

- CHAPTER 20 OBJECTIVES
- Describe the procedure used to check for spark.
- Discuss what to inspect and look for during a visual inspection of the ignition system.
- List the steps necessary to check and/or adjust ignition timing on engines equipped with a distributor.
- Describe how to test the ignition system using an oscilloscope.

Checking For Spark

- If the engine is equipped with a separate ignition coil, remove the coil wire from the center of the distributor cap, install a **spark tester**, and crank the engine.
- A good coil and ignition system should produce a blue spark at the spark tester.



FIGURE 20-1 A spark tester looks like a regular spark plug with an alligator clip attached to the shell. This tester has a specified gap that requires at least 25,000 volts (25 kV) to fire.

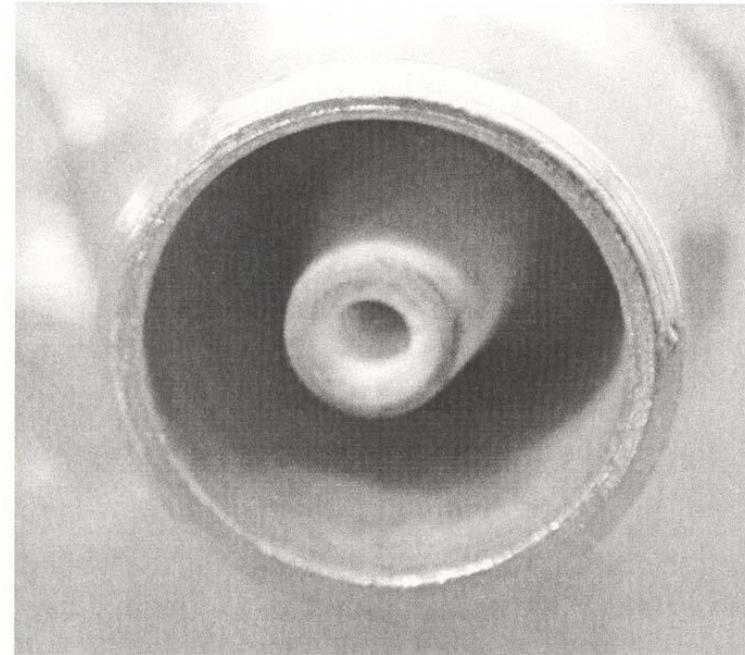


FIGURE 20-2 A close-up showing the recessed center electrode on a spark tester. It is recessed $\frac{3}{8}$ in. into the shell and the spark must then jump another $\frac{3}{8}$ in. to the shell for a total gap of $\frac{3}{4}$ in.

Checking For Spark (continued)

- Typical causes of a no-spark (intermittent spark) condition include the following:
 1. Weak ignition coil
 2. Low or no voltage to the primary (positive) side of the coil
 3. High resistance or open coil wire, or spark plug wire
 4. Negative side of the coil not being pulsed by the ignition module
 5. Defective pickup coil
 6. Defective module

Electronic Ignition Troubleshooting Procedure

- When troubleshooting any electronic ignition system for no spark, follow these steps to help pinpoint the exact cause of the problem:
 - Step 1
 - Turn the ignition on (engine off) and, using either a voltmeter or a test light, test for battery voltage available at the positive terminal of the ignition coil.
 - If the voltage is not available, check for an open circuit at the ignition switch or wiring.

Electronic Ignition Troubleshooting Procedure (continued)

- Step 2
 - Connect the voltmeter or test light to the negative side of the coil and crank the engine.
 - The voltmeter should fluctuate or the test light should blink, indicating that the primary coil current is being turned on and off.
 - If there is no pulsing of the negative side of the coil, then the problem is a defective pickup, electronic control module, or wiring.

Ignition Coil Testing Using An Ohmmeter

- To test the primary coil winding resistance, take the following steps:

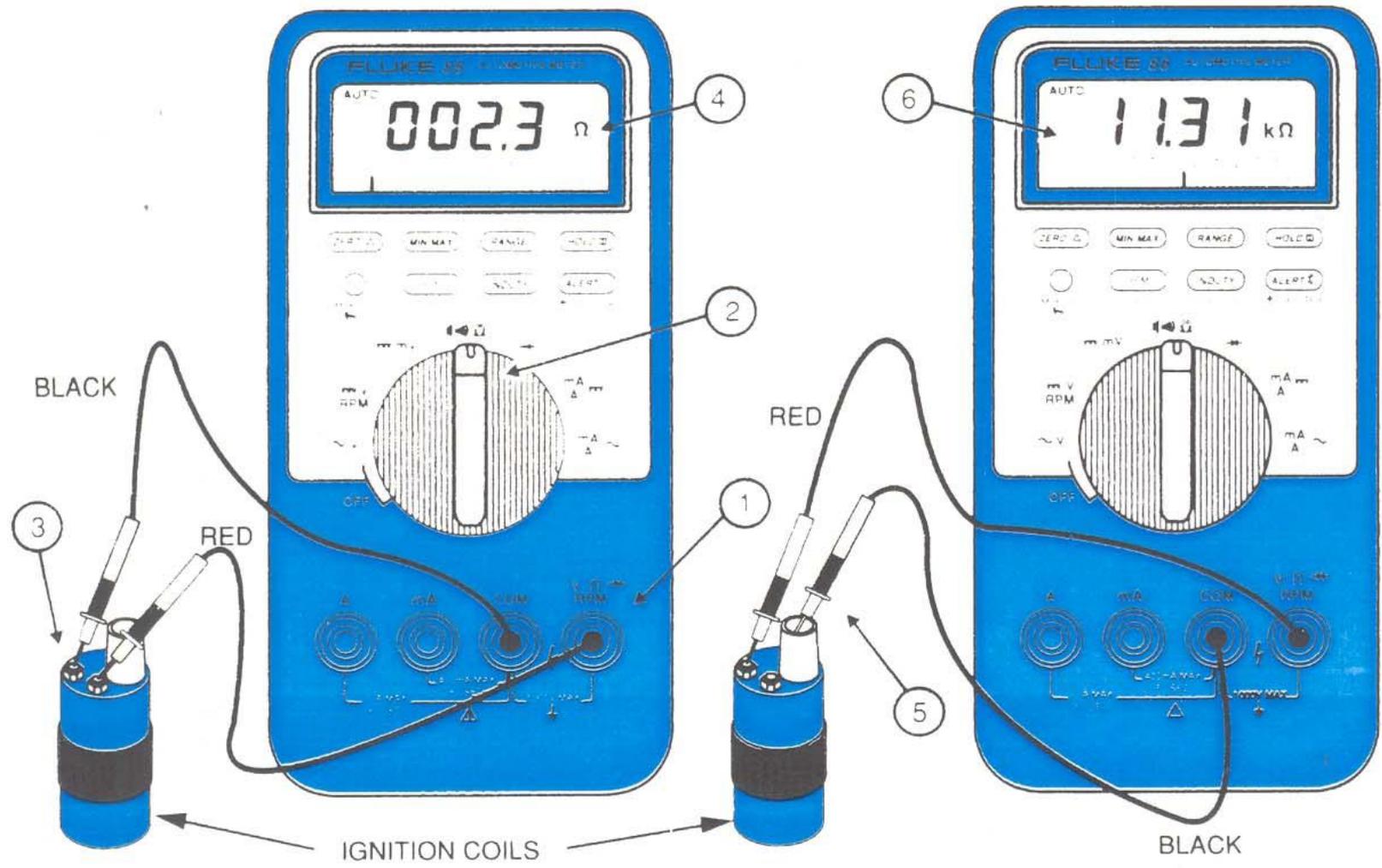


FIGURE 20-3 Checking an ignition coil using a multimeter set to read ohms. (Courtesy of Fluke Corporation)

Pickup Coil Testing

- The pickup coil, located under the distributor cap on many electronic ignition engines, can cause a no-spark condition if defective.
- The pickup coil must generate an AC voltage pulse to the ignition module so that the module can pulse the ignition coil.
- A pickup coil contains a coil of wire, and the resistance of this coil should be within the range specified by the manufacturer.

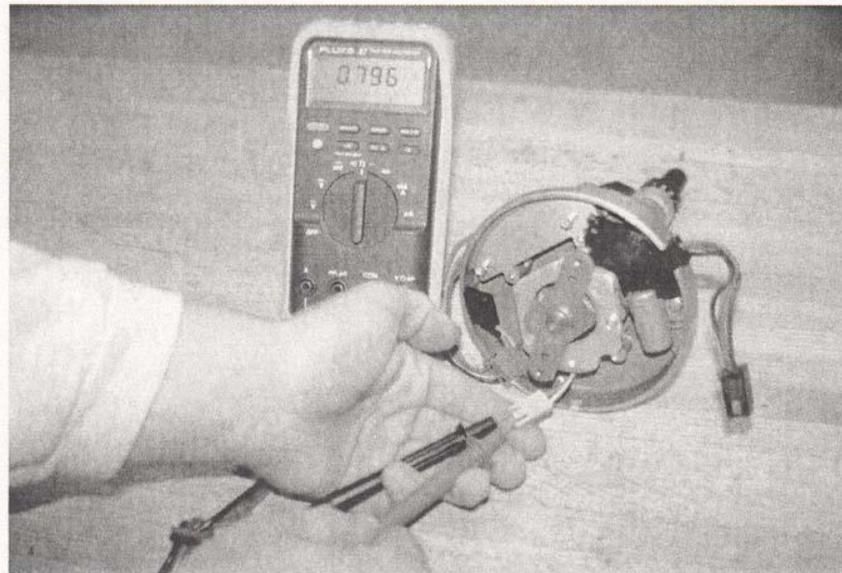


FIGURE 20-4 Measuring the resistance of an HEI pickup coil using a digital multimeter set to the ohms position. The reading on the face of the meter is 0.796 k Ω or 796 ohms in the middle of the 500- to 1500-ohm specifications.

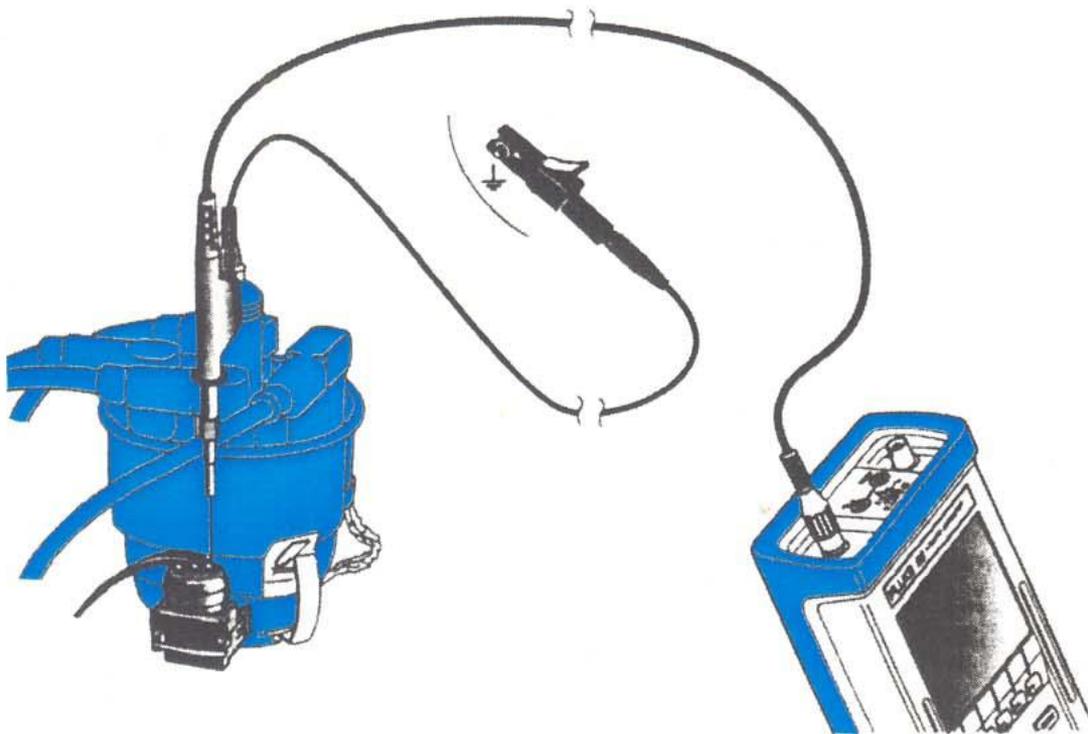
Manufacturer	Pickup Coil Resistance (Ohms)
General Motors	500 – 1500 (white and green leads)
Ford	400 – 1000 (orange and purple leads)
Chrysler	150 – 900 (orange and black lead)

Pickup Coil Testing (continued)

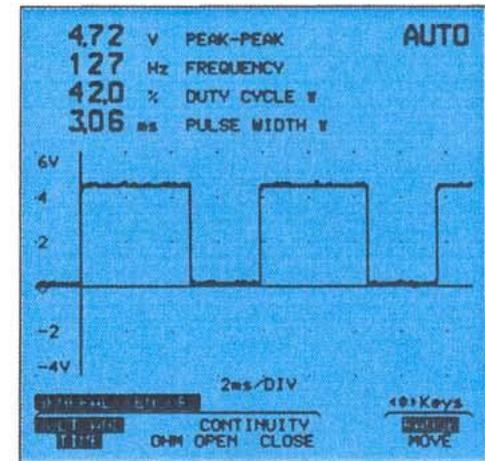
- The pickup coil can also be tested for proper voltage output.
- During cranking, most pickup coils should produce a minimum of 0.25 volt AC.
- This can be tested with the distributor out of the vehicle by rotating the distributor drive gear by hand.

Testing Hall Effect Sensors

- Using a digital voltmeter, check for the presence of charging voltage (pulsed on and off DC) when the engine is being cranked.
- The best test is to use an oscilloscope and observe the waveform.



(a)



(b)

FIGURE 20-6 (a) The connection required to test a Hall effect sensor. (b) A typical waveform from a Hall effect sensor. (Courtesy of Fluke Corporation)

Ignition System Diagnosis Using Visual Inspection

- Check all spark plug wires for proper routing. All plug wires should be in the factory wiring separator.
- Check that all spark plug wires are securely attached to the spark plugs and to the distributor cap or ignition coil(s).
- Remove the distributor cap and carefully check the cap and distributor rotor for faults.
- Remove the spark plugs and check for excessive wear or other visible faults. Replace if needed.

Ignition System Diagnosis Photo Sequence



PS 19-11 Ground out a cylinder one at a time and observe if the engine speed or idle quality is affected. If one cylinder does not respond then this test can help pinpoint a fault in a particular cylinder. Insert 2-inch lengths of vacuum hose between the coil tower and the spark plug wires. This test can also be performed on vehicles equipped with a distributor.

Testing For Poor Performance

- Step 1
 - Start the engine and ground out each cylinder one at a time by touching the tip of a grounded test light to the rubber vacuum hose.
 - Even though the computer will increase idle speed and fuel delivery to compensate for the grounded spark plug wire, a technician should watch for a change in the operation of the engine.
 - If no change is observed or heard, the cylinder being grounded is obviously weak or defective.
 - Check the spark plug wire or connector with an ohmmeter to be certain of continuity.

Testing For Poor Performance (continued)

- Step 2
 - Check all cylinders by grounding them out one at a time.
 - If one weak cylinder is found, check the other cylinder using the same ignition coil (except on engines that use an individual coil for each cylinder).
 - If both cylinders are affected, the problem could be an open spark plug wire, defective spark plug or defective ignition coil.

Testing For Poor Performance (continued)

- Step 3
 - To help eliminate other possible problems and determine exactly what is wrong, switch the suspected ignition coil to another position (if possible).
 - If the problem now affects the other cylinders, the ignition coil is defective and must be replaced.
 - If the problem does not “change positions,” the control module affecting the suspected coil or either cylinder’s spark plug or spark plug wire could be defective.

Testing For A No-Start Condition

- Test the output signal from the crankshaft sensor.
- Most computerized engines with distributorless ignitions use a crankshaft position sensor.
- These sensors are either the Hall effect type or the magnetic type.
- The sensors must be able to produce a variable (either sine or digital) signal.
- A meter set on AC volts should read a voltage across the sensor leads when the engine is being cranked.
- If there is no AC voltage output, replace the sensor.
- If the ignition control module is receiving a changing signal from the crankshaft position sensor, it must be capable of switching the power to the ignition coils on and off.
- Remove a coil or coil package, and with the ignition switched to on (run), check for voltage at the positive terminal of the coil(s).

Firing Order

- **Firing order** means the order that the spark is distributed to the correct spark plug at the right time.
- The firing order of an engine is determined by crankshaft and camshaft design.
- The firing order is often cast into the intake manifold for easy reference.



FIGURE 20-12 The firing order is cast or stamped on the intake manifold on most engines that have a distributor ignition.

- Firing order is also important for waste-spark-type distributorless (direct-fire) ignition systems.
- The spark plug wire can often be installed on the wrong coil pack that can create a no-start condition or poor engine operation.

Spark Plug Wire Inspection

- Spark plug wires should be visually inspected for cuts or defective insulation and checked for resistance with an ohmmeter.
- Good spark plug wires should measure less than 10,000 ohms per foot of length.

Distributor Cap And Rotor Inspection

- Inspect a distributor cap for a worn or cracked center carbon insert, excessive side insert wear or corrosion, cracks, or carbon tracks, and check the towers for burning or corrosion by removing spark plug wires from the distributor cap one at a time.

SPOTS WHERE SPARK
ARC HAD OCCURRED

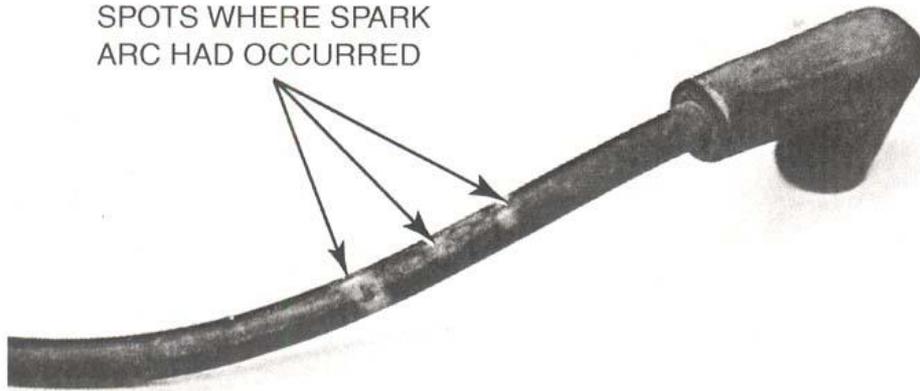


FIGURE 20-18 With careful visual inspection, the technician discovered this defective spark plug wire.

Spark Plug Service

- Spark plugs should be inspected when an engine performance problem occurs and should be replaced regularly to ensure proper ignition system performance.
- Many spark plugs have a service life of over 20,000 miles (32,000 kilometers).
- Platinum-tipped original equipment spark plugs have a typical service life of 60,000 to 100,000 miles (100,000 to 160,000 kilometers).
- *Platinum-tipped spark plugs should not be regapped!*
- Using a gapping tool can break the platinum after it has been used in an engine.

Spark Plug Inspection

- Two indications and their possible root causes include the following:
 1. Carbon fouling. If the spark plug(s) has *dry black carbon* (soot), the usual causes include:
 - Excessive idling
 - Slow-speed driving under light loads that keeps the spark plug temperatures too low to burn off the deposits
 - Overrich air-fuel mixture
 - Weak ignition system output
 2. Oil fouling. If the spark plug has *wet, oily* deposits with little electrode wear, oil may be getting into the combustion chamber from the following.
 - Worn or broken piston rings
 - Defective or missing valve stem seals

- All spark plugs should be in the same condition, and the color of the center insulator should be light tan or gray.

Spark Plug Inspection (continued)

- As a spark plug wears, the center electrode becomes rounded.
- If the center electrode is rounded, higher ignition system voltage is required to fire the spark plug.
- When installing spark plugs, always use the correct tightening torque to ensure proper heat transfer from the spark plug shell to the cylinder head.

	Torque with torque wrench (in lb-ft)		Torque without torque wrench (in turns)	
	Cast-iron head	Aluminum head	Cast-iron head	Aluminum head
Spark plug				
Gasket				
14 mm	26-30	18-22	1/4	1/4
18 mm	32-38	28-34	1/4	1/4
Tapered seat				
14 mm	7-15	7-15	1/16 (snug)	1/16 (snug)
18 mm	15-20	15-20	1/16 (snug)	1/16 (snug)

Spark Plug Inspection (continued)

- **NOTE:** General Motors does not recommend the use of antiseize compound on the threads of spark plugs being installed in an aluminum cylinder head, because the spark plug will be overtightened. This excessive tightening torque places the threaded portion of the spark plug too far into the combustion chamber where carbon can accumulate and result in the spark plugs being difficult to remove. If antiseize compound is used on spark plug threads reduce the tightening torque by 40%. Always follow the vehicle manufacturer's recommendations.

Quick And Easy Secondary Ignition Tests

- For intermittent problems, use a spray bottle to apply a water mist to the spark plugs, distributor cap, and spark plug wires.
- With the engine running, the water may cause an arc through any weak insulating materials and cause the engine to miss or stall.

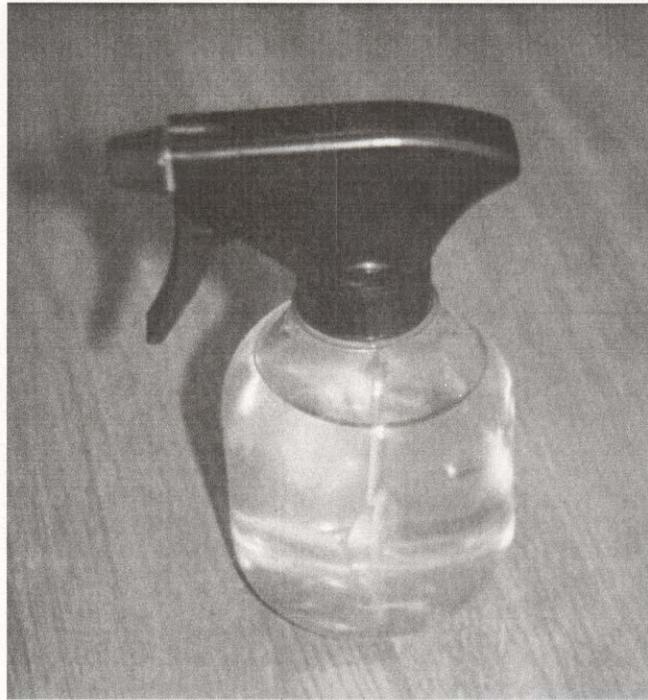


FIGURE 20-29 A water spray bottle is an excellent diagnostic tool to help find an intermittent engine miss caused by a break in a secondary ignition circuit component.

Ignition Timing

- Engines must be at idle with computer engine controls put into **base timing**, the timing of the spark before the computer advances the timing.
- To be assured of the proper ignition timing, follow exactly the timing procedure indicated on the underhood emission decal.

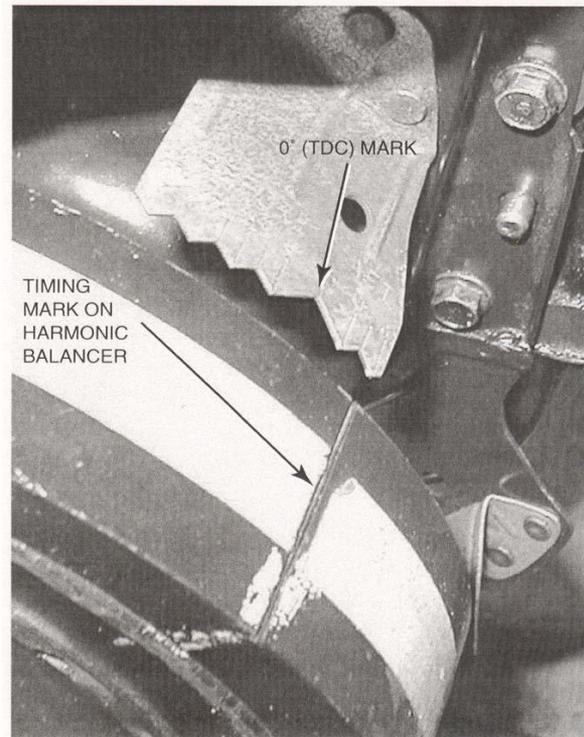


FIGURE 20-30 Typical timing marks. The degree numbers are on the stationary plate and the notch is on the harmonic balancer.

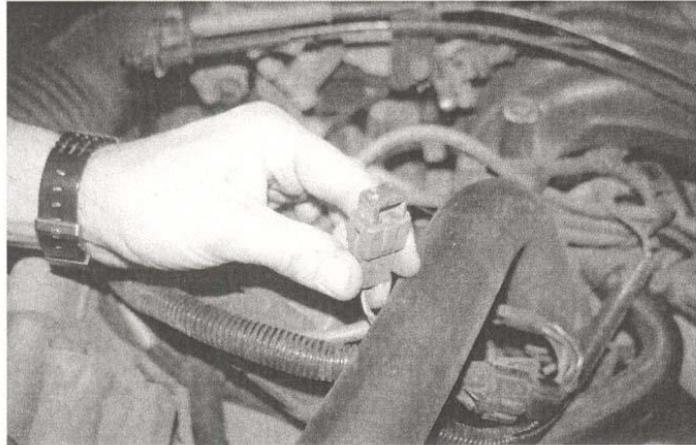
Ignition Timing (continued)

- If the ignition timing is too far *advanced*, for example, if it is set at 12 degrees before top dead center (BTDC) instead of 8 degrees BTDC, the following symptoms may occur:
 1. Engine ping or spark knock may be heard, especially while driving up a hill or during acceleration.
 2. Cranking (starting) may be slow and jerky, especially when the engine is warm.
 3. The engine may overheat if the ignition timing is too far advanced.
- If the ignition timing is too far *retarded*, for example, if it is set at 4 degrees BTDC instead of 8 degrees BTDC, the following symptoms may occur:
 1. The engine may lack in power and performance.
 2. The engine may require a long period of starter cranking before starting.
 3. Poor fuel economy may result from retarded ignition timing.
 4. The engine may overheat if the ignition timing is too far retarded.

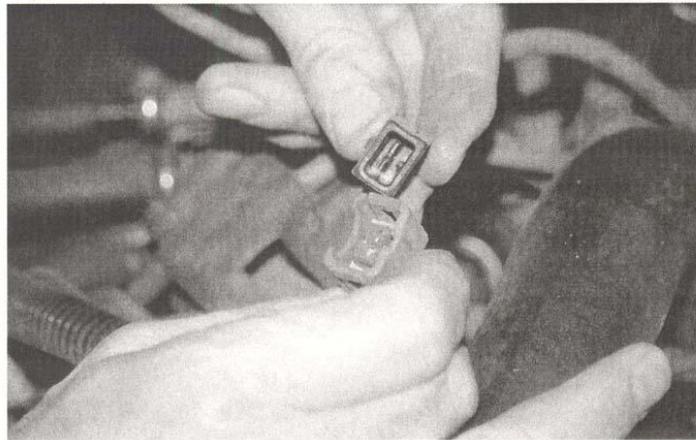
Pretiming Checks

- Before the ignition timing is checked or adjusted, the following items should be checked to ensure accurate timing results:
 1. The engine should be at normal operating temperature (the upper radiator hose should be hot and pressurized).
 2. The engine should be at the correct timing RPM (check the specifications).
 3. Check the timing procedure specified by the manufacturer. This may include disconnecting a “set timing” connector wire, grounding a diagnostic terminal, disconnecting a four-wire connector, or similar procedure.

Checking Or Adjusting Ignition Timing



(a)



(b)

FIGURE 20-32 (a) Typical SPOUT connector as used on many Ford engines equipped with distributor ignition (DI). (b) The connector must be opened (disconnected) to check and/or adjust the ignition timing. On DIS/EDIS systems, the connector is called SPOUT/SAW (spark output/spark angle word).

Checking Or Adjusting Ignition Timing

- Use the following steps for checking or adjusting ignition timing:
 1. Start the engine and adjust the speed to that specified for ignition timing.
 2. With the timing light aimed at the stationary timing pointer, observe the position of the timing mark with the light flashing. Refer to the manufacturer's specifications on underhood decal for the correct setting
 3. To adjust timing, loosen the distributor locking bolt or nut and turn the distributor housing until the timing mark is in correct alignment. Turn the distributor housing in the direction of rotor rotation to retard the timing and against rotor rotation to advance the timing.
 4. After adjusting the timing to specifications, carefully tighten the distributor locking bolt. It is sometimes necessary to readjust the timing after the initial setting because the distributor may rotate slightly when the hold-down bolt is tightened.

Scope-Testing The Ignition System

- Any automotive scope will show an ignition system pattern.
- All ignition systems must charge and discharge an ignition coil.
- With the engine off, most scopes will display a horizontal line.
- With the engine running, this horizontal (zero) line is changed to a pattern that will have sections both above and below the zero line.
- Sections of this pattern that are above the zero line indicate that the ignition coil is discharging.
- Sections of the scope pattern below the zero line indicate charging of the ignition coil.

Scope-Testing The Ignition System (continued)

- The height of the scope pattern indicates voltage.
- The length (from left to right) of the scope pattern indicates time.

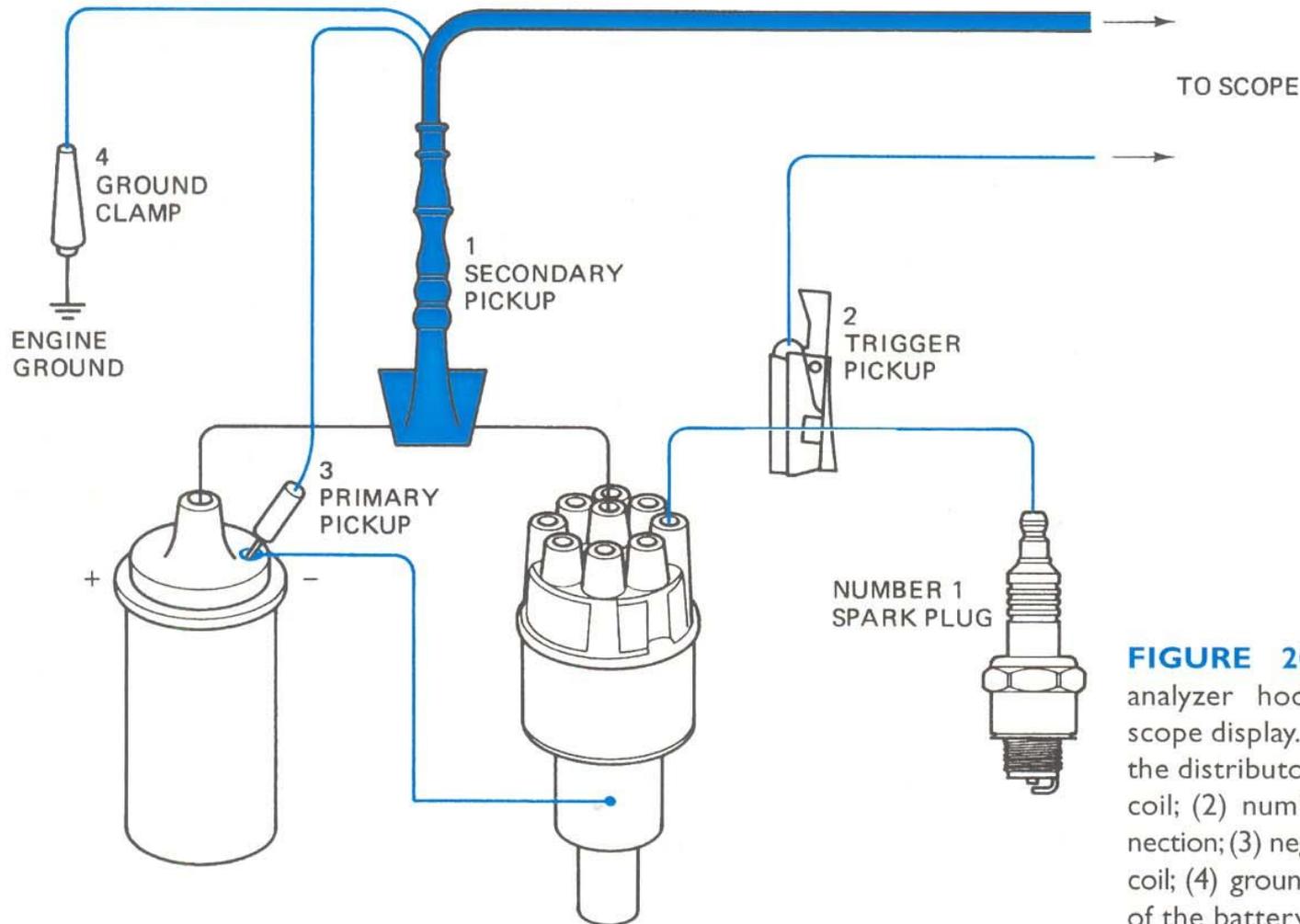


FIGURE 20-34 Typical engine analyzer hookup that includes a scope display. (1) Coil wire on top of the distributor cap if integral type of coil; (2) number 1 spark plug connection; (3) negative side of the ignition coil; (4) ground (negative) connection of the battery.

Firing Line

- The leftmost vertical (upward) line is called the **firing line**.
- The height of the firing line should be between 5000 and 15,000 volts (5 and 15 kV) with not more than a 3-kV difference between the highest and the lowest cylinder's firing line.

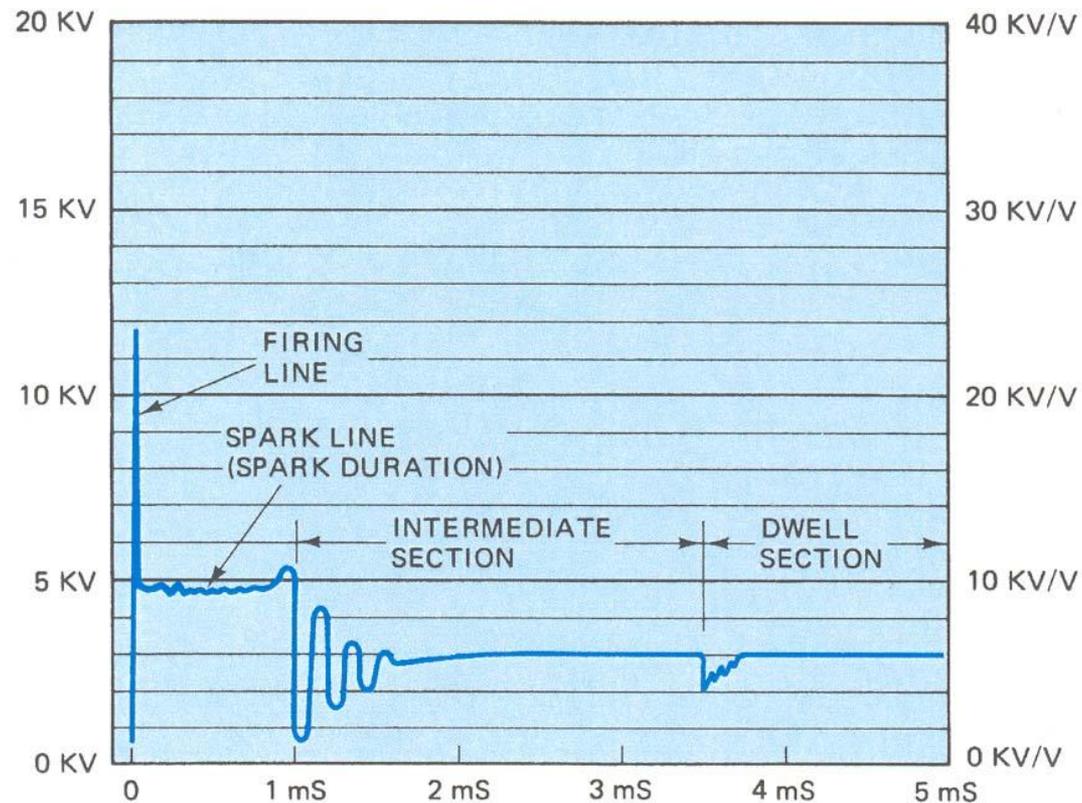
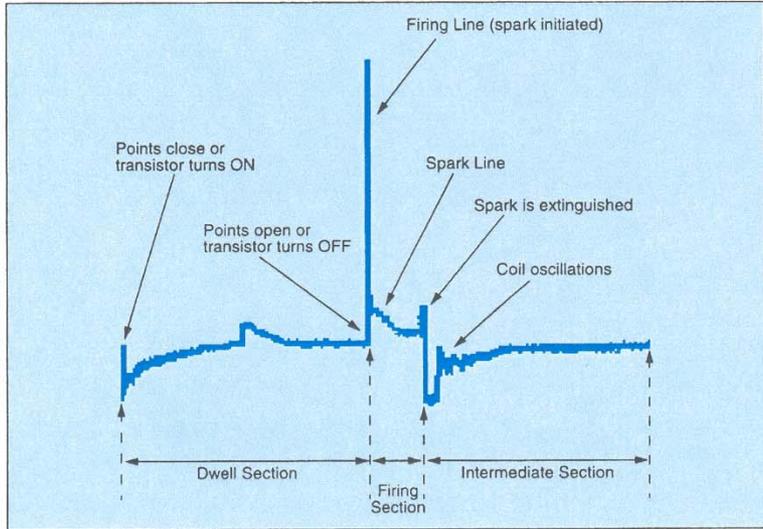


FIGURE 20-36 Typical secondary ignition oscilloscope pattern.

Firing Line (continued)

Secondary Conventional (Single)



Secondary Conventional (Parade)

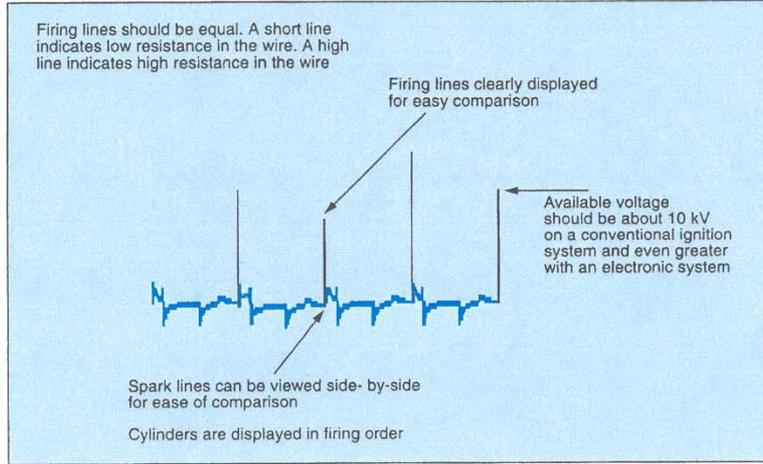


FIGURE 20-37 A single cylinder is shown at the top and a four-cylinder engine at the bottom. (Courtesy of Fluke Corporation)

Firing Line (continued)

- The height of the firing line indicates the *voltage* required to fire the spark plug.
- It requires a high voltage to make the air inside the cylinder electrically conductive (to ionize the air).
- A higher than normal height (or height higher than that of other cylinders) can be caused by one or more of the following:
 1. Spark plug gapped too wide
 2. Lean fuel mixture
 3. Defective spark plug wire

Firing Line (continued)

- If the firing lines are higher than normal for *all* cylinders, then possible causes include one or more of the following:
 1. Worn distributor cap and/or rotor (if the vehicle is so equipped)
 2. Excessive wearing of all spark plugs
 3. Defective coil wire (the high voltage could still jump across the open section of the wire to fire the spark plugs)

Spark Line

- The **spark line** is a short horizontal line connected to the firing line.
- The height of the spark line represents the voltage required to maintain the spark across the spark plug after the spark has started.
- The height of the spark line should be one-fourth of the height of the firing line (between 1.5 and 2.5 kV).

Spark Line (continued)

- The length (from left to right) of the line represents the length of time for which the spark lasts (duration).
- The spark duration should be between 0.8 and 2.2 milliseconds (usually between 1.0 and 2.0 ms).
- The spark stops at the end (right side) of the spark line.

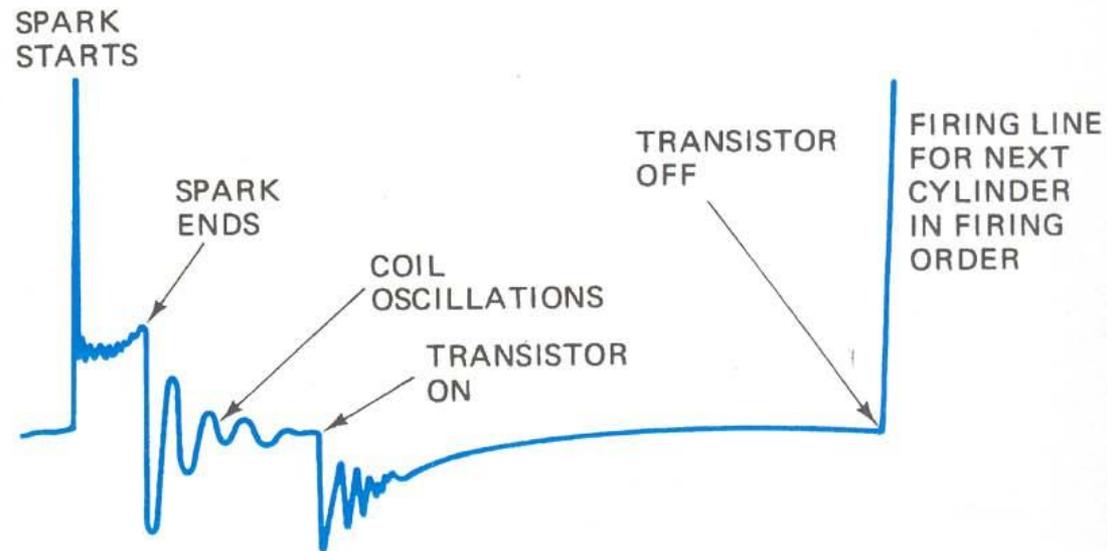


FIGURE 20-38 Drawing shows what is occurring electrically at each part of the scope pattern.

Intermediate Oscillations

- After the spark has stopped, some energy remains in the coil.
- This remaining energy dissipates in the coil windings and the entire secondary circuit.
- The oscillations are also called the “ringing” of the coil as it is pulled.

Transistor-On Point

- After the intermediate oscillations, the coil is empty (not charged), as indicated by the scope pattern being on the zero line for a short period.
- When the transistor turns on an electronic system, the coil is being charged.
- Note that the charging of the coil occurs slowly (coil-charging oscillations) because of the inductive reactance of the coil.

Dwell Section

- **Dwell** is the amount of time that the current is charging the coil from the transistor-on point to the transistor-off point.
- At the end of the dwell section is the beginning of the next firing line.
- This point is called “transistor off,” and indicates that the primary current of the coil is stopped, resulting in a high-voltage spark out of the coil.

Pattern Selection

- These three positions are as follows:
 1. Superimposed. This superimposed position is used to look at differences in patterns between cylinders in all areas except the firing line. There are no firing lines illustrated in superimposed positions.

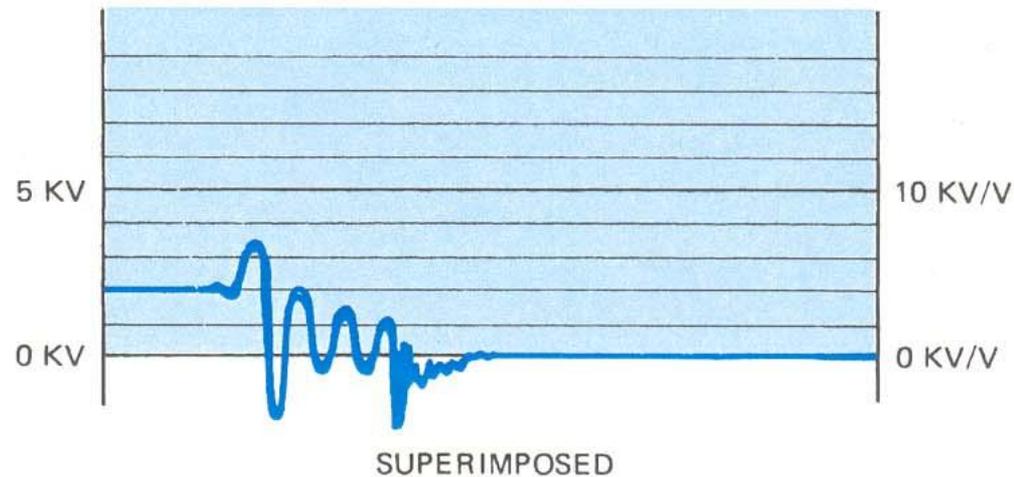


FIGURE 20-39 Typical secondary ignition pattern. Note the lack of firing lines on superimposed pattern.

Pattern Selection (continued)

2. Raster (stacked). Cylinder 1 is at the bottom on most scopes. Use the raster (stacked) position to look at the spark line length and transistor-on point. The raster pattern shows all areas of the scope pattern except the firing lines.

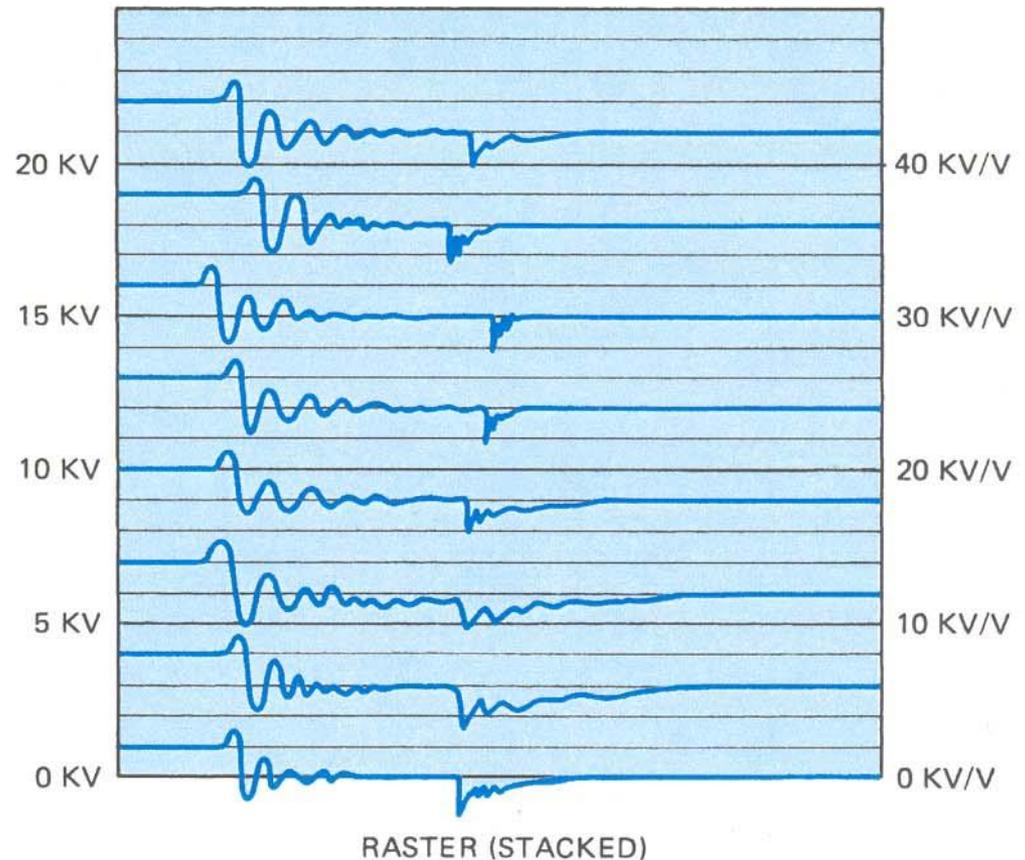
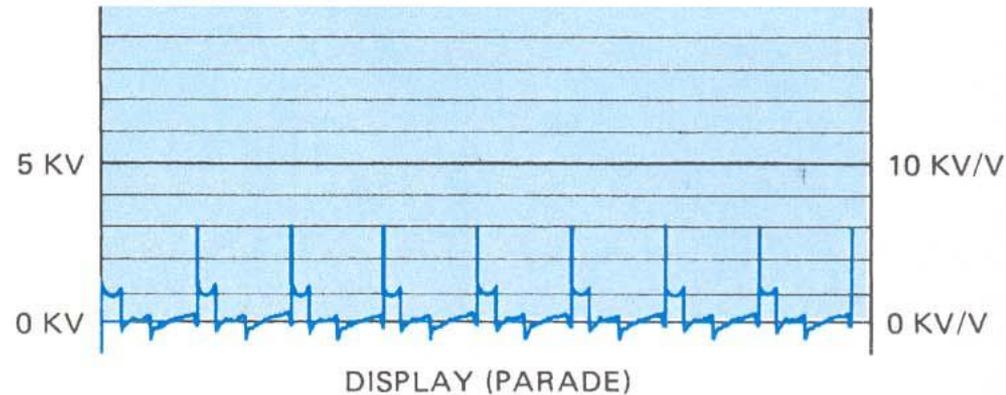


FIGURE 20-40 Raster is the best scope position to view the spark lines of all the cylinders to check for differences. Most scopes display the cylinder 1 at the bottom. The other cylinders are positioned by firing order above cylinder 1.

Pattern Selection (continued)

3. Display (parade). Display (parade) is the only position in which firing lines are visible. The firing line section for cylinder 1 is on the far right side of the screen, with the remaining portions of the pattern on the left side. This selection is used to compare the height of firing lines among all cylinders.

FIGURE 20-41 Display is the only position to view the firing lines of all cylinders. Cylinder 1 is displayed on the left (except for its firing line, which is shown on the right). The cylinders are displayed from left to right by firing order.



Reading The Scope On Display (Parade)

- Firing lines are visible only on the display (parade) position.
- The firing lines should all be 5 to 15 kV in height and be within 3 kV of each other.
- If one or more cylinders have high firing lines, this could indicate a defective (open) spark plug wire, a spark plug gapped too far, or a lean fuel mixture affecting only those cylinders.

Reading The Spark Lines

- Spark lines can easily be seen on either superimposed or raster (stacked) position.
- On the raster position, each individual spark line can be viewed.
- The spark lines should be level and one-fourth as high as the firing lines (1.5 to 2.5 kV, but usually less than 2kV).

Reading The Spark Lines (continued)

- The spark line voltage is called the **burn kV**.
- The *length* of the spark line is the critical factor for determining proper operation of the engine because it represents the spark duration time.
- Following are guidelines for spark line length:
 - 0.8 ms – too short
 - 1.5 ms – average
 - 2.2 ms – too long
- If the spark line is too short, possible causes include the following:
 1. Spark plug(s) gapped too widely
 2. Rotor tip to distributor cap insert distance gapped too widely (worn cap or rotor)
 3. High-resistance spark plug wire
 4. Air-fuel mixture too lean (vacuum leak, broken valve spring, etc.)

Reading The Spark Lines (continued)

- If the spark line is too short, possible causes include the following:
 1. Spark plug(s) gapped too widely
 2. Rotor tip to distributor cap insert distance gapped too widely (worn cap or rotor)
 3. High-resistance spark plug wire
 4. Air-fuel mixture too lean (vacuum leak, broken valve spring, etc.)

Reading The Spark Lines (continued)

- If the spark line is too long, possible causes include the following:
 1. Fouled spark plug(s)
 2. Spark plug(s) gapped too closely
 3. Shorted spark plug or spark plug wire

Spark Line Slope

- Downward-sloped spark lines indicate that the voltage required to maintain the spark duration is decreasing during the firing of the spark plug.
- This downward slope usually indicates that the spark energy is finding ground through spark plug deposits (the plug is fouled) or other ignition problems.

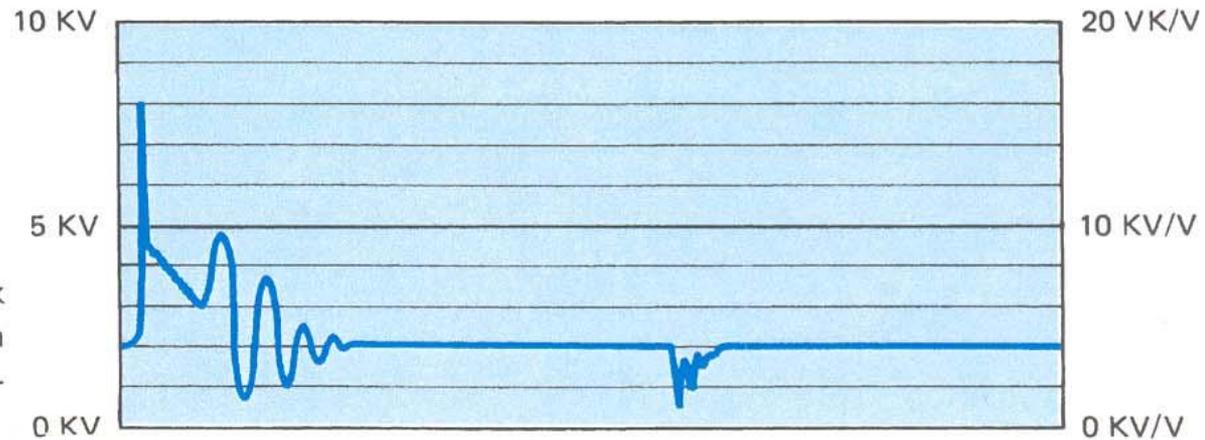


FIGURE 20-42 A downward-sloping spark line usually indicates high secondary ignition system resistance or an excessively rich air-fuel mixture.

Spark Line Slope (continued)

- An upward-sloping spark line usually indicates a mechanical energy problem.
- A defective piston ring or valve would tend to seal better in the increasing pressures of combustion.
- As the spark plug fires, the effective increase in pressures increases the voltage required to maintain the spark, and the height of the spark line rises during the duration of the spark.

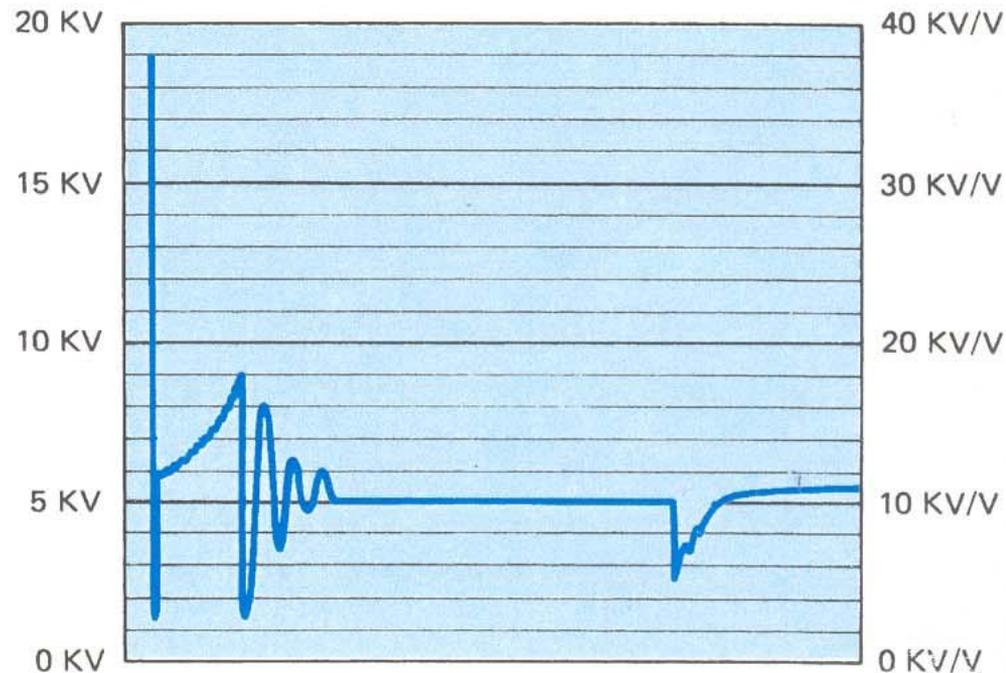
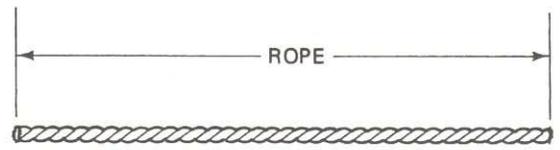


FIGURE 20-43 An upward-sloping spark line usually indicates a mechanical engine problem or a lean air-fuel mixture.

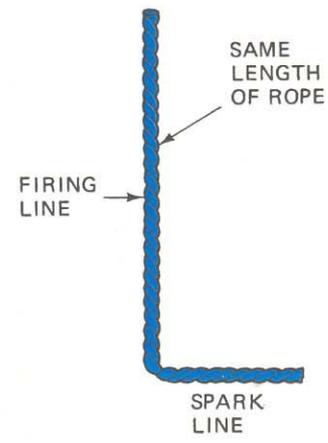
Spark Line Slope (continued)

- An upward-sloping spark line can also indicate a lean air-fuel mixture.
- Typical causes include:
 1. Clogged injector(s)
 2. Vacuum leak
 3. Sticking intake valve

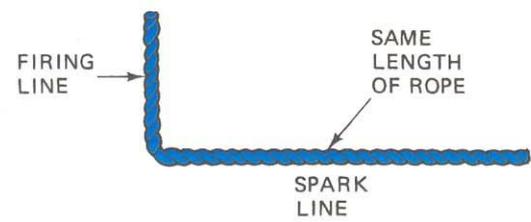
Spark Line Slope (continued)



LENGTH OF ROPE REPRESENTS AMOUNT OF ENERGY STORED IN IGNITION COIL



SAME LENGTH OF ROPE (ENERGY). IF HIGH VOLTAGE IS REQUIRED TO IONIZE SPARK PLUG CAP, LESS ENERGY IS AVAILABLE FOR SPARK DURATION. (A LEAN CYLINDER IS AN EXAMPLE OF WHERE HIGHER VOLTAGE IS REQUIRED TO FIRE WITH A SHORTER-THAN-NORMAL DURATION.)



IF LOW VOLTAGE IS REQUIRED TO FIRE THE SPARK PLUG (LOW FIRING LINE), MORE OF THE COIL'S ENERGY IS AVAILABLE TO PROVIDE A LONG-DURATION SPARK LINE. (A FOULED SPARK PLUG IS AN EXAMPLE OF LOW VOLTAGE TO FIRE, WITH A LONGER-THAN-NORMAL DURATION.)

FIGURE 20-44 The relationship between the height of the firing line and length of the spark line can be illustrated using a rope. Because energy cannot be destroyed, the stored energy in an ignition coil must dissipate totally, regardless of engine operating conditions.

Reading The Intermediate Section

- The intermediate section should have three or more oscillations (bumps) for a correctly operating ignition system.
- Because approximately 250 volts are in the primary ignition circuit when the spark stops flowing across the spark plugs, this voltage is reduced by about 75 volts per oscillation.
- Additional resistances in the primary circuit would decrease the number of oscillations.
- If there are fewer than three oscillations, possible problems include the following:
 1. Shorted ignition coil
 2. Loose or high-resistance primary connections on the ignition coil or primary ignition wiring

Ignition System Troubleshooting Guide

- The following list will assist technicians in troubleshooting ignition system problems.

Problem	Possible causes and/or solutions
No spark out of the coil	Possible open in the ignition switch circuit Possible defective ignition module (if electronic ignition coil) Possible defective pickup coil or Hall effect switch (if electronic ignition) Possible shorted condenser
Weak spark out of the coil	Possible high-resistance coil wire or spark plug wire Possible poor ground between the distributor or module and the engine block

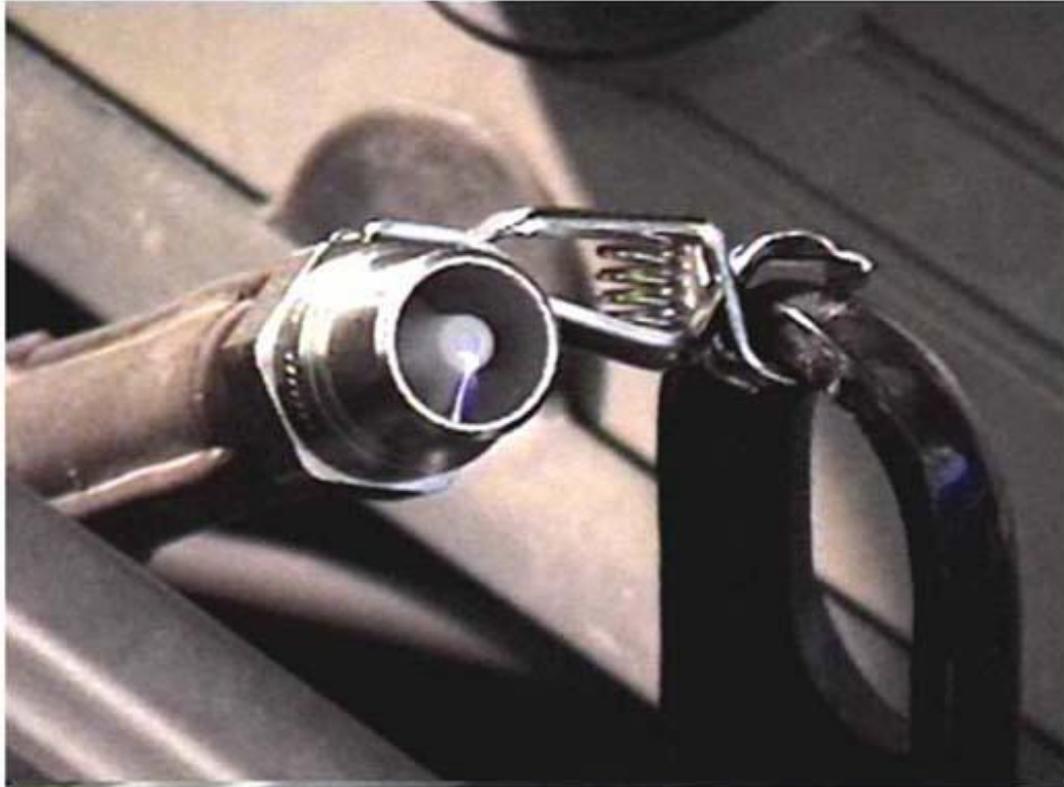
Ignition System Troubleshooting Guide (continued)

Problem	Possible causes and/or solutions
Engine missing	Possible defective (open) spark plug wire Possible worn or fouled spark plugs Possible defective pickup coil Possible defective module Possible poor electrical connections at the pickup coil and/or module

REVIEW QUESTIONS

- Why should a spark tester be used to check for spark rather than a standard spark plug?

Ignition System Diagnosis Photo Sequence



PS 19-3 Attach a spark tester to the end of the spark plug wire and then clip the spark tester to a good engine ground. Start the engine and observe the spark tester. A spark should consistently jump the gap indicating that the system is capable of supplying at least 25,000 volts (25 kV).

REVIEW QUESTIONS

- What harm can occur if the engine is cranked or run with an open (defective) spark plug wire?

REVIEW QUESTIONS

- What are the sections of a secondary ignition scope pattern?

REVIEW QUESTIONS

- What can the slope of the spark line indicate about the engine?

Ignition System Diagnosis Photo Sequence



PS 19-4 Engine faults as well as ignition system faults can often be detected by using a tester capable of measuring spark plug firing voltage such as this unit from Snap-On tools. Connect the ground clip to a good engine ground and clip the probe around a spark plug wire.

Ignition System Diagnosis Photo Sequence



PS 19-5 Start the engine and rotate the thumb wheel until the red light emitting diode (LED) just flickers off and then read the firing voltage on the display. This cylinder shows about 12-13 kV with conventional firing. This reading is about normal (5 to 15kV).

Ignition System Diagnosis Photo Sequence



PS 19-7 Another tester that can be used is one from OTC tools. To use this tester, connect the ground clip to a good engine ground and connect the test probe around a spark plug wire.

Ignition System Diagnosis Photo Sequence



PS 19-8 Start the engine and select “spark kV.” This is the voltage required to fire the spark plugs; this display indicates 16.4 kV. This is higher than normal and could be due to a high-resistance spark plug wire or a wide gap spark plug.

Ignition System Diagnosis Photo Sequence



PS 19-9 Move the selector to read “burn kV.” The reading indicated 1.9 kV. This is the voltage necessary to keep the spark firing after it has been started. It should be less than 2 kV for most vehicles.

Ignition System Diagnosis Photo Sequence



PS 19-10 Move the selector to “burn time.” The reading is 1.2 mS (milliseconds). This is the duration of the spark and it should be between 1 and 2 mS.