LAB – SCAN TOOL

AUTEL AL439

FOR 1996+ VEHICLES ONLY

Students:

1	Date:
2.	Block:

Date: _____ Block:

Fill in each box with the appropriate information.

Be sure to have the Instructor's initials before moving on to the next step - these are there to ensure everything is SAFE and CORRECT. Each team member must be able to answer questions from your instructor to receive credit for this lab.



VEHICLE	DENTIFICATION		
Year:	Make:		
Model:	Mileage:		
VIN Numb	r:		
SAFETY			
	 Always perform automotive testing in a safe environment. 		
	Wear safety eye protection that meets ANSI standards.		
	• Keep clothing, hair, hands, tools, test equipment, etc. away from all moving or hot engine parts.		
	Connect and run the SHOP EXHAUST SYSTEM to the vehicle when running		
	Put blocks in front of the drive wheels and never leave the vehicle unattended while running tests.		
	 Use extreme caution when working around the ignition coil, distrignition wires and spark plugs. These components create hazardo when the engine is running. 	extreme caution when working around the ignition coil, distributor cap, tion wires and spark plugs. These components create hazardous voltages on the engine is running.	
	• Put the transmission in PARK (for automatic transmission) or NEU manual transmission) and make sure the parking brake is engage	JTRAL (for d.	
	NOTE the location of fire extinguishers.		
	 Don't connect or disconnect any test equipment while the ignitio engine is running. 	n is on or the	
	• Keep the scan tool dry, clean, free from oil/water or grease. Use a on a clean cloth to clean the outside of the scan tool, when neces	a mild detergent ssary.	
STOP!!!	INSTRUCTOR'S INITIALS	:	

Somewhere around your knees you will lind a connection	
port that looks like the one on the right.	1 2 3 4 5 6 7 8
Where is it in this vehicle?	9 10 11 12 13 14 15 16
Plug in the SCAN TOOL and it should light up and turn on	FIR Diss/CRF101W FIR Diss/CRF101W 1 Vendor Option 9 Vendor Option 2 J1850 Bar + 10 J1850 BUS 3 Vendor Option 11 Vendor Option 4 Charati Ground 12 Vendor Option 5 Signal Ground 13 Vendor Option 6 CAN (J-2234) High 14 CAN (J-2234) Low 7 ISO 9141-2 R-Line 15 ISO 9141-2 Low 8 Vendor Option 16 Battery Fower OBD-II Connector and Fnout-
You don't usually need the key on for this.	
TWO TERMS YOU NEED TO KNOW:	
KOEO – "Key On Engine Off" Engine Running" KOER – "Key On	
Once the SCAN TOOL in on, look for the icon to retrieve DIAGNOSTIC TROUBLE CODES	
STORED CODES are where there is for sure a problem.	
PENDING CODES are where the computer thinks there is a problem, but it might not be lingering enough to be an issue.	Circuit Test Start Test
PERMANENT CODES are only on cars with "CAN Protocols."	1
What CODES are reported? (DO NOT DELETE THEM YET)	
	If the Scanner says "Manufacturer Specific Codes Are Found!" you will need to tel the scanner what the vehicle is.



I/M READINESS

I/M READINESS: This is testing and monitoring to see if the vehicle's Emission Controls are working correctly. Some vehicles require certain drive cycles or modes of operation to be completed before these tests check out ok. An I/M READINESS that says "NO" doesn't mean it's not working correctly, it just may not have completed the full test yet.



Go into READY TEST and wait for the computer to gather its data. Which ones have checkmarks??

Complete this screen with the information you see:



INSTRUCTOR'S INITIALS:

STOP!!!



	What information should you provide to the Vehicle	Press any key to con.
	What results (if any) did the scan tool give you?	Component Test The selected mode is not supported Press any key to con
	test. It is possible that the on-board computer does not let scan tools perform these tests. In which case, it will let you know.	Component Test Command Sent! Press any key to con.
COMPC	DNENT TESTS The Component Test tells the on-board computer to perform its Leak Test of the EVAP (Evaporative Emissions) System. This scan tool might not be successful in ENDING the test, so you may want to consult the Service manual (NOT the Owner's Manual) to find out how to end the	Component Test Evap Leak Test ?
		HO2S11 Voltage amplituID11MOD\$10TEST(volts)400MIN(volts)1E1MAX(volts)STSOK
	TEST RESULT	On-Board Mon. Test 1/31 O2 Mon. B1S1 02 Mon. B1S2 O2 Mon. B1S3 02 Mon. B1S4 O2 Mon. B2S1 02 Mon. B2S2
	Scroll through the available tests, and pick FOUR DIFFERENT MONITOR TESTS (ie: not ALL "O2" tests) Write down what test you chose, and what the results were:	HO2S Monitor HO2S Monitor Catalyst Monitor EVAP Monitor EVAP Monitor EVAP Monitor

THROTTLE POSITION SENSOR TEST

This test requires that there is a functioning battery in the Scan Tool.

The Throttle Position Sensor (TPS) is the only way the computer knows what your foot is doing. It unfortunately doesn't last forever, and if it no longer gives the correct signal to the computer, you're going to have driveability issues.

Most TPS's have:

- 5V SOURCE Not 5V? Signal WILL be faulty
- Variable Signal
 Could just be faulty
- OV GROUND Not OV? Signal WILL be faulty

Typically, the SIGNAL wire will be the MIDDLE of the three.

Key ON, Engine OFF (KOEO)

From the Main Screen of the Scan Tool, select CIRCUIT TEST FUNCTION

Find DC VOLTAGE

BACK PROBE each outer TPS connection with a safety pin so it hopefully contacts the wire connection inside, and touch the RED probe to the safety pin, with the BLACK probe on the battery NEGATIVE Post. You should expect to see 5V

OUTER Wire 1

What did you measure? Is this POWER or GROUND?

OUTER Wire 2

What did you measure? Is this POWER or GROUND?



+5V

(GROUND)

AUTO

5.00V

0.00V

VARIABLE

OUTPUT

To test the sensor output, switch to AC VOLTAGE

BACK PROBE the middle TPS connection with a safety pin so it hopefully contacts the wire connection inside, and touch the RED probe to the safety pin, with the BLACK probe on the battery NEGATIVE Post. Move the throttle with your hand. It should display a smooth graph as you move the throttle smoothly

MIDDLE Wire

Sketch what you saw Is it SMOOTH?

STOP!

INSTRUCTOR'S INITIALS!!!

STARTER TEST

This test merely measures the voltage that the battery drops to while the engine is cranking. It is a rough estimate of the condition of the Starting System.

The Starting System consists of the Battery, the Battery Connections (both + and -), the Battery Cables, and the Starter Motor. Faults in any of these components typically result in a LOW voltage reading during this test.

EITHER: Connect the Scan Tool to the OBD port

OR: connect the **Red** and **Black** test leads directly to the **Battery** + and – (respectively)

Go to Start Test from the main menu.

You should see the current Battery Voltage on the screen. I would expect it to be over 12V with the car NOT running.

Press **OK** and the Scan Tool will prompt you to start the engine. A cranking voltage lower than 9.6V is usually indicating a problem.

	Decision	Action
	CRANKING NORMAL	The starter voltage is normal and the starting system is OK. (Figure 8.3)
	CRANKING ABNORMAL	The vehicle can't start and there is a problem with the starting system. Check the battery, connection, wiring and starter. (Figure 8.4)
CIRCLE the result you got:	CRANKING LOW	The starter voltage is low and you'd better check the starter system before a problem happens. (Figure 8.5)
	CHARGE BATTERY	The starter voltage is low and the battery is discharged. Fully charge the battery and retest the starter system. (Figure 8.6)
	NO START	If you didn't start engine to continue the test, the scan tool wait for two minutes and abort the test. (Figure 8.7)
STOP!		INSTRUCTOR'S INITIALS!!!

INSTRUCTOR'S INITIALS!!!

CHARGING TEST		
This test merely measures the voltage Charging System provides to the bate engine is running. It is a rough estin condition of the Charging System. No Systems produce upwards of 14.5V about 2000rpm.	ge that the ttery while the nate of the Aost Charging while cruising at	CHARGE TEST I.Turn off all vehicle loads 2.Rev the engine at 2000 rpm for 15 seconds Press OK to Continue
The Charging System consists of the Battery Connections (both + and -), and the Alternator. Faults in any of typically result in LOW or NO chargin during this test.	Battery, the the Battery Cable these componen ng voltage readin	S, ts CHARGE TEST B 1.Hold the engine RPM 2.Turn high beams and blower motor on
EITHER: Connect the Scan Tool to th	e OBD port	Press OK to Continue
OR: connect the Red and Black test the Battery + and – (respectively)	leads directly to	
Go to Start Test from the main men	u, and select Cha	rge Test.
Press OK and follow the prompts on	the Scan Tool.	
	Decision	Action
		The charging system is showing normal output.
CIRCLE the result you got:	NORMAL	The charging system is showing normal output. No problem detected. (Figure 8.12) There is a problem with the charging system. The alternator is not providing enough current to power the system's electrical loads and charge the battery. (Figure 8.13) ♦ Check the belts to ensure the alternator is
CIRCLE the result you got: Based on your test results, what do you need to tell the owner of this vehicle?	LOW OUTPUT	 The charging system is showing normal output. No problem detected. (Figure 8.12) There is a problem with the charging system. The alternator is not providing enough current to power the system's electrical loads and charge the battery. (Figure 8.13) Check the belts to ensure the alternator is rotating with the engine running. Replace broken or slipping belts and retest. Check the connections from the alternator to the battery. If the connection is loose or heavily corroded, clean or replace the cable and retest.
CIRCLE the result you got: Based on your test results, what do you need to tell the owner of this vehicle?	NORMAL	 The charging system is showing normal output. No problem detected. (Figure 8.12) There is a problem with the charging system. The alternator is not providing enough current to power the system's electrical loads and charge the battery. (Figure 8.13) Check the belts to ensure the alternator is rotating with the engine running. Replace broken or slipping belts and retest. Check the belts to ensure the alternator is is loose or heavily corroded, clean or replace the cable and retest. There is a problem with the charging system. The voltage output from the alternator to the battery. If the connection is loose or heavily corroded, clean or replace the cable and retest. There is a problem with the charging system. The voltage output from the alternator to the battery exceeds the normal limits of a functioning regulator. (Figure 8.14) Check to ensure there are no loose connections and that the ground connection is normal. If the connection is OK, check the regulator. NOTE: Most alternators have a built-in regulator requiring you to replace the alternator. In older vehicles that use external voltage regulators, you may need to replace only the voltage regulator.
CIRCLE the result you got: Based on your test results, what do you need to tell the owner of this vehicle?	NORMAL LOW OUTPUT HIGH OUTPUT EXCESSIVE RIPPLE	 The charging system is showing normal output. No problem detected. (Figure 8.12) There is a problem with the charging system. The alternator is not providing enough current to power the system's electrical loads and charge the battery. (Figure 8.13) Check the belts to ensure the alternator is rotating with the engine running. Replace broken or slipping belts and retest. Check the belts to ensure the alternator is is loose or heavily corroded, clean or replace the cable and retest. There is a problem with the charging system. The voltage output from the alternator to the battery. If the connection is loose or heavily corroded, clean or replace the cable and retest. There is a problem with the charging system. The voltage output from the alternator to the battery exceeds the normal limits of a functioning regulator. (Figure 8.14) Check to ensure there are no loose connections and that the ground connection is normal. If the connection is OK, check the regulator requiring you to replace the alternator. In older vehicles that use external voltage regulators. One or more diodes in the alternator aren't functioning or there's stator damage, which is shown by an excessive amount of AC ripple current supplied to the battery. (Figure 8.15) Make sure the alternator mounting is sturdy and that the belts are in good shape and functioning properly. If the mounting and belts are good, check the alternator.