

## Using a Multimeter

In prior lessons I have used a tool called a Multimeter. This is an electrical measurement tool and while it is capable of many different things I use it for two basic functions.



Continuity – is there “continuity” from point A to point B in my circuit

Current – Do I have current and if so how much

With this basic information I can find out which wires are which on my motorcycle, if I have completed my task properly and many times the quality of my work.

Some Symbols

~ Symbol for Alternating current – this is what is in your house

= Symbol for Direct Current – actually the top line is several dots – this is what we want to use for the bike

▶◀ This is the symbol used for Continuity.

Read your manual and make sure how the red and black lead are supposed to be connected to your meter. In my case the black lead plugs into “Com” and the red plugs into V  $\Omega$  Hz.



You can see the two different ends of the leads. It should come with an alligator clip that slides off and exposes a probe.

#### Checking continuity

1. Turn the selector knob to  $\blacktriangleright$ |-  $\blacktriangleleft$
2. Connect the alligator clip to the bare end of a wire and use the probe to touch the battery terminals.
3. If there is a completed circuit the meter should make a sound (mine has a low shriek)

You can use this to test unknown wires to see if they are ground or power. You do not have to use the battery (many times the leads will not reach or it is inconvenient). In this case you can find a bare bolt on the frame of the bike and use that as a ground. Then check continuity between the unknown wire/terminal and the bolt (first test the bolt with the battery negative and ensure it is a good ground).

You can use this to test a switch.

1. Turn the selector knob to

2. Connect one alligator clips to the terminal and the other to known ground or power
3. Activate the switch that should control the item and see if you get a continuity sound.

You can also use to check your connections and terminations to ensure they are good. By attaching the clip or touching the probe to a bare part of the circuit on one side of the new connection and then touch something on the other end.

Checking for power:

1. Set your Multimeter to =
2. There are several scales to use for Direct current and I use 20
3. If the leads are properly connected the meter when you have the red on power and the black on ground it will read positive. If they are switched the meter will read negative. This way you can also determine polarity of your circuit.

You can see my meter connected to the batter on my Vstrom. Notice the black to ground and the red to positive.

To get accustomed to using this tool start by playing around a bit



## Continuity

1. Set the meter to check continuity and
2. Touch the two probes together
3. Get a piece of wire and strip the ends and connect the alligator clips to the ends
4. Attach the black lead to the battery negative terminal and then use the probe to touch bolts on your bike and see which are good grounds (have continuity with the negative terminal).



## Power

1. Set the meter to check for power.
2. Use the probes to touch the battery terminals (red to positive and black to negative)
3. Change the terminals (black to positive and red to negative)

## Determine a circuit

1. Unhook one of your headlight connectors
2. Connect the black lead to a good known ground
3. Use the red probe to determine which of the wires in the plug is the ground (continuity)

Now turn the key on the bike energizing the lights

Use the probes (checking for power) to determine which of the leads are power and which is ground

1. Attach the black one to the lead you determined was ground

2. Set the meter for power and probe each of the other leads in the connector and watch the readout on the meter
3. Now turn on the Hi Beam and check now which is power.

You can find out a lot of basic information with this tool.

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