

## Lesson 12: Detecting Problems

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After installation, problems may arise in the electrical system. These problems can be the result of improper wiring, misuse, or just wear on equipment. When problems occur, detecting what the problem is and correcting it is important.

Investigating the nature of the problem may require the use of different testing devices.

#### Testers Used in Troubleshooting

A variety of meters and testers can test electrical systems. Three of the more common are the neon tester, the voltage tester, and the VOM meter. Figure 12.1 shows examples of these testing devices.

The neon tester is the simplest device used by electricians. This tester can be used on either a 120-volt or 240-volt system. A glowing light indicates that voltage is present in a circuit. The greater the voltage in the circuit, the brighter the light glows.

A voltage tester is used to indicate the voltage and polarity, or direction of electrical flow, in a circuit. The tester uses a series of neon lights. A neon tester is commonly used for testing outlet receptacles. It has two leads attached to the

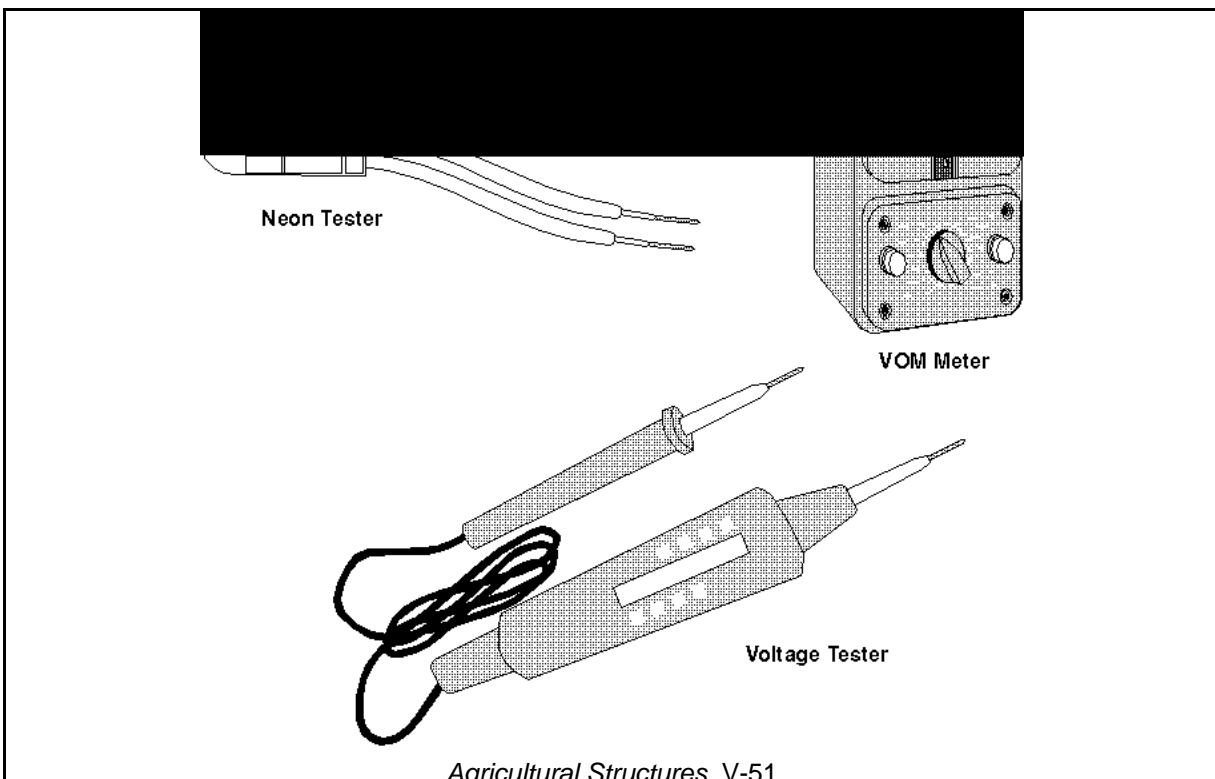
to indicate the approximate voltage moving through the circuit.

Another type of tester is a VOM meter. VOM stands for volt-ohm-milliammeter. This tester supplies the same information as the others, displaying the voltage and polarity of the circuit. It also provides accurate measurements of circuit resistance and amperage. To provide this information, this testing device combines a voltmeter, ohmmeter, and ammeter in one casing. The voltmeter measures the voltage across two points in an electrical circuit. The ohmmeter measures resistance, and the ammeter measures the electrical flow or amperage. The VOM meter provides this information on a calibrated numerical scale.

#### Using Testing Devices

To safely determine what type of electrical problem exists, it is important to know how to use testing devices properly. All testers come with manufacturer's directions for their use. These instructions should be read prior to using any type of testing device.

tester. To use a neon tester to test a receptacle, the ends of the leads are placed into the parallel



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slot openings. If the tester lights up, no problem exists. If the tester does not light up, the end of one of the leads is inserted into the ground opening, with the other lead in one of the other slots. If the tester lights up, the problem is with the neutral connection or the neutral wire, which is not allowing electricity to flow beyond the receptacle. However, if the tester still does not glow, the outlet cover plate and receptacle are removed. The leads are then touched to the opposite terminal screws. If the tester lights up, the receptacle does not function and should be replaced.

The voltage tester can test outlets, switches, fixtures, and other electrical devices. Like the neon tester, it has two leads attached to the tester housing. It works in a similar way. However, the voltage tester also indicates whether an electrical system carries 120 volts or 240 volts as well as the polarity of the system.

A VOM meter is similar to the other testers in that it has two leads. However, the leads are color coded, with red used for the power side and black for return or neutral side of the circuit during testing. The leads are used as they are with the other testers; for example, to test a switch, the leads are connected to the terminals of the switch after the cover plate is removed.

Some special considerations exist when using the ohmmeter portion of the meter. The ohmmeter contains its own power source, so all power to the electrical system should be disconnected before testing for circuit resistance.

If the power is not shut off, damage to the meter will occur.

### Summary

Three types of testers are commonly used when examining electrical systems for problems. They are neon testers, voltage testers, and VOM meters. To properly troubleshoot the electrical system, it is important to be competent in the use of the various testing devices. Before using any testing device, carefully read all the manufacturer's instructions to avoid problems.

### Credits

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