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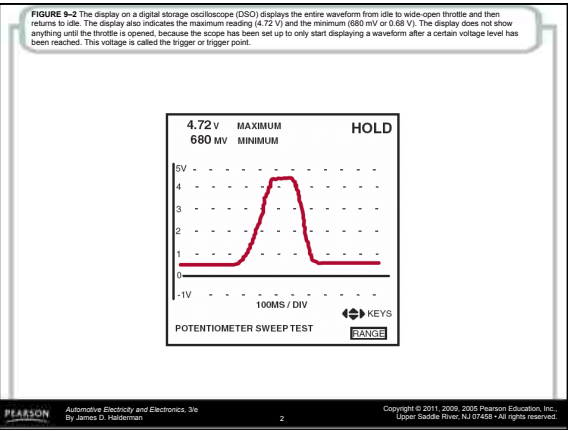
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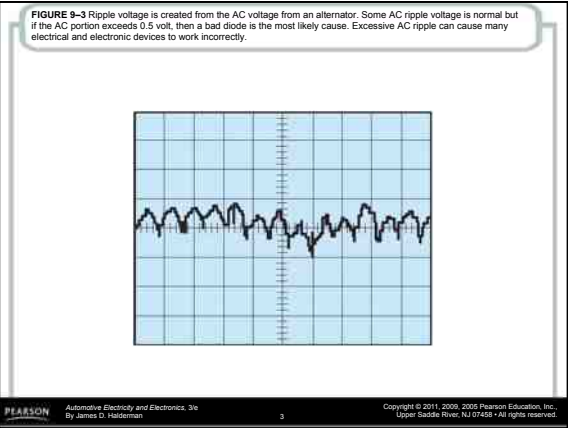
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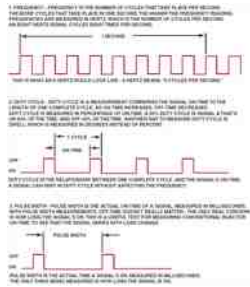
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**FIGURE 9-4** A pulse train is any electrical signal that turns on and off, or goes high and low in a series of pulses. Ignition module and fuel-injector pulses are examples of a pulse train signal.




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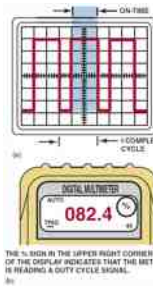
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**FIGURE 9-5** (a) A scope representation of a complete cycle showing both on-time and off-time. (b) A meter display indicating the on-time duty cycle in a percentage (%). Note the trigger and negative (-) symbol. This indicates that the meter started to record the percentage of on-time when the voltage dropped (start of on-time).




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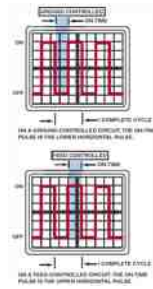
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**FIGURE 9-6** Most automotive computer systems control the device by opening and closing the ground to the component.




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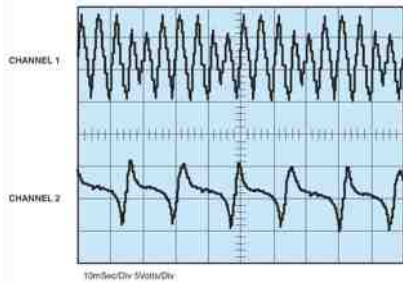
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FIGURE 9-7 A two-channel scope being used to compare two signals on the same vehicle.




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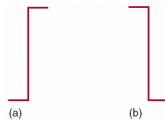
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FIGURE 9-8 (a) A symbol for a positive trigger—a trigger occurs at a rising (positive) edge of the signal (waveform). (b) A symbol for a negative trigger—a trigger occurs at a falling (negative) edge of the signal (waveform).




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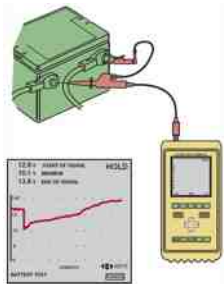
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FIGURE 9-9 Battery voltage is represented by a flat horizontal line. In this example, the engine was started and the battery voltage dropped to about 10 V as shown on the left side of the scope display. When the engine started, the alternator started to charge the battery and the voltage is shown as climbing.




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FIGURE 9-10 A typical graphing multimeter that can be used as a digital meter, plus it can display the voltage levels on the display screen.



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