

- [F2]** – Proceed: return to the Main Menu;
[F5] – Access the DIS setup screen (see Figure 1-24).

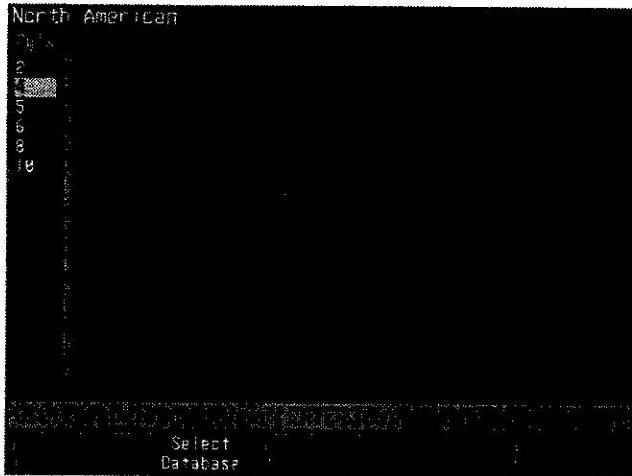


Figure 1-24

You will be required to select the number of cylinders, make and engine description (see Figure 1-25). Press **[ENTER]** after each selection. When finished, you will be returned to the Vehicle Setup/Quick Spec Entry screen.



Figure 1-25

Step 4: Select a Test

1. Use the Arrow Keys to move back and forth along the Main Menu bar at the top of the screen. One of four pop-down menus displays on the screen.
2. Use the Up or Down Arrow Keys or press the test number to highlight the test from the pop-down menu.
3. Press **[ENTER]** to start the test.

Direct Access

Use "Direct Access" to select the exact test you wish to run, without searching for it in the regular menu system.

To display the "Test List," press **[F5]** from any menu screen. The "Test Direct Access" screen appears, (see Figure 1-26).

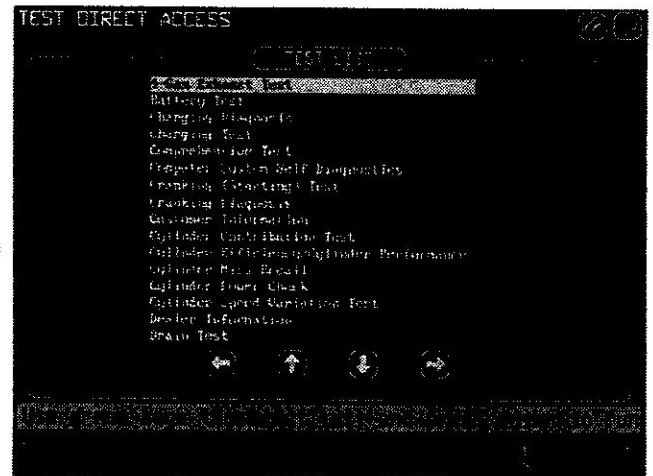


Figure 1-26

Use the Up and Down Arrow Keys to highlight a test. Start the test by pressing **[ENTER]**. Or press the letter to go the corresponding letter in the list (for example, pressing **[S]** takes you to the "S" section of the list).

Step 5: Connect the Test Leads

We recommend that you connect all the test leads before running any diagnostic tests. Figure 1-27 shows a conventional ignition lead hookup. Connecting all the leads allows you

maximum efficiency and flexibility in selecting the tests needed to diagnose a problem. It will also ensure accurate test results and correct diagnostic messages from the tests you run.

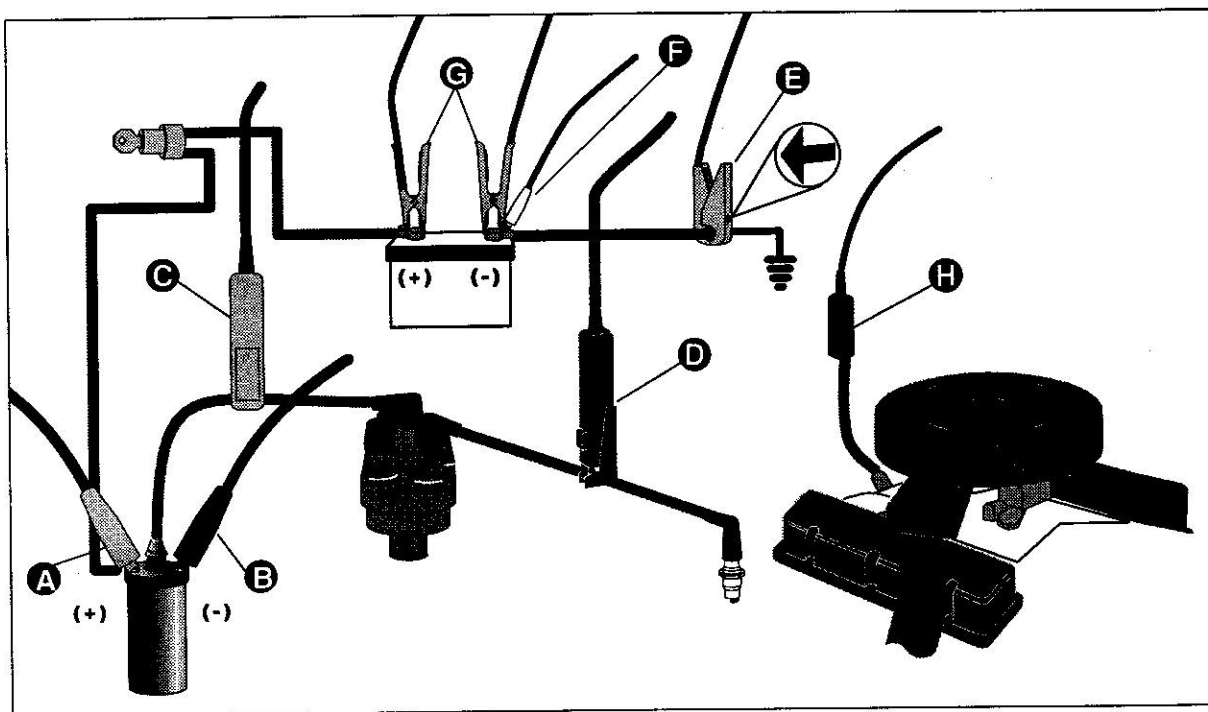


Figure 1-27

A - Coil Positive — Connect (yellow) to Positive coil terminal.

B - Coil Negative — Connect (blue) to Negative coil terminal.

C - Secondary Probe — Place around high tension lead from coil to distributor. Must be completely closed; not touching plug wires, metal parts, vacuum hoses or water. Supplies high voltage information. (Not used in DIS testing.)

D - Green #1 Probe — Place around #1 spark plug wire. Supplies cylinder #1 firing information.

E - Gray Amp Probe — Place around the positive or negative battery cable. Supplies current information. Clamp must be around all wires to terminal. **NOTE:** Check the arrow on the clamp carefully! If probe is clamped around negative terminal wires, arrow should point toward battery. If probe is clamped around positive terminal wires, arrow should point away from battery.

F - White Clip — Connect to Negative battery terminal. Provides system ground.

G - Positive and Negative Battery Load Leads — Connect to the battery posts.

Secondary Ignition Adapters

The **H-Clip Adapter** (see Figure 1-28) provides a hookup site for the yellow and blue primary lead clips on late model Ford and GM vehicles.

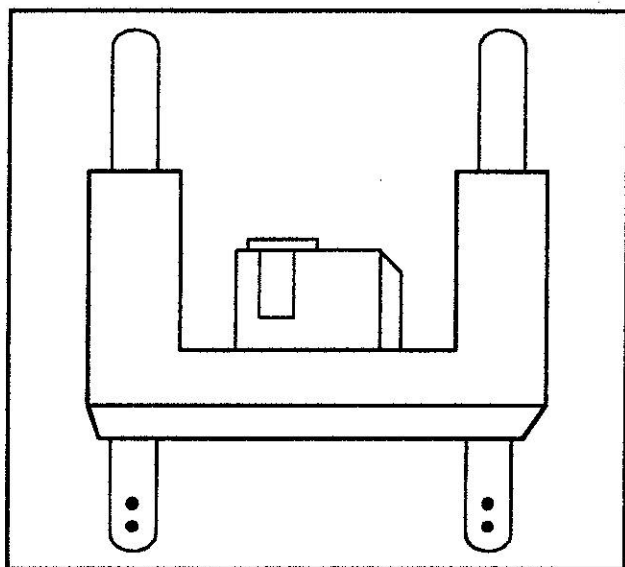


Figure 1-28

Ford: Slip the two dimpled prongs into the distributor coil. Connect the blue clip to the smooth prong on the negative side of the coil. Clip the yellow clip to the smooth prong on the positive side of the coil.

GM: Disconnect the coil wires at the coil. Slip the center connectors of the adapter into the socket where the coil wires were connected. Attach the disconnected coil wires to the dimpled prongs. Then connect the blue clip to the smooth prong on the negative side of the coil. Clip the yellow clip to the smooth prong on the positive side of the coil.

GM H.E.I. Adapter: This adapter is supplied with your Engine Analyzer (see Figure 1-29). The adapter is used in place of the yellow pickup on all GM HEI vehicles equipped with integral coil/distributor systems. Disconnect the yellow pickup from the secondary lead. Plug the HEI adapter into the secondary lead and screw the connector ring over it. Attach the HEI adapter to the vehicle at the coil.

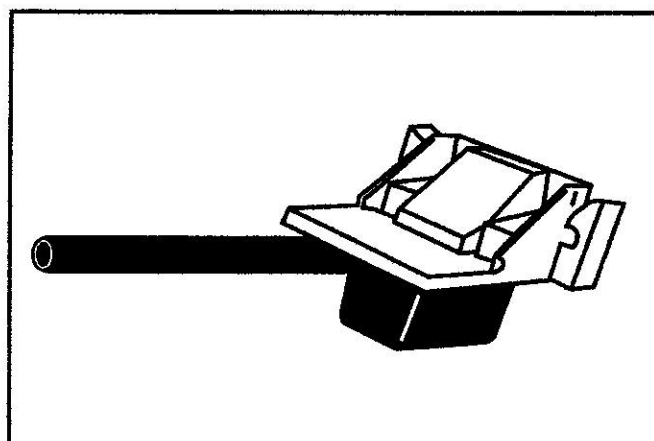


Figure 1-29

Toyota HEI Adapter: Use this adapter probe in place of the standard yellow, high-tension secondary probe.

Attaching the Adapter Probe

1. Align the adapter probe clip (A) with slots and pin on adapter probe (B), then turn counter-clockwise to secure in place. See Figure 1-30.

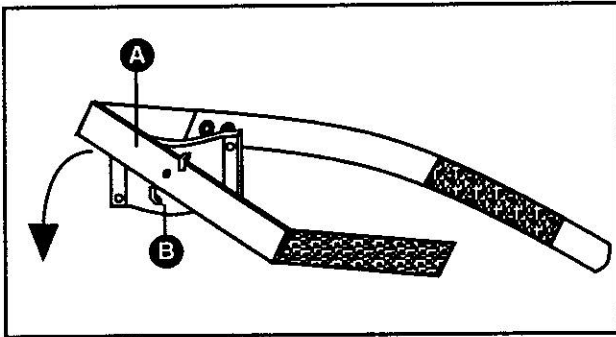


Figure 1-30

2. Place adapter probe on front-center of distributor cap.
3. Wrap adapter probe clip strap tightly around distributor cap, then press velcro ends together to secure (see Figure 1-31).

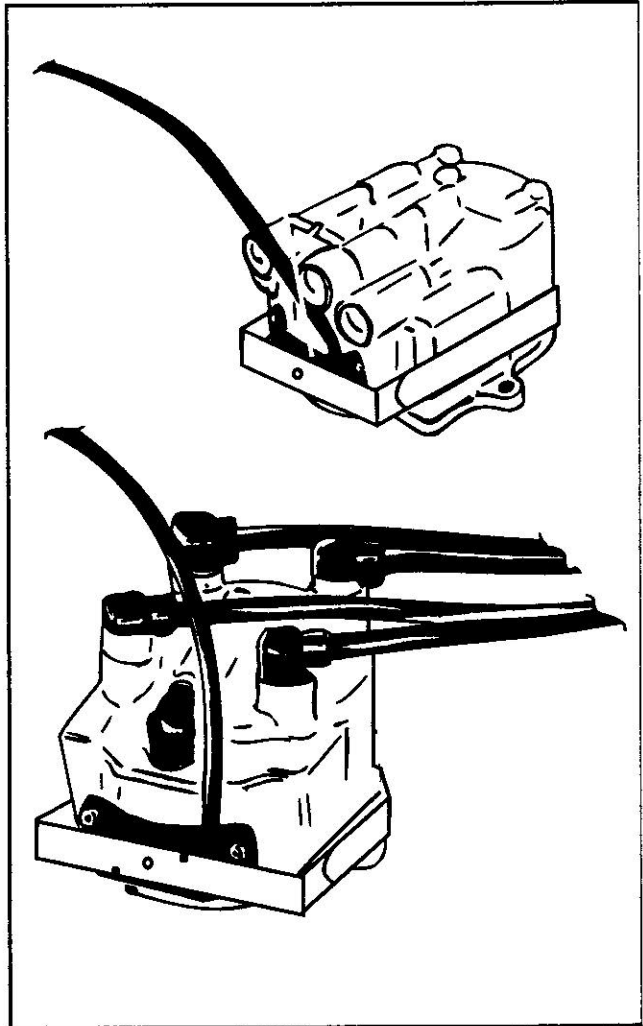


Figure 1-31

Removing the Adapter Probe

1. Pull velcro material apart.
2. Remove adapter probe assembly.

DIS Leads

DIS Secondary Probe Assemblies

There are two secondary probe assemblies. One assembly is positive (red); one is negative (black). Each assembly has four small clips. These must be clipped securely around each spark plug wire on the test vehicle. On 4- and 6-cylinder systems, some clips will be dangling free. Make sure they are not touching the engine block or any other wires. Make sure any extra wires cannot come into contact with a moving fan blade.



Pull vehicle plug wires apart so that they are at least 1" apart from each other. Connect the DIS leads to the plug wires. Make sure that the DIS leads are at least one inch apart from each other and from ground. This prevents "cross talk" between leads.

Figure 1-32 shows some of the common connections required for DIS operation. If RPM readings are unstable, press [F7] and change the trigger type. Choose "Primary" from the trigger box.

Use the low current probe to get the primary signal. Connect the probe around the most direct wire from the ignition switch to the DIS ignition coil module, to avoid noise caused by other components in the circuit. You may have to consult the manual for the vehicle that you are testing to find the correct wire and location to use.

Make/Ignition Type	Engine Size	Pin Location/Wire Color
Chrysler	1.6L	Pin 4 - Black/White
Chrysler	3.3L (1990)	Lt. Green/Black
Ford DIS	1.9L (1991)	DIS Triple Spark System
Ford DIS	4.0L, 1.9L	Wire to Pin 8 - EDIS Module
Ford DIS	3.0L, 3.8L	Red/Lt. Green
Ford DIS	2.3L	Pin R2, L2 - Red/Lt. Green
GM Type	3.0L, 3.8L	Pin P - Pink/Black at Coil Connector
GM Type	3.0L, 3.8L	Pin M - Pink/Black at Coil Connector
GM Type	3.3L, 3300	Pin M - Pink/Black at Coil Connector
GM Type	3.8L, 3800	Pin P - Pink/Black at Coil Connector (Closest to Alternator)
GM CPC	2.0L, 2.5L	Pink/Black or Solid Red Two Wire Connector (Left Side of Coil)
GM CPC	2.8L	Two Wire Connector - Pink/Black
GM IDI	2.3L	Pin L - Solid Pink Last Pin on Top Row of Connector (Closest to Firewall before Inverting Unit)
Mazda	80 CID	Pin 2 - Black/Yellow
Mitsubishi	1.6L	Pin 4 - Black/White
Nissan	1.8L	Black Wire Loop next to Igniter, Left Front of Motor
Saab	2.0L	#1 Probe around all Four Wires - Blue, Green, Orange and Gray in Ignition Coil Harness
Toyota	3.8L	Pin 4 - Brown Wire Green Connector 4-Wire Connector on Left Side of Coil Unit Cover

Figure 1-32

Special DIS Secondary Clip Connections

NOTE For the GM 2.3L (QUAD-4) with IDI System, a special procedure is required to connect secondary clips:

GM 2.3L (QUAD-4) —

1. Remove and invert the coil assembly. Reinstall the assembly so coil terminals are accessible.
2. Install plug wires between the coil terminals and the spark plugs. (Order your spark plug adapter kit through Automotive Diagnostics part number 00044431-001. GM also makes a kit for this and it is available from your local dealer.)
3. Clip the secondary clips onto the spark plug leads just installed, according to the polarity setup of the vehicle.

See manufacturer's information for more details on this procedure.

Ford 2.3L — This is a double spark system with a full-time pack that does most of the work, and a part time pack that only operates under certain conditions, for emissions controls. Test these ignition systems in two steps:

1. Connect DIS leads to the full-time pack and run all tests in the usual way.
2. After testing the full-time pack, connect the DIS leads to the part-time pack. Press [F2] and perform a DIS setup routine again, with engine running at idle (the part-time pack is always active at idle). After verifying setup on the part-time pack, run any necessary ignition system tests to check the part-time pack.

NOTE A variety of accessory lead sets are available for DIS and DI vehicles, such as:

DIS 12-Cylinder Lead Set (metal) — 6 Red/Positive and 6 Black/Negative leads work with all secondary ignition cable diameters. Part number B44-112. Requires the B44-102 DIS/DI Extension Harness (see below).

Nissan 1.6L/1.8L DI Secondary Lead Set — Works on all 1.6 Liter and 1.8 Liter Direct Ignition Systems. Part number B44-501. Requires the B44-102 DIS/DI Extension Harness (see below).

Nissan 300ZX/Infiniti J30 DI Secondary Lead Set — Works on all 300ZX and Infiniti J30 Direct Ignition Systems. Part number B44-502. Requires the B44-102 DIS/DI Extension Harness (see below).

BMW Direct Ignition System Lead Set — Works on all 6- and 8-cylinder BMW engines (M-50 and M-60 class) that use individual ignition coils. Part number B44-401. Requires the B44-102 DIS/DI Extension Harness (see below).

DIS Converter All Negative — This adapter converts positive DIS and negative DIS leads to all-negative DIS leads. When used with four positive and four negative, will provide up to eight negative polarity inputs to the engine analyzer. Part number B44-101.

DIS/DI 400 Extension Harness Kit — This 17-foot long extension harness replaces the existing DIS harness at the Engine Analyzer connector. It provides a connector that allows the use of existing 170/270 series Engine Analyzer DIS secondary lead sets. Part number B44-102.

Check the Trigger Lead Status

After connecting the leads to the vehicle, press [F7]. The "Trigger Lead Status" screen will appear. Check the input signals from the leads and the gas analyzer to make sure that they are working correctly.

1. Make sure that the secondary leads are properly connected according to the polarity setup.
2. Make sure each secondary clip is securely connected to its spark plug wire.
3. Make sure the green #1 lead is installed on the #1 cylinder wire, as far away from the DIS module as possible. The lead should be connected between the secondary clip and the plug.

Press [F2] to continue on with testing.

Step 6: Run the Test and Access Diagnostic Messages

Follow the screen prompts. Each test usually provides a "live" screen which allows you to see the current system status. The "live" screen will show you the results of any adjustments that you make.

Whenever the procedural portion of any test is completed and the diagnostic results are displayed, press [F2] to read the diagnostic messages. The diagnostic message screen (see Figure 1-33) lists the possible problem, its causes and a list of suggestions of possible solutions.

Press the Arrows Keys if they appear, to scroll up or down the text. At times, "F Key" prompts will also appear, allowing you to display related diagnostic message screens.

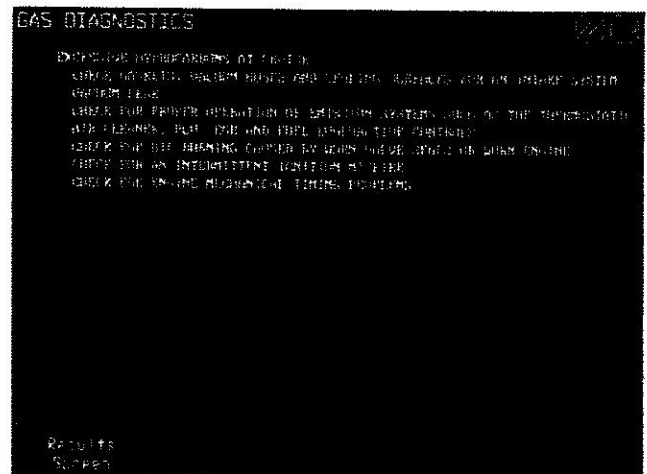


Figure 1-33

Step 7: Print Test Reports

After the diagnostic portion of any test, press [F10]. When the menu screen appears, press [F12]. The "Print Reports" screen will appear (see Figure 1-34).

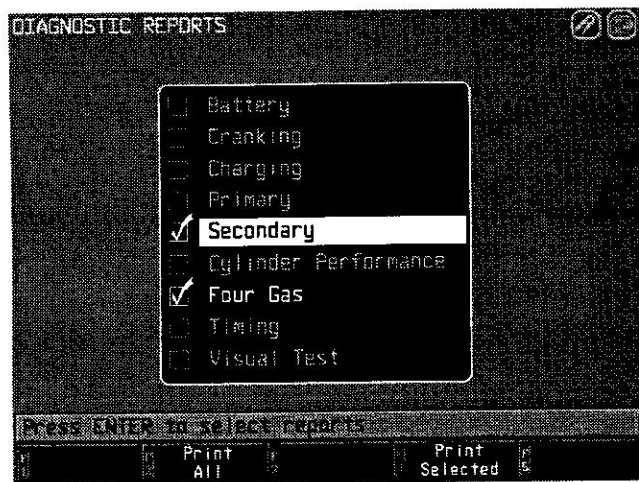


Figure 1-34

The screen lists all of the available reports. Report names in white are ready to print. "Ghosted" reports are not available, because the diagnostic test was not run.

Press:

The Arrow Keys to move the cursor up or down the list;

[ENTER] to select the test(s) to print;

- [F2] – to print all the available tests;
- [F3] – to print the Quick Comprehensive Test Report. This item will appear only if the Quick Comprehensive Test was completed.
- [F4] – to print any test marked by a check mark.
- [F12] – to print the test results for the highlighted system only.

Printed reports will include the station header, (station name, address and sales message, if any - see the "Utilities" chapter for more information), customer information, the test results and the diagnostic messages.



Remember, the reports from the Diagnostic Reports screen will contain the most current data available.

If you run a Quick Comprehensive Test, all of the systems that data was collected for will be white and will contain test results.

If you then run any diagnostic test (from either the Diagnostic Test Menu or the Service Tools Menu), and then press [F12] from any menu screen, all of the items will be highlighted.

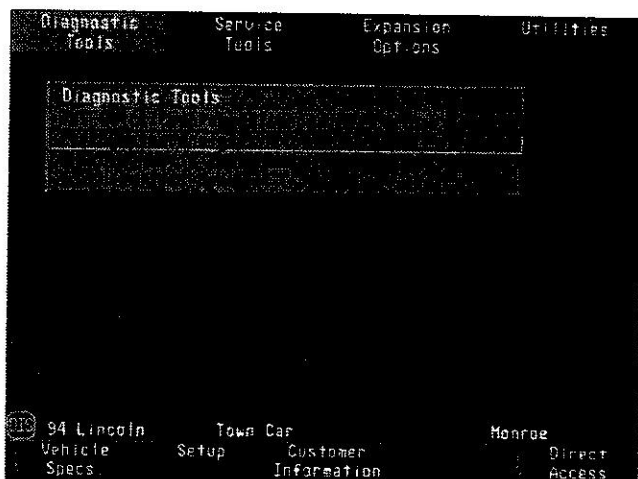
Example: Suppose you run a complete Quick Comprehensive test. Then you run the Primary and Secondary tests from the Diagnostic Test Menu. Your printouts will contain test results as follows:

From the menu screen, press [F12]. The "Reports" screen will appear (refer to Figure 1-34). If you press [F2], the printout will contain all of the most recent data - the results for the Primary and Secondary tests will reflect the Service or Diagnostic tests that you just ran. The other reports however, will contain data from the Quick Comprehensive test that was completed earlier.

If you press [F3] from the Diagnostic Reports screen, the analyzer will print out all of the Quick Comprehensive test results, since they are stored separately from the "Diagnostic Reports" results. If you run another Quick Comprehensive test or load a new customer, all of the test results will be overwritten.

Chapter 2

Diagnostic Tools



Main Icons



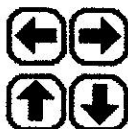
Press [F7] to see Lead Status Screen. Flashing icon indicates problem with one or more leads.



Press [F10] to display previous menu screen.



DIS Specs loaded.



Arrow Keys are active - press the appropriate arrow to scroll up or down a text screen, or change the scale on a meter screen.

The Diagnostic Tools Menu provides several different options for diagnosing vehicle systems:

Quick Comprehensive Test — This semi-automatic test runs a standard series of tests on all vehicle engine systems. This test is designed to run with a minimum of vehicle manipulation on your part.

Symptom Analysis — The operator enters information about symptoms and this program narrows down the possible causes.

Diagnostic Test Menu — This menu provides a specific set of vehicle system diagnostic tests. Each test enters the diagnostic test immediately, without a "live" data screen step.

User Test Menu — This menu can contain up to ten (10) customized test sequences that you design to meet your special needs.

Hot Keys

- [F6] — **Help**—Displays help screens.
- [F7] — **Trigger Lead Status**—Displays *Trigger Lead Status* screen.
- [F8] — **Kill** - Stops the engine.
- [F9] — **Clear** - Clears data fields and displays.
- [F10] — **Previous Menu** - Aborts the test in progress and return to the previous menu or proceed to the next test in a user test.
- [F11] — **Form Feed** - Form feeds paper from the printer.
- [F12] — **Print Reports** - Displays the *Print Reports* menu.
- [Print Screen] — Prints a "screen dump", an exact copy of what appears on the screen.

Quick Comprehensive Test

The *Quick Comprehensive* test is an automatic sequence of system tests, designed to provide an overall look at vehicle performance.

During testing, the computer collects and stores diagnostic information. At the end of testing, this information is provided in complete customer and technical reports. The reports show vehicle performance data compared to specifications. Reports include diagnostic messages, which point out problem areas and discuss possible causes.

The *Quick Comprehensive* test sequence is arranged so that:

- The analyzer provides a clear overall look at performance while vehicle systems are operating;
- Very little manipulation of the vehicle is required;
- Testing of all performance-related systems on the vehicle takes a minimum of time;
- The analyzer provides comprehensive diagnostic messages which are displayed on the screen and/or are printed on any report generated.

To check specific systems further after running the *Quick Comprehensive* test, select the appropriate test from the *Diagnostic Test Menu*.

The Comprehensive test procedure will vary according to vehicle specifications, as follows:

When a vehicle's specifications do not show a fast idle speed, or when the fast idle speed is the same as the normal idle speed, the *Fast Idle* test will not be performed during comprehensive testing. To perform the *Fast Idle* test on such a vehicle during comprehensive testing, edit the specifications to show a fast idle speed.

If specifications are not entered for *Total Advance Timing* and *Mechanical (Centrifugal) Advance Timing*, the *Basic Timing* test is the **ONLY** test that will be performed. To perform *Total Advance Timing* and *Mechanical Timing* tests, the operator must edit the specifications to show values for these items.

When specifications indicate that ignition timing cannot be adjusted (as in the case of some DIS ignitions), the entire timing procedure is skipped. The *Quick Comprehensive* tests can be run without using the gas analyzer, if desired. However, the tests will not have the benefit of emissions values when determining diagnostics.



Make sure the vehicle cannot roll! Set the parking brake and place transmission in "PARK" or, "NEUTRAL" (manual transmissions only). If necessary, chock the wheels.



The *Quick Comprehensive* menu item will be ghosted (colored gray) until full specs are loaded. You cannot access this function without loading complete vehicle specifications into analyzer memory.

Prepare For Testing

1. Turn the analyzer ON and allow it to warm up.
2. Enter the customer and vehicle specifications. Refer to the "Introduction" chapter for complete details.

NOTE If there is any difference between the emissions control decal information found on the vehicle and the disk-based specifications, use the Edit Specifications screen to enter the emissions decal information.

3. Connect the test leads to the vehicle. Connect all of the leads as shown in Figure 1-26 to give a complete picture of engine performance and diagnostics.
4. Slide the building exhaust removal system hose over the tailpipe. Turn on the exhaust fan. Allow the vehicle to warm up to normal operating temperature.
5. If necessary, turn off all lights and accessories. Make sure the ignition key is "OFF."
6. Select "Quick Comprehensive Test" from the "Diagnostic Tools" menu.
7. The "Trigger Lead Status" screen appears. Check the lead status and make any adjustments necessary.
8. With the remote keypad in hand, press [F2] to begin the test.

NOTE The following section covers the Visual Inspection sequence. It is important to note that Visual Inspection will not appear if it was deselected in the Engine Analyzer Configuration Setup procedure.

Visual Inspection

1. The "Visual Inspection" screen will appear (see Figure 2-1).

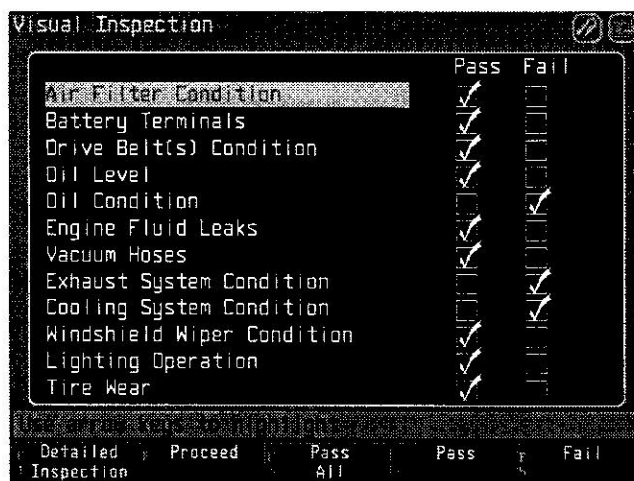


Figure 2-1

Press:

- [F1] – to display the *Detailed Inspection* screen (see Figure 2-2). This screen shows additional items which are part of the system and are highlighted on the *Visual Inspection* screen;
- [F2] – to continue with the *Quick Comprehensive* test;
- [F3] – to pass all of the items on the list. The analyzer places a check mark in all boxes and then continues with the test procedure.
- [F4] – to pass the highlighted item;
- [F5] – to fail the highlighted item.

Use the arrow keys to move the cursor up and down the list. Press the right-arrow key (or [F5]) to "fail" the item. Press the left-arrow key (or [F4]) to "pass" the item.

Press [F1] to create a custom visual inspection menu. The *Detailed Inspection* screen will appear (see Figure 2-2).

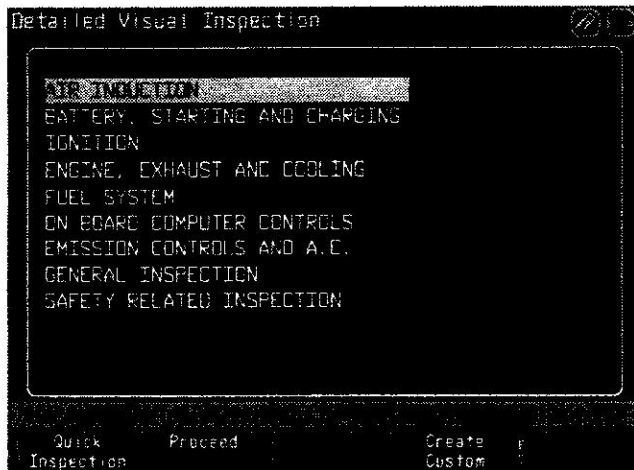


Figure 2-2

Press:

- [F1] – to return to the *Visual Inspection* screen;
- [F2] – to continue with the *Quick Comprehensive* test;
- [F4] – to create a custom visual inspection checklist. Follow the screen prompts and type in the test title and the inspection items. You can make up to ten different lists of up to 20 items each.

It is important to perform a thorough inspection of the test vehicle before running the Quick Comprehensive Test. Checking the vehicle will prevent testing problems caused by obviously bad wires, vacuum lines, fan belts, etc. Use the list which follows as a guide to a visual inspection.

Battery

- Check for loose hold-downs.
- Check electrolyte level; fill if necessary.
- Check cable connections for good contact, cleanliness, excessive corrosion. Clean and tighten as needed.

Battery (continued)

- Check cables for fraying, breaks, poor insulation.
- Check battery case for cracks.

Belts

- Check fan belt for cracks, impending breaks, proper tension; tighten or fix as needed.
- Check all other drive belts in the same way and make necessary corrections.

Fluid Levels

- Check engine oil level and add if necessary.
- Check transmission fluid; add if needed.
- Also check other fluid levels: power steering, brake system, windshield washer, etc.

Filters, Emission Control Devices

- Check air filters (carburetor, air pump, crank-case breathers), PCV, air injection, other emission devices, vacuum control valves, etc.

Electrical Connections

- Check wiring (low and high tension) for cleanliness, tightness, seating, general condition.

Exhaust System

- Check resonator, muffler, exhaust pipes, clamps, tail pipes and catalytic converter for breaks, leaks.

Hoses

- Check all hoses (PCV, heater, radiator, power steering, vacuum, fuel, evaporative control, etc.) for general condition, leaks, cracks, tightness, proper connection, etc.

Radiator and Cap

- Check coolant level; fill as needed.
- Check cap for condition.

Test Procedure

1. The Battery Test screen appears. Follow the screen prompts and enter the Cold Cranking Amps (CCA), if necessary. The battery CCA specification that appears on screen is the minimum value required for the vehicle. If a larger CCA battery is installed in the vehicle, input the higher value in the CCA field.

Press [F5] to change the units. A small menu appears. Choose between any of the following units of measurement:

- CCA** – Cold Cranking Amps
- DIN** – German Institute for Normalization units
- IEC** – International Electrotechnical Commission units
- A-Hrs** – Amp-Hours

Shut the engine OFF. Press [ENTER] to start the test. The battery test will commence (see Figure 2-3).

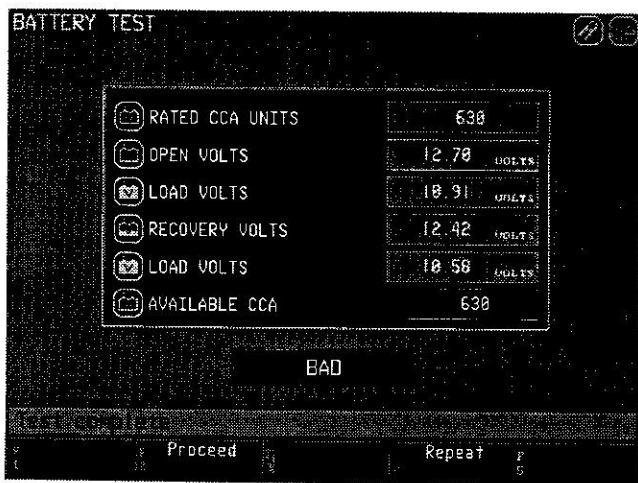


Figure 2-3

2. After the Battery Test is complete, the *Quick Comprehensive* test screen appears (see Figure 2-4). Follow the screen prompts and zero the Light Gray High Amp probe. Press [F2] to continue the test.

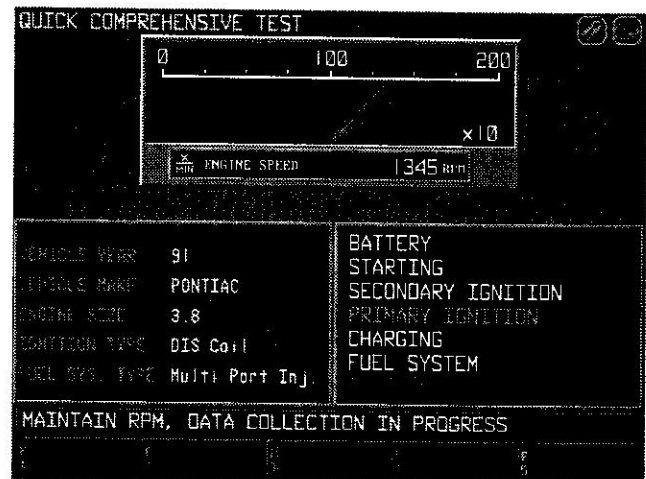


Figure 2-4

As the test runs, the green highlight in the test list box moves up and down, indicating which systems are being tested. The analyzer executes the tests in the most efficient manner, which means that each test will not necessarily be completed in exact order.

After the testing portion is completed, a series of Result screens appear. Figure 2-5 shows the first screen in the series that will usually appear.

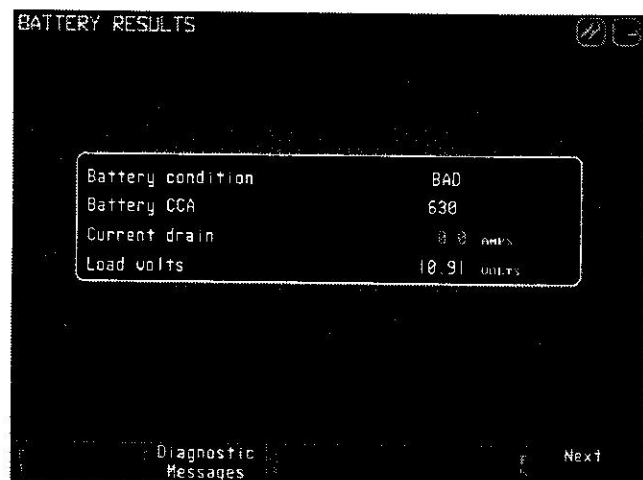


Figure 2-5

Symptom Analysis

Colored data fields indicate test results as follows:

- Green** – good, within specification
- Red** – bad, above or below specification
- Yellow** – marginal
- White** – the analyzer does not diagnose the data.

Press:

- [F2]** – Display diagnostic messages relating to this series of tests.

After reviewing the last results screen, press:

- [F10]** – to return to the main menu;
- [F12]** – to print the test results. For complete details refer to "Print Test Reports" in Chapter 1.

Reviewing Previous Test Results

When you return to the menu screen after completing a *Quick Comprehensive* test, a new "F Key" will appear on the screen. Press [F4] to review the results of the *Quick Comprehensive* test and print out a copy, or copies of the test results.

If you save the test results to disk as a *Quick Comprehensive* Test using the "Save To Disk" function, you can recall the results later. Use the *Retrieve From Disk* function in the *Utilities* menu to reload the record into the analyzer. When you return to the menu screen, the "F4" key will appear, and you can then press [F4] to review and/or print out a copy of the *Quick Comprehensive* test results. The analyzer will print the date that the test was completed on the top of the test result page.

If you retrieve a *Quick Comprehensive* test from disk and then run another test of any type, the *Quick Comprehensive* results will be deleted from analyzer memory (but remain stored on-disk). This prevents the analyzer from using out-of-date data for diagnosis.

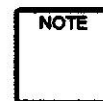
Symptom Analysis is a computerized guide to troubleshooting that will help you determine the source of vehicle malfunctions and suggest possible remedies.

A number of symptoms may be selected, ranging from stalling problems to the appearance of exhaust smoke.

After you have selected all observed symptoms and conditions, the computer runs the analysis and displays the results on the screen and/or prints a report.

Procedure

1. Select *Symptom Analysis* from the *Diagnostic Tools* menu.



If you have not selected a vehicle yet, you will be prompted to select the type of fuel system and whether or not the vehicle has an O₂ sensor (see Figure 2-6). Type the number(s) of your selection(s), then press [F2] to continue.

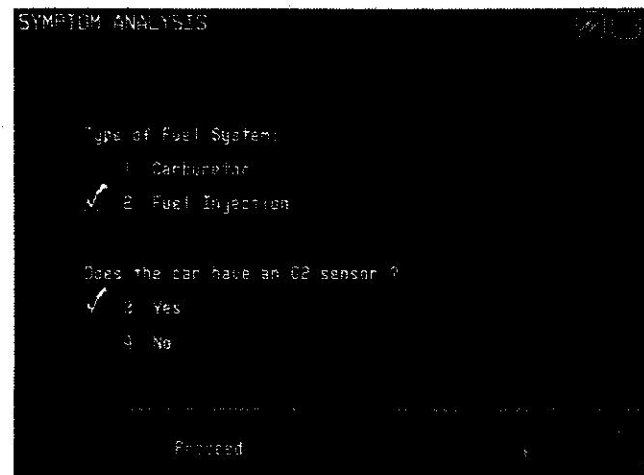


Figure 2-6

A list of symptoms will be displayed (see Figure 2-7).

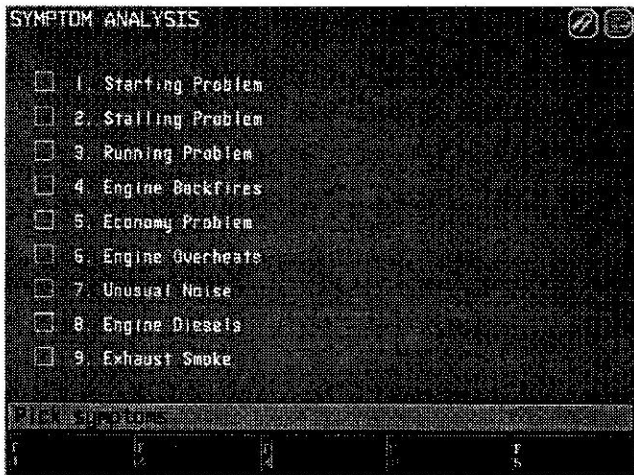


Figure 2-7

2. Press the number next to a symptom in the displayed list that matches the symptom the vehicle shows.
3. When you select certain symptoms, such as *Starting Problem* or *Running Problem*, you will be prompted to select specific symptoms (see Figure 2-8).

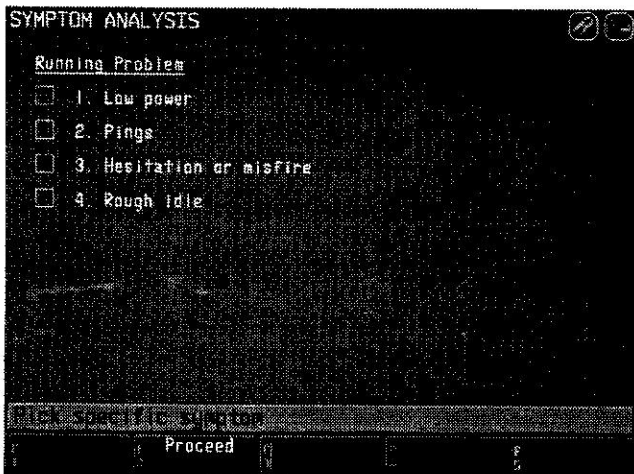


Figure 2-8

Press the number matching the correct specific symptom. When you select certain specific symptoms, such as *Hesitation* or *Misfire*, you will be prompted to select the condition(s) under which the symptom occurs (see Figure 2-9).

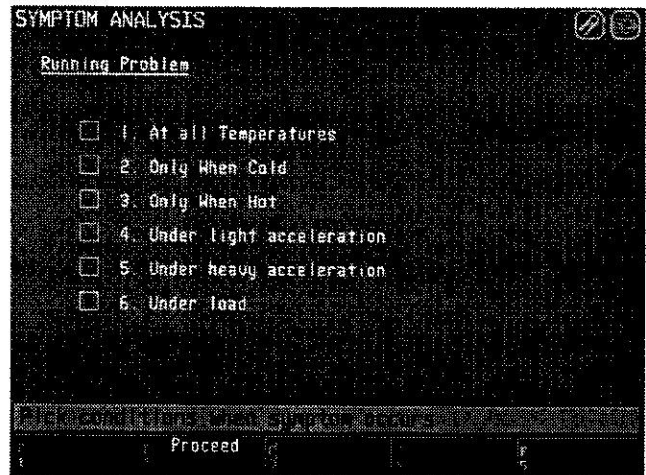


Figure 2-9

You can select more than one condition. Press the number(s) matching the correct condition(s).

4. When finished, press:
 - [F1] – to run the analysis;
 - [F2] – to continue to the symptom selection list and pick additional symptoms that are occurring.
5. Follow the prompts on the next screens and confirm the vehicle symptoms and conditions. Observe the "F Keys" at the bottom of the screen and either confirm the information (press [F2] - "Yes") or make changes (press [F4] - "No" and then re-select). When finished, press [F2]. The analyzer computer will run the diagnostic routine and will display an analysis on the screen.

If you have chosen a single symptom, the screen will appear as shown in Figure 2-10.

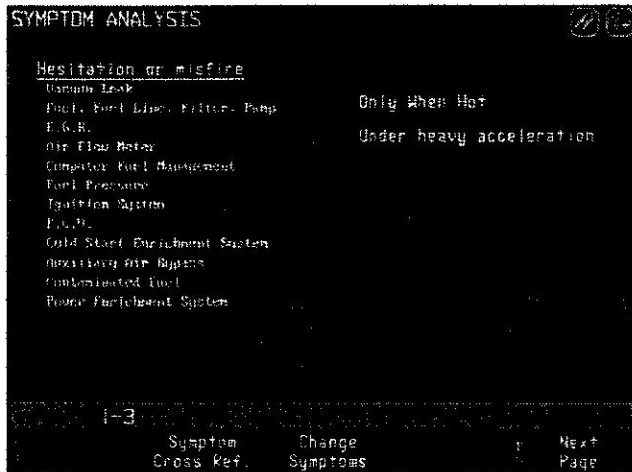


Figure 2-10

Press:

- [F2] – return to the previous *Symptom Analysis* screen;
- [F3] – to change the symptoms;
- [F5] – go to the next page of symptom analysis;
- [F10] – to return to the *Diagnostic Tools* menu;
- [F12] – to print a *Symptom Analysis* report on the printer.

If you have chosen multiple symptoms, the chart shown in Figure 2-11 will appear.

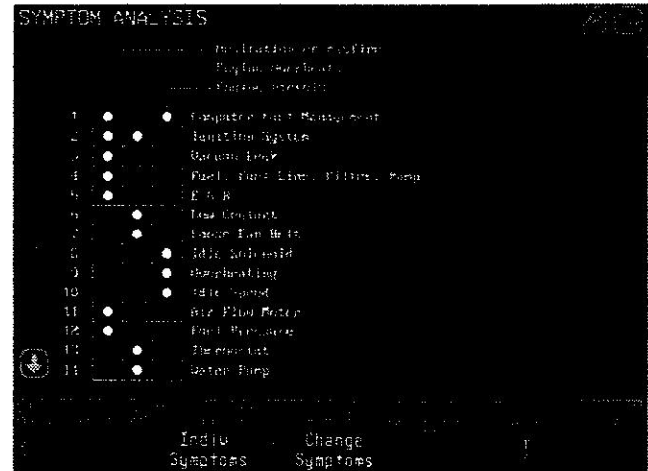


Figure 2-11

The circles inside the boxes indicate which components might be causing one or more of the symptoms you have selected.

The chart is weighted - the components most likely to be causing the problem are listed first.

Press:

- The Arrow Keys** – to scroll up and down the "cause" list;
- [F2] – to display the individual symptoms on a screen that looks similar to Figure 2-10;
- [F3] – to return to the *Symptoms List* to choose another symptom;
- [F10] – to return to the *Diagnostic Tools* menu;
- [F12] – to print a hard copy of the entire chart.

Diagnostic Test Menu

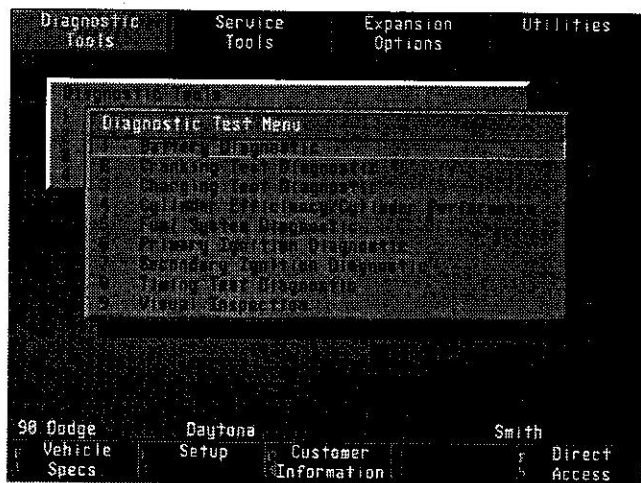


Figure 2-12

This menu provides you with a selection of diagnostic routines for testing vehicle systems. Each of these routines immediately enters a diagnostic routine, which will run the test, provide diagnostic messages and test results which can be printed out.

Use the Arrow Keys to select the test or type the number of the test you wish to run. Press [ENTER] to start each test.

Battery Diagnostic Overview

This routine is designed to test and report on the condition of any 12-volt automotive battery. The test reports the following data:

- Available CCA** — (Cold Cranking Amps) from the battery.
- Open Circuit Voltage** — measured at the battery positive and negative terminals.
- Load Voltage** — measured at the battery positive and negative terminals while a load is placed on the battery.
- Recovery Voltage** — measured at the positive and negative terminals during a period of time after the load is removed from the battery.

Minimum Leads Required:

- Battery Load Leads on battery terminals.

Recommended Lead Hookup:

- Connect all leads per Figure 1-27.

Test Procedure

1. Follow the screen prompt and type in the battery CCA rating. If you are not sure of the battery's rating, refer to a battery application manual, or enter the numbers per the chart below.

No. of Cylinders	CCA
4	400
6	500
8	575

Type in the CCA Rating and press [ENTER]. To change the battery rating units, press [F5]. The *Battery Rating Units* screen will appear. Type the number which matches the rating units you will use. The available units:

- CCA** – Cold Cranking Amps;
DIN – German Institute for Standardization units;
IEC – International Electrotechnical Commission units;
A-HR – Amp-Hours.

2. The test will run and the results screen will appear (see Figure 2-13).

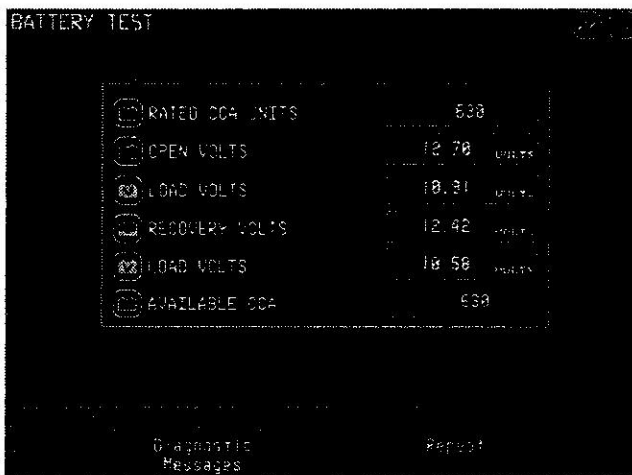


Figure 2-13

Results in green are within specification. Results in yellow are marginal - no diagnostics are available. Results in red are above or below acceptable established limits. If the results appear in white, there are no diagnostics available because Vehicle Specifications were not entered.

Press:

- [F2]** – to display the diagnostic messages;
[F4] – to run the test again;
[F10] – to return to the *Diagnostic Test Menu*;
[F12] – to access the *Print Reports* menu.

Cranking Test Diagnostic Conventional Ignitions



Place the transmission in "PARK" or, if manual, "NEUTRAL." Set the parking brake. Make sure the vehicle cannot roll. If necessary, chock the wheels.

Required Lead Hookup:

- Green #1 Lead
- Coil Positive Lead (Yellow)
- Coil Negative Lead (Blue)
- System Ground Lead (White)
- Positive and Negative Battery Load Leads
- Vacuum/Pressure Transducer
- Amps Probe

Recommended Lead Hookup:

- Connect all leads per Figure 1-27.

1. If the engine is running when you select the test, the analyzer will inhibit the ignition and shut off the engine. Follow the screen prompt (see Figure 2-14) and crank the engine until it starts.

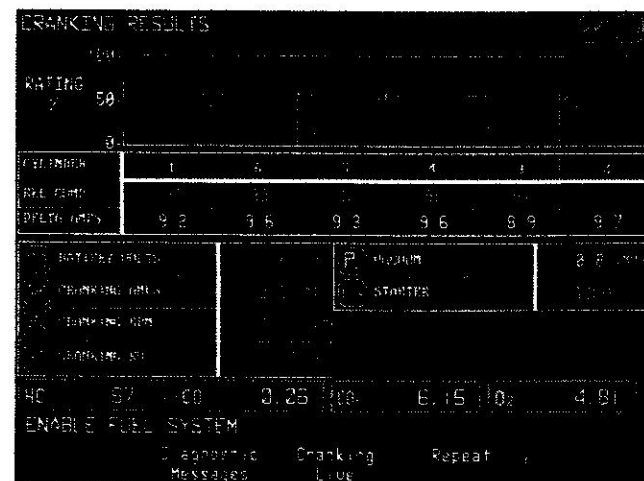


Figure 2-14

Press:

- [F2] – to display diagnostic messages, after the engine starts;
- [F3] – to display the *Cranking Live* screen;
- [F4] – to repeat the test.

When you press [F3], a *Cranking Live* screen appears (see Figure 2-15). Use this screen to make sure that all leads and vehicle components are working correctly. If the “AMP” digital meter shows a high or negative reading, zero the light gray amp probe.

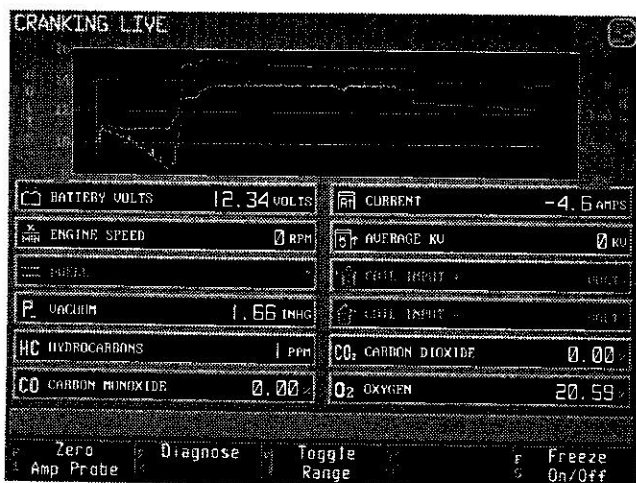


Figure 2-15

Press:

- [F1] – to zero the amp probe;
- [F2] – to run the diagnostic routine;
- [F3] – to toggle the ranges of the data displayed between high and low scales;
- [F4] – default is to “On”, which “kills” the ignition system (conventional ignitions only), press to remove inhibit and allow engine to start;
- [F5] – to freeze data.

Direct Ignition Systems (DIS)



Place transmission in “PARK” or, if manual, “NEUTRAL.” Set the parking brake. Make sure the vehicle cannot roll. If necessary, chock the wheels.

Required Lead Hookup:

- Green #1 Lead
- System Ground Lead (White)
- Positive and Negative Battery Load Leads
- Vacuum/Pressure Transducer
- Secondary DIS High Tension Adapters
- Low Current Probe
- Amp Probe

Follow the screen prompt and disable the fuel system as described below. Then crank the engine until it starts and press [F2] to display Diagnostic Messages.

Ported Fuel Injection (PFI) with Clear Flood Mode, and Sequential Fuel Injection (SEFI) with Clear Flood Mode

1. Turn the ignition key to the RUN Position.
2. Depress the Accelerator all the way to WIDE OPEN THROTTLE.
3. Begin cranking the engine until prompted to enable fuel system.
4. Release the Accelerator and continue cranking until the engine starts.



If the engine starts during Step 3, immediately release the accelerator pedal and retest.

Ported Fuel Injection (PFI) without Clear Flood Mode, and Sequential Fuel Injection (SEFI) without Clear Flood Mode

1. Disconnect the Fuel Pump Relay or Inertia Switch.
2. Run the engine until all fuel is exhausted from the fuel system.
3. Follow the screen prompts.

Throttle Body Injection (TBI) and Central Fuel Injection (CFI)

1. Disconnect the fuel injector connector(s) at the fuel injector.
2. Run the engine until all fuel is exhausted from the fuel system.
3. Follow the screen prompts.

Disabling Carbureted Fuel Systems

Carburetor with Electric Fuel Pump

1. Disconnect fuel pump relay or wiring connector to fuel pump.
2. Run the engine until all fuel is exhausted from the carburetor bowl.
3. Follow the screen prompts.

Carburetor with Mechanical Fuel Pump

1. Crimp rubber fuel inlet hose with hose pliers.
2. Run the engine until all fuel is exhausted from the carburetor bowl.
3. Follow the screen prompts.

Carburetor with Decel Valve

1. Disconnect decel valve per manufacturers recommendations.
2. Run the engine until all fuel is exhausted from the carburetor bowl.
3. Follow the screen prompts.

Charging Test Diagnostic

Overview

The Charging Test allows you to measure the alternator output under a load condition. This test also provides you the tools necessary to check the diode condition.

Conventional Ignitions

Required Lead Hookup:

- Green #1 Lead
- Coil Positive Lead (Yellow)
- Coil Negative Lead (Blue)
- System Ground Lead (White)
- Positive and Negative Battery Load Leads
- Amp Probe

Recommended Lead Hookup:

- Complete hookup per Figure 1-27.

Direct Ignition Systems (DIS)

Required Lead Hookup:

- Green #1 Lead
- System Ground Lead (White)
- Positive and Negative Battery Load Leads
- Secondary DIS High Tension Adapters
- Amp Probe
- Low Current Probe (required only if there is an inadequate secondary signal. In that case, the low current probe should be connected to the B+ ignition module.)

Test Procedure



Place the transmission in "PARK" or, if manual, "NEUTRAL." Set the parking brake. Make sure the vehicle cannot roll. If necessary, chock the wheels.

1. Follow the screen prompt and run the engine at 2000 RPM. The green line on the graph represents voltage. The gray line represents alternator amps.

NOTE

If the alternator amps are over 20, a timer will appear on the screen. The test may then take up to thirty seconds to complete.

The analyzer will then place a load on the battery and then allow the battery to stabilize.

2. Follow the next screen prompt and run the engine at idle. The analyzer will then apply a load to the battery.

The diode pattern will appear on the screen (see Figure 2-16).

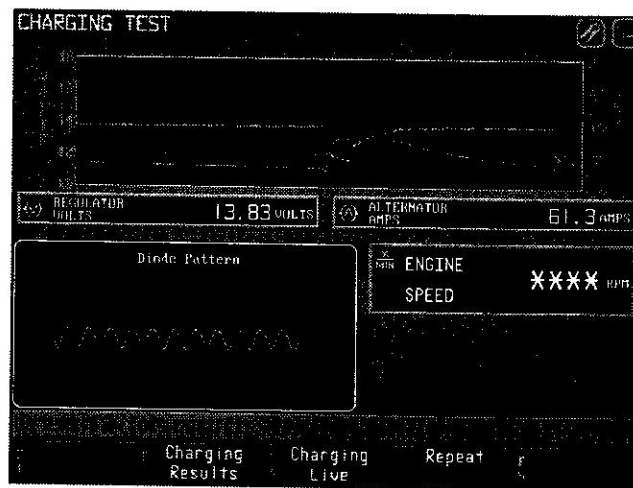


Figure 2-16

Press:

- [F2] – to display the *Results* screen;
- [F3] – to display the *Charging Live* screen;
- [F4] – to repeat the test.

Results Screen

When you press [F2] the *Results* screen appears (see Figure 2-17).

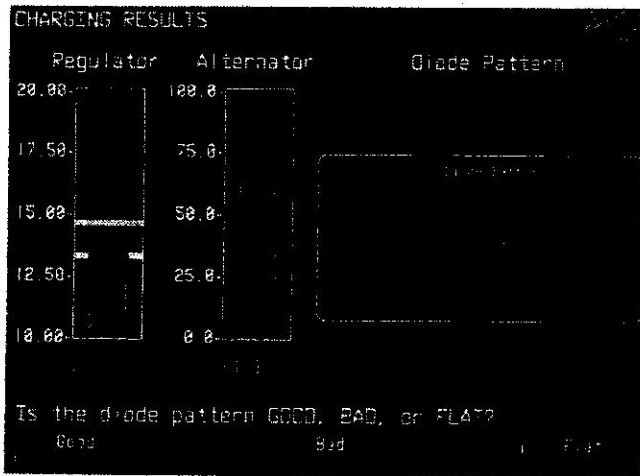


Figure 2-17

The gray bars represent the actual readings. The yellow bars on the "Regulator" graph represent marginal readings. For acceptable results, the gray bar should appear well inside the green area on both graphs. The digital readings shown below the graphs will also indicate whether the results are acceptable. Readings outside specified limits will appear in red.

The analyzer then prompts you to judge the diode pattern. Refer to Figure 2-18.

Press:

- [F1] – to indicate the diode pattern is good;
- [F3] – to indicate the diode pattern is bad;
- [F5] – to indicate the diode pattern is flat.

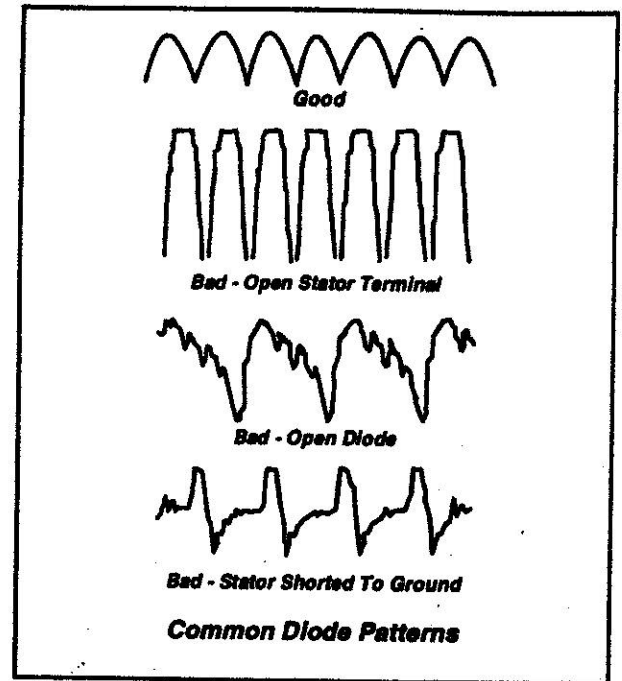


Figure 2-18

A good pattern will show regular, even waves, with some variation acceptable. A bad pattern has uneven or irregularly shaped waves. A flat pattern indicates the alternator is not working at all.

After you indicate the pattern condition, press:

- [F2] –to display the diagnostic messages;
- [F3] –display the *Charging Live* screen;
- [F10] –to return to the *Diagnostic Tools* menu;
- [F12] –to print the test report.

Charging Live Screen

When you press [F3], a *Charging Live* screen appears (see Figure 2-19). Use this screen to make sure all leads and vehicle components are working correctly. If the "AMP" digital meter shows a high or negative reading, zero the amp probe.

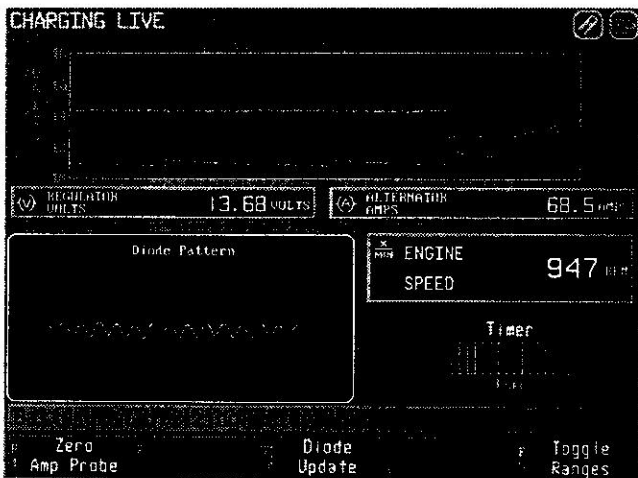


Figure 2-19

Press:

- [F1] – to zero the amp probe;
- [F3] – to update the diode pattern which appears on the screen;
- [F5] – to toggle the scales on the data display between a high and low scale.



If it is necessary to zero the amp probe, remove the probe from the vehicle and completely close the probe jaws. After the analyzer completes the *Zero Amp Probe* procedure, replace the probe, making sure it is clamped around ALL of the negative battery leads! Check the arrow on the clamp carefully. If the probe is clamped around the negative terminal wires, the arrow should point toward the battery. If the probe is clamped around the positive terminal wires, the arrow should point away from the battery.

Cylinder Efficiency/Performance

Cylinder Efficiency (Conventional Ignitions)

The Cylinder Efficiency test measures the relative power contribution of each cylinder to overall engine performance. The test measures power lost when each cylinder is inhibited. Then the computer calculates the relative contribution of each cylinder and displays that information on the screen in the form of a bar graph.

Required Lead Hookup:

- Green #1 Lead
- Coil Positive Lead (Yellow)
- Coil Negative Lead (Blue)
- System Ground Lead (White)
- Vacuum/Pressure Transducer

Recommended Lead Hookup:

- Connect all leads per Figure 1-27.

Select *Cylinder Efficiency/Cylinder Performance* from the *Diagnostic Test Menu*. The *Cylinder Efficiency* data screen will appear with the message "Shorting Cylinder # n" (where 'n' is the number of the cylinder). Each cylinder will be shorted (in engine firing order) as the data is collected from it.

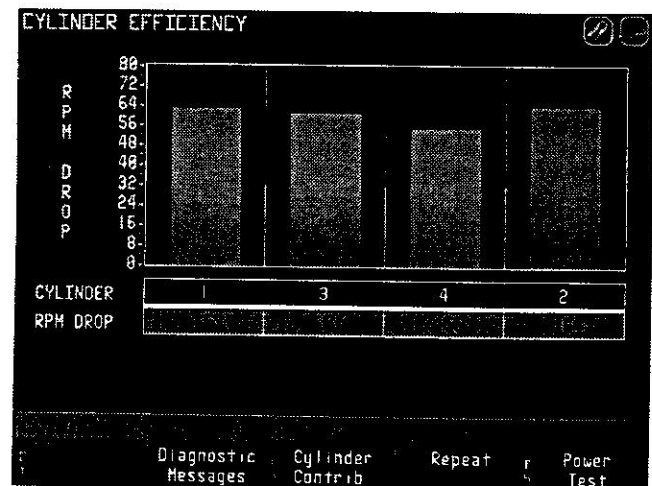


Figure 2-20

After the data has been collected, the computer calculates the results and displays the RPM Drop Values in the boxes under the graph (see Figure 2-20).

Press:

- [F2] – to display Diagnostics;
- [F3] – to display the *Cylinder Contribution* screen (the “live” screen for this test);
- [F4] – to repeat the *Cylinder Efficiency* test;
- [F5] – to run the *Power* test.

The vertical bars represent the power LOST when a cylinder is “killed.” The taller the bar, the greater the power loss. There is a bar for each cylinder, arranged in engine firing order.

The light blue box which appears behind the green bars represents the average RPM for the vehicle. Any bars which appear in red are below the average, and represent a weak cylinder.

Cylinder Contribution

This screen displays the live RPM readings for each cylinder, (see Figure 2-21).

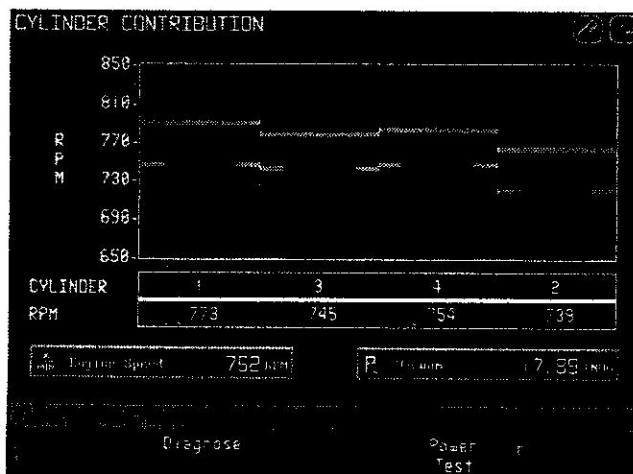


Figure 2-21

The gray bars represent the minimum and maximum readings for each cylinder.

Press:

- [F2] – to run the *Cylinder Efficiency* test;
- [F4] – to run the *Power* test;
- [F9] – to clear the display and begin displaying new information.

The *Cylinder Contribution* screen represents the “Live” screen for this Diagnostic test.

Power Check

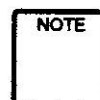
Power Check allows the operator to “kill” cylinders and watch the resulting changes in engine RPM, HC, CO, CO₂ and O₂. This information allows the operator to evaluate the performance of individual cylinders. This test will provide better results on older engines or on engines which are running roughly.

Required Lead Hookup:

- Green #1 Lead
- Coil Positive Lead (Yellow)
- Coil Negative Lead (Blue)
- System Ground Lead (White)
- Positive and Negative Battery Load Leads
- Vacuum/Pressure Transducer
- Exhaust Gas Analyzer Lead

Recommended Lead Hookup:

- Connect all leads per Figure 1-27.



Power Check does NOT apply to DIS systems.

NOTE Some computer-controlled fuel management systems attempt to compensate for RPM loss during *Power Check*. You can often disable this compensating feature according to the vehicle manufacturer's instructions. However, it may be easier to run a *Cylinder Efficiency* test, which will not trigger the computer compensation.

Even if the engine is computer controlled, you may want to run the *Power Check*. If the computer is working properly, you will see the RPM compensation as cylinders are inhibited.

When finished, remember to re-connect any components disconnected from the vehicle.

The *Power Check* screen appears, (see Figure 2-22).

CYLINDER POWER CHECK						
	(RPM)	(INHG)	(PPM)	(%)	(%)	(%)
	756	18.30	2492	0.12	7.90	10.33
1	-14	16.85	1671	0.15	8.58	8.96
3	-68	17.75	1519	0.17	8.76	8.72
4	-30	17.48	1467	0.10	8.65	8.87
2	-30	17.14	1564	0.14	8.55	9.01

Figure 2-22

Follow the screen prompt or press:

- [F1] – to toggle between “Manual” and “Automatic” testing;
- [F3] – to return to the *Cylinder Contribution* screen;
- [F5] – to run the *Cylinder Efficiency* test.

Automatic Testing

The automatic sequence will inhibit each cylinder in firing order, one at a time.

Manual Testing

Make sure that the engine is running at a stable RPM. For manual testing, type in the cylinder number(s) to inhibit. The analyzer then inhibits the cylinder and displays the various readings on the chart on the screen. Type the number of an inhibited cylinder to release that cylinder.

Cylinder Performance (DIS Vehicles)

If you enter specifications for a DIS vehicle, the analyzer will automatically run the *Cylinder Performance* test. The computer calculates the relative contribution of each cylinder and displays that information on the screen in the form of a bar graph.

Required Lead Hookup:

- Green #1 Lead
- Secondary DIS High Tension Adapters
- System Ground Lead (White)

Recommended Lead Hookup:

- Connect all leads per Figure 1-27.

1. The *Cylinder Performance* meter screen appears (see Figure 2-23). Follow the instructions on the screen, start the vehicle's engine and adjust the RPM reading to fall within the shadowed meter range on the screen.
2. Once the RPM is stable within the specified range, the message “Retrieving Cylinder Performance Data” appears.
3. When the analyzer is finished collecting data, the *Cylinder Performance* data screen appears (see Figure 2-24).

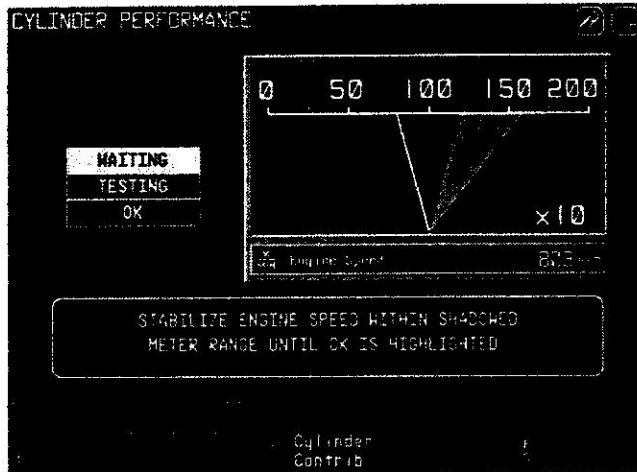


Figure 2-23

The light blue box which appears behind the green bars represents the average RPM for the vehicle. Any bars which appear in red are below the average, and represent a weak cylinder.

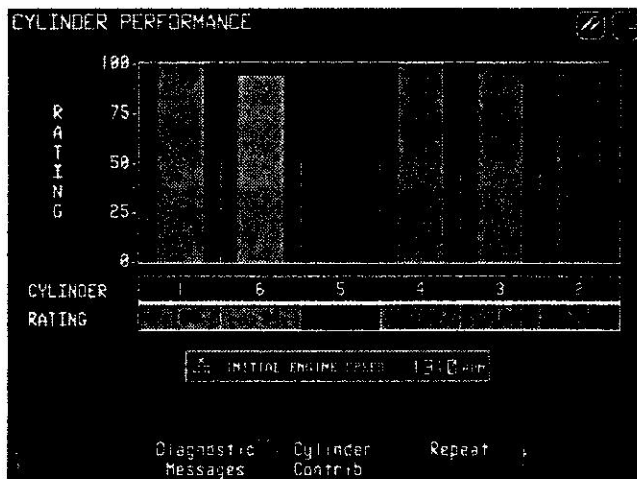


Figure 2-24

4. Press [F3] to display the *Cylinder Contribution* screen, the "live" screen for this test (see Figure 2-25).

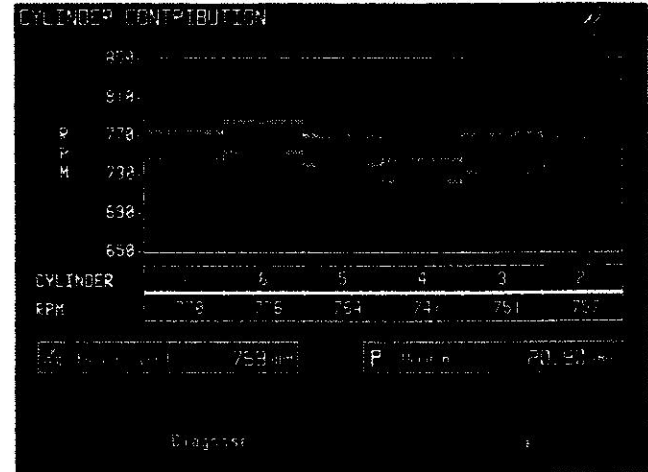


Figure 2-25

5. The vertical green bars represent the contribution of each cylinder to overall engine performance, in the form of individual cylinder RPM. The horizontal gray bars behind the green bars display constantly updated minimum and maximum RPM values for each cylinder during the test run.

Fuel System Diagnostic

This test displays exhaust gas readings for the vehicle at both idle and cruise RPM.

Conventional Ignitions

Required Analyzer Hookup:

- Green #1 Lead
- System Ground Lead (White)
- Exhaust Gas Analyzer Probe
- Secondary Lead and Adapter

Recommended Lead Hookup:

- Connect all leads per Figure 1-27.

Direct Ignition Systems

Required Analyzer Hookup:

- Green #1 Lead
- System Ground Lead (White)
- Positive and Negative Battery Load Leads
- Vacuum/Pressure Transducer
- Secondary DIS High Tension Adapters
- Low Current Probe
- Amp Probe
- Exhaust Gas Analyzer Probe

1. Start the engine, if necessary. Follow the screen prompts and run the engine at cruise RPM. Watch the RPM box - red numbers indicate the RPM is too high, or too low. Green numbers indicate that the readings are within the test limits. When the analyzer detects a stable cruise RPM, the high speed portion of the test will run.
2. Follow the screen prompt and adjust the vehicle's engine to run at the manufacturer's idle RPM. When the analyzer detects an RPM within spec, the analyzer will read the RPM and dilution values, and will display the results on the screen, with a shadow function to show the acceptable range (see Figure 2-26).

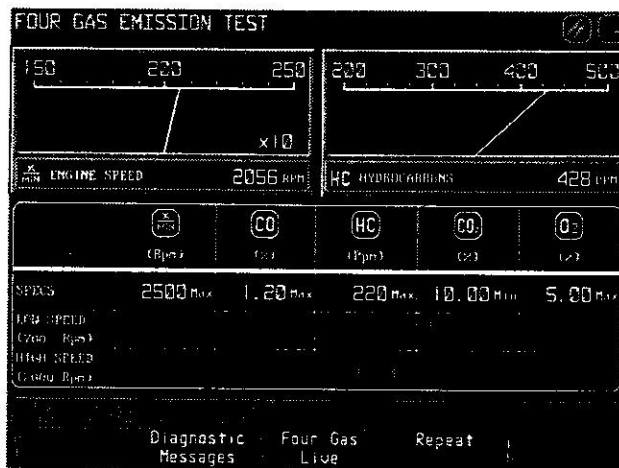


Figure 2-26

Press:

- [F2] – to display diagnostics;
- [F3] – to display the “Live” screen;
- [F4] – to repeat the test. The Engine Speed meter on the left side will always be displayed. Press [F5] to toggle the right meter through each exhaust gas.

Primary Ignition Diagnostic

The Primary Ignition Diagnostic Test collects primary ignition data at idle speed.

Required Lead Hookup:

- Green #1 Lead
- Coil Positive Lead (Yellow)
- Coil Negative Lead (Blue)
- System Ground Lead (White)
- Positive and Negative Battery Load Leads

Recommended Lead Hookup:

- Connect all leads per Figure 1-27.

The test automatically runs once it is selected. The screen shown in Figure 2-27 appears.

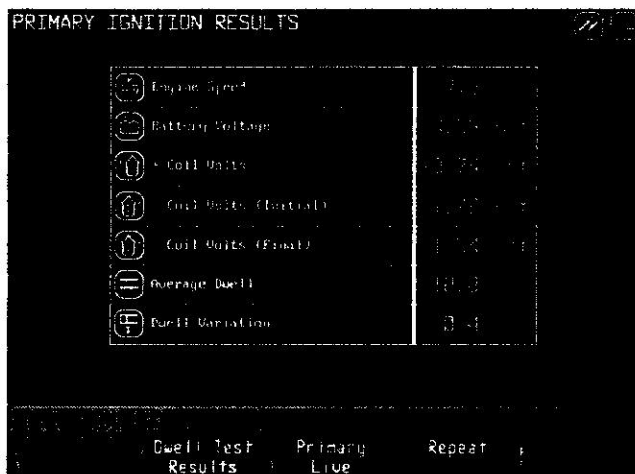


Figure 2-27

Press:

- [F2] – to display the *Dwell Test Results* screen;
- [F3] – to display the *Primary Live* screen;
- [F4] – to repeat the test.

From the *Dwell Test Results* screen (see Figure 2-28), press:

- [F1] – to backup and review the *Primary Ignition Results* screen;
- [F2] – to read the Diagnostic Messages;
- [F3] – to display the *Primary Ignition Live* screen;
- [F4] – to repeat the test.

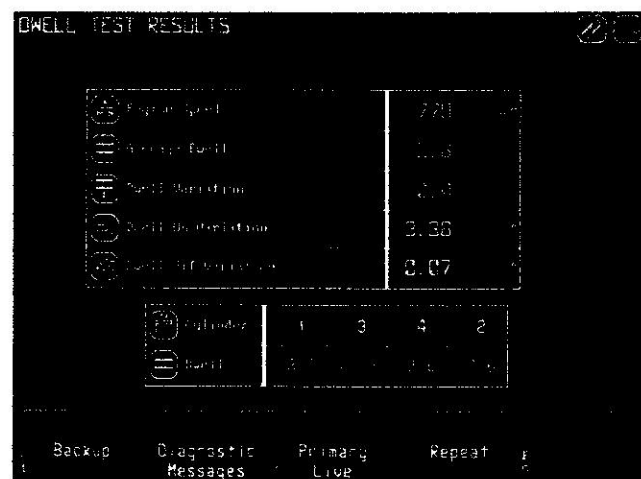


Figure 2-28

From the *Primary Live* screen (see Figure 2-29), press:

- Left- and Right-Arrow keys** – to select the active meter;
- [F1] – to turn the meter trace (used to show trends) "On" and "Off";
- [F2] – to read the diagnostic messages;
- [F3] – to zero-center the active meter.

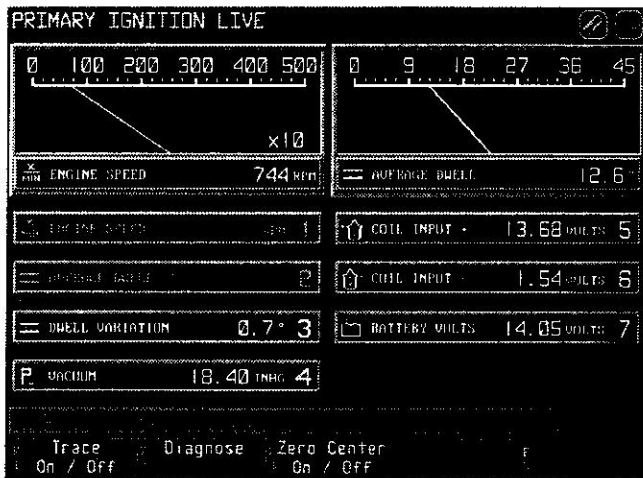


Figure 2-29

Test Result Definitions

Battery Volts — The voltage measured at the battery's positive and negative terminals.

Coil Input + — The voltage measured at the positive terminal of the ignition coil. This measurement is an average of several readings prior to the "Points Open / Transistor Off" portion of the primary pattern.

- Coil Volts — The voltage measured at the negative terminal of the ignition coil. This measurement is an average of several readings just after the "Points Close / Transistor On" portion of the primary pattern.

- Coil Volts (Final) — The voltage measured at the negative terminal of the ignition coil. This measurement is an average of several readings just before the "Points Open / Transistor Off" portion of the primary pattern.

Average Dwell — Each cylinder's average dwell over one distributor revolution. DWELL is the time period measured in degrees or percent that current is flowing in the primary ignition circuit.

Dwell Variation — The Maximum Cylinder Dwell and Minimum Cylinder Dwell during one distributor revolution.

Dwell Test Result Definitions

Average Dwell — The average of each cylinder's dwell over one distributor revolution. DWELL is the period of time measured in degrees or percent that current is flowing in the primary ignition circuit.

Dwell Variation — The Maximum Cylinder Dwell and Minimum Cylinder Dwell during one distributor revolution.

Dwell On Variation — The variation in degrees or percent of the DWELL ON signal. This measurement relates to variations of when the points close or the electronic module turns on to provide power to the ignition coil.

Dwell Off Variation — The variation in degrees or percent of the DWELL OFF signal. This measurement relates to variations of when the points open or the electronic module turns off. This relates to when the spark plug fires in each cylinder.

Cylinder — When the actual firing order is used, this relates to the actual cylinder number. When the actual firing order is not used this relates to the Nth cylinder in the firing order.

Dwell — The individual Dwell of each cylinder during one revolution of the distributor.

Secondary Ignition Diagnostic Conventional Ignition



Figure 2-30

The KV test samples a series of firings for each cylinder, then reports on individual spark plug burn times (milliseconds) and the following KV readings:

"Average KV" — The average KV required to initiate a spark. The amount for each cylinder's secondary circuit is stored and shown on the screen in the proper cylinder column.

"Delta KV" — The difference between the minimum and maximum KV.

"Burn Time" — The length of time in milliseconds that the spark plug is arcing.

"Burn KV" — The average KV required to maintain the spark. The amount for each cylinder's secondary circuit is stored and shown on the screen in the proper cylinder column.

"Burn KV Slope" — The change in Burn KV from the start of the spark line to the end of the spark line.

"Coil Oscillations" — The average number of secondary coil oscillations per cylinder.

After delta KV is displayed, the operator will be prompted to snap the throttle wide open and release it. This action is needed to obtain Snap KV and Circuit Gap values.

"Snap KV" — Secondary KV for each cylinder is sampled under load caused by engine acceleration. The highest value is stored and shown on the screen.

"Circuit Gap KV" — The voltage required to jump the largest air gap (except spark plug gap) in each cylinder secondary circuit is stored and shown on the screen.

Repeating this test may yield slightly different values. This is due to variations in mixture richness, turbulence, temperature, etc.

1. Start the engine. The analyzer samples the cylinder firings and calculates the test values.
2. Follow the screen prompt and "snap" the throttle. The analyzer measures the burn time, various KV readings and circuit gap, and then displays the results for each cylinder on the chart on the screen.

Press:

- [F2] — to access diagnostic messages;
- [F3] — to display the *Secondary Live* screen;
- [F4] — to cancel the test while it is running, or repeat the test after it has completed.

Secondary Live Screen

If you press [F3] the *Secondary Live* screen will appear (see Figure 2-31).

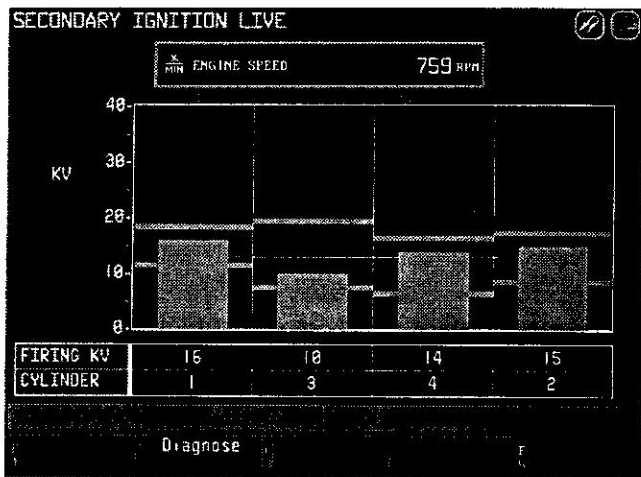


Figure 2-31

Gray bars represent the minimum and maximum KV's detected. The thin white line represents the average KV's detected.

Press:

- [F2] – to run the diagnostic procedure;
- [F9] – to reset the Min. and Max. bars.

Digital Secondary KV - DIS

The test for DIS vehicles runs the same way as conventional tests. Follow the screen prompt and "snap" the accelerator when prompted.

Secondary data is collected from the DIS system. After a few seconds, the display screen reports the following KV readings for the compression firings and exhaust firings of each cylinder (see Figure 2-32).

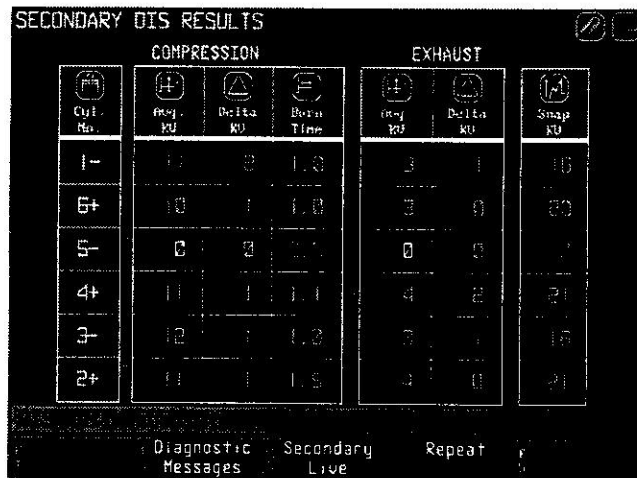


Figure 2-32

"Average KV" — The average KV required to initiate spark, averaged over a number of firings.

"Delta KV" — The difference between the minimum and maximum KV.

"Burn Time" — The length of time in milliseconds that the spark plug is arcing.

NOTE The "Average KV" values for compression should be several KV higher than the "Average KV" for exhaust. Compression increases cylinder resistance thus requiring higher voltage at the plug. High "Average KV" values for exhaust indicate high resistance.

Again, repeating this test may yield slightly different values, due to variations in mixture richness, turbulence, temperature, etc.

DIS Secondary Live Screen

If you press [F3] the *DIS Compression Live* screen will appear (see Figure 2-33).

Gray bars represent the minimum and maximum KVs detected. The thin white line represents the average KVs detected.

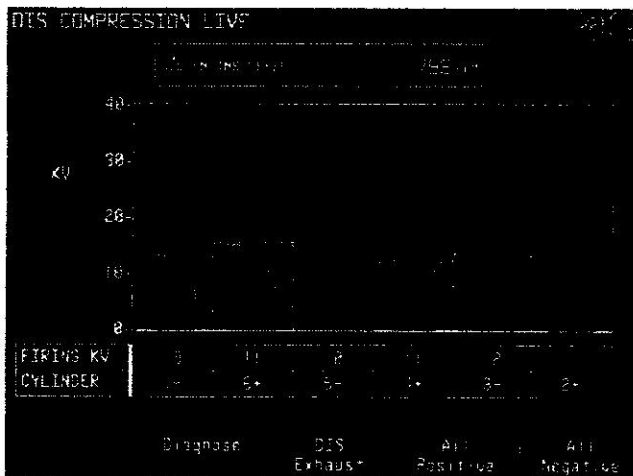


Figure 2-33

Press:

- [F2] – to run the diagnostic procedure;
- [F3] – to toggle between DIS Exhaust and Compression, (note that the screen title will change) displays exhaust firings;
- [F4] – to display all positive firings;
- [F5] – to display all negative firings.

Timing Test Diagnostic

The Timing Diagnostic tests are Total Advance, Centrifugal Advance, and Base Timing. Measured results are compared against the vehicle specification entered and then are highlighted on the *Results* screen to indicate the condition and generate diagnostics.

The sequence described below describes the timing test for a vehicle equipped with a "Standard Distributor" - one equipped with centrifugal weights and a vacuum advance unit. The timing test will change depending on the vehicle specification entered. For example, vehicles with computer-controlled timing will not perform the centrifugal advance portion of the test.



Make sure the vehicle cannot roll! Place the transmission in PARK or NEUTRAL. If necessary, chock the wheels.

1. The *Timing Test* screen appears (see Figure 2-34). The analyzer will test the Total Advance Timing first.

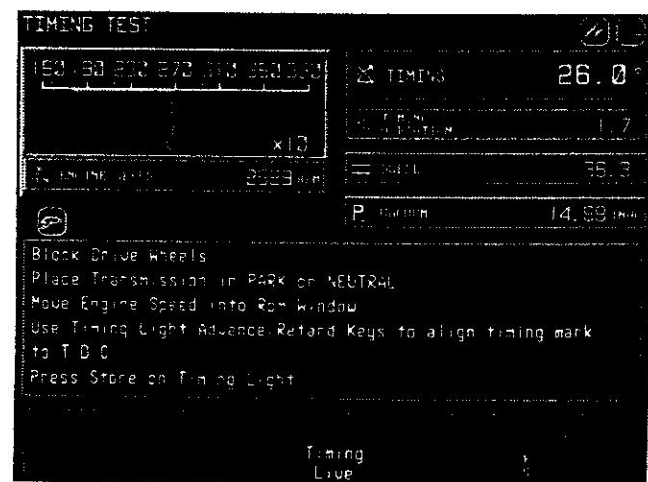


Figure 2-34

2. Start the engine and increase the RPM into the green range shown in the RPM meter.
3. Press [ADVANCE] or [RETARD] on the timing light to align the timing marks on the engine.

NOTE Lightly tap the "Advance" or "Retard" buttons to advance or retard the timing 1/2 degree at a time. When the timing marks line up press [STORE] on the timing light. While maintaining the RPM at the specified level, use the timing light to move the timing mark to Top Dead Center (T.D.C.). Once the mark is at T.D.C. press [STORE].

4. The analyzer will now perform the *Centrifugal Advance* test. Remove the vacuum advance hose from the vacuum unit and plug the hose.
5. Increase the RPM into the green range field. Use the timing light to align the timing mark to T.D.C. Press [STORE] on the timing light.
6. The analyzer will now perform the *Base Timing* test. Follow the instructions on the vehicle's emissions decal and prepare the engine for the *Timing Test*. Use the timing light and set the timing mark according to the decal instructions. Once the timing mark is set correctly, press [STORE] on the timing light.

From the Base Timing screen, press:

- [F2] – to display the *Timing Test Results* screen (see Figure 2-35);
- [F3] – to display the *Timing Live* screen;
- [F4] – to repeat the test.

TIMING TEST RESULTS

	Base Timing	Computer Advance	Total Timing
Engine Speed (RPM)	756	2000	2050
Timing (°)	10.0	10.0	20.0
Specification (°)	10.0	10.0	
Timing Variation (°)	0.0	0.0	0.0
Base II (°)	12.5		23.0
Vacuum (in.Hg)	13.11		23.42

Diagnostic Messages Timing Live Repeat

Figure 2-35

At the *Timing Test Results* screen, press:

- [F2] – to view diagnostic messages;
- [F3] – to go to the *Timing Live* screen;
- [F4] – to repeat the test.

When you are finished, restore the engine to its normal operating condition. For example, if you are testing a Ford equipped with an EEC system, reinstall the in-line spout connector that you removed before starting the test. If you are testing a GM vehicle, re-enable the Electronic Spark Timing Controls and clear codes.

User Tests

Timing Live Screen

Press [F3] for the Timing Live screen (see Figure 2-36). Use this screen to check the effects of any changes you make to the vehicle.

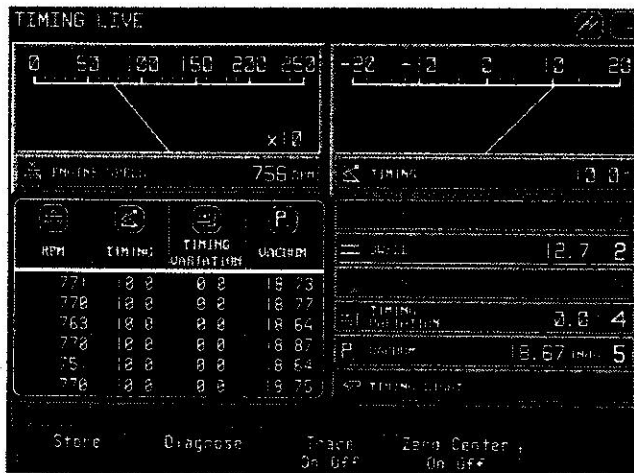


Figure 2-36

Use the Arrow Keys to select either meter as active. Press the number of the digital meter you wish to display in the analog meter box.

Press:

- Left- and Right-Arrow keys** – to select the active meter;
- [F1]** – to store the current reading in analyzer memory (data will be displayed in the boxes at the lower left corner of the screen);
- [F3]** – to turn meter trace (used to show trends) “ON” and “OFF;”
- [F4]** – to zero-center the active meter.

Select *User Tests* from the *Diagnostic Tools* menu. The *User Tests* menu will appear (see Figure 2-37).

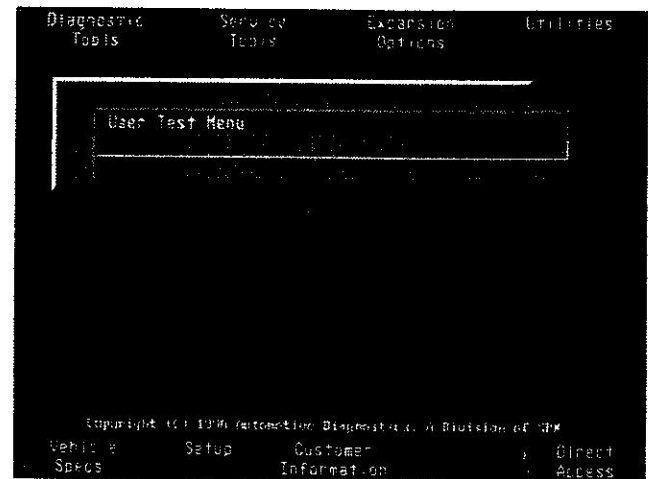


Figure 2-37

This menu, which you create, can contain up to ten different custom test sequences. For details on how to create a user test, see Chapter 5, “Utilities.”

We recommend that you include Customer Information and Vehicle Specifications as the first and second parts of every user test.

Use the Arrow Keys to scroll up and down the test list or type the number of the test you wish to run. Press [ENTER] to start the test.

When each sub-routine in your test is completed, press [F10] to proceed to the next sub-routine.

Press [F10] two times quickly to display a menu that will allow you to quit, repeat or skip a test in the routine you are running.

Notes:

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.