

# True-RMS-Digital Multimeter VC 840

**For precise measurements of the body voltage according to the Standard SBM for Building Biology**  
**Ready to use with a PC / Laptop**



Suitable for measuring the capacitive coupling of the human body to the 120V power line (“body voltage”) according to the Standards of Building Biology “SBM”, that means with an impedance of 10 MOhm parallel to 100 pF.

For the description of the many functions of the Multimeter VC 840 itself, as well as the use of the standard-accessories that go with the multimeter, please refer to the English operating manual supplied by the manufacturer (Voltcraft).

## Measurement instruction the capacitively coupled “body voltage”

### Preparation for measurement

Connect the black grounding wire to the jack of the VC840 labelled “COM”. Connect the red silicone wire to the jack “HzVΩ”. (see picture above)



Connecting to the Ground potential (Ground rod): For best results you should connect the black grounding wire to an independent grounding rod close by, e.g. in the garden. If this is not possible the best solution is to connect to heater pipes or water pipes with the included big grounding clip (see picture). If an electrician is available it is possible to connect it under his control to the grounding wire of the power line. **Caution! Never try to connect it to the line by yourself, serious injuries may occur.**

### Configuration of the measurement unit VC840

Put the main turning switch to the position “V”, then press the yellow button.

Push the blue button once (to the left of the display must appear the marking “TRMS” and “AC”. The measurement unit is placed in auto range mode.

When body voltage is below 1 volt switch to the more sensitive measurement range “Millivolt”. To do this push the button “RANGE” (top left button of the VC840) 5 times. If done correctly, you should see “mV” on the right side of the display. To go back to the less sensitive “Auto range” measurement range press the blue button 2 times.

**Procedure for actual measurements**

The person to be measured sits or lays in the position where the body voltage is to be measured (the measurement is “position-sensitive” and will vary from place to place and position to position). Hold the hand probe tightly in one hand. All power lines that could cause capacitive coupling should be connected to the wall sockets. Other people can influence the measurement and should never stand close to the person to be measured. The person to be measured should not have direct contact to the black grounding wire and should not touch the VC840 because of the resulting capacitive coupling to the ground.

Building biological suggestions following SBM:

<b>Abnormality:</b>	<b>none</b>	<b>small</b>	<b>large</b>	<b>extreme</b>
<b>Body voltage (in mV):</b>	<b>&lt; 10</b>	<b>10-100</b>	<b>100-1000</b>	<b>&gt; 1000</b>

**Important: The measurement of the body voltage does not replace a measurement of the field strength of low frequency (LF) alternating fields.** Because of superposition of fields dependant on the place of measurement, all sources should be minimized even if they compensate each other resulting in a lower reading of the body voltage.

**Remarks:**

If the measurement unit is in the mode “Auto range” (“Auto” is displayed ) the measurement value drops very slowly for small signals (below 0.02 V). In this case it is better to use the millivolt range (see above for instructions).

The exact quality of the reference ground you use can only be determined by a licensed electrician. You get a rough impression by the following procedure:

Place the hand electrode close to a power line cable or AC-Adaptor so that minimum of 0.500 Volt is displayed. Now put the black ground wire to different grounding systems. If it is possible use a metal grounding rod in the garden. Pour some gallons of water on the grounding rod to ensure a good connectivity to the earth. Wait for about 5 Minutes so that the water can soak the earth. If the reading does not change significantly the reference ground is good for measurement. If there are big deviations in body voltage dependent of the used grounding system, you have to check the grounding system by a licensed electrician. For preliminary measurements you should use the grounding that causes the highest readings.

Sometimes interferences with radio frequency signals might occur because of inductive loops of the long black grounding wire. To check this out, you use a grounding rod in the garden as mentioned above. Place your feet to the left and right side of the ground rod. Take the hand electrode in one hand and the VC840 in the other hand. The long grounding wire is placed in a big circle around you. You use the millivolt measurement range as mentioned above. The displayed value has to be below 5 millivolt if there if no interference problem present.

If the measured value is above 5 millivolts you have two measurement options. You can reduce the length of the black grounding wire until the measured value of this experiment goes down below 5 millivolts. The black grounding cable is screwed at the 4mm plug side.

The other possibility is to subtract the measured value from each body voltage measurement. This approach is not as precise as the first one, but much easier to handle.