the device’s LED does not turn on, this means the battery voltage is too low and the batteries must be replaced.
- If the coin is small or farther away, the device may not detect it because the induced current is too small. Use only 1oz+ silver bars or coins.
- If both LEDs flash repeatedly, this means that the device has detected that the sensor temperature has deviated too far from its calibration temperature. Simply switch off the device and then switch it on again to allow it to recalibrate.
- If you’re still having trouble with your device, send us an email to support@sigmaboss.com and we’ll be happy to help.

FAQ

What's the difference between a SigmaBoss device and an XRF meter?

An XRF meter ionizes a metal sample using X-rays, causing the sample to emit radiation at certain frequencies. Each element radiates a unique, different spectrum. By measuring the radiation, you can surmise the composition of the alloy. However, XRF meters only penetrate a few microns thick – shallow enough that plated brass won't be detected.

A SigmaBoss device induces and measures electrical currents in a metal sample, and penetrates a few millimeters, deep enough to detect brass, tungsten, et cetera cores.

What instrument should I use to verify a really thick bar all the way through?

To measure deep within thick bars, the correct instrument to use is an ultrasound machine. Though some Sigma device manufacturers claim 10+mm measuring depth at very low frequencies, it's really an empty boast as for bars that valuable you would want to use the correct instrument for the job, and an ultrasound machine can visualize aberrations all the way through the bar. Only then can you be confident that the thick bars don't have altered cores.

Why does my reading vary on the same bar/coin?

Rather use expensive high-precision analog components to measure electrical properties (and individually calibrate each meter), we keep costs down using smart digital signal processing algorithms (that can self-calibrate) for the same functionality. When it comes to measuring something as sensitive as minute changes in magnetic field, this can be prone to minor amounts of electrical noise. So, while you get great bang for your buck, and the average reading will be true, there is minor variation in the individual readings.

We feel that it's an acceptable trade-off for a specialized analog instrument, and it also allows you to avoid maintenance costs (physical properties of the precision analog components change with age, so need to be periodically sent back to the manufacturer for recalibration).

I think the packaging of minted bars shouldn't be damaged, but you advocate removing bars to verify weight and dimensions. How do I reconcile this?

The heart of the matter is an emotional sense of destroying "premium" by removing bars from assay packaging. Ask yourself if it's an investment (where you're trying to make money reselling at a higher price via a repeatable process), or an emotional purchase (where you get to feel like a dragon hoarding shiny treasure!). Either is cool, but your answer probably determines your perspective on wanting mint condition packaging.

We've seen Perth mint and Pamp fakes get increasingly sophisticated over the years – the packaging has become good enough that you have to be a true expert to distinguish the latest Chinese fake packaging. For this reason we advocate verifying density where possible.