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How to Make Your Own Body Voltage (BV) Meter!

by
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Body Voltage testing is the most accurate and useful method for measuring the ELF Electric Fields emitted from power lines, wiring, lights, appliances and other electrical sources.

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Part A. How to Make Your Own Test Meter

A1. The Three Basic Parts of Your BV Meter…

Your *Body Voltage Meter* has three main parts. The digital *multimeter* is a common electrical test instrument that you can buy at almost any Radio Shack, hardware store or building supply store, or you might be able to borrow one from a friend. The *skin probe sensor* and the *grounding probe* are simple pieces that you will assemble yourself from common materials…

1. The *multimeter* is a standard digital voltmeter that will be used to measure the strength of the AC voltages induced onto your skin by the AC electric fields.

2. The *skin probe sensor* is a short piece of wire that you will assemble yourself. One end of the wire has a "banana plug" connector that you will insert into the multimeter. The other end has a short length of exposed metal that you will use to make contact with your skin.

3. The *grounding probe* is a long piece of wire that you will also assemble. One end will have a "banana plug" connector to insert into the multimeter. The other end will have an "alligator clip" that you will attach to the metal shank of a long screw driver that is driven into the earth outside.

A2. List of Parts You Will Need to Get…

Here is a list of the parts you will need to get. These parts can usually be obtained at any standard Radio Shack, electronic supply store, hardware store, or "big box" building supply store.

1 Digital multimeter (see Item # A3 below)	$30 - $60
2 Test probe leads (they come with the multimeter)	-----
1 Extra test lead with an "alligator clip" on one or both ends	$2 to $5
100 feet or more of any insulated copper wire (electrical wire or speaker wire; size #14, #16 or #18 okay)	$10 - $25
3 Wire nuts (for whatever size wire you buy)	$1 to $4
1 Roll of electrician's tape	$1 to $2
1 Screw driver (any type, with 6 inch metal shank or longer)	$3 to $6

Tools: You will also need a *wire stripper/cutter* tool to cut the wires and strip the plastic insulation from the ends. If you do not already have a wire stripper, you can borrow one, or buy one from the same store you get the other parts.

A3. How to Choose a Good Multimeter…

You will need a multimeter than can measure down to 0.1 Volts AC (100 millivolts AC) or better. You will usually be measuring AC volts in the range of 0.1 to 10.0 Volts AC. A meter that can measure down to 0.01 Volts AC (10 millivolts AC) is preferred.

I recommend that you don't get the cheapest meter available (usually under $30) because they are often too limited in quality and sensitivity. I also recommend that you get a digital multimeter rather than an analog or "needle" type. *(Special note: a suggestion for a low priced "good enough" multimeter that you can probably order on the internet is the Gardner Bender GB GDT-3200.)*

A4. How to Make the Skin Probe Sensor…

Your digital multimeter will usually come with at least two test leads that plug into the meter. Take one of these test leads – the red one – to make your skin probe sensor. (Save the other test lead – the black one – for later, for the grounding probe.)

Basically, this red test lead is already almost exactly what we want, except that it is too long. You need to shorten it. On one end of the test lead there will be a "banana plug" connector that fits into the multimeter. *(On some test leads, the banana plug is bare and visible, and on other test leads it is protected by a plastic shroud. In either case, the "banana plug" end is the end that plugs into the multimeter.)* Cut the test lead wire at about 4 inches from the banana plug.

On the other end of the original red test lead, there will be a short exposed length of metal, usually an inch or more long. On this end, cut the test lead wire at about 8 inches from the exposed metal. Save these two red end pieces, and discard the longer piece of red wire that was between them.

Taking these two end pieces, strip the plastic insulation off the last half inch of wire for each piece, using your wire stripper. Then, take the two stripped ends and splice them together with a wire nut. To be sure that they don't come apart, wrap the splice with some electrician's tape.

You now should have a short red skin probe sensor (about 8 to 12 inches long), with a banana plug connector on one end, and the short bare metal shank on the other end.

A5. How to Make the Grounding Probe…

Take the other test lead (the black one) that came with the multimeter. Again, find the end with the "banana plug" and cut the wire at about 4 inches from the banana plug. Keep this short black end piece and discard the rest of the test lead.

Next, take the extra test lead that you purchased separately – the one that has an "alligator clip" on one end. Cut this test lead at about 4 inches from the alligator clip. Keep this short end piece and discard the rest of the extra test lead.

Now, you are going to take the two short end pieces that you just prepared, and splice one of them to one end of the long 100 foot wire, and the second end piece to the other end of the 100 foot wire: To do this, strip the last half inch of insulation from the end of the black banana plug piece, and also strip the last half inch of insulation from one end of the 100 foot wire. Splice these two stripped ends together with a wire nut, and tape the connection to make sure it stays secure. Then strip the insulation from the last half inch of the alligator clip piece, and also strip the last half inch of insulation from the other end of the 100 foot wire. Splice these two stripped ends together with a wire nut and tape them.

Note: If you later find that you would like a length longer than 100 feet for your ground probe sensor, you can always splice in another piece of wire to extend it as long as you like. That's okay.

You now are ready to set up and use your Body Voltage Test Meter!

Part B. How to Operate Your Body Voltage Meter

B1. Introduction to Body Voltage Testing…

Your Body Voltage Meter has three main parts. (1) The alligator clip end of the 100' long "*grounding probe"* will be clipped to a screwdriver driven into some moistened soil outside. This is how the BV Meter will determine "zero" Volts. (2) Then you will touch your skin to the bare metal end of the red "*skin probe sensor".* (3) The *"multimeter"* will display the exact AC voltage that is measured on your skin due to the electric fields around you.

B2. How to Set Up the Body Voltage Meter…

Step 1. Pick a location where you wish to test the *electric fields* – for example, in your bedroom, on the couch in front of the television, at your computer, in the kitchen, etc.

Step 2. Find the nearest location outside the building where there is a patch of accessible earth – real dirt that goes down deep, not just a planter box. Ideally, this would be close to a door or window that can be opened so that the long 100 foot *grounding probe* wire can be run from the inside to the outside. If the soil is dry, moisten the dirt with some water to improve conductivity. Then push the long screwdriver (or other metal rod) into the earth until only an inch of the metal shank is left exposed above the ground.

(Note: If there is no accessible connection to the earth within about 100 feet – for example in a large commercial building or tall apartment building – see #B6 below.)

Step 3*.* Unwind the long 100 foot *grounding probe* wire carefully, running it from the room to be tested, through the open door or window, and out to the screwdriver you placed into the moist soil.

Step 4. Outside, clip the *alligator clip* end of the long *grounding probe* to the metal shank of the screwdriver*.* Make sure that the *alligator clip* makes a very good connection to the metal shank (not the plastic handle) of the screwdriver. (You can wrap some tape around this connection to make sure that it does not get pulled away accidentally during the test.)

Step 5. Inside the room, take your multimeter and turn the dial to the "AC Volts" setting. (*You need to set the dial to AC Volts, **not** DC Volts!* Sometimes "AC" will be symbolized with a wavy line and DC will be marked with a straight line.) Find the two holes in your multimeter that are used for measuring AC voltage (note: one of them might be marked "com" or the symbol for grounding). Insert the banana plug of the *ground probe sensor* into one of these holes. Then insert the banana plug of the *skin probe sensor* into the other hole. It doesn't really matter which is which.

Step 6. Turn the multimeter "ON". Your body voltage meter is now set up and ready to use. (If your multimeter is not the "auto-ranging" type, you may need to adjust the dial to the proper AC volt setting. See your multimeter instructions for details.)

B3. How to Take an Accurate Measurement…

Step 1. Be sure that you are wearing shoes with insulated soles. (If you are barefoot, the skin voltage may be drained to the ground, and the measurement would not be accurate.)

Step 2. Position yourself as you would normally be in this location. For example, in the bedroom, lay down on your bed exactly where you would normally sleep. At your computer, sit in the chair just as you normally would. This is important because the electric fields are directional, and the measurement can be quite different when laying down as compared to sitting or standing.

Step 3. Hold the *multimeter* in one hand. Then position the long 100 foot *grounding probe* wire as far away from your body as possible – so it is not touching you, not underneath your feet, not crossing your body, and not encircling you.

Step 4. Grasp the bare metal end of the *skin probe sensor* between two of your fingers, or place it firmly against your skin anywhere. Hold still for several seconds, and then read the voltage measurement displayed on the multimeter. The voltage may jump around a little bit – this is normal. Just hold still for a few seconds and write down the average number.

Step 5. Always turn off the multimeter when you are done, so that the battery will stay fresh for future use.

B4. How to Test in Another Room…

Now, to measure the electric fields in another room, carry your multimeter setup to the new room, *but only if* you have enough length of *grounding probe* wire to do this. Be very careful with the *grounding probe* wire – route it safely to the next location without pulling the alligator clip off of the screwdriver outside. If the wire is not long enough to do this, you may need to relocate the screwdriver to a different place outside.

As before, hold the bare end of the *skin probe sensor* in your fingers, keeping the long *grounding probe* wire as far away from you as possible. Hold still for a moment, and then record the measurement. You can also change locations and positions in the same room to see how the electric fields vary from one particular place to another, or from one position to another such as sitting versus standing.

Be sure to check that the alligator clip stays connected to the screwdriver outside, and that the two banana plugs stay inserted firmly into the multimeter. Be sure to turn off the meter when you are finished. You can check that the meter is working properly by following the steps in the next section.

B5. How to Check That Your BV Meter is Working Properly…

You can verify that your Body Voltage Meter is working properly in several ways. One, find a lamp or small appliance with a cord that has a 2-prong plug at the end (not the grounded 3-prong type of plug). Plug in the cord to a wall outlet and turn on the light or appliance. Stand several feet away from the lamp cord, and take a body voltage measurement. Then go right up to the lamp cord and lay it across your leg or arm. Take a second measurement. You should see the level go up, probably a volt or more.

Another test is to go into a bathroom, kitchen, laundry, garage or other room where there are exposed metal water pipes. For example, sometimes the pipes are exposed in the cabinet below a sink. Touch the metal water pipe with your free hand and take a body voltage measurement. The skin voltage should be very low, probably 0.2 volt or less. Then let go of the pipe and take another measurement. The voltage will usually go up somewhat. (This works well, assuming that the pipes are properly grounded.)

In general, the measurements should go up as you get closer to power cords and to the electrical wires hidden in walls, floors and ceilings. If this is not so, check that the screwdriver is driven into the soil making a good connection with the earth, and that the alligator clip is still well secured to the metal shank of the screwdriver. Add some water to the soil at the screwdriver to improve conductivity. Check that the banana plug ends of the two sensor wires are inserted tightly into the proper two holes on your *multimete*r. Check that your multimeter is set properly to one of the “AC volts” settings, and that the battery is still good.

B6. What If There is No Accessible Soil, as in a Tall or Large Building?

For accurate measurements, a clean reference point for "zero" Volts is needed. Since the earth is by definition "zero" volts, the preferred method is always to use a ground rod driven directly into the soil.

This Body Voltage Meter set-up will work well for most homes and offices where there is some accessible soil within about 100 feet of the room being tested. Even on the second floor, the ground probe sensor wire can usually be fed down the stairs or out through a window and connected into the ground below. If you need more length, you can also splice more wire onto the grounding probe wire. This is okay to do.

However, if the above steps are impossible or impractical – for example inside a large office building or tall apartment building – another reference for "zero" Volts may be used. One alternate grounding source might be the grounded third prong of a standard three-prong electrical outlet (assuming that the outlet is, in fact, properly grounded). If you know how to safely connect to the grounded third prong of the electrical outlet you can use this as your reference for "zero" Volts. But please, if you do not know how to do this safely, do not attempt this on your own. Please call an electrician or contact us for a phone consultation.

A second alternative for a zero Volt reference – but again not necessarily as reliable and clean as the earth itself – is any metal water pipe or other grounded metal structure inside the building. In this case, you would simply attach the alligator clip of the ground probe sensor directly to the water pipe or grounded metal. But remember, neither of these methods is as good as connecting directly to the earth, so always try to find some soil first.

Part C. Other Helpful Information about Electric Fields

C1. Why Use the Body Voltage Method?

The simplest and most accurate way to test the *ELF electric fields* is to directly measure the AC voltage induced onto your skin. This method is called *body voltage testing* or *skin voltage testing*. This method works because the human body is electrically conductive.

Because our bodies are electrically conductive, they are always attracting and absorbing electromagnetic fields (EMFs), similar to any man-made antenna, like the one for your car radio which attracts radio frequency (RF) fields.

Because your skin is so conductive, the nearby electric fields can easily "collapse" or "couple" onto your skin, generating a measurable AC electrical voltage on the surface of your body. This is exactly what your new Body Voltage Meter is actually measuring – the electrical AC voltage that is induced onto your skin by the ELF electric fields around you.

C2. Why Measure the Electric Fields?

Researchers have linked electromagnetic fields (EMFs) to a variety of health effects – including leukemia, lymphoma, brain and nervous system tumors and other cancers, as well as to suppression of the immune system and many other important effects.

At the common 60 hertz frequency of our electricity (this is also called ELF or extremely-low-frequency), EMFs have two separate and distinct components, and each is measured with a different type of instrument. While most of the scientific research has been focused on the *magnetic fields* component, the *electric fields* component has also demonstrated important health effects.

Electric fields induce measurable electrical voltages onto the skin, which some people seem very sensitive to. A wealth of anecdotal evidence suggests that people who are knowingly "sensitive" to electrical sources – reporting symptoms such as headache, fatigue, sleep problems, mental confusion, dizziness, burning or itchy skin, tinnitus and other health problems – may be affected by the *electric fields*.

C3. What Levels Are Considered Safe?

It is difficult to define any specific level of the *ELF electric fields* as completely safe or unsafe, and there is still great controversy about the potential health effects from exposure to electromagnetic fields. The information below is based on anecdotal experience from my own work and that of other EMF professionals. You will have to decide for yourself what levels to consider safe or unsafe.

In nature – for example outside under trees, at the beach, or anywhere far away from electrical sources – the body voltage measurement is usually zero (0.0 AC Volts). For millions of years before the invention of electricity, the body voltage measurement was almost always zero Volts AC.

Today, the typical home has body voltage levels varying from 0.1 to 5.0 Volts or more, depending on the exact location and the position of the person being tested. The average level in homes across the USA is probably between 0.5 and 2.0 Volts.

Anecdotally, a level of 1.0 Volt or higher is definitely enough to trigger "symptoms" in many sensitive people, and most will report symptoms at even lower levels. In my work, I find that for people who are sensitive to electric fields, I usually need to reduce the levels to 0.1 Volt or less to significantly reduce their complaints.

The highest Body Voltage level I have tested in a home was 34.5 Volts. My client was young and healthy, but experienced severe difficulties shortly after moving into her new home. She couldn't concentrate, and said she would literally lapse into an "unconscious stupor" for hours at a time, and then wake up even more fatigued. She was scared that she would not be able to work any longer. But she fully recovered in just a few days, after the wiring problems that were causing the unusually high electric fields (reversed polarity and lack of electrical grounding).

In another example, an older gentleman had experienced his third frightening trip to the emergency room in which a heart defibrillator was used to correct a severe heart

arrhythmia. He called me when he realized that all three arrhythmia attacks occurred while he was sitting at his computer. I measured over 11.0 Volts on his skin due to his computer – almost enough to run low-voltage lights! We reduced his electric fields down to 0.1 Volt by grounding his computer and adding shielding.

In my professional work, I generally try to reduce people's long-term exposures down to 0.5 volt or less. In the bedrooms, *I usually try to reduce the bed locations to 0.1 volt or less, since sleep is such a critical time for the body's rest and rejuvenation.*

For individuals who are hypersensitive to EMFs or have a severe illness, cancer, chronic fatigue, chemical sensitivity, poor immune function, etc., I generally try to reduce all long-term exposures down to the 0.1 Volt level.

C4. What Are the Common Sources of Electric Fields?

While power lines can be a very strong source of *ELF electric fields* outside, especially near the metal towers and wooden poles, they are usually not a significant source of exposure inside most homes.

For most people, the biggest exposure to *electric* fields will be from the unseen electrical wiring found in nearby walls, floors and ceilings. The second largest source is usually from nearby power cords for lamps, clocks, computers, appliances, etc.

Certain electrical wiring conditions can also cause high exposures. For example, if you plug a computer into a wall outlet that is not properly grounded, that computer will usually emit much stronger electric fields than if it was grounded. Electrical devices that can emit high levels of electric fields include computers, televisions, fluorescent lights, and electric blankets.

C5. How to Determine Exactly What the Sources Are...

Electric fields are emitted from a variety of sources, many of which may be unknown, unseen or unexpected. Therefore it is good to test with a meter, such as the Body Voltage Meter. The following procedures can help you track down and determine the exact sources of the electric fields you are measuring.

In general, the strength of the field will increase as you approach the source, and decrease as you move away from it. But be aware that if there are several different sources, the complex field patterns can mix in surprising and unpredictable ways, making it more difficult to determine the exact sources clearly.

Step 1. Turn "OFF" the main electrical breaker switch for the whole building, so that everything inside the home is "OFF." Measure and record the body voltage in several locations, especially the bedrooms. This gives you a very good idea of the electric field levels due to all *external* sources such as power lines, neighboring homes, etc.

Step 2. Turn the main power switch back "ON" again. Turn "ON" all the lights and appliances that you would normally have on. Measure and record the body voltage in the exact same locations as you did before in Step 1. This gives you a good idea of the total electric fields from the combination of *external* sources (such as power lines) plus the *internal* sources inside the building such as electrical wiring, lights, power cords and appliances.

Step 3. Next, for each location, subtract the measurement in *Step 1* from the measurement in *Step 2*. This new number will give you a good estimate of the electric fields emitted from only the *internal* sources – e.g., electrical wiring, lights, cords and appliances. (Generally, you will have little or no control over the *external* sources, but you may have a lot of control over the *internal* sources, especially if they are lamp cords and similar items that can be unplugged or turned off when not in use.)

Step 4. To test if a particular item – such as a lamp or clock next to the bed – is a significant source of electric fields, take a body voltage measurement on yourself near the item. Then without moving or changing your position, unplug the item completely and retest the body voltage to see if there is a significant change.

Step 5. Perhaps most helpful, is to determine which particular electrical breaker circuits are causing the electric fields for a particular location. Pick a place to test, such as lying on your bed. Turn "OFF" all the individual circuit breakers, *but leave the main power switch "ON"*. Then turn "ON" one breaker at a time – keeping all the other circuit breakers "OFF" – and take a body voltage measurement for each individual circuit breaker. Record your measurements. You will quickly see which particular circuits are causing the strongest electric fields for that particular location.

C6. What You Can Do About the Electric Fields…

Sometimes you can simply move a bed, couch or chair to a new location and reduce the exposure level. Often, you can unplug electrical power cords for lights and appliances, especially those near the beds. And at night, you can turn off the particular circuit breakers that are causing any high electric fields in the bedrooms.

Your existing unshielded wiring can be shielded with special shielding paints or other materials. Shielded cords can be installed onto lamps and appliances, especially those near beds. For new or remodel construction work, low-EMF "shielded wiring" can be installed using shielded wiring materials and special methods.

Thank you. I hope this information has been helpful.

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