Electrical Training
Voltage Drops and Drains
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Electrical troubleshooting relies on the fact that the battery and alternator are in working order
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There are a few common mistakes made when troubleshooting electrical circuits.
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One is we forget to check the ground for the circuit we are diagnosing. We have a tendency to use any ground we can find when in fact, we need to use the ground for that circuit.
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The second is we do not load the circuit to see if we have a voltage drop.
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If you use a volt meter to measure across a heavily corroded 12 volt or ground connection it may read good voltage but it may not have the ability handle a load.
So how do you find these kinds of problems? You do a voltage drop test.
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The voltage drop test is the most effective way to find bad connections in electrical circuits. It's a quick and easy test that doesn't require any disassembly and will quickly show you whether or not you have a good connection or a bad one.
To do a voltage drop test, you create a load in the circuit that's being tested. You then use a digital volt meter (DVM) to measure the voltage drop across the connection while it is under a load.
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If a connection is good, you should find little or no voltage drop. If you find a voltage drop of more than 1 volt then the connection is bad.
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We will test the hydraulic connections as an example.
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When checking the power strip you need to remember to run the hydraulics during the testing.
Place one lead of the DVM on the strip and the other on battery ground. You should have a reading of approximately 12 volts.
Now operate the hydraulics. If the voltage drops off move your test lead to the contact block.
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Place one lead of the DVM on the block and the other on battery ground. You should have a reading of approximately 12 volts.
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Now operate the hydraulics. If the voltage falls off continue the testing toward the battery.
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If the voltage is good, you have a bad connection between the strip and the block.
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Now test for the ground block.
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Since ground will search for a good connection we want to do a test to look for difference in potential. Faulty ground connections will cause the sawmill to ground where ever it can. If you have ever noticed sparks from the cam follower bearings or a hot or glowing power feed chain, this is an indication of a faulty ground.
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If left alone, it will damage the cam followers and weaken the power feed chain.
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Place one lead of the DVM on the block and the other on hardened welded rod. You should have a reading of approximately 0.00 volts.
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Operate the hydraulics. You should have a reading of no more than approximately .75 volts. A higher reading indicates a faulty ground connection.
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There are two main reasons a battery will drain overnight. One is an internal short within the battery. The second are parasitic drains.
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What is parasitic drain?
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It is a drain on the battery that causes it to run down while sitting. These drains can be caused by a component not turning off or battery acid and wet sawdust laying on top of the battery. The battery should be kept clean.
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Here is a procedure we use to isolate a parasitic drain.
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With the key off, remove the negative battery cable from the battery. Using a 12-volt test light hook one end to the negative battery post and the other end to the negative battery cable.
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The test light will be lit if there is a drain.
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Remember that the drain will only be on circuits that have voltage when the key is off. Your wiring diagram will guide you.