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How to test anti lock brake sensor

ABS stands for Anti-lock Braking System and is a clever tool that assists in stopping your car. Whilst it's a system that's better off not used, ABS proves crucial in emergencies when heavy braking takes place, and can prove particularly helpful when road conditions are tricky, like those you'd experience in the rain or winter. In this article, we will take a look at ABS in more detail and answer a variety of commonly asked questions related to the handy braking system. What does an anti-lock braking system do? Many drivers would have experienced an ABS system kicking in during their time on the road, but a significant amount are unaware of what it actually does. ABS kicks in under heavy braking and gives the driver better control over the car by keeping the rotation of the wheels consistent, allowing the car to slow down or stop in a safe manner. As ABS allows you to maintain control of the car during heavy braking, you're able to steer away from and avoid hazards in the road. Without ABS, your car's tyres would experience what's known as 'locking up'. This is where your brakes will stop your wheel from rotating altogether, causing them to skid across the road's surface. A wheel lock up can be dangerous as it causes the driver to lose control of the car's steering, which can lead to accidents and collisions, and also damage the tyres by causing a flat spot. How does ABS work? An ABS system works by using sensors to calculate each individual wheel's rotation speed. If the sensors detect one or multiple wheels are rotating at different speeds, it will activate the ABS system to level this out by reducing the brake pressure for that particular wheel(s). The sensors are sensitive enough to register small changes in rotating speeds and can make multiple adjustments every second. If your wheels begin to lock again after the ABS has activated, the ABS will step back in to adjust rotating speeds once more. The ABS system is only really there for emergencies, so if it activates multiple times on a journey, you may want to adjust your driving style to better suit the road's conditions. ABS warning lights explained On modern cars, there are a wide variety of warning lights that can be triggered from time to time, one of which is the ABS warning light. Your ABS warning light is fairly easy to spot – it should be a circle, with 'ABS' written in the middle, as seen in the image above. When the ABS system is activated during heavy braking, it may trigger an indicator on your dashboard to let you know it's in operation. It will only be temporary, though, and you may see it flickering as the ABS activates and deactivates itself during braking. Your ABS warning light will also appear when you start your engine as your car's computers check the ABS is working as it should. If this warning light remains, it could mean there's a more serious issue that needs looking at. What should you do if your ABS warning light stays on? If your ABS warning light stays on after your car has started up, you'll need to get it looked at. It could be for a variety of reasons, but the most common issues include: Damaged or dirty ABS sensors Issues with wires and electronics A blown or damaged fuse The system has been turned off If it's just your ABS warning light that's on, then your brakes will work as normal, so you're safe to take your car to your nearest garage. However, if both your ABS warning light and your brake warning light are illuminated, you will not be able to drive your car anywhere as it's unsafe. How to activate ABS on your car It's a legal requirement for all cars built after 2004 to have ABS fitted, and you may be wondering how you activate it on your car. Upon starting your engine, your ABS system should automatically turn on, and you'll see an ABS light on your dashboard temporarily as it checks itself over. When driving, your ABS system will be automatically activated under sharp or heavy braking as it adjusts the brake pressures to maintain optimal wheel rotation speeds. When your ABS is activated, you may see a warning light temporarily flash up on your dashboard, and your car may judder or vibrate momentarily. If you're planning on testing your ABS system, you should only do so when it's safe. This means finding a quiet, straight stretch of road, and only testing it when you're sure there are no cars around. The process is exactly the same as when you practised emergency stops when you learnt how to drive. Pros and Cons of ABS As with most systems, there are a variety of advantages and disadvantages to the anti-lock braking system. Overall, it's an extremely useful system to have, as it ensures optimal safety in all road conditions. Advantages of ABS: Maximum stopping power, which proves particularly helpful when wet or driving on ice ABS allows you to maintain control over the car when under heavy braking You'll have peace of mind knowing an advanced safety system is by your side Disadvantages of ABS: If something goes wrong with the ABS system, it can be an expensive job to repair On some road surfaces, such as loose gravel, the ABS system can occasionally become confused More automotive advice from Evans Halshaw Anti-lock brakes are a useful bit of kit that help you get to your destination in the safest possible manner. As a system that doesn't need switching on manually, you'd be forgiven for not knowing what it actually does, but you will now be more clued-up on how ABS benefits you on a daily basis. If you're concerned about your ABS system or would simply like a vehicle health check-up, your nearest Evans Halshaw dealer will be able to help out. Alternatively, our blog section is home to a wide range of informative owner's guides to help you understand your car that bit more. This signal is sent to the ABS control module, which uses it to monitor wheel speed and intervene if a wheel is about to lock up. If the sensor output is not proportional to the wheel speed, the wiring harness or the sensor itself may be damaged. While a multimeter is the most accurate method, you can use a scan tool to check for ABS fault codes, which may indicate a faulty sensor. Anti-lock Braking Systems (ABS) are crucial components of modern vehicles, ensuring optimal braking performance and preventing wheel lock-ups. A faulty ABS brake sensor can compromise the system’s effectiveness, leading to reduced braking power and potential safety hazards. To ensure the proper functioning of your ABS system, it’s essential to know how to test an ABS brake sensor. ABS brake sensors are typically mounted on each wheel hub and detect wheel speed using a magnetic pulse wheel. When the wheel rotates, the sensor generates an electrical signal proportional to the wheel speed. This signal is sent to the ABS control module, which uses it to monitor wheel speed and intervene if a wheel is about to lock up. ABS warning light illuminated on the dashboard: This is a common indication of a problem with the ABS system, including faulty sensors. Reduced braking performance: A malfunctioning sensor can result in uneven braking or reduced stopping power. Wheel lock-ups during braking: If a sensor fails to detect wheel speed accurately, the ABS system may not engage, leading to wheel lock-ups. Erratic ABS operation: If the sensor provides inaccurate signals, the ABS system may activate unnecessarily or fail to engage when needed. Before starting the test, ensure the vehicle is parked on a level surface and the parking brake is engaged. Wear safety glasses and gloves for protection. You will need the following tools and equipment: Multimeter Jumper wire Scan tool (optional) Tire chocks Visually inspect the sensor and its wiring harness for any damage or loose connections. Check the sensor mounting for any loose bolts or brackets. Disconnect the sensor from the wiring harness. Set the multimeter to the ohms (Ω) setting. Connect the multimeter probes to the sensor terminals. The sensor should have a resistance within the manufacturer’s specified range, typically between 1,000 and 2,000 ohms. Reconnect the sensor to the wiring harness. Rotate the wheel by hand or use a tire chock to spin the wheel off the ground. Use a multimeter to measure the AC voltage generated by the sensor while rotating the wheel. The sensor should generate an AC voltage proportional to the wheel speed. If you have a scan tool, you can use it to check for ABS fault codes. Connect the scan tool to the vehicle’s diagnostic port. Access the ABS system menu and look for any stored fault codes. If the sensor resistance is out of range, it may be faulty and needs replacement. If the sensor output is not proportional to the wheel speed, the wiring harness or the sensor itself may be damaged. If the scan tool identifies a fault code, it will provide information on the specific sensor or system component that needs attention. If the ABS brake sensor is faulty, it needs to be replaced. The replacement procedure may vary depending on the vehicle model. Refer to the vehicle’s service manual for specific instructions. After replacing the sensor, it may need to be calibrated using a scan tool to ensure proper operation. Testing ABS brake sensors is crucial for maintaining a fully functional ABS system. By following the steps outlined in this guide, you can accurately diagnose and resolve any issues with ABS brake sensors, ensuring optimal braking performance and enhancing vehicle safety. Regular testing and maintenance of your ABS system is essential for peace of mind and a safer driving experience. Q: How often should I test my ABS brake sensors? A: It’s recommended to test ABS brake sensors every 12-24 months or as per the manufacturer’s recommendations. Q: Can I test ABS brake sensors without a multimeter? A: While a multimeter is the most accurate method, you can use a scan tool to check for ABS fault codes, which may indicate a faulty sensor. Q: Is it safe to drive with a faulty ABS brake sensor? A: Driving with a faulty ABS brake sensor can compromise braking performance and increase the risk of wheel lock-ups. It’s recommended to have the sensor replaced as soon as possible. Q: Can I replace ABS brake sensors myself? A: While it’s possible to replace ABS brake sensors yourself, it’s recommended to seek professional assistance if you’re not comfortable working on automotive electrical systems. Q: How do I know if my ABS system is working properly? A: You can perform a simple test by driving on a slippery surface and applying the brakes firmly. The ABS system should prevent the wheels from locking up and allow the vehicle to maintain control. Image used with permission by copyright holder Antilock breaking systems (ABS) have been available on every car sold new for more than a century, it just wasn’t always electronic or automatic. Early on, the driver had to perform ABS duties by repeatedly pumping the brake pedal to prevent the wheels from locking up under heavy braking. It took decades – and a detour via the aviation industry – before engineers figured out how to build sensors that could prevent a lock-up of the wheels under braking. German engineer Karl Wessel received a patent for an automotive brake force regulator in 1928, but he never managed to bring his design to production. While the need to regulate the hydraulic pressure sent to the wheels under heavy braking was obvious, the lack of suitable technology during the late 1920s prevented engineers like Wessel from developing a commercially-viable anti-block system (ABS) for cars. Keeping it cheap would have made it far too complicated; keeping it simple would have made it way too expensive. Motorists continued to skid out of control like hockey pucks while the technology matured. ABS began appearing on airplanes and on trains, two types of vehicles that badly needed the ability to stop without skidding, during the 1950s. England-based Dunlop played a pioneering role in developing the technology, and named its mechanical ABS system Maxaret. The feature remained expensive, but it was much easier to offset its cost when building an airplane compared to making a car. Airlines were open to the idea of paying more for a Maxaret-equipped model because the feature could help them save money by reducing tire wear, and even help them make more money by letting planes carry more weight. British automaker Jensen had its finger on the aviation industry’s pulse. “As a result of tests, it has been calculated that the allowable operating weight of a particular modern passenger transport fitted with Maxaret could be increased by as much as 15%, a figure representing some eight passengers,” Flight magazine optimistically wrote in 1953. British automaker Jensen had its finger on the aviation industry’s pulse. Its engineers decided to make a sports car equipped with ABS technology after watching heavy planes fitted with Maxaret safely come to a stop on shockingly short runways. The FF that Jensen introduced in 1966 stood out as the first production car made with ABS, and it even came with permanent four-wheel drive, but it wasn’t a mass-produced model that everyone could enjoy. It was an expensive, low-volume coupe sold only in a handful of markets. Jensen made about 320 examples of the FF through 1970. The FF used a car-specific evolution of Dunlop’s Maxaret technology. While the Jensen model was never officially sold in the United States, American automakers heard about it and forged partnerships with suppliers to make ABS available on their more expensive cars as quickly as possible. Ford developed a system named Sure-Track with Kelsey-Hayes, and released it halfway through 1969 on the Thunderbird as well as on the Lincoln Continental Mark III. AC Electronics helped General Motors develop Track Master, which was available on the Cadillac Eldorado, and True Track, which Oldsmobile offered on the Vista Cruiser (yes, like Eric Forman’s) and the Toronado. Both systems were introduced in 1970. Image used with permission by copyright holder The three aforementioned systems acted only on the rear wheels because they were more likely to lock up than the front ones. On the surface, this argument made sense: weight moves to the front of the car under heavy braking, so there is less mass over the rear axle. However, the front wheels – which provide most of the braking force – remained at the mercy of physics. They could still lock when the driver mashed the brake pedal to the metal, which made the car unsteerable, especially on wet or icy roads. The next breakthrough in ABS technology came not from Mercedes-Benz, as many have claimed, but somewhat surprisingly from Chrysler. The Detroit-based automaker teamed up with Bendix to develop a four-wheel, electronic ABS system named Four-Wheel Sure Brake that’s more closely related to the system fitted to every car, truck, and SUV sold new in 2019. Chrysler claimed Sure Brake relied on “space age computer” technology to keep a car pointed in the right direction under heavy braking. Chrysler beamed with pride. It called its Sure Brake anti-skid system “the first computer-operated, four-wheel anti-skid braking system offered on an American car.” It didn’t stop there; it claimed Sure Brake relied on “space-age computer” technology to keep a car pointed in the right direction under heavy braking. The feature became available at an extra cost on the 19-foot long Imperial, Chrysler’s flagship model, for the 1971 model year. Advancements in the field of electronics made Sure Brake considerably more advanced than Maxaret. The system relied on data provided by a small gear linked to each wheel. Sensors measured the gear’s rotation speed by counting its teeth, and converted that information to electronic pulses it sent to a computer that was a little bit smaller than a shoe box. The computer cut hydraulic pressure when it detected a wheel was about to lock (the wheel slowed down before locking), and sent pressure again a split-second later to continue stopping the car. This cycle had the same effect as pumping the brakes, but it occurred up to four times per second, which was faster than a human could manage. Sure Brake measured the speed of each wheel independently, so the Imperial could come to a safe stop even if two of its wheels were on ice. Chrysler embedded a blue indicator labeled Sure Brake into the instrument cluster to help drivers understand the system. The indicator lit up when the system was active, and it remained on to indicate a problem. The firm stressed the system was fail-safe, so the enormous Imperial would brake normally if Sure Brake shut down for any reason. Image used with permission by copyright holder Four-Wheel Sure Brake was hugely innovative, and correspondingly expensive. In 1971, the Chrysler Imperial carried a base price of $6,044 (about $38,000 in 2019). Chrysler charged $351.50 (approximately $2,200 in 2019) for Four-Wheel Sure Brake that same year. To add context, an AM/FM stereo with an eight-track cost $419.70, while tinted windows added $58.45, figures that represent $2,500 and $370, respectively. Engineers experienced the system with near-superstitious awe, but Imperial buyers wanted old-school luxury, not cutting-edge tech, and many refused to pay extra for what they considered a useless, over-complicated gizmo. Chrysler dropped the feature in 1973. Broadly speaking, motorists didn’t accept the merits of ABS technology until the 1980s. Even then, the systems remained expensive, and it took several more years for it to trickle down into the realm of economy cars. It was common to see cars proudly wearing an ABS emblem on the trunk lid in the 1990s, and rightfully so. Chrysler charged LeBaron buyers $954 (approximately $2,000 in 2019) for four-wheel disc brakes with ABS in 1989. Not everyone could afford to tick a $2,000 box on an order sheet. “This path is leading up into the development of highly automated driving features.” On the other hand, Mercedes-Benz made the technology standard on all of its cars, from the entry-level 190 to the mighty S-Class, starting in 1984. This decision represented a surprising amount of foresight. European officials made ABS mandatory on all new cars in 2004. The feature has been required – along with electronic stability control – since 2013 on passenger cars and trucks sold in the United States. In 2019, every car regardless of market segment, price, or body style is developed with ABS in mind from the get-go. Modern-day ABS systems are considerably more sophisticated than Maxaret or Four-Wheel Sure Brake, but they perform the same basic function. Bosch, the company that helped Mercedes develop and launch its first production-bound ABS system in 1978, explained ABS also serves as the foundation for a long list of electronic driving aids that are either common or required on all new cars. “We’ve added additional functions, like stability control, adaptive cruise control, and hill hold assist, but everything is still somehow based on ABS technology. Automatic emergency braking needs it, too. The technology also supports the regenerative braking function in hybrid vehicles. This path is leading up into the development of highly automated driving features,” Michael Kunz, Bosch North America’s vice president of engineering safety, told Digital Trends. Ronan Glon is an American automotive and tech journalist based in southern France. As a long-time contributor to Digital... Anti-lock Braking System (ABS) sensors are components within modern vehicles that work with the ECU to control the intensity of the brake when you try to stop your car.They are sensors attached to wheels through a harness that monitor the rotational speed of the wheels and also use this data to determine if the wheels are locking up. A brake applied through the ABS also works faster than a manual brake. This means they are useful in more stringent conditions like when you drive on wet or icy roads.A problem with the sensor spells an apparent danger to your life, and the ABS light or traction control system light coming on requires very urgent attention. How do you diagnose the sensor for issues?Our guide takes you through all you need to know about how to test ABS sensor.Let’s get right in.For all the tests mentioned here, you would needMultimeter Set of Wrenches Car Jack OBD Scan ToolThe multimeter helps us make multiple forms of diagnoses on the sensor and is, therefore, the most important tool.Lift the vehicle with a car jack, disconnect the ABS from its sensor cable, set the multimeter to the 20k Ohms range, and place the probes on the sensor terminals. You expect to get the appropriate reading between 800 and 2000 Ohms if the ABS is in good condition. We will dive deeper into this testing process and also show you how to diagnose a fault by testing the sensor’s AC voltage reading.Lift The Vehicle With A JackFor safety measures, you put the car transmission in park mode and also activate the emergency brake so that it doesn’t move while you are under it.Now, to have access to the sensor to conveniently run a diagnosis on it, you also have to lift the car where the sensor is located. Depending on your vehicle, the sensor is typically located at the back of one of your wheel hubs, but you may refer to your car manual to know its exact location. You also want to know how the specific ABS sensor on your vehicle looks to avoid mixing the sensor up with other sensors.Slide in a mat under your vehicle to keep your clothes clean while you run these tests.Set The Multimeter To The 20k Ohms RangePut the meter in the Ohms setting represented by the omega symbol (Ω).You will see a group of numbers at the Ohms section of the meter which represents the measurement range (200, 2k, 20k, 200k, 2m, and 200m).The expected resistance of an ABS sensor requires you to put the meter in the 20k ohms range to get the most appropriate reading. Now, you disconnect the anti-lock braking system from its sensor cable to expose the terminals for the test.Here, you simply and gently pull apart the wire harnesses where they are connected and move your focus to the harness on the wheel side.Place Probes On ABS TerminalsSince polarity doesn’t matter while measuring Ohms, you place your meter probes on any of the sensor terminals. Now, you check the meter for a reading. ABS sensors are expected to have between 800 Ohms and 2000 Ohms.Looking at your car’s sensor model, you determine the right specifications to evaluate whether you are getting the right value or not. Since the meter is put in the 20k Ohms range, it shows a constant value between 0.8 and 2.0 if the sensor is in good condition.A value outside this range, or a fluctuating value, means the sensor is faulty and needs to be replaced. If you also get an “O.L” or “1” reading, this means the sensor has a short, break, or an excessive amount of resistance in its wire harness and you need to replace it. Testing the voltage from an ABS sensor helps us find out whether the sensor works correctly when in actual use.With the car put in park mode, emergency brake activated, and the vehicle lifted, follow these steps. Set Multimeter To 200 AC Voltage RangeAC volt is represented by “V~” or “VAC” on the multimeter and usually has two ranges; 200V~ and 600V~.Put the multimeter in the 200V~ setting so you get the most appropriate results from your test.Place Probes On ABS TerminalsJust like in the resistance test, you place the meter leads on the terminals of the ABS.Thankfully, the ABS terminals don’t have polarity, so you simply place the leads on any of the terminals without worrying about inaccurate readings. Now, to mimic the vehicle moving, you spin the wheel hub to which the ABS is connected. This generates voltage and the amount of volt generated depends on the speed of the spinning wheel.You want to make sure you turn the wheel at a constant rate to get a constant value from the meter.For our test, you make a revolution every two seconds. This way, you aren’t worked up from spinning the wheel.The multimeter is expected to display a voltage value at this point. For our revolution speed, the appropriate AC volt reading is about 0.25V (250 millivolts).If you don’t get a reading from the meter, try to push in the sensor wire harness where it goes into the wheel hub. If you still don’t get a reading when you check the multimeter, then the ABS has gone bad and needs to be replaced. A lack of voltage or an inappropriate volt value may also be caused by a problem with the wheel hub itself. To diagnose this, replace the ABS with a new sensor and run this exact voltage test again. If you still don’t get an appropriate volt reading, then the problem is with the wheel hub and you need to replace it. The OBD scanner offers you an easier solution to identifying problems with your ABS sensor, although these aren’t as accurate as the multimeter tests.You insert the scanner into the reader slot beneath the dashboard and look out for error codes associated with the ABS. All error codes starting with a “C” point to a problem with the sensor. For instance, the error code C0060 shows a problem with the left front ABS, while C0070 shows a problem with the right front ABS.Refer to this full list of ABS error codes and their meanings to know what to expect.The ABS sensor is a fairly easy component to test and also offers different ways we may diagnose our vehicles for issues.However, with any test you wish to run, make sure you apply the right safety measures and set the multimeter to the appropriate range to get the right results.As mentioned in our article, remember that the functionality of your ABS significantly determines your safety on the road, so any faulty component should be replaced immediately before the vehicle is used. A good ABS sensor is expected to hold between 800 Ohms and 200 Ohms depending on the vehicle or model of the sensor. A value outside this represents a short circuit or inadequate resistance. A bad ABS sensor shows signs like the ABS or traction control light coming on at the dashboard, the car taking longer to stop, or dangerous instability while braking in wet or icy conditions.