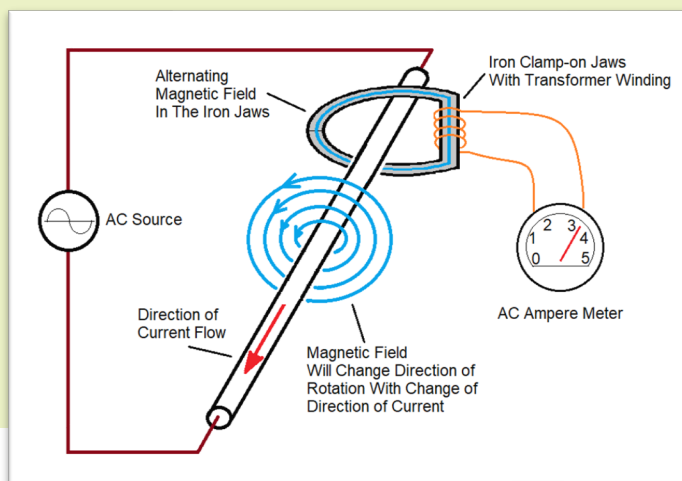


What's it all About?

A clamp-on AC (alternating current) ampere meter is simple and easy to use. Many are low cost and some do not need batteries. Depending on the wiring that you are testing, the jaws of the ampere meter need to open large enough to clamp around the electric cables, metallic pipes, or other conducting items.

The AC clamp-on ampere meter is truly a transformer device. It is powered by the alternating magnetic field found around an AC current carrying conductor. The wire going through the jaws is a one turn input (primary) winding of the transformer. The output (secondary) winding has many turns and it powers the AC ampere meter. It allows current to be measured in the circuit without disconnecting or de-energizing it.



Keys to Remember

- The hinged jaw of the ampere meter is integrated into the electrical meter, which allows technicians to clamp the jaws around a wire, cable or other conductor at any point available in an electrical system.
- If you place the jaws around all the wires in a cord or electric cable, the reading should be zero regardless of how much current is in the wires. The magnetic field of the current going out on one wire is canceled by the magnetic field of the current returning on the other wire. If any amperage is read by the meter, something is very wrong! It could be dangerous. The meter should always read zero. (See Figure 1)
- The service drop triplex cable may show a small amount of current. The grounded wire has a ground rod on each end. A small amount of current may be flowing through the earth from ground rod to ground rod. The earth is a poor conductor so the current may only be a fraction of an amp. (See Figure 2)
- You may find a dangerous electric current where it should not be by using a clamp-on ampere meter. Look for current on metallic water pipes, gas pipe, air-conditioner pipes, TV cable, phone lines, barbed wire fence, ground rods, electrical conduit, aluminum siding, or any other possible conductor. Switch off circuit breakers to find the cause. If all breakers are off and the current is still there, the current is coming from a neighbor or the electric utility. Call the electric utility. (See Figure 3)

For the Project

- Clamp-on ampere meter
- Electric conductors to test, include drawings, pictures, or diagrams
- Include test data and notes for each conductor tested
- Record sheet
- 4-H Exhibit Skills and Knowledge Sheet

How to Use an Ampere Meter

1. Choose an electrical conductor to test. The voltage on the conductor to be tested should be lower than 480V. To get a reading, the electrical wire should be connected to an electrical appliance that is running or operating.
2. Choose the appropriate function and range. If you are measuring current that is higher than specified in the range, you can damage your device. If you are not sure about the range, choose a high range and decrease it as needed. Consult instruction manual before use.
3. Clamp the conductor. If the conductor is not yet connected to a power source, connect it. The meter should give you a reading.

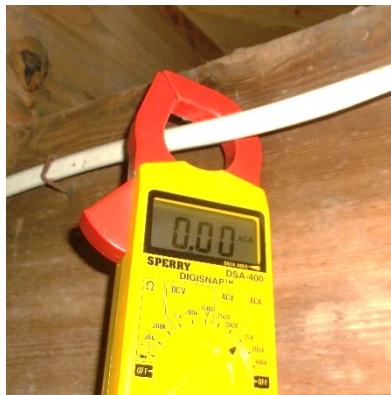


Figure 1



Figure 2



Figure 3

Troubleshooting

When troubleshooting a device that is connected to the power source with an electrical cord, getting a current measurement can be difficult. You will need a means of separating the conductors, and can do this by using a tool called a Line Splitter (See Figure 4). It is placed between the wall receptacle and the electric cord. The openings allow the ampere meter to take current measurements while the device is operating (See Figure 5). If the device being measured has a very low current draw there is a second opening in the line splitter with a multiplier of 10. To create the multiplier of 10 there are simply 10 loops of the conductor around the opening. After taking your measurements, you must divide by 10 for the actual current of the device. This improves the accuracy when measuring very small electrical loads. If a line splitter is not available, simply wrap conductor wire around the jaws (Figure 6). On this same tool, there are ports where voltage measurement can be made simultaneously if needed.



Figure 4



Figure 6



Figure 5

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