Sigma Metalytics

Precious Metal VERIFIER

User Guide

The Precious Metal Verifier is a scientific instrument, to get proper readings from your unit please review this manual carefully. There are important special conditions to consider when using the unit and they are outlined in this guide.

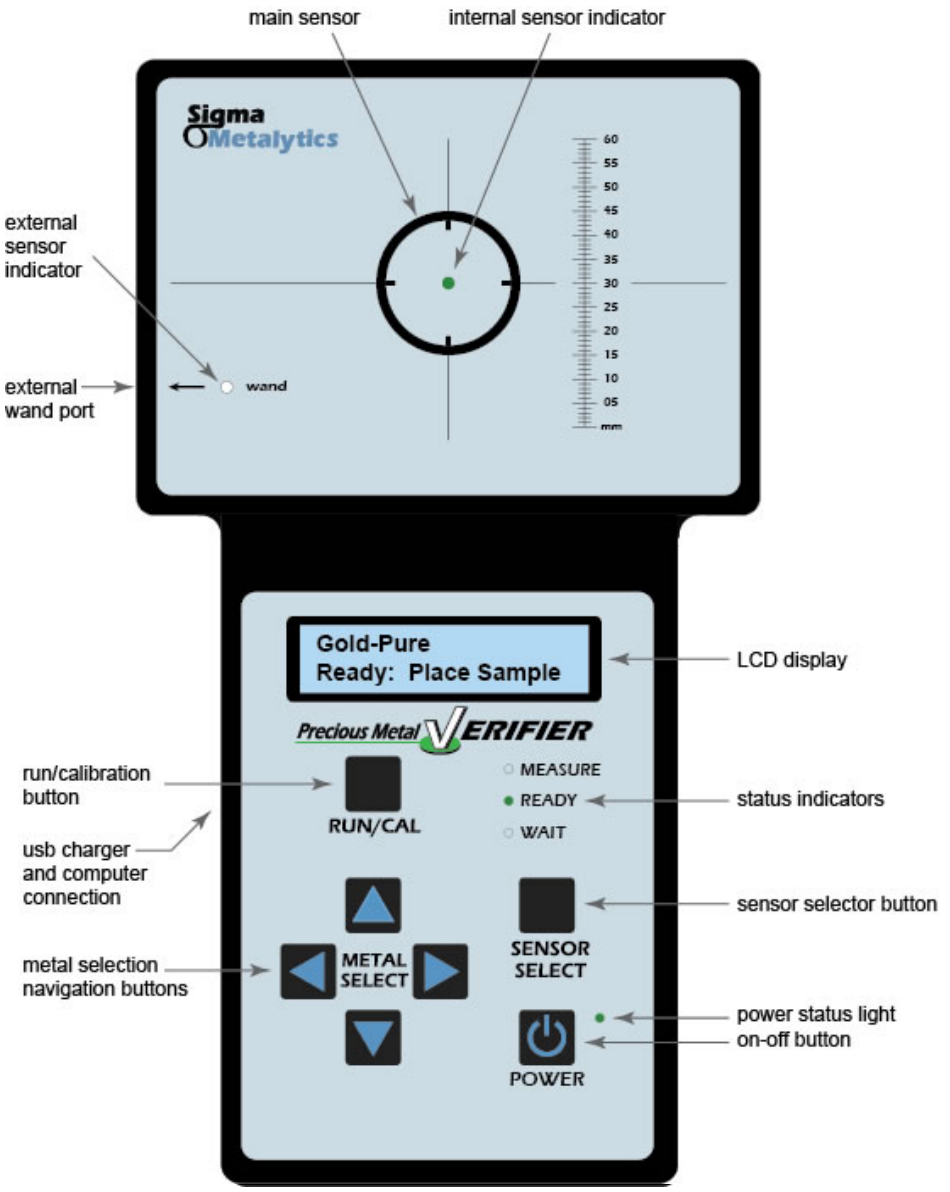
Instructions are also available on our website at www. Sigmametalytics.com

If you have a QR reader (an app you can get for your smart phone) you can access instructions here

Sigma Metalytics and the Precious Metal Verifier make no claim, guarantee or promise that measurements made by the Precious Metal Verifier indicates any sample is or is not the selected metal or alloy, whether the reading is within or is not within the bounds consistent with the selected metal or alloy. To ensure accuracy, **read the instructions and special conditions** which can alter the reading from outside to within the expected bounds or from within to outside the expected bounds. The readings given by the Precious Metal Verifier are INFORMATIONAL ONLY and any judgment about or action taken on any sample is entirely the responsibility of the user.

Contents

Unit Diagram



Instructions

1. Clear all samples from the unit. Do not place samples on the unit until metal and alloy have been selected and the display reads: **Ready: Place Sample**
2. Turn on the unit. Wait until Display reads, **Remove Sample Push Run/ Cal → Start**. If you are using a wand, connect it now. The green LED on the panel will indicate the active sensor. Use the sensor button to select between the main unit sensor and the wand. A wand cannot be selected unless it is connected.
3. Press the Run/Cal Button. You have to press the Run/Cal button whenever the message, **Remove Sample Push Run/Cal → Start** appears, or whenever a change in metal or sensor is made.
4. Select the metal using the up and down arrow keys. Categories available are Gold, Silver, Other, and Bullion.
5. Select the alloy using the left and right arrow keys.

    a. Gold- lists the following alloys: Pure .999+, 91.7% 22K bal Cu, 90% bal Cu, American Eagle, Krugerrand, and 98.6%.
    b. Silver- lists the following alloys: 99.99% Pure, 99.9% Pure, 92.5% Sterling, 90%US pre 1900, 90%US pre 1945, 90% Coin 1960, 96% Britannia, and 80% Canadian.
    c. Other- lists the following: Platinum, Palladium, Rhodium, Copper, and Calibrator.
    d. Bullion- lists the following: Silver .9999, Gold .9999, Platinum, and Palladium.

6. Once your metal and alloy are selected press the Run/Cal button. The display will then read, **Ready: Place Sample**.
7. Place the sample over the sensor. If you are using the main unit sensor, the sample must cover the round target or beyond. If you are using a wand, hold the wand to the center of the sample.
8. The display will show the results. See page 4 for results interpretation.
9. When you're ready to test a sample of a different metal or alloy begin at step #4 above.

Instructions (cont)

Notes:

A coin that is attracted to a magnet will be ignored by the Precious Metal Verifier, it will reset to **Remove Sample Push Run/Cal** → **Start**.

The Gold-91.7% 22K bal Cu and the Gold-Krugerrand ranges are identical.

American Eagle gold is 22K too, but has a different scale as the alloy contains silver as well as copper.

Morgan and Trade dollars should be measured on the Silver-90%US pre1900 range. Peace dollars and walking Liberty half dollars should be measured on the Silver-90%US pre1945 range.

We have varying ranges to cover older 90% silver. These ranges are more selective than the modern range, due to less pure alloys in the past. The measurements will not exclude counterfeit alloys nearly as well as the 1960 (and later) range. They advise that if the reading is outside the given range the coin must be regarded with suspicion, as the reading is not consistent with the right metal. However, a coin reading inside the range could still be made from other metals, and it is best to check the dimensions of these coins, their weight, and their look as well. Silver US coins between 1945 and 1960 vary in purity as some coins (notably Ben Franklin 50 cent pieces) were at times made from melted coin silver of lesser purity.

Results Interpretation

The black cursor box will be between the brackets if the metal is within the expected range.

The black cursor box can read slightly to the left of the brackets if the sample:

- is lightly embossed
- is very cold.
- is too small and/or far away from the sensor

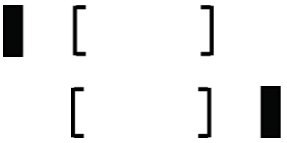
Further checking, research and analysis by another method is recommended.

The black cursor box can read slightly to the right of the brackets if the sample:

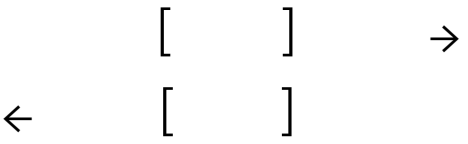
- is deeply embossed
- is very warm
- is to thin or too small for the chosen sensor (see calibration disk page 8)
- is off the center target on the main unit sensor

Further checking, research, and analysis by other methods is recommended.

The further the black cursor is outside the brackets the more likely it is that the sample is not made from the selected metal. Further checking, research and analysis by another method is recommended.



If a left or right arrow appears, then the metal in the sample is most likely not the metal selected.



Selecting the Appropriate Sensor for your Sample

To get accurate readings it is important that the correct sensor is paired with the appropriately sized sample. For instance, using the main sensor with 18mm, small coins (e.g. ¼ oz gold coins) will give incorrect readings. **Each sensor is paired with a specific Precious Metal Verifier, do not interchange units and sensors.**

1. MAIN SENSOR

   - In its standard mode, the main sensor reads samples of pure gold and silver alloys which are at least 1.1 mm thick. Other precious metals such as gold alloys, platinum and palladium should be at least 2.4 mm thick. Thinner samples can be read using the calibration disk (see page 9)
   - The main sensor reads samples with a diameter greater than 24 mm as long as they are not in a case.
   - Coins in a case must be at least 30 mm to assure an accurate reading.

2. SMALL & LARGE WANDS

   - The small wand has a small ‘s’ on its face. The larger wand is labeled with the word ‘large’.
   - These wands read samples of pure gold, silver, and silver alloys which are at least 0.8 mm thick, and down to .4mm thick with the use of the calibration disk (see sensor selection chart-page 7, and calibration disk use - page 9
   - Other precious metals such as gold alloys, platinum and palladium should be at least 1.7 mm thick. Samples as thin as 1.0 mm can be read with the use of the calibration disk.
   - The small wand can read samples with a width or diameter as small as 8.0 mm. The large wand can read samples with a width or diameter as small as 18.0 mm.
   - When cases have a high plastic ridge, the large wand is closer to the sample than the main sensor, and may get a better reading.

3. BULLION WAND:

   - The Bullion wand is actually the largest of the three wands and has the gold colored label with the word, 'Bullion'.
   - The Bullion wand reads samples of pure silver which are at least 4.0 mm thick. Pure gold and silver alloys must be at least 4.5 mm thick. Other precious metals such as gold alloys, platinum and palladium should be at least 7.0 mm thick. Thinner samples can be read using the calibration disk (see sensor selection chart -page 7, and the calibration disk use - page 9)
   - Bars and coins must be at least 24 mm in diameter for measurement with the Bullion wand.

Bullion Wand Specifications

Sizes of Samples

A large enoungh sample thickness is crucial to receiving an accurate measurement with the bullion wand. This wand will not work with standard coins as they are too thin. Review the chart on page 7.

Testing thin samples

The calibrator disk can be placed behind the sample to check if the sample is too thin and confirm readings.

If the reading with the calibrator moves more than 2 cursors from the original reading without the calibrator, then the sample is too thin to be measured by the bullion wand. Recheck the sample on the main sensor.

Deepness of measurements

When measuring pure gold and silver sub-surface metal changes up to 1.5 mm (60 mils) deep can be detected. Sub-surface metal change up to 3.5 mm (140 mm) can be detected for 22k gold, 90% gold, platinum and palladium.

Silver Metal Composition and False Readings

The metal settings in the bullion database are optimized for increased sensitivity to gold, silver and other precious metal. A narrow silver range has been set up to distinguish silver from copper. This range is actually narrower than some .999 silver bars, and when a .999 silver bar has contaminants in it the reading will move to the right. Thus, a real .999 silver bar could read outside the brackets as fake. (Note that Copper will read 4 blocks to the right) If a silver bar measures outside the brackets further investigation is required. Carefully check the volume of the bar against its weight, check dimensions and possibly even file a corner to validate the sample with other methods.

Considerations when measuring

Heavy stamping and surface continuity of bars have an effect on readings, be sure to get the sensor as close and as flat to the bar as possible. Find as smooth a section of the bar as possible and measure in more than one spot on the bar. If a bar has inserts of counterfeit metals, you will tend to see a suspicious reading running down the length of the bar, or across the width, often in multiple places.

Sensor Specification Chart

To Use This Chart: 1. Identify the metal category you will be measuring: pure silver, pure gold and silver alloys, or gold alloys-platinum-palladium.

2. Select the column of your coin or bar thickness from the row of the metal you selected.
3. Move down in the column until you are in the same row as the correct diameter/width of the item you are measuring.
4. In the intersection of that row and column is(are) your best choice(s) for sensors to use.

note: There is a millimeter scale on the top of the Precious Metal Verifier that you can use to measrue the diameter/width and sample thickness.

Metal Type	Thickness (mm)				
Pure Silver (.999&.9999)	0.4-0.8	0.8-1.0	1.0-3.3	3.3-4.0	4.0+
Pure Gold & Silver Alloys*	0.4-0.8	0.8-1.1	1.1-3.3	3.3-4.5	4.5+
Gold Alloys*, Platinum & Palladium	1.0-1.7	1.7-2.4	2.4-6.5	6.5-7.0	7.0+
Diameter/Width (mm)					
30+	Large, C, N	Large, Main, C	Main	Main	Bullion, C, N / Bullion
24-30	Large, C, N	Large, Main, C, N	Large, Main, N	Large, Main, N	Bullion, C, N / Bullion, N
18-24	Large, C, N	Large,N	Large,N	Large,N	Large,N
8 -18	Small, C, N	Small, N	Small, N	Small, N	Small, N
Sensor Choice					

C - use calibration disk.
N - Can't make numismatic case (slab) measurements, but plastic bags/packaging are okay.
note: A smaller sized sensor can always be used but is subject to greater surface variation effects, and will not penetrate as deeply in the sample.

*Silver alloys include: 90%-coin silver, Morgan,Peace, and Trade dollars, sterling silver, Britannia silver, and 80% silver.

* gold alloys include: 22K - Krugerrand, American Eagle gold, and 90% gold.

* minimum thickness for rhodium and 98.6% gold is 1.6 times the minimum for pure silver.

Conditions that Affect Readings and Accuracy

1. THIN COINS: Thin coins may give inaccurate readings. To check to see if this is the case:
   - Using the Main Sensor: place your sample on the sensor, and then place the calibration disk on top of your sample. If the reading changes then the first reading is most likely incorrect and the second reading is more dependable. Also retest using a wand.
   - Using a wand: place the wand against the sample, and hold the calibration disk BEHIND your sample. Again, if the reading changes, the reading with the calibration disk is more dependable.
2. HIGH RELIEF COINS: High relief coins can have unusual readings, especially with the wands. Most stamped coins will have no problem with relief, but molded samples can have much higher relief. Here are some suggestions:
   - Try moving the sensor to a flatter area of the sample.
   - Turn the sample over and measure another area.
   - Moving the coin around will give varying readings, but the left-most value will be the more accurate reading.
3. SMALL COINS: It is important to use the appropriate sensor for small coins. Please see section “Selecting the Appropriate Sensor for your Sample” on page 5.
4. BARS: Some contaminated areas can read out of the brackets. Bubbles, cracks and deep stamping can affect the reading. Disregard measurements in those areas.
5. SECURITY CASES: Security cases may have a high plastic ridge around the edge. At times, this makes it difficult for the main unit sensor to read the coin. Try using the larger wand as it will put the sample closer to a sensor.
6. PLATING: Plating generally has very little effect on the reading, typically only 1 box to the right or less.

Unexpected Readings

1. Check both sides and different places on the sample.
2. Press Run/Cal button to recalibrate the instrument.
3. Check if the sample is particularly cold or hot. If cold the cursor will appear to the left and if hot it will appear to the right.
4. Check a known good sample of the same metal type and alloy.
5. Try a different sensor.
6. If using wands clean the connector (rubbing alcohol may be used). Check to see that the connector is fitting properly.
7. A coin that is attracted to a magnet will be ignored by the Precious Metal Verifier, it will reset to **Remove Sample Push Run/Cal → Start**.

Calibration Disk

The unit has been provided with a calibration disk. The calibration disk has two uses. First, it allows for measurement of thin samples. Second, it can be used to check to see if the instrument is working correctly.

To Check Thin Samples:

1. To check thinner samples with a wand hold the sample to the wand and then hold the calibration disk behind the sample.
2. To check thinner samples with the main sensor place the sample on the sensor, be sure it covers the black target area. Place the calibration disk on top of the sample. Make sure it is above the target area.

To Check Correct Operation of the Precious Metal Verifier:

1. Using the navigation pad move the down arrow until the display reads “Other”, then move the right arrow to “Calibration”.
2. Press run/cal with the disk removed and then place the disk on the main unit or on the large or small wand. The reading should be between the brackets.
3. When using the wands if the measurement is not between the brackets unplug and replug the wand to ensure that it is working correctly. Turn the unit off and then back on and try the calibration disk again.
4. The calibration disk cannot be checked with the Bullion wand as the disk is too thin.
5. Contact us at info@sigmametalytics.com if the calibration disk measures incorrectly on your unit.

Battery Charging and Use

1. The Precious Metal Verifier contains a rechargeable lithium battery with reserve capacity to last the lifetime of the equipment.
2. When the battery is low, the green LED light next to the on-off button blinks slow, every 2 sec.
3. To charge the unit, connect a USB cable from the power supply to the micro USB port on the Verifier (see page 1). You can also charge the Verifier from your computers USB connection.
4. While charging the lamp blinks in fast pulses, and when charging is complete the lamp stops blinking.
5. When the unit is off it can still be connected for charging, but the LED will not be illuminated.
6. From a very low charged state it can take up to 5 hours to fully charge the battery. You can charge the battery while the unit is in use, but the battery charges more quickly if the unit is off and connected to a charging source.

Power Management

The Precious Metal Verifier has built-in features to improve battery life:

1. The unit will dim after one minute of no action. Placing a coin on the sensor or pushing any button restores the display backlight.
2. After five minutes of no action (no buttons pressed), the unit will completely turn off. Press the power button to turn the unit back on.

Measurement Mode

The Precious Metal Verifier Measurement Mode allows the user to see a measured value for the item under test. The value is related (close, but not exact) to the resistivity of the metal being tested. Identical metals will have identical values. In this way different alloys and metals can be characterized. To enable this function:

1. Turn off the Precious Metal Verifier, and then press and hold down the button that says *Sensor Select*, and while holding down this button, press and release the power button.

2. When the display reads:

   Remove Sample
   Push Run/Cal → Start

   - Release the Sensor button
   - Make sure the sensor is away from any metal and press the Run/Cal button

3. The display will read:

   Measurement Mode
   Ready: Place Sample

   Place the test sample on the sensor. You will read the measurement of your sample on this screen. Any non-magnetic metal can be read here, as long as it completely covers the sensor circle or wand head. The display will show,

   Measurement Mode
   Value =

   followed by the measurement for your test sample.

4. To return to normal operation, turn the unit off and on again.

Use Considerations

Use with caution:

It is not our recommendation or intention for the Precious Metal Verifier (PMV) to be the sole means for identification of counterfeit coins and bars. Our measurement of a material's electrical characteristic (resistivity or conductivity) is necessary, but not by itself sufficient for such a purpose.

We recommend that you check the item being measured against its specified weight, and size along with the resistivity measurement. You should use your normal visual checks of the material as well.

Other materials have the same resistivity as pure gold, and as such can look like gold on the PMV. These materials will be less dense than gold, so they will be larger or weigh less than the specified value. If you check material that looks good on the PMV, but has the wrong weight or dimensions, then you should not accept the material as consistent with the correct metal.

Do not try to use the PMV to determine what a material is. The PMV will only provide the electrical characteristic (resistivity or conductivity) of the metal, not the atomic structure. Correct use is to have an expectation of the material type (gold, silver, platinum, etc.), and alloy content (22K, coin silver, sterling, .999 pure, etc.), and to verify that the material being tested is consistent with your expectation.

Used in this way, the PMV is a great asset in avoiding counterfeit products.