Continue

If figuring out how to read ohms on a multimeter has been on your mind, you’ve landed in the perfect spot! Quick Summary: Here’s a quick rundown on how to get those ohm readings right with your multimeter, broken down into three easy steps: Step 1: Identifying the Scale – Spot the right symbols and numbers on your multimeter. Step 2: Understanding the Resistance Value – Learn what the numbers on your multimeter mean. Step 3: Checking the Range – Confirm you’re in the correct range for an accurate reading. This article will demystify multimeters and their knack for measuring resistance. We’ll start from the basics and gradually upgrade to advanced troubleshooting techniques. Get ready to tackle those ohm readings like a pro! Let’s clear up some confusion about ohms and multimeters. First, ohms are measurement units that help us understand the resistance in a circuit. This tells you how much a device will slow down the flow of electricity. And the tool for measuring this? That’d be our trusted multimeter. A multimeter isn’t just about measuring resistance; it’s way more versatile than that. It combines three different tools: the ohm meter, voltmeter, and amp meter. So, you only need your handy multimeter instead of juggling three different gadgets. Now that we better understand ohms and multimeters let’s explore different techniques to read ohms on a multimeter. Stay tuned. We’re just getting started. RELATED Multimeter Continuity Symbol (Guide) This step is critical in understanding how to read ohms. Mainly, what you’re looking for here is the resistance value. Video | GalcoTV First up, check out the display for the omega symbol (Ω), which stands for ohms. If there’s a ‘K’ or ‘M’ in front of it, you’re in the kilo-ohm (KΩ) or mega-ohm (MΩ) range. For instance, 3.4 on the display with just an omega symbol is 3.4 ohms. But if it says ‘3.4K’ before the omega, you’re looking at 3.4 kilo-ohms or 3400 ohms. Video | GalcoTV The numbers on the display show how much a material or device resists electric current. The higher the number, the more resistance it has, meaning it needs more oomph to integrate into a circuit. Video | GalcoTV If you spot dashed lines or ‘1’ or ‘OL’ (which stands for over-the-loop) on the display, your range setting is too low. For meters without an auto-range feature, you’ll need to adjust the range manually until you get a proper reading. There you go. There are three simple steps to get those ohm readings right! RELATED How to Wire a Potentiometer (5 Easy Steps) This will walk you through how to test ohms with a multimeter. Ensuring we take each step cautiously can help us get an accurate measurement and stay safe. Let’s dive into the steps! Before I even touch my multimeter, safety is my number one priority. I always wear safety glasses and thoroughly read through the manual. You’ve got to respect electricity and the tools you use with it. Video | GalcoTV This is crucial. I always turn off the circuit I’m working on. It’s not just about preventing interference with the test; it’s about keeping safe. Video | GalcoTV I set my multimeter to the ohm symbol (Ω). If I’m unsure about the resistance I’ll encounter, I use an auto-ranging multimeter, which figures out the range. Handy, right? Video | GalcoTV Accuracy is key. I always quickly check to ensure my multimeter is reading correctly. Often, the issue is not with the tool but how we use it. Video | GalcoTV Time to connect the probes. I stick to the color code – black to COM and red to the Voltage-Ohm jack. Keeping the polarity right is super important. Video | GalcoTV Here’s where the magic happens. I compare the reading on the multimeter to what I expect from the circuit. If I see a ‘K’ or ‘M’ next to the omega symbol, I know I’m dealing with kilo-ohms or mega-ohms. And remember, higher numbers mean more resistance. If the display shows ‘OL’ or dashed lines, that’s my cue to adjust the range, especially if I use a manual multimeter. RELATED Multimeter Capacitance Symbol and How to Read It (Guide) Hey there, DIY enthusiasts! Let’s dive into some nifty tips to ensure your journey with a multimeter is smooth sailing. Even the handiest among us can hit a snag or two, so here’s how to troubleshoot common issues: Common IssuePossible CauseAdvanced Troubleshooting TipInaccurate ReadingsLoose connections or wrong measurement scaleAlways, and I mean always, ensure those connections are snug as a bug. A loose wire can throw off your whole game.Double-check that your multimeter is dialed into the right scale. I learned this when a simple oversight led to some head-scratching results.If you’re not sure, the manual is your best friend.‘OL’ or OverloadResistance too high for the rangeHere’s the thing about ‘OL’ – it’s telling you the resistance is too high for the setting.I switch to a higher resistance range, and if the multimeter has auto-ranging (a real lifesaver), I let it do its magic.Zero ReadingPossible short circuitOnce, while working on a vintage amplifier, a zero reading led me to discover a hidden short.Using the continuity setting, I traced the issue to a small, overlooked connection. It’s like being a detective but with circuits!Fluctuating ReadingsDirty or corroded componentA bit of cleaning goes a long way. I always use a gentle electrical contact cleaner and a soft brush. And remember to let it dry completely before you test it again. You’d be surprised how often this solves the problem.No ReadingDead battery or faulty test leadsFirst things first – check the battery. It’s a simple step that’s easy to overlook.Then, give those test leads a once-over. I’ve had my share of worn-out leads, and replacing them often does the trick.Also, ensure they’re plugged in – it’s a common mishap.Consistently High ReadingsCalibration issueThis can scream a calibration issue. I’ve had to recalibrate my multimeter a few times, especially after heavy use.For the tech-savvy, the manual might guide you through it, but professional calibration is usually the best route.Intermittent ReadingsLoose internal connections can be the culprit, like when mine took a tumble off the workbench. This usually calls for a professional touch.Unstable Readings in Certain ModesMode switch issuesA bit of contact cleaner can work wonders, but sometimes, it’s a sign to get some professional help. Remember, it’s important to understand electronic components and safety well when dealing with advanced issues. If you’re ever in doubt, it’s best to seek professional help rather than risk damage to the multimeter or the circuit you’re testing. RELATED How To Test a Capacitor with a Multimeter (3 Simple Methods) Can I Measure The Resistance Of A Live Circuit? Hold up there, safety first! Always make sure the circuit is powered off before measuring resistance. Measuring a live circuit can damage your multimeter and, more importantly, it’s a safety hazard. How Often Should I Calibrate My Multimeter? Aim to calibrate your multimeter once a year, especially if you’re using it regularly. Keeping it calibrated means keeping it accurate, and that’s what counts. Can A Multimeter Be Used To Measure Both AC And DC Resistance? Resistance isn’t about AC or DC – it’s a constant value. So, whether it’s an AC or DC circuit, your multimeter’s ohm setting is ready to measure resistance. Is It Possible To Damage A Multimeter By Using The Wrong Settings? So, it’s crucial to understand what you’re measuring and set your multimeter accordingly. Using the wrong setting, especially on a high-energy circuit, can harm your multimeter and be a safety risk. What’s The Difference Between Auto-Range and Manual-Range Multimeters? Auto-range multimeters automatically adjust to the resistance range of whatever you’re testing. It’s like having a smart assistant doing the guesswork for you. Manual-range multimeters, on the other hand, require you to select the range yourself. They’re great for learning the ropes but need a bit more know-how. Can Environmental Factors Affect My Multimeter Readings? You bet they can! Temperature, humidity, and even electromagnetic fields can influence your readings. Use your multimeter in a stable environment, away from extreme conditions, for the most accurate results. It’s all about creating the right setting for your electronic endeavors. How Can I Check If My Multimeter Is Working Properly Before Measuring Ohms? Before diving into any measurements, check quickly to ensure your multimeter is in good working order. Set it to the resistance setting and touch the two probes together. If it reads close to zero, your meter is ready to go. If not, it might be time for new batteries or a checkup. RELATED Multimeter Continuity Symbol (Guide) Organizations: Books: “How To Use A Digital Multimeter” by Matt Alvin Getting the Most from Your Multimeter Website Resources: Video References: GalcoTV About Sam OrlovskyCertifications: B.E.E. Education: University Of Denver - Electric Engineering Lives In: Denver Colorado Electrical engineering is my passion, and I’ve been in the industry for over 20 years. This gives me a unique ability to give you expert home improvement and DIY recommendations. I’m not only an electrician, but I also like machinery and anything to do with carpentry. One of my career paths started as a general handyman, so I also have a lot of experience with home improvement I love to share. | Reach Me Hey there! You’ve come to the right place if you’re curious about measuring DC voltage with a multimeter. I’m here to walk you through this essential skill step by step. Here’s how: Step 1: Set your multimeter to the appropriate voltage range; start higher and adjust if unsure. Step 2: Attach the red probe to the positive point and the black probe to the negative. Step 3: Check the display for the voltage reading; it should be close to the expected value of the power source. Step 4: Adjust the multimeter’s range when switching to batteries with different voltages for accurate readings. In this guide, I’ll explain everything you need to know about measuring DC voltage. I’ll also share some handy troubleshooting tips. So, grab your multimeter, and let’s dive into the world of DC voltage measurement together! Let’s break down what DC Voltage means in a way that’s easy to get. DC, or Direct Current Voltage, is about steady and consistent power flow. Think of it as the energy you get from batteries or solar panels. In the grand scheme of things, you’ve got two main types of electrical energy – AC and DC. AC is the alternating current you get from your wall sockets, where the flow of electricity changes direction periodically. But DC? That’s your constant, one-direction flow, like what you’d get from a car battery or those rooftop solar panels. And let me tell you, understanding the difference between these two is super important, especially when you’re tinkering with electrical projects. It helps you choose the right tools and use them as safely and effectively as possible. So next time you’re powering up a project, remember the steady, reliable nature of DC voltage – it might be the perfect fit for your needs. RELATED What is Live Wire? (Ultimate Guide) If you’ve ever needed to measure the voltage of a battery or any DC (Direct Current) source, then knowing how to use a digital multimeter accurately is a must. Step 1: Preparing the Multimeter Make sure the multimeter is set for voltage measurement. For instance, if you’re measuring a 9-volt battery, set the dial to a range that covers it – like 20 volts. Video | 1929fordhotrod Start higher and adjust as needed if you’re uncertain about the voltage. Step 2: Connecting the Probes Connect the multimeter probes to your power source. Remember, red is for positive, and black is for negative. Video | 1929fordhotrod If the reading comes down negatively, switch them around. Step 3: Reading the Voltage Observe the voltage reading. For a 9-volt battery, for instance, it should show something close to 9 volts. Video | 1929fordhotrod The battery is slightly depleted if it’s a bit off, like 8.6 volts. Step 4: Adjusting the Range for Different Batteries If you switch to a different type of battery, like a double-A, you might need to adjust the range. Video | 1929fordhotrod I changed it to 2 volts for a 1.5-volt double-A battery. And there you have it. Measuring DC voltage might seem daunting at first, but it’s a breeze with these steps. Remember, safety first, and always double-check your settings. Happy measuring! RELATED How to Use a Multimeter (Basic Guide for Beginners) Let’s dive into some troubleshooting tips when measuring DC voltage with a multimeter – think of it a handy guide to avoid those little slip-ups that can happen to anyone. ProblemTroubleshooting TipsIncorrect Dial SettingsAlways double-check that the multimeter is set to DC voltage (‘V’ with a straight line). It’s easy to mistakenly set it to resistance or AC voltage, leading to nonsensical readings.Improper Probe ConnectionsEnsure probes are fully inserted: black to COM and red to V Ω. Loose connections can cause erratic readings.Misinterpretation of ReadingsDon’t be alarmed by a negative reading; it’s likely due to reversed probes. Switch them around for an accurate reading. Positives should be on the higher potential point, and negatives should be on the lower.Starting Voltage SettingBegin with a higher voltage setting and then adjust downward if necessary, especially if the voltage range is unknown. This approach prevents blowing a fuse, a lesson I learned the hard way.Condition of ProbesRegularly inspect the probes for damage or wear. Faulty probes not only give inaccurate readings but are also a safety risk. Replacing them when needed is essential for reliable and safe voltage measurements.Understanding the ReadingsRemember, the goal is to understand the meaning behind the reading in the context of your project. If something seems off, don’t hesitate to recheck your setup or start the measurement process again. Patience and attention to detail are key in these situations. Remember, measuring voltage isn’t just about getting a reading; it’s about understanding what that reading means in the context of your project. RELATED Can You Hammer in a Screw? (A Handyman Answers) Let’s chat about keeping your multimeter in great condition. Maintaining this tool is crucial, not just for its longevity but also for your safety and the accuracy of your readings. I’ve picked up a few tricks I’d love to share over the years. First things first, keep your multimeter clean. Dust, dirt, and grime can mess with the accuracy. I usually use a soft, dry cloth to wipe the exterior. Suppose you’re dealing with stubborn dirt; a bit of isopropyl alcohol on a cloth does wonders. Just avoid harsh chemicals that can damage the screen or casing. Multimeters run on batteries, and we know what old batteries can do. They leak and corrode, which is bad news for any device. I check mine periodically and replace them if they run low or every year or so, even if they’re not dead. This proactive step saves a lot of grief later. Your probes are as important as the multimeter itself. I inspect mine regularly for any damage or wear. Frayed wires or damaged tips can lead to inaccurate readings or safety hazards. If you spot any damage, don’t hesitate to replace them. How you store your multimeter matters a lot. I keep mine in a case when not in use. This protects it from dust, moisture, and accidental drops. Even a dedicated drawer or shelf is better than leaving it open. Pushing your multimeter beyond its limits is asking for trouble. I always make sure not to exceed its voltage or current ratings. This not only prevents damage but also keeps you safe. For the pros out there, calibration is key. Even if you’re just a hobbyist, it’s good to know that your readings are accurate. Professional calibration is recommended every year or two, depending on how often you use it. Lastly, handle your multimeter with care. Rough handling can mess up its internal components. I’ve learned this the hard way – dropping a multimeter can knock something loose inside, leading to frustrating inaccuracies. Remember these; your multimeter will be a trusty companion for years. RELATED How to Use a Cen Tech Multimeter? (7 Function Guide) What’s the Best Way to Measure Voltage in Sensitive Electronics? Use a digital multimeter with high input impedance, start with the highest voltage range, and reduce gradually. Ensure the device is off, if possible, to prevent damage. Can Multimeters Be Used to Diagnose All Types of Electrical Problems? While versatile, multimeters can’t diagnose complex circuit board faults, high-frequency signal issues, or digital circuit problems. Specialized tools may be needed for these tasks. How Do Environmental Factors Affect Multimeter Readings? High temperatures, humidity, and electromagnetic interference can affect readings. Use the multimeter in a controlled environment and protect it from extreme conditions. What’s the Lifespan of a Multimeter and How Does Usage Affect It? The lifespan varies based on quality, usage, and maintenance. A well-maintained multimeter can last over a decade, but harsh conditions and heavy use can shorten its life. Are There Special Considerations When Using a Multimeter on a Car Battery? Set the multimeter to the correct DC voltage range, connect probes correctly to the battery terminals, and be cautious of sparks due to explosive gases emitted by batteries. RELATED What is Live Wire? (Ultimate Guide) Organizations: Books: Website Resources: Video References: 1929fordhotrod About Sam OrlovskyCertifications: B.E.E. Education: University Of Denver - Electric Engineering Lives In: Denver Colorado Electrical engineering is my passion, and I’ve been in the industry for over 20 years. This gives me a unique ability to give you expert home improvement and DIY recommendations. I’m not only an electrician, but I also like machinery and anything to do with carpentry. One of my career paths started as a general handyman, so I also have a lot of experience with home improvement I love to share. | Reach Me Download Article A guide to testing voltage, amperage, resistance, and continuity Download Article A digital multimeter is a super handy tool for quickly measuring voltage, resistance, continuity, and current in many types of electrical circuits. It’s really easy to use a digital multimeter once you understand the various symbols on the dial. This wikiHow article teaches you how to use a digital multimeter with tips from master electrician Jesse Kuhlman. Plug the black lead into the COM terminal. Plug the red lead in to measure V (volts), A /mA (amps), or Ω/Ohms (resistance). Set the voltage to auto-range or slightly higher than what's expected. Touch the red lead to the positive end of the circuit or electrical component. Touch the black lead to the negative end of the circuit or electrical component. Read the reading on the screen. 1 Plug the test leads into the COM and V terminals. Always plug the black test lead into the terminal that’s labeled “COM” for “Common.” Always plug the red test lead into the terminal labeled “V” for “Voltage,” since this is what you’re testing.[1] Voltage is the speed or force at which electrons move through a circuit. Kuhlman likes to think of voltage like water pressure flowing through a water hose: The higher the force or "pressure" in an electrical circuit, the higher the voltage.[2] Both AC and DC voltage are measured using the test leads in this setting. 2 Move the dial to the voltage setting for AC or DC voltage. Turn the dial to V~ (or the V with a wave sign next to it) if you’re measuring AC voltage. Switch the dial to V (or the V with a horizontal line next to it) to measure DC voltage.[3] AC/Alternating Current: According to Kuhlman, AC voltage is used in almost all standard wiring you find in the home. This includes electrical outlets, lights, and light switches.[4] DC/Direct Current: DC voltage is most often used to measure circuits that are powered by batteries. DC voltage is, therefore, used in cars and most electronic circuits. Kuhlman says you may find some DC wiring in the home, typically to power low-voltage lights like under-the-counter lights or yard signs.[5] They will usually be connected to a transformer that converts AC to DC.[6] Advertisement 3 Set the voltage to auto-range or higher than what’s expected. Most digital multimeters have an auto-range function that automatically detects the voltage range. However, if your multimeter does not have this function, set the voltage to the nearest range that's higher than you expect. Look at the numbers on the dial and choose the setting that’s closest to the expected voltage of what you’re measuring while still being above that voltage.[7] If you set the voltage range too low, you won’t get an accurate reading. For example, if you’re measuring a 12V battery and there are settings for 2V and 20V on your multimeter, set the dial to 20V. If you don’t know the voltage of what you’re reading, just set the multimeter to its highest voltage rating. The standard voltage for most electrical outlets, lights, and light switches is 120V. Heavier appliances, such as your oven or clothes dryer, may plug into a 240V outlet.[8] 4 Touch the probes to both sides of a load or power source. Put the tip of the black probe on the negative lead of a battery or into the right side of a wall socket, for example. Put the red probe on the positive end of a battery or into the left side of a wall socket, for instance.[9] If you’re not sure which end is positive and which is negative, try putting a probe on each end and seeing what the multimeter says. If it’s showing a negative number, your positive and negative are switched. To avoid getting shocked, keep your fingers away from the tips of the probes when you’re putting them near a wall socket. Keep the probes from coming into contact with one another, or you can generate a short circuit that could possibly cause an electrical fire. Always hold the probes by the colored handles. They are insulated, which prevents shock. The way AC electricity is wired in the home is through a "hot" wire that carries the electrical current and a "neutral" wire through which the electrical current returns through. The hot wire is usually black and the neutral wire is usually white. You also have a green wire, which is the ground. To test AC, touch the red probe to the hot wire and touch the black probe to the ground wire or a ground piece of metal.[10] 5 Read the voltage on the multimeter screen. Once your probes are connected to the positive and negative leads, you’ll get a reading on the multimeter telling you the voltage of what you’re testing. Look at the digital screen to find the reading and take note of it if desired.[11] Looking at your reading tells you whether or not the voltage you're measuring is average or not. For example, if you measure the wall socket and the multimeter reads 100V, this is below the average (RMS value or root mean square value) of 120V, letting you know this wall socket voltage is low. If you’re checking the voltage of a new 12V battery, the reading should be right around 12V. If it is lower or there is no reading at all, the battery is low or dead. Advertisement 1 Plug in the test leads into COM and A or mA and turn the dial to Amps. Insert the black plug into the COM terminal. Put the red plug into amps or milliamps, labeled with A or mA, depending on the amperage of the current you intend to measure. Locate the Amps setting and turn the multimeter dial to it.[12] Amperage measures the rate or number of electrons flowing through an electrical circuit.[13] Using Kuhlman's water hose analogy, while voltage is equivalent to the water pressure flowing through a hose, amperage measures the size of the hose. A larger hose allows more water to travel through at once.[14] Your multimeter likely has two terminals for amps: one for currents up to 10 amps (10A) and one that measures up to roughly 300 milliamps (300mA). If you’re unsure of the range of amperage you’re measuring, place your red plug in the amps terminal. You can always switch to milliamps for a more precise reading if necessary. Some multimeters have two As, 1 for alternating current (AC used for residential power and represented by the wave sign) and 1 for direct current (DC used in batteries and wires and represented by a horizontal line with a dotted line under it). Direct current is the one that's most used for this reading. 2 Break a circuit by disconnecting 1 of the wires in it. This allows you to use your multimeter as an ammeter to complete the circuit and measure the current. Unplug or otherwise remove a wire from the terminals it’s connected to on one side of the circuit, leaving the other wire connected to its terminals.[15] It doesn’t matter which side of the circuit you disconnect. The point is to make a space to splice your multimeter into the circuit so it can act as an ammeter and tell you how much current is flowing through the circuit. "Splicing in the multimeter" means that you're connecting the multimeter to the current going directly through the wires. 3 Touch the multimeter leads to the free terminals and read the current. Connect one probe to each of the terminals you just disconnected the wire from to splice it into the circuit. Read the screen to determine how much current is flowing through the circuit.[16] It doesn’t matter which probe you touch to which side of the circuit. Your multimeter will give you a reading either way. You can troubleshoot electrical circuits by splicing your multimeter into different sections of them. If one section gives you a lower current reading, it might mean a bad wire is inhibiting electrical flow. If you initially test amps and get a really low reading, such as 1, switch to testing milliamps for a more precise reading. Advertisement 1 Insert the black test lead in COM and the red test lead in the Ω terminal. Stick the black test lead plug into the COM terminal. The red test lead plug goes into the terminal labeled Ω, which is the symbol for ohms, the unit that resistance is measured in.[17] Resistance measures how much a material obstructs an electrical current that flows through it. Different materials have different levels of electrical resistance. Materials that have low levels of resistance are called conductors because they allow electricity to flow through them more easily. Going back to the water hose analogy, resistance would be like adding a nozzle that restricts water flow through the hose. The Ω sign is likely linked with the V sign, meaning the terminal to measure ohms and voltage is the same. 2 Set the dial to a number on the multimeter resistance scale. Look for the Ω symbol on your multimeter dial area. Twist the dial to a number close to the expected resistance in this section. If you aren’t sure what the expected resistance is, set it to a number at the top of the scale. You can adjust it as you measure until you get a precise reading.[18] For example, if you’re measuring the resistance of a wire, set the dial to just above 0. You can look up the expected resistance for different electrical components online or in an owner manual. The Ω values on your multimeter can range from 200 to 2 million ohms, depending on the specific type of multimeter you have. 3 Place the probes on the resistor or electrical component and read the resistance. Touch the tips of the probes onto each end of the resistor. Look at the multimeter digital screen to see the reading, which tells you the amount of resistance in ohms.[19] If your multimeter is just reading “1,” you might need to increase the value of ohms measured by turning the dial so your reading is more specific. Write down the reading if needed, noting the correct unit. Advertisement 1 Unplug or remove the batteries from the device you want to test. If the device is still being powered, you can’t test for continuity. Make sure it is disconnected from all power sources before you proceed.[20] The continuity option on your multimeter is for testing whether wires are still working or not. If you’re not sure whether a certain cord or wire still has a good connection, you can test this by measuring its continuity. This tests the connection between two points in a circuit. Continuity is the presence of a complete path of electrical flow. For example, a brand-new electrical wire should have full continuity. However, if it is frayed or broken, it doesn’t have continuity because the electricity cannot flow through it. Using the water hose analogy, measuring continuity checks to see if there is a leak in the water hose. This is a good way to see if cables are broken internally. 2 Plug the probe wires into the multimeter and set the dial to continuity. Put the red plug into the terminal labeled as V, Ω, or with the sign for continuity, which looks like a sound wave. Insert the black plug into the COM terminal. Turn the dial to the picture that looks like a sound wave.[21] A sound wave looks like a series of increasingly larger ”)” symbols. Instead of having a range of numbers in its area, the continuity option only shows one sound wave. Twist the dial until it’s pointing directly at the continuity sound wave to be sure it’s on the right setting. 3 Connect the probes to the ends of the component you’re testing. Place the black probe on one end of the component and the red probe on the other. Make sure that the probes are both touching the ends at the same time so the multimeter works properly.[22] The component doesn’t have to be disconnected from a circuit to test for continuity. It doesn’t matter which probe you put on which end of the component. Examples of components you can test the continuity of are wires, switches, fuses, and conductors. You have to be touching two conductive ends to test for continuity. For example, touch the probes to two bare ends of a wire. 4 Listen for a beep to signal that there’s a strong connection. As soon as the two probes are touching the wire ends, you should hear a beep if the wire is working well. If you don’t hear a beep, this means you have a short in the wire.[23] If you have a cut or burnt wire, your wire might have a short. The beep is telling you that there’s almost no resistance between the two points. Advertisement Add New Question Question Can a multimeter measure wattage? Jesse Kuhlman Master Electrician, Kuhlman Electric Jesse Kuhlman is a Master Electrician and the Owner of Kuhlman Electric based in Massachusetts. Jesse specializes in all aspects of home and residential wiring, troubleshooting, generator installation, and WiFi thermostats. Jesse is also the author of four eBooks on home wiring including "Residential Electrical Troubleshooting" which covers basic electrical troubleshooting in residential homes. No, that's actually one of the few things that a multimeter won't help you with. It can only measure amperage or current. Question How do you read the amperage if my multimeter is reading voltage? Jesse Kuhlman Master Electrician, Kuhlman Electric Jesse Kuhlman is a Master Electrician and the Owner of Kuhlman Electric based in Massachusetts. Jesse specializes in all aspects of home and residential wiring, troubleshooting, generator installation, and WiFi thermostats. Jesse is also the author of four eBooks on home wiring including "Residential Electrical Troubleshooting" which covers basic electrical troubleshooting in residential homes. All modern multimeters have an amperage and a voltage setting. They're really easy to read, but you do typically need to switch the setting, usually by turning a dial or pressing a button. Question How do I determine a current is grounded? Jesse Kuhlman Master Electrician, Kuhlman Electric Jesse Kuhlman is a Master Electrician and the Owner of Kuhlman Electric based in Massachusetts. Jesse specializes in all aspects of home and residential wiring, troubleshooting, generator installation, and WiFi thermostats. Jesse is also the author of four eBooks on home wiring including "Residential Electrical Troubleshooting" which covers basic electrical troubleshooting in residential homes. If you get a voltage reading of 120 volts or whatever you're normally reading between the hot and neutral, you know there is a ground there using a multimeter. Ask a Question Advertisement Thanks Thanks Thanks Advertisement Co-authored by: Master Electrician, Kuhlman Electric This article was co-authored by Jesse Kuhlman and by wikiHow staff writer, Travis Boylls. Jesse Kuhlman is a Master Electrician and the Owner of Kuhlman Electric based in Massachusetts. Jesse specializes in all aspects of home and residential wiring, troubleshooting, generator installation, and WiFi thermostats. Jesse is also the author of four eBooks on home wiring including "Residential Electrical Troubleshooting" which covers basic electrical troubleshooting in residential homes. This article has been viewed 564,548 times. Co-authors: 37 Updated: March 4, 2025 Views: 564,548 Categories: Featured Articles | Electrical Maintenance Print Send fan mail to authors Thanks to all authors for creating a page that has been read 564,548 times. "Really I understand that's how to check whether it's good or bad. I'm thankful for wikiHow." Share your story Test Equipment Multimeter What is a multimeter? It’s a versatile tool that lets you measure electrical properties like voltage, current, and resistance. The multimeter shown in this video and article is by FLIR Extech. A typical multimeter has a dial in the center where you select what you want to measure. You’ll see symbols for voltage (V), current (A), and resistance (Ω). The display shows your measurements, and the ports at the bottom are where you plug in the probes. Most multimeters will have two probes: a black one for the COM or common port and a red one for different measurement settings. The color is just convention, but following that convention will help prevent confusion, so I always plug the black probe into the COM port. For the red probe, use the port labeled 'V ohm' for measuring voltage and resistance. If you’re measuring current, you’ll usually use the port labeled 'A' for amps or 'mA' for milliamps. Now, let’s introduce the most common measurements and how to take them. Testing for Continuity This test checks whether electrical current can flow between the two probes and can help spot a bad solder joint or a short circuit. For this test, the circuit power should be off. Turn the dial to the speaker icon. Some multimeters have multiple functions on this setting, so you may also have to press a MODE button until the speaker icon appears on the screen. To check if you are successfully set to continuity-checking mode, touch the probes together: the meter should beep to indicate continuity. Measuring Voltage Next up is voltage. Voltage tells you how much electrical potential exists between two points in a circuit. To measure it, turn the dial to the voltage setting. If you’re working with a DC circuit, like a battery, choose the 'V' with a straight line. For AC voltage, choose the 'V' with a wavy line. Place the black probe on the negative terminal and the red probe on the positive terminal. The reading will show up on the screen. If you see a negative sign, it just means your probes are swapped. Measuring Resistance Next, resistance. This measures how much a component resists the flow of current. Turn the dial to the resistance setting, which is represented by the omega symbol (Ω). Make sure the circuit or component you’re testing is powered off! Touch the probes to either side of the resistor. The screen will display the resistance in ohms. Measuring Current Finally, current. This measures the flow of electricity in a circuit. Current measurements can be tricky, so start with the highest range on your multimeter and work your way down if needed. To measure current, you’ll need to break the circuit and connect the multimeter in series. The red probe goes in the 'A' or 'mA' port, depending on the current range. Be cautious with this step, as improper settings can blow a fuse in your multimeter. Common multimeter questions: What’s the difference between auto-ranging and manual? Auto-ranging multimeters automatically select the correct range for your measurement. Manual ones require you to pick the range yourself. If you’re unsure of the range you are measuring, start high and work your way down. Why isn’t my multimeter working? Check that the battery is fresh and in place, and ensure the probes are securely connected. If you’re measuring voltage or resistance on a manual meter, you may have the incorrect range selected for your measurement. The meter may show OL or the number one if the range is exceeded. If you’re measuring current, you may have blown a fuse—a common issue with beginners. Here’s what the fuse looks like, and they are easy to replace: Can it do anything else? Often, yes, your multimeter will have additional features. Some can measure capacitance– connect the probes and wait for the value to stabilize. You can also measure the forward voltage drop on diodes. Some multimeters also have a temperature probe or other specialized features. I hope you feel confident and ready to test your project using a multimeter! If you want to learn more, there are more videos and articles about multimeters here on DigiKey: If you want to learn more about DIY electronics, check out the rest of my series and subscribe on YouTube to be sure you don’t miss the next video. Add all DigiKey Parts to Cart How can financial brands set themselves apart through visual storytelling? Our experts explain how.Learn MoreThe Motorsport Images Collections captures events from 1895 to today’s most recent coverage.Discover The CollectionCurated, compelling, and worth your time. Explore our latest gallery of Editors’ Picks.Browse Editors' FavoritesHow can financial brands set themselves apart through visual storytelling? Our experts explain how.Learn MoreThe Motorsport Images Collections captures events from 1895 to today’s most recent coverage.Discover The CollectionCurated, compelling, and worth your time. Explore our latest gallery of Editors’ Picks.Browse Editors' FavoritesHow can financial brands set themselves apart through visual storytelling? Our experts explain how.Learn MoreThe Motorsport Images Collections captures events from 1895 to today’s most recent coverage.Discover The CollectionCurated, compelling, and worth your time. Explore our latest gallery of Editors’ Picks.Browse Editors' Favorites How to Read Ohms on a Digital Multimeter: A Step-by-Step Guide Introduction When it comes to troubleshooting electrical circuits, a digital multimeter (DMM) is an essential tool. One of the most common applications of a DMM is to measure electrical resistance, which is typically measured in ohms (Ω). In this article, we will provide a step-by-step guide on how to read ohms on a digital multimeter, highlighting the key features, advantages, and potential pitfalls to avoid. What are Ohms? Ohms, denoted by the symbol (Ω), are a unit of electrical resistance. Resistance is the opposition to the flow of electric current in a conductor, such as a wire. Understanding ohms is crucial in various electrical applications, including electronics, electrical engineering, and maintenance. How to Read Ohms on a Digital Multimeter: A Step-by-Step Guide Step 1: Set the Multimeter to Ohms Mode To read ohms on a DMM, you need to set the device to the correct mode. Most DMMs have a switch or a button to select different measurement modes. Look for the Ohms (Ω) or Resistance (R) mode, which is usually denoted by an icon or abbreviation (e.g., Ω or R). Step 2: Set the Range Once you’ve selected the Ohms mode, you’ll need to set the range. The range refers to the maximum value the DMM can measure. Common ohms ranges include: • 200Ω • 2kΩ • 20kΩ • 200kΩ • 2MΩ Step 3: Measure the Resistance Hold the positive (red) lead of the DMM probe against the positive terminal of the component or circuit you’re measuring, and the negative (black) lead against the negative terminal. Make sure the leads are securely connected to the circuit. Step 4: Read the Measurement The DMM will display the measured resistance value on its screen. The value will be displayed in ohms (Ω). Some DMMs may also display a small symbol (•) to indicate that the measurement is in ohms. Common Measurement Ranges and Conversions Here’s a quick reference table for common measurement ranges and their corresponding conversions: Measurement Range Multiplier Value in Ohms 200Ω 1 200Ω 2kΩ 1000 2,000Ω 20kΩ 10,000 20,000Ω 200kΩ 100,000 200,000Ω 2MΩ 1,000,000 2,000,000Ω Troubleshooting Tips Make sure the DMM is set to the correct range: If the measured value is too high or too low, check that the range is set correctly. Use the correct leads: Ensure the positive (red) lead is connected to the positive terminal and the negative (black) lead to the negative terminal. Check the component or circuit: Verify that the component or circuit is functioning correctly and not damaged or faulty. Use the DMM’s auto-ranging function: Many DMMs have an auto-ranging feature, which automatically adjusts the range for the measured value. Conclusion Reading ohms on a digital multimeter is a straightforward process that requires attention to detail and a basic understanding of electrical concepts. By following the steps outlined in this article, you’ll be able to accurately measure resistance and troubleshoot electrical circuits with confidence. Remember to always check the DMM’s range, use the correct leads, and verify the component or circuit is functioning correctly. Happy measuring! Your friends have asked us these questions - Check out the answers! Electrical resistance, measured in ohms, is a crucial parameter that determines the flow of current in a circuit. Ohm’s Law states that the current ‘I’ flowing through a conductor is directly proportional to the voltage ‘V’ applied across it and inversely proportional to the resistance ‘R’. Electrical resistance, measured in ohms, is a crucial parameter that determines the flow of current in a circuit. Testing ohms with a digital multimeter (DMM) is an essential skill for electricians, hobbyists, and anyone working with electrical systems. This comprehensive guide will provide a step-by-step approach to effectively test ohms using a DMM. Understanding Ohms and Ohm’s Law Before delving into the testing process, it’s essential to understand the concept of ohms and Ohm’s Law. Resistance, represented by the symbol ‘R,’ is the opposition to the flow of electrical current in a conductor. Ohm’s Law states that the current ‘I’ flowing through a conductor is directly proportional to the voltage ‘V’ applied across it and inversely proportional to the resistance ‘R’: I = V/R. Selecting the Right DMM for Ohm Testing DMMs come with varying features and capabilities. For ohm testing, it’s recommended to use a DMM with an autoranging function, which automatically selects the most appropriate resistance range for the measurement. Step-by-Step Guide to Ohm Testing 1. Safety Precautions: Always ensure the circuit is de-energized before testing. Wear appropriate safety gear, including insulated gloves and safety glasses. Never touch live electrical components. 2. Setting Up the DMM: Set the DMM to the ohms measurement function. Select the appropriate resistance range based on the expected resistance value. Connect the DMM leads to the component you want to test. 3. Identifying the Test Points: Locate the two terminals or test points on the component where you want to measure resistance. 4. Connecting the DMM Leads: Connect the positive (red) lead to one test point and the negative (black) lead to the other test point. 5. Reading the Display: The DMM will display the resistance value in ohms. If the display shows “OL” (Overload), the resistance is too high for the selected range. If the display shows “0” (Short Circuit), the component has a very low resistance or is shorted. 6. Interpreting the Measurement: A low resistance value indicates good electrical conductivity. A high resistance value indicates poor electrical conductivity or an open circuit. Troubleshooting Common Ohm Testing Problems 1. No Reading: Check the continuity of the DMM leads and test points. Ensure the component is not damaged. 2. Incorrect Reading: Verify the test point connections and the selected resistance range. Calibrate the DMM according to the manufacturer’s instructions. Additional Considerations for Ohm Testing Temperature Dependence: Resistance can vary with temperature. Component Tolerance: Components may have a specified tolerance for resistance, which affects the expected measurement range. Insulation Testing: DMMs can also perform insulation testing, which measures the resistance between two conductors separated by an insulating material. In a nutshell: Mastering the art of testing ohms with a digital multimeter empowers you to diagnose electrical issues, ensure component integrity, and maintain the safety and reliability of electrical systems. By following the steps outlined in this guide, you can effectively measure resistance and gain valuable insights into the electrical characteristics of your circuits. Frequently Asked Questions Q1. What does “OL” on a DMM display mean? A1. OL indicates an overload condition, which occurs when the measured resistance exceeds the selected range. Q2. How can I improve the accuracy of my ohm testing? A2. Use a high-quality DMM, ensure clean test points, and calibrate the meter regularly. Q3. Is it safe to touch the test points while measuring resistance? A3. No, it is not safe to touch the test points during ohm testing as electrical current may be present. Updated on: December 9, 2018 Intro These procedures will reveal you exactly how to make use of a digital multimeter (DMM), an important device that you can make use of to detect circuits, discover other individuals’s electronic styles, and also to test Ohms. For this reason the ‘multi’-‘meter’ or multiple dimension name. One of the most fundamental things we measure are voltage as well as current. A multimeter is additionally wonderful for some standard peace of mind checks as well as troubleshooting. Is your circuit not functioning? Does the switch work? Put a meter on it! The multimeter is your first support when fixing a system. In this tutorial we will certainly cover measuring voltage, current, resistance as well as continuity. Every fixer should know their means around a multimeter, which has simply north of a zillion utilizes for testing digital components as well as circuits. In this tutorial we’re mostly likely to show you exactly how to make use of a multimeter. This tutorial is primarily resolved for novices that are beginning in electronics and also have no suggestion just how to use a multimeter and also just how it can be beneficial. We’ll check out the most usual attributes on a multimeter as well as exactly how to measure current, voltage, resistance as well as exactly how to check continuity. What is a multimeter and also why do you require one? A multimeter is a measurement tool absolutely essential in electronic devices. It integrates three important features: a voltmeter, ohmeter, and ammeter, and in many cases continuity. The tool allows you to comprehend what is taking place in your circuits. Whenever something in your circuit isn’t working, it will certainly assist you fixing. Below’s some sc