

# SECTION 18

## EEC IV—Quick Test—All Engines

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## When To Use This Diagnostic Procedure

This diagnostic procedure is only used on Electronic Engine Control (EEC-IV) equipped vehicles when the Diagnostic Routines, Section 2 instruct you to perform EEC-IV Diagnostics. It is divided into two test formats. **Quick Test**, a functional EEC-IV system test, and **Pinpoint Tests**, a number of specific component tests.

To test and service the EEC-IV subsystem, perform the Quick Test first. **If the vehicle passes all three phases of the Quick Test: Key On, Engine Off, Engine Running, and Continuous Testing without running any Pinpoint Tests, you will know the EEC-IV subsystem is OK and the vehicle's problem exists somewhere else other than in the EEC-IV subsystem.** However, if a Step of the Quick Test fails, perform only the Pinpoint Tests specified by the failed Step. Do not begin any Pinpoint Test without following the instructions at the beginning of the Section.

After all tests and services have been completed, repeat the entire Quick Test to make sure the EEC-IV subsystem works properly.

## Quick Test Description

The Quick Test is a functional test of the EEC-IV system consisting of basic Test Steps (described below). These Steps must be carefully followed in sequence, otherwise misdiagnosis, or the replacement of non-faulty components may result.

### Quick Test Steps

1. Visual Check and Vehicle Preparation
  - Checks for obvious faults.
  - Properly prepares the vehicle for testing.
2. Equipment Hook-up
  - Ensures that the proper equipment for gathering test data is ready, prior to testing.
3. Key On, Engine Off Self-Test
  - Is a static check of processor inputs and outputs.
4. Computed Timing Check
  - Verifies the system ability to compute and maintain a fixed spark timing during Self-Test.
5. Engine Running Self-Test
  - Is a dynamic check with the engine in operation.
6. Continuous Self-Test
  - Checks the sensor inputs for opens and shorts while the vehicle is in operation.

The Key On, Engine Off and Engine Running Self-Tests are intended to detect faults present at the time of testing only, not intermittent faults. Intermittent faults are detected by Continuous Self-Test.

A continuous memory code is information collected and stored from an intermittent fault detected in a previous drive-cycle, the fault may not be present at this time.

**WARNING:** Anyone who departs from the instruction provided in this publication must first establish that he compromises neither his personal safety nor the vehicle integrity by his choice of methods, tools or parts.

## QUICK TEST: Visual Check And Vehicle Preparation

1.0

Correct test results for the Quick Test are dependent on the proper operation of related non-EEC components systems. It may be necessary to correct faults in these areas before EEC will pass Quick Test. Refer to Diagnostic Routines, Section 2 for service.

Before hooking up any equipment to diagnose the EEC system, make the following checks:

1. Verify the condition of air cleaner and ducting. These components may be removed and reinstalled as necessary for service and/or inspection.
2. Check all engine vacuum hoses for:
  - Leaks or pinched hoses.
  - Proper emission routing per Vehicle Emission Control Information (VECI) Decal.
3. Check the EEC system wiring harness electrical connections for:
  - Proper connections.
  - Loose or detached connectors, wires and terminals.
  - Corrosion.
  - Proper routing of harness.

It may be necessary to disconnect or disassemble the connector assembly to perform some of the inspections. (Note the location of each pin before disassembly.)

4. Check processor, sensors and actuators for physical damage.
5. Perform all safety steps required to start and run operational vehicle tests.
6. Apply the emergency brake. Place shift lever in Park; Neutral for manual transmission.
7. **Turn Off all electrical loads** such as the radio, lamps, air conditioner, etc. Be sure doors are closed whenever readings are made.
8. Verify engine coolant is at the specified level.
9. Start engine and idle until the upper radiator hose is hot and pressurized and the throttle is off fast idle. While the engine is operating, check for leaks around the exhaust manifold, EGO sensor, and vacuum hose connections.

**NOTE:** If engine will not start, starts but stalls, idles rough or runs rough continue through Quick Test Step 3.0. If any of the above conditions are still present after a pass code 11 in the Key On, Engine Off Self-Test, go to Pinpoint Test Step **A2** for no start or diagnostics by symptom in the proper Engine Supplement Section for stalls or roughness.

10. Turn ignition Key Off.
11. Service items as required, and proceed to equipment hook-up, Step 2.0

## QUICK TEST: Equipment Hook-Up

# 2.0

### Using the STAR tester:

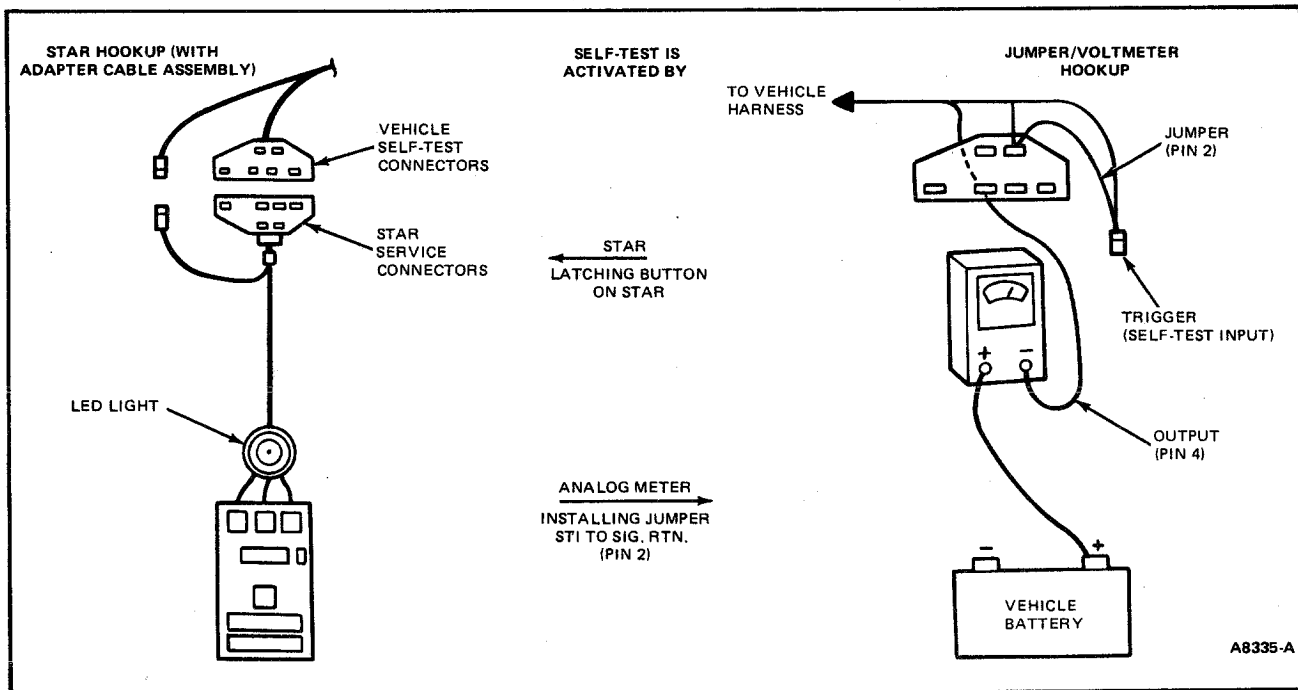
- Turn the ignition key Off.
- Connect the color-coded adapter cable leads to the STAR tester.
- Connect the adapter cable's two service connectors to the vehicle's appropriate Self-Test connectors.
- Connect the timing light.

After equipment hook-up, GO to Quick Test Step 3.0

### Using analog voltmeter:

- Turn ignition key Off.
- Connect a jumper wire from Self-Test Input (STI) to Pin 2, Signal Return on the Self-Test connector (refer to the diagram below).
- Set analog VOM on a DC voltage range to read from 0 to 15 volts DC. Connect VOM from battery (+) to Pin 4 Self-Test Output (STO) in the Self-Test connector.
- Connect the timing light.

After equipment hook-up, GO to Quick Test Step 3.0



## QUICK TEST: Key On, Engine Off Self-Test

# 3.0

### A CODE OUTPUT

Correct test results for the QUICK TEST are dependent on the proper operation of related non-EEC-IV components/systems. It may be necessary to correct any faults in these areas before EEC-IV will pass the QUICK TEST. Refer to the diagnostic routines, section 2 for proper servicing.

- Verify that the vehicle has been properly prepared per QUICK TEST STEPS 1.0 and 2.0.
- Place transmission in neutral or park. Set parking brake. Place A/C or heater control to off. Place octane switch in premium position on 2.3L SVO TURBO.
- Activate SELF-TEST.
- Place key in run position to start SELF-TEST.

**NOTE: Do not depress throttle during SELF-TEST.**

- Observe and record all service codes indicated. One of the following outputs will occur.

**NOTE: Continuous memory codes recorded in this step will be used for diagnosis later in QUICK TEST Step 6.0!**

RESULTS			ACTION TO TAKE
Code Format			
Key On Engine Off	Separator	Continuous Memory	
11	1(0)	11 ▶	KEY ON, ENGINE OFF and CONTINUOUS MEMORY indicate a pass. Go To QUICK TEST STEP 4.0. If vehicle is a no start, go to Pinpoint Test Step <b>A2</b>
ANY CODE(S)	1(0)	11 ▶	KEY ON, ENGINE OFF TEST indicates a fault. Record codes and Go To QUICK TEST STEP 3.0B.
ANY CODE(S)	1(0)	ANY CODE(S) ▶	KEY ON, ENGINE OFF and CONTINUOUS MEMORY indicate a fault. Record ALL codes. DO NOT REPAIR CONTINUOUS MEMORY CODES AT THIS TIME! KEY ON, ENGINE OFF and ENGINE RUNNING codes must be repaired first. Go To QUICK TEST STEP 3.0B.
11	1(0)	ANY CODE(S) ▶ EXCEPT 15	CONTINUOUS MEMORY indicates a fault. DO NOT REPAIR THESE CODES AT THIS TIME! KEY ON, ENGINE OFF and ENGINE RUNNING codes must be repaired first. Go To QUICK TEST STEP 4.0.
11	1(0)	15 ▶	Go To Pinpoint Test Step Q10.
NO CODES OUTPUTTED			Repeat SELF-TEST and verify that no service codes are present. Go To Pinpoint Test Step Q1.

\*Star tester displays a 10 in place of a 1 for the single digit separator code, therefore the separator code is expressed in the results column as 1(0).

# QUICK TEST: Key On, Engine Off Self-Test

## 3.0

### B RESULTS AND ACTION TO TAKE

- Using the KEY ON, ENGINE OFF service codes from QUICK TEST step 3.0A, follow the instructions in the ACTION TO TAKE column in this step.
- When more than one service code is received always start with the first code received.
- Whenever a repair is made REPEAT QUICK TEST!

**NOTE: Before proceeding to the specified Pinpoint Test, read the instructions on how to use the Pinpoint Tests at the beginning of the Pinpoint Test section.**

## PASSENGER CAR

RESULTS	ACTION TO TAKE									
	Key On, Engine Off Service Codes	1.9L EFI	2.3L EFI TURBO	2.3L OHC FBC	2.3L CFI **		2.5L CFI	3.0L EFI	3.8L CFI	5.0L SEFI
					BASE	PLUS				
15 GO to Pinpoint Step	▶	Q12	Q12	Q12	Q12	Q12	Q12	Q12	Q12	Q12
19 GO to Pinpoint Step	▶▶	*	*	*	*	*	*	Q50	*	Q50
21 GO to Pinpoint Step	▶▶▶	DE1	DE1	DE1	DE1	DE1	DE1	DE1	DE1	DE1
22 GO to Pinpoint Step	▶▶▶▶	DF1	DF1	DF1	DF1	DF1	DF1	DF1	DF1	DF1
23 GO to Pinpoint Step	▶▶▶▶▶	DH1	DH1	DH1	DH1	DH1	DH1	DH1	DH1	DH1
24 GO to Pinpoint Step	▶▶▶▶▶▶	DA1	DA1	*	DB1	DB1	DB1	DB1	DB1	DB1
26 GO to Pinpoint Step	▶▶▶▶▶▶▶	DK1	DK1	*	*	*	*	*	*	*
31 GO to Pinpoint Step	▶▶▶▶▶▶▶▶	*	*	*	DN1	DM1	DN1	DL1	DD2	DN1
32 GO to Pinpoint Step	▶▶▶▶▶▶▶▶▶	*	*	*	DN30	*	DN30	*	*	DN30
34 GO to Pinpoint Step	▶▶▶▶▶▶▶▶▶▶	*	*	*	DN35	*	DN35	DL8	*	DN35
35 GO to Pinpoint Step	▶▶▶▶▶▶▶▶▶▶▶	*	*	*	DN5	*	DN5	DL5	*	DN5
51 GO to Pinpoint Step	▶▶▶▶▶▶▶▶▶▶▶▶	DE10	DE10	DE10	DE10	DE10	DE10	DE10	DE10	DE10
52 GO to Pinpoint Step	▶▶▶▶▶▶▶▶▶▶▶▶▶	*	*	*	FF1	FF1	FF1	FF1	*	*
53 GO to Pinpoint Step	▶▶▶▶▶▶▶▶▶▶▶▶▶▶	DH3	DH3	DH3	DH3	DH3	DH3	DH3	DH3	DH3
54 GO to Pinpoint Step	▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶	DA10	DA10	*	DB10	DB10	DB10	DB10	DB10	DB10
56 GO to Pinpoint Step	▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶	DK10	DK10	*	*	*	*	*	*	*
61 GO to Pinpoint Step	▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶	DE20	DE20	DE20	DE20	DE20	DE20	DE20	DE20	DE20
62 GO to Pinpoint Step	▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶	*	*	*	*	*	*	T61	*	*
63 GO to Pinpoint Step	▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶	DH10	DH10	DH10	DH10	DH10	DH10	DH10	DH10	DH10
64 GO to Pinpoint Step	▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶	DA20	DA20	*	DB20	DB20	DB20	DB20	DB20	DB20
66 GO to Pinpoint Step	▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶	DK20	DK20	*	*	*	*	*	*	*
67 GO to Pinpoint Step	▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶	FA1	FA1	FA1	FA1	FA1	FA1	T81	FA1	FA1
68 GO to Pinpoint Step	▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶	*	*	KF1	KF1	KF1	KF1	*	KF1	*
81 GO to Pinpoint Step	▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶	*	*	*	*	*	*	*	KC8	KC8
82 GO to Pinpoint Step	▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶	*	*	*	*	*	*	*	KC8	KC8
83 GO to Pinpoint Step	▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶	*	*	*	*	*	X30	X30	DD17	*
84 GO to Pinpoint Step	▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶	*	*	*	DN10	DM17	DN10	DL11	DD17	DN10
85 GO to Pinpoint Step	▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶	*	*	*	KD4	KD4	KD4	KD4	*	KD4
87 GO to Pinpoint Step	▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶	*	*	*	J7	J7	X15	X15	J7	J7
89 GO to Pinpoint Step	▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶	*	*	*	*	*	*	T51	KP5	*
No Codes/Code Not Listed		GO to Pinpoint Test Step Q1								

\*\*There are two unique Self-Test strategies for 2.3L CFI Tempo/Topaz vehicles, therefore special attention must be given in identifying "base" engine vs "plus" engine on these vehicles to ensure usage of the correct pinpoint test.

# QUICK TEST: Key On, Engine Off Self-Test

# 3.0

## LIGHT TRUCK

RESULTS ▶	ACTION TO TAKE					
	2.3L EFI	2.8L FBC	2.9L EFI	3.0L EFI	4.9L FBC	5.0L EFI
Key On, Engine Off Service Codes						
15 GO to Pinpoint Step ▶▶▶	Q12	Q12	Q12	Q12	Q12	Q12
19 GO to Pinpoint Step ▶▶▶	*	*	Q50	Q50	*	*
21 GO to Pinpoint Step ▶▶▶	DE1	DE1	DE1	DE1	DE1	DE1
22 GO to Pinpoint Step ▶▶▶	DF1	DF1	DF1	DF1	DF1	DF1
23 GO to Pinpoint Step ▶▶▶	DH1	DH1	DH1	DH1	DH1	DH1
24 GO to Pinpoint Step ▶▶▶	DB1	DB1	DB1	DB1	*	DB1
31 GO to Pinpoint Step ▶▶▶	DD2	DD2	DL1	*	*	DD2
34 GO to Pinpoint Step ▶▶▶	*	*	DL8	*	*	*
35 GO to Pinpoint Step ▶▶▶	*	*	DL5	*	*	*
51 GO to Pinpoint Step ▶▶▶	DE10	DE10	DE10	DE10	DE10	DE10
52 GO to Pinpoint Step ▶▶▶	FF1	*	*	FF1	*	*
53 GO to Pinpoint Step ▶▶▶	DH3	DH3	DH3	DH3	DH3	DH3
54 GO to Pinpoint Step ▶▶▶	DB10	DB10	DB10	DB10	*	DB10
61 GO to Pinpoint Step ▶▶▶	DE20	DE20	DE20	DE20	DE20	DE20
63 GO to Pinpoint Step ▶▶▶	DH10	DH10	DH10	DH10	DH10	DH10
64 GO to Pinpoint Step ▶▶▶	DB20	DB20	DB20	DB20	*	DB20
67 GO to Pinpoint Step ▶▶▶	FA1	FA1	FA1	FA1	FA1	FA1
68 GO to Pinpoint Step ▶▶▶	*	KF1	*	*	KF1	*
81 GO to Pinpoint Step ▶▶▶	*	KC8	*	*	*	KC8
82 GO to Pinpoint Step ▶▶▶	*	KC8	****	*	*	KC8
83 GO to Pinpoint Step ▶▶▶	DD17	DD17	*	*	*	DD17
84 GO to Pinpoint Step ▶▶▶	DD17	DD17	DL11	*	*	DD17
85 GO to Pinpoint Step ▶▶▶	*	KD4	*	KD4	*	*
87 GO to Pinpoint Step ▶▶▶	J7	KK5	J7	J7	*	J7
88 GO to Pinpoint Step ▶▶▶	*	KJ6	*	*	*	*
89 GO to Pinpoint Step ▶▶▶	KR1	KR1	KR1	KR1	*	*
No Codes/Code Not Listed	GO to Pinpoint Test Step Q1					

\*\*\*\*Ignore Code 82.

**QUICK TEST: TIMING CHECK****4.0**

TEST STEP	RESULT	ACTION TO TAKE
<ul style="list-style-type: none"> <li>● If engine is a no start, go directly to Pinpoint Test Step A1 NO START.</li> <li>● If engine starts but stalls go directly to DIAGNOSTIC BY SYMPTOM in the proper ENGINE SUPPLEMENT SECTION.</li> <li>● Key off, wait 10 seconds.</li> <li>● Verify SELF-TEST trigger has been activated.</li> <li>● Restart engine and check timing while in SELF-TEST. You have 2 minutes from the time the last code is outputted to check SELF-TEST timing.</li> <li>● Correct SELF-TEST timing equals base plus 20° BTDC ± 3° (see VECI decal for correct base timing).</li> </ul> <p>EXAMPLE: If base timing is 10° BTDC then SELF-TEST timing is: <math>10^{\circ} + 20^{\circ} = 30^{\circ} \pm 3^{\circ}</math> therefore SELF-TEST timing is 27°-33° BTDC.</p>	<p>Engine stalls during timing check</p> <p>Timing is not base + 20° BTDC</p> <p>Timing is base plus 20° BTDC</p>	<p>Go To DIAGNOSTIC BY SYMPTOM in the proper ENGINE SUPPLEMENT SECTION.</p> <p>Go To Pinpoint Test Step <b>P1</b>.</p> <p>Go To QUICK TEST Step <b>5.0</b>.</p>



# QUICK TEST: Engine Running Self-Test

5.0

**A** CODE OUTPUT

**NOTE: If engine is a no start go directly to Pinpoint Test Step A1 . If engine stalls go directly to Diagnostic By Symptom in the proper engine supplement section.**

- Deactivate SELF-TEST.
- Start and run engine at greater than 2000 RPM for 2 minutes. This warms up the EGO sensor.
- Turn engine off, wait 10 seconds.
- Restart engine.
- **Do not depress throttle during Self-Test unless a dynamic response code occurs.**
- Activate SELF-TEST. The ENGINE RUNNING SELF-TEST will progress as follows:
  - Engine ID code. ①  
Depress and release the brake pedal, only once, after the ID code has been received. This tests the Brake on/off switch on 2.5L CFI and 3.0L EFI passenger cars and 2.3L EFI, 2.8L FBC, 2.9L and 3.0L EFI trucks.
  - Run test.
  - If a dynamic response code occurs, perform a brief WOT. ②
  - ENGINE RUNNING service codes.
- Observe and record all service codes. One of the following outputs will occur.

**NOTE: If engine stalls during Self-Test, go directly to Diagnostic By Symptom in the proper engine supplement section.**

RESULTS			ACTION TO TAKE
Code Format			
Engine ID	Dynamic Response	Engine Running	
2(0), 3(0) or 4(0)	1(0) or no dynamic response pulse	11	ENGINE RUNNING SELF-TEST indicates a pass. If the symptom was of an intermittent nature, Go To QUICK TEST STEP 6.0. If the drive symptom is currently present, Go To DIAGNOSTIC BY SYMPTOM in the proper ENGINE SUPPLEMENT SECTION. Otherwise testing is complete. EEC-IV system is OK.
2(0), 3(0) or 4(0)	1(0) or no dynamic response pulse	ANY CODES	ENGINE RUNNING SELF-TEST indicates a fault. Go To QUICK TEST STEP 5.0B.
98	No dynamic response pulse	ANY CODES	Rerun QUICK TEST STEP 3.0A and ensure a pass code 11 for KEY ON, ENGINE OFF portion.
NO CODES OUTPUTTED			Repeat SELF-TEST and verify that no service codes are present, then Go To Pinpoint Test Step Q1.

① Engine ID code is equal to half the number of cylinders (a code of 2 equals a 4 cylinder engine. STAR tester adds a zero to all single digit readings, so a 20 code equals a 4 cylinder engine). For 5.0L SEFI a service code 98 may appear instead of the engine ID code indicating the need to ensure a pass code 11 for the KEY ON, ENGINE OFF portion of Quick Test 3.0A.

② Star displays a 10 in place of a 1 for the single digit separator code, therefore, the dynamic response code is expressed in the results column as 1(0). Some vehicles do not require a brief wot and therefore will not display a 1(0).

# QUICK TEST: Engine Running Self-Test

5.0

## B RESULTS AND ACTION TO TAKE

- Using the ENGINE RUNNING service codes from QUICK TEST STEP 5.0A, follow the instructions in the ACTION TO TAKE column in this step.
- When more than one service code is received, always start service with the first code received.
- Whenever a repair is made, REPEAT QUICK TEST!

## PASSENGER CAR

RESULTS	ACTION TO TAKE									
	Engine Running Service Codes	1.9L EFI	2.3L EFI TURBO	2.3L OHC FBC	2.3L CFI **		2.5L CFI	3.0L EFI	3.8L CFI	5.0L SEFI
					BASE	PLUS				
12 GO to Pinpoint Step	KE1	KE1	KF16	KF16	KF16	KF16	KE1	KF16	KE1	
13 GO to Pinpoint Step	KE3	KE10	KF19	KF19	KF19	KF19	KE10	KF19	KE10	
16 GO to Pinpoint Step	*	*	HB21	KF19	*	KF19	KE1	KF19	KE1	
17 GO to Pinpoint Step	KE11	*	*	*	*	*	*	*	*	
21 GO to Pinpoint Step	DE1	DE1	DE1	DE1	DE1	DE1	DE1	DE1	DE1	
22 GO to Pinpoint Step	DF1	DF1	DF7	DF7	DF7	DF7	DF7	DF7	DF7	
23 GO to Pinpoint Step	DH1	DH1	DH1	DH1	DH1	DH1	DH1	DH1	DH1	
24 GO to Pinpoint Step	DA1	DA1	*	DB1	DB1	DB1	DB1	DB1	DB1	
25 GO to Pinpoint Step	*	DG1	*	*	*	*	DG1	*	*	
26 GO to Pinpoint Step	DK1	DK1	*	*	*	*	*	*	*	
31 GO to Pinpoint Step	*	*	*	DN1	DM1	DN1	DL21	DD1	DN1	
32 GO to Pinpoint Step	*	*	*	DN30	DM11	DN30	DL20	DD11	DN30	
33 GO to Pinpoint Step	*	*	*	DN40	DM11	DN40	DL30	DD11	DN40	
34 GO to Pinpoint Step	KA1	KA1	*	DN35	DM11	DN35	DL25	DD11	DN35	
35 GO to Pinpoint Step	*	*	*	DN5	DM30	DN5	DL25	DD30	DN5	
41 GO to Pinpoint Step	HA11	HA11	HB1	HF5	HF5	HF5	HG10	HD7	HC1	
42 GO to Pinpoint Step	HA8	HA8	HB20	HF9	HF9	HF9	HG7	HD14	HC15	
43 GO to Pinpoint Step	*	*	HB40	*	*	*	*	*	*	
44 GO to Pinpoint Step	*	*	KC1	*	*	*	*	KC1	KC1	
45 GO to Pinpoint Step	*	*	KC1	*	*	*	*	KC1	KC1	
46 GO to Pinpoint Step	*	*	KC1	*	*	*	*	KC1	KC1	
55 GO to Pinpoint Step	*	*	*	FC3	*	FC3	*	HD1	*	
58 GO to Pinpoint Step	*	*	KF12	KF12	KF12	KF12	*	KF12	*	
62 GO to Pinpoint Step	*	*	*	*	*	*	T71	*	*	
72 GO to Pinpoint Step	*	*	DF10	DF10	DF10	DF10	DF10	DF10	*	
73 GO to Pinpoint Step	DH20	DH20	DH20	*	DH20	*	DH20	*	*	
74 GO to Pinpoint Step	*	*	*	*	*	FD1	FD1	*	*	
75 GO to Pinpoint Step	*	*	*	*	*	FD4	FD4	*	*	
76 GO to Pinpoint Step	DK30	DK30	*	*	*	*	*	*	*	
77 GO to Pinpoint Step	M1	M1	M1	*	M1	*	M1	*	*	
91 GO to Pinpoint Step	*	*	*	*	*	*	*	HD7	HC1	
92 GO to Pinpoint Step	*	*	*	*	*	*	*	HD14	HC15	
94 GO to Pinpoint Step	*	*	*	*	*	*	*	KC1	KC1	
98 GO to Pinpoint Step	*	*	*	*	*	*	*	*	****	
99 GO to Pinpoint Step	ISC HAS NOT LEARNED YET. RERUN QUICK TEST STEPS 3.0 THRU 5.0									
No Codes/Code Not Listed	GO to Pinpoint Test Step Q1									

\*\*\*\*Service Code 98 may appear indicating the need to ensure a pass code 11 for the Key On Engine Off portion of Quick Test Step 3.0A.  
 \*\*There are two unique self test strategies for 2.3L CFI Tempo/Topaz vehicles. Therefore special attention must be given in identifying "base" engine vs. "plus" engine on these vehicles to ensure usage of the correct Pinpoint Test.

# QUICK TEST: Engine Running Self-Test







# 5.0

## LIGHT TRUCK

RESULTS	ACTION TO TAKE					
Engine Running Service Codes	2.3L EFI	2.8L FBC	2.9L EFI	3.0L EFI	4.9L FBC	5.0L EFI
12 GO to Pinpoint Step	KE1	KF16	KE1	KE1	KF16	KE1
13 GO to Pinpoint Step	KE10	KF19	KE10	KE10	KF19	KE10
16 GO to Pinpoint Step	KE1	HB21	*	KE1	HB21	KE1
21 GO to Pinpoint Step	DE1	DE1	DE1	DE1	DE1	DE1
22 GO to Pinpoint Step	DF7	DF7	DF7	DF7	DF7	DF7
23 GO to Pinpoint Step	DH1	DH1	DH1	DH1	DH1	DH1
24 GO to Pinpoint Step	DB1	DB1	DB1	DB1	*	DB1
25 GO to Pinpoint Step	DG1	DG1	DG1	DG1	*	DG1
31 GO to Pinpoint Step	DD1	DD1	DL21	*	*	DD1
32 GO to Pinpoint Step	DD11	DD11	DL20	*	*	DD11
33 GO to Pinpoint Step	DD11	DD11	DL30	*	*	DD11
34 GO to Pinpoint Step	DD11	DD11	DL25	*	KA1	DD11
35 GO to Pinpoint Step	DD30	DD30	DL25	*	*	DD30
41 GO to Pinpoint Step	HE11	HB1	HG10	HG10	HB1	HE11
42 GO to Pinpoint Step	HE8	HB20	HG7	HG7	HB20	HE8
43 GO to Pinpoint Step	*	HB40	*	*	HB40	*
44 GO to Pinpoint Step	*	KC1	*	*	KC1	KC1
45 GO to Pinpoint Step	*	KC1	*	*	KC1	KC1
46 GO to Pinpoint Step	*	KC1	*	*	KC1	KC1
55 GO to Pinpoint Step	*	*	FC3	*	*	*
58 GO to Pinpoint Step	*	KF12	*	*	KF12	*
65 GO to Pinpoint Step	*	FC1	FC1	*	*	*
72 GO to Pinpoint Step	DF10	DF10	DF10	DF10	DF10	DF10
73 GO to Pinpoint Step	DH20	DH20	DH20	DH20	DH20	DH20
74 GO to Pinpoint Step	FD1	FD1	FD1	FD1	*	*
75 GO to Pinpoint Step	FD4	FD4	FD4	FD4	*	*
77 GO to Pinpoint Step	M1	M1	M1	M1	M1	M1
No Codes/Code Not Listed	GO to Pinpoint Test Step Q1					

## QUICK TEST: Continuous Self-Test

# 6.0

TEST STEP		RESULT	ACTION TO TAKE
<b>A</b>	<b>CONTINUOUS MEMORY CODES</b>		
	<ul style="list-style-type: none"> <li>To ensure proper diagnosis of CONTINUOUS MEMORY codes, QUICK TEST STEPS 1.0 through 5.0 must be successfully completed.</li> <li>Do the results of both KEY ON, ENGINE OFF and ENGINE RUNNING SELF-TEST result in a pass code 11?</li> </ul>	Yes  No 	Go To <b>6.0B</b> .  Return to Step 1.0 of QUICK TEST and make the necessary repairs indicated in QUICK TEST STEPS 3.0 and 5.0 before continuing.
<b>B</b>	<b>CLEAR CONTINUOUS MEMORY CODES</b>		
	<ul style="list-style-type: none"> <li>Prepare the vehicle for KEY ON, ENGINE OFF QUICK TEST per steps 1.0, 2.0, and 3.0.</li> <li>Perform KEY ON, ENGINE OFF SELF-TEST. When the service codes begin, exit the self-test program (via unlatching STAR or removing the jumper wire from STI to Signal Return). Exiting QUICK TEST during code output will clear all codes stored in the CONTINUOUS MEMORY.</li> <li>Repeat KEY ON, ENGINE OFF SELF-TEST.</li> <li>Does KEY ON, ENGINE OFF SELF-TEST output 11-10-11?</li> </ul>	Yes  No 	Go To <b>6.0C</b> .  Check STI circuit for short to ground. Repair as necessary. Repeat Step <b>6.0B</b> .
<b>C</b>	<b>DETERMINE CODES TO BE TESTED</b>		
	<ul style="list-style-type: none"> <li>Refer to CONTINUOUS MEMORY CODES recorded in QUICK TEST STEP 3.0A.</li> <li>Have any of the codes been repaired either in KEY ON, ENGINE OFF or ENGINE RUNNING SELF-TESTS?</li> </ul>	Yes  No 	Disregard codes already serviced. For remaining codes, Go To <b>6.0D</b> .  Go To <b>6.0D</b> .

**QUICK TEST: Continuous  
Self-Test****6.0****D TEST RESULTS AND ACTION TO TAKE**

- **YOU SHOULD NOT BE HERE UNLESS ALL PREVIOUS QUICK TEST STEPS HAVE BEEN SUCCESSFULLY COMPLETED!**
- Verify proper test equipment hook up per QUICK TEST STEP 2.0.
- SELF-TEST deactivated. Do not activate SELF-TEST unless instructed.
- Using the service codes determined in STEP 6.0C, follow the action to take instructions. (While in the appropriate PINPOINT TEST, one or both of the continuous monitor modes described below may have to be used to find the intermittent fault.)

**CONTINUOUS MONITOR (WIGGLE) MODES**

- **KEY ON ENGINE OFF**  
With SELF-TEST deactivated, turn the ignition key to the ON position. You are now in the continuous monitor mode (wobble test). STO will be activated whenever a fault is detected. A fault is indicated when the STAR LED turns off or the VOM deflection is 10.5V or greater.
- **ENGINE RUNNING**  
Activate SELF-TEST and perform ENGINE RUNNING QUICK TEST. After service code output has been completed do not turn engine off or deactivate SELF-TEST. Approximately 2 minutes after code 11 has been outputted the system will enter and remain in continuous monitor mode until SELF-TEST is deactivated or the engine is turned off. STO will be activated whenever a fault is detected. A fault is indicated the same way as KEY ON ENGINE OFF.
- Refer to the appendix for a detailed description of the continuous monitor (wobble test).

# QUICK TEST: Continuous Self-Test

# 6.0

## PASSENGER CAR

RESULTS	ACTION TO TAKE								
	1.9L EFI	2.3L EFI TURBO	2.3L OHC FBC	2.3L CFI**		2.5L CFI	3.0L EFI	3.8L CFI	5.0L SEFI
BASE				PLUS					
13 GO to Pinpoint Step	*	*	*	KF19	KF19	KF19	*	*	*
14 GO to Pinpoint Step	Y1	Y1	Y1	Y1	Y1	Y1	Y1	Y1	Y1
18 GO to Pinpoint Step	N1	N1	N1	N1	N1	N1	N1	N1	N1
21 GO to Pinpoint Step	DE90	DE90	DE90	DE90	DE90	DE90	*	*	*
22 GO to Pinpoint Step	DF90	DF90	DF90	DF90	DF90	DF90	DF90	DF90	DF90
29 GO to Pinpoint Step	*	*	*	*	*	*	T2	*	*
31 GO to Pinpoint Step	*	*	*	DN92	DM90	DN92	DL90	DD90	DN92
32 GO to Pinpoint Step	*	*	*	DN90	*	DN90	DL94	*	DN90
33 GO to Pinpoint Step	*	*	*	DN95	*	DN95	DL97	*	DN95
34 GO to Pinpoint Step	*	*	*	DN98	*	DN98	DL93	*	DN98
35 GO to Pinpoint Step	*	*	*	DN92	*	DN92	DL90	*	DN92
39 GO to Pinpoint Step	*	*	*	*	*	*	T31	*	*
41 GO to Pinpoint Step	HA20	*	HB1	*	*	*	*	*	*
42 GO to Pinpoint Step	HA20	*	HB20	*	*	*	*	*	*
51 GO to Pinpoint Step	DE91	DE91	DE91	DE91	DE91	DE91	DE91	DE91	DE91
53 GO to Pinpoint Step	DH90	DH90	DH90	DH90	DH90	DH90	DH90	DH90	DH90
54 GO to Pinpoint Step	DA90	DA90	*	DB90	DB90	DB90	DB90	DB90	DB90
56 GO to Pinpoint Step	DK90	DK90	*	*	*	*	*	*	*
57 GO to Pinpoint Step	*	*	*	*	*	*	T41	*	*
59 GO to Pinpoint Step	*	*	*	*	*	*	T21	*	*
61 GO to Pinpoint Step	DE94	DE94	DE94	DE94	DE94	DE94	DE94	DE94	DE94
63 GO to Pinpoint Step	DH94	DH94	DH94	DH94	DH94	DH94	DH94	DH94	DH94
64 GO to Pinpoint Step	DA93	DA93	*	DB93	DB93	DB93	DB93	DB93	DB93
66 GO to Pinpoint Step	DK93	DK93	*	*	*	*	*	*	*
69 GO to Pinpoint Step	*	*	*	*	*	*	T11	*	*
78 GO to Pinpoint Step	*	*	*	B10	*	*	*	*	*
No Codes/Code Not Listed	GO to Pinpoint Test Step Q1								

\*\*There are two unique Self Test strategies for the 2.3L CFI Tempo/Topaz vehicles, therefore special attention must be given in identifying "base" engine vs "plus" engine on these vehicles to ensure usage of the correct Pinpoint Test.

# QUICK TEST: Continuous Self-Test

# 6.0

## LIGHT TRUCK

RESULTS	ACTION TO TAKE					
	2.3L EFI	2.8L FBC	2.9L EFI	3.0L EFI	4.9L FBC	5.0L EFI
Continuous Memory Service Codes						
14 GO to Pinpoint Step	Y1	Y1	Y1	Y1	Y1	Y1
18 GO to Pinpoint Step	N1	N1	N1	N1	N1	N1
21 GO to Pinpoint Step	DE90	DE90	DE90	*	DE90	DE90
22 GO to Pinpoint Step	DF90	DF90	DF90	DF90	DF90	DF90
31 GO to Pinpoint Step	DD90	DD90	DL90	*	*	DD90
32 GO to Pinpoint Step	*	*	DL94	*	*	*
33 GO to Pinpoint Step	*	*	DL97	*	*	*
34 GO to Pinpoint Step	*	*	DL93	*	*	*
35 GO to Pinpoint Step	*	*	DL90	*	*	*
41 GO to Pinpoint Step	*	HB1	*	*	HB1	*
42 GO to Pinpoint Step	*	HB20	*	*	HB20	*
51 GO to Pinpoint Step	DE91	DE91	*	DE91	DE91	DE91
53 GO to Pinpoint Step	*	DH90	DH90	DH90	DH90	DH90
54 GO to Pinpoint Step	DB90	DB90	DB90	DB90	*	DB90
61 GO to Pinpoint Step	DE94	DE94	DE94	DE94	DE94	DE94
63 GO to Pinpoint Step	DH94	DH94	DH94	DH94	DH94	DH94
64 GO to Pinpoint Step	DB93	DB93	DH93	DH93	*	DB93
No Codes/Code Not Listed	GO to Pinpoint Test Step Q1					

## APPENDIX: Self-Test Description

### SELF-TEST DESCRIPTION

The Self-Test is divided into three specialized tests: Key On, Engine Off, Engine Running, and Continuous memory. The Self-Test is not a conclusive test by itself, but is used as a part of the functional Quick-Test diagnostic procedure. The processor stores the Self-Test program in its permanent memory. When activated, it checks the EEC-IV system by testing its memory integrity and processing capability, and verifies that various sensors and actuators are connected and operating properly.

The Key On, Engine Off and Engine Running tests are functional tests which only detect faults present at the time of the Self-Test. Continuous testing is an ongoing test that stores fault information for retrieval at a later time (during the Self-Test).

#### Key On, Engine Off

At this time, a test of the EEC-IV system is conducted with power applied and engine at rest.

For Self-Test to detect errors in this test the fault must be present at the time of testing. For intermittents, refer to Continuous Memory Codes.

#### Separator Pulse

A single 1/2 second separator pulse is issued 6-9 seconds after the last Functional Test code (Key On, Engine Off only). Then 6-9 seconds after the single 1/2 second separator pulse, the continuous codes will be issued. Refer to the example below:

**NOTE: The separator code and continuous memory codes follow Key On, Engine Off testing codes ONLY.**

#### Continuous Memory Codes

Continuous memory codes are issued as a result of information stored during continuous monitor testing, while the vehicle was in normal operation. These codes are displayed only during the Key On, Engine Off testing and after the separator code. These codes should be used for diagnosis only when Key On, Engine Off and Engine Running Self-Tests result in code 11 and all Quick Test steps 1.0 through 5.0 have been successfully completed.

#### Engine Running Test

At this time, a test of the EEC-IV system is conducted with the engine running. The sensors are checked under actual operating conditions and at normal operating temperatures. The actuators are exercised and checked for corresponding results.

#### Engine Identification Codes (ID Codes)

Engine ID codes are issued at the beginning of the engine running test and are one-digit numbers represented by the number of pulses sent out. The engine ID code is equal to 1/2 the number of engine cylinder (i.e. 2 pulses = 4 cylinders). These codes are used to verify the proper processor is installed and that the Self-Test has been entered.

#### Dynamic Response Check

The dynamic response check verifies the movement of the TP, VAF, and MAP sensors during the brief Wide Open Throttle (WOT) performed during the Engine Running Test. The signal for the operator to perform the brief WOT is a single pulse or 10 code on the STAR. Also, during the Engine Running Test, the brake pedal must be depressed and released after the ID code to assure operation of the brake on/off switch for 2.8L and 2.3L EFI light trucks.



## **APPENDIX: Diagnostic Aids**

### **OUTPUT STATE CHECK**

The output state check aids in servicing output actuators associated with the EEC-IV system. It enables the technician to energize and de-energize most of the system output actuators (turn EGR solenoid and Self-Test Output (STO) On and Off) on command. This mode is entered after all codes have been received from Key On, Engine Off and Continuous Testing. At this time, leave Self-Test activated and depress the throttle. Each time the throttle is depressed the output actuators will change state (On to Off or Off to On).

- Enter Self-Test.
- Code Output Ends.
- Do Brief WOT.
- Output Actuators Actuated.
- Next Brief WOT.
- Output Actuators Deactivated.

### **CYLINDER BALANCE TEST**

The cylinder balance test is an aid in servicing the 5.0L SEFI EEC-IV fuel system by energizing and de-energizing each injector separately. This test mode is entered after all service codes have been displayed—following the Engine Running Quick Test. At this time leave the Self-Test activated, and perform a brief Wide Open Throttle (WOT), approximately one second. Total test time is approximately 90 seconds.

## APPENDIX: Continuous Self-Test

The Continuous Memory service codes are separated from the Quick Test Key On, Engine Off codes by a single separator pulse, Figure 5.

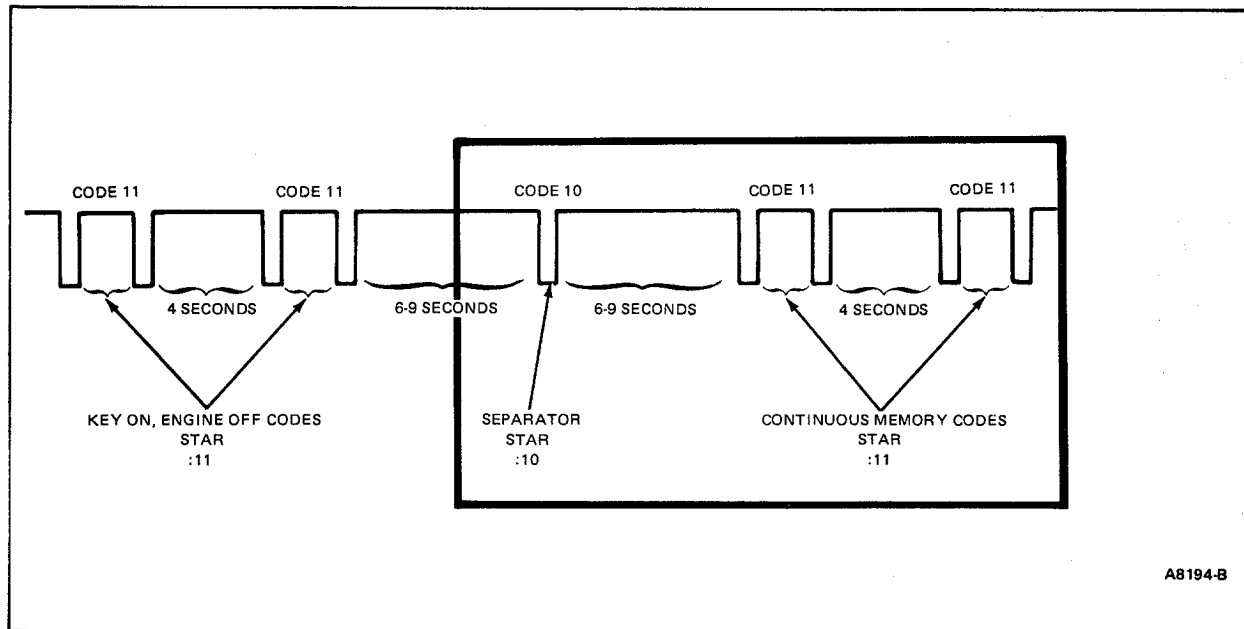


Figure 5 Continuous Memory Self-Test Output Code Format

The Continuous Memory codes should never be used for Diagnosis until the Key On, Engine Off and Engine Running Tests result in a pass code 11.

The service codes that were displayed (repeated) in both the Continuous Memory and Engine Running Test are considered repaired. The unique service code(s) displayed only in Continuous Memory are considered the intermittent service codes.

During this mode of testing we continuously monitor inputs to processor for opens and shorts. The continuous memory codes must be retrieved within twenty engine temperature warm up cycles. On the twenty-first Engine Temperature cycle the service code will be automatically erased. The continuous memory code can also be erased by deactivating Quick Test, while the service codes are being outputted.

### Continuous Monitor Test

This test is intended as an aid in diagnosing intermittent failures in the sensor input circuits. The Self-Test output is energized whenever the continuous memory mode senses a fault and de-energized when the system is OK.

- Connect a VOM/STAR to the Self-Test output.

## APPENDIX: Continuous Self-Test (Continued)

- **Key On, Engine Off Continuous Monitor Test, (Wiggle).**

To enter this mode, “verify” Self-Test is not activated and then turn the key to run. Self-Test output will be activated whenever a continuous fault is detected and if the duration is long enough, a fault code will be stored.

- **Engine Running Continuous Monitor Test, (Wiggle).**

This mode of testing is entered approximately 2 minutes after the service codes from the Engine Running portion of Quick Test (Step 5.0) because the engine running test can be entered only once per ignition cycle. An alternate quick method (eliminates waiting for Self-Test to complete its cycle) is to enter the running test, exit, and re-enter (do not shut the engine off). This will put you in the Engine Running Continuous Monitor (Wiggle) Test.

The Continuous Monitor (Wiggle) Test will allow the technician to enter this mode of Self-Test and to attempt to re-create the intermittent failure (tap, move, wiggle the harness and/or the suspected sensor).

If the VOM/STAR indicates a fault (short or open) the corresponding service code will be stored. Now with the knowledge of the affected circuits, a close check of the harness and associated connectors can be made.

**NOTE: Remember to keep your eyes on the VOM/STAR for any change which will indicate where the intermittent is located.**

### EXAMPLE: How to Use the Continuous Monitor Test (Systematically)

If a service code 51 was displayed: Engine Coolant Temperature Sensor:

- Visually inspect the sensor **very closely**.
- Enter Continuous Monitor test.
- Lightly TAP on the sensor.
- Push/pull on the sensor harness connector (do not disconnect, yet).
- Test and Wiggle (shake) harness vigorously working from the sensor connector toward the dash panel and from the dash panel to the processor in short sections.
- If VOM has not given a positive indication of an intermittent, disconnect the sensor from the harness as carefully as possible. Remove terminals from the connector. Visually inspect terminals at both ends for corrosion, bad crimps, improperly seated terminals, etc.
- Reconnect after inspection.
- Disconnect processor from harness as carefully as possible.
- Inspect terminals.
- Only remove terminals associated with the sensor being inspected.
- If the VOM does not give a positive intermittent indication, reconnect the connector and erase the Continuous Test service codes.
- To erase the continuous service codes:
  - Initiate Key On, Engine Off Self-Test.
  - Remove jumper from the Self-Test input terminal as soon as the **first** service code is received (even if an “11” is the first code).
  - Rerun Self-Test with jumper to verify services have been erased.

## APPENDIX: Code Output Format

### SERVICE CODES

The EEC-IV system communicates service information to the outside world by way of the Self-Test service codes. These service codes are two-digit numbers representing the results of Self-Test.

The service codes are transmitted on the Self-Test output (found in the Self-Test connector) in the form of timed pulses, and read by the technician on a voltmeter or on the STAR tester.

### SELF-TEST OUTPUT CODE FORMAT\* KEY ON, ENGINE OFF

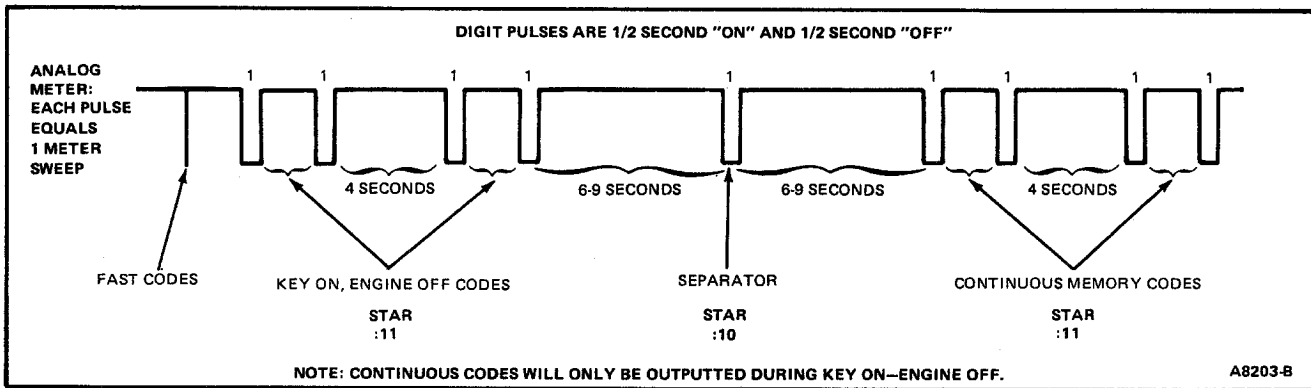


Figure 1 Key On, Engine Off Self-Test Output Code Format

### SELF-TEST OUTPUT CODE FORMAT\* ENGINE RUNNING

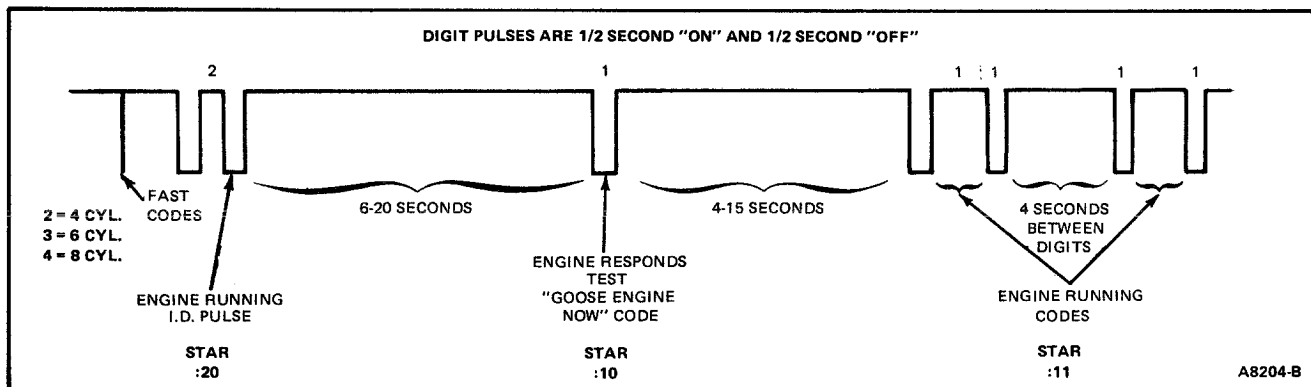


Figure 2 Engine Running Self-Test Output Code Format

### Fast Codes

Fast codes are issued prior to regular service codes. These codes contain the identical information as the regular service codes but are transmitted at 100 times the normal rate. These codes are interpreted by special equipment at the Body and Assembly Division. They serve no purpose for the field.

For this reason the STAR has been designed to disregard these codes. Some meters in service detect these codes as a short burst of information (slight meter deflection).

# APPENDIX: Self-Test With Analog Voltmeter

## Reading Codes—Analog Voltmeter

When a service code is reported on the analog voltmeter for a function test, it will represent itself as a pulsing or sweeping movement of the voltmeter's needle across the dial face of the voltmeter (Figure 3). Therefore, a single-digit number of three will be reported by three needle pulses (sweeps). However, as previously stated, a service code is represented by a two-digit number, such as 2-3. As a result, the Self-Tests service code of 2-3 will appear on the voltmeter as two needle pulses (sweeps), then, after a two-second pause, the needle will pulse (sweep) three times.

The continuous memory codes are separated from the functional codes by a six-second delay, a single half-second sweep, and another six-second delay. They are produced on the voltmeter in the same manner as the functional codes.

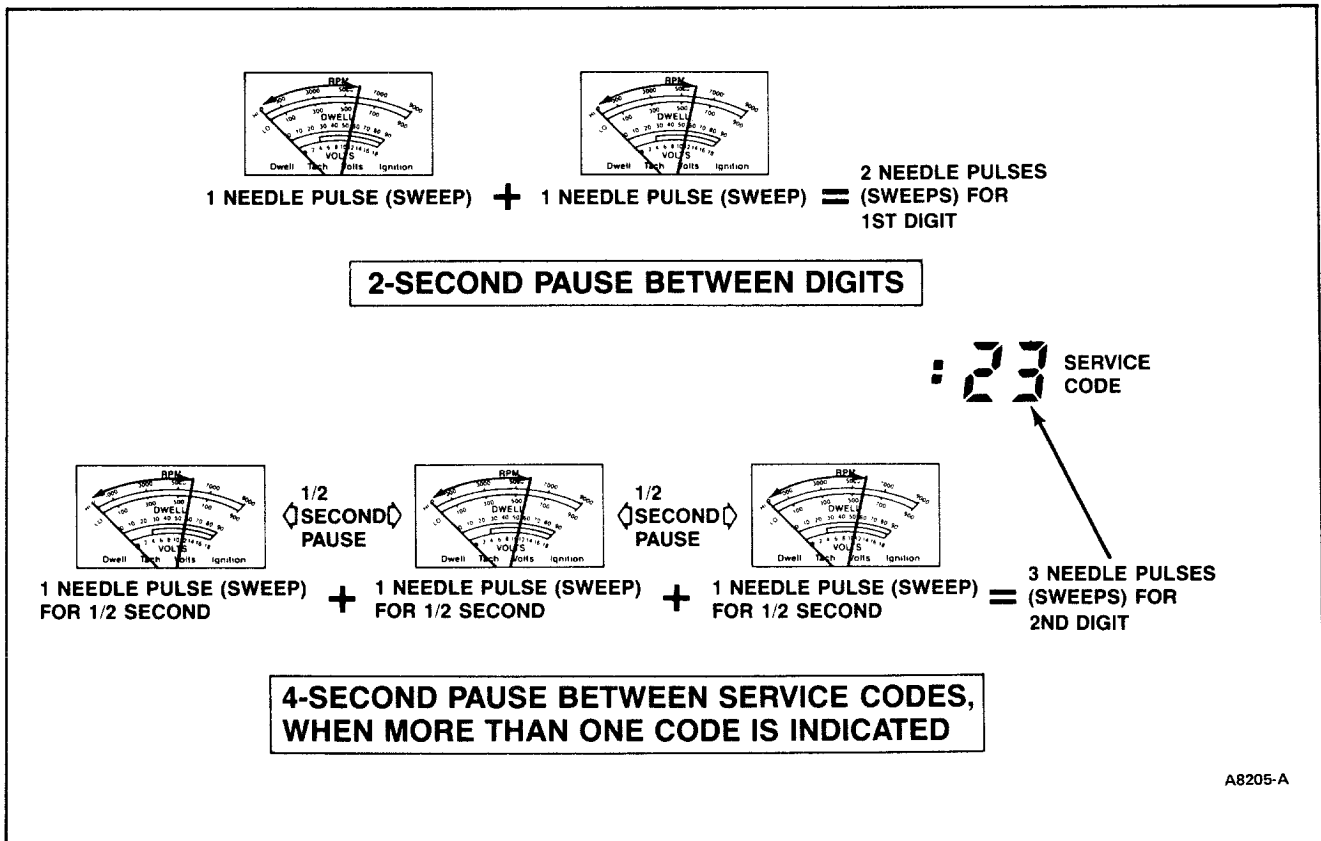


Figure 3 Analog Voltmeter Functional Service Code

## APPENDIX: Self-Test With STAR Tester

### Reading Codes—Self-Test Automatic Readout (STAR) Rotunda Model 007-00004 or Equivalent

After hooking up the STAR tester and turning on its power switch, the tester will run a display check and the numerals 88 will begin to flash in the display window (Figure 4). A steady 00 will then appear to signify that the STAR tester is ready to start the Self-Test and receive the test's service codes.

To receive the service codes, press the pushbutton at the front of the STAR tester. The button will latch down, and a colon will appear in the display window in front of the 00 numerals. The colon **must** be displayed to receive the service codes.

If for any reason the technician wishes to clear the display window during the Self-Test, he must turn off the vehicle's engine, press the tester's pushbutton once to unlatch it (colon will disappear), then press the button again to latch down the button (colon will appear again). Every time the STAR tester is turned off, the low battery indicator (LO BAT) should show briefly at the upper left corner of the tester's display window. If the LO BAT indicator shows steadily at any other time during the operation of the STAR tester with any service code, turn its power switch to Off and replace the 9-volt battery in the tester.

The STAR tester will display the last service code received, even after disconnecting it from the vehicle. It will hold the service code on the display until the power is turned off or the pushbutton is unlatched and relatched.

**WARNING:** Anyone who departs from the instructions provided in this publication must first establish that he compromises neither his personal safety nor the vehicle integrity by his choice of methods, tools, or parts.

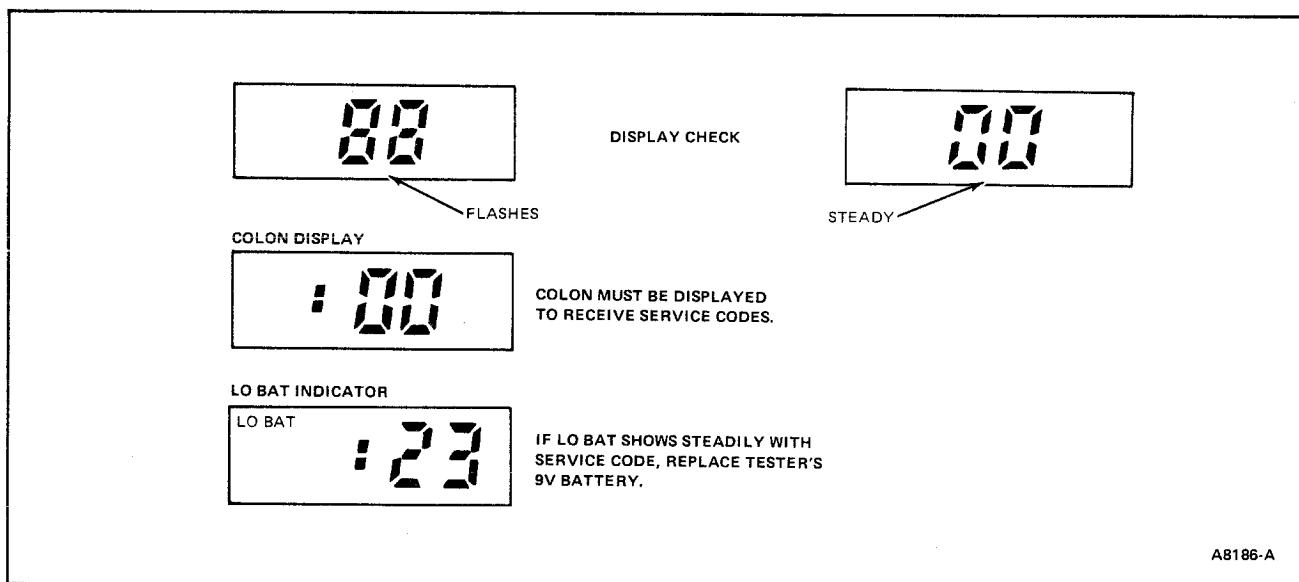
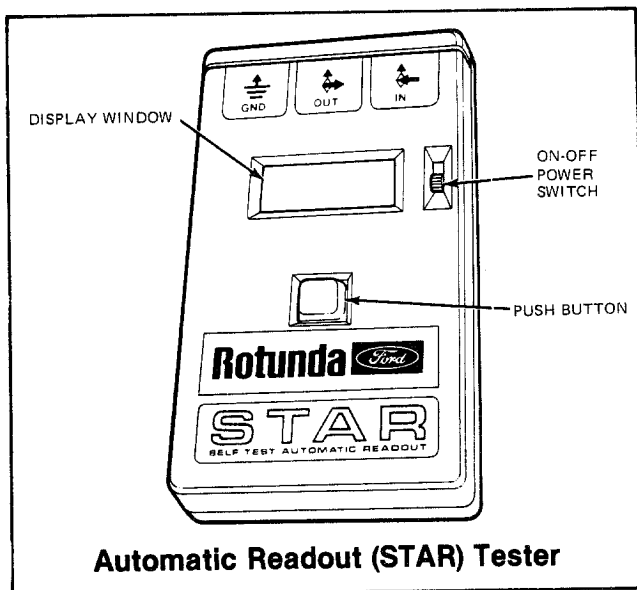


Figure 4 Self-Test Output Code Format

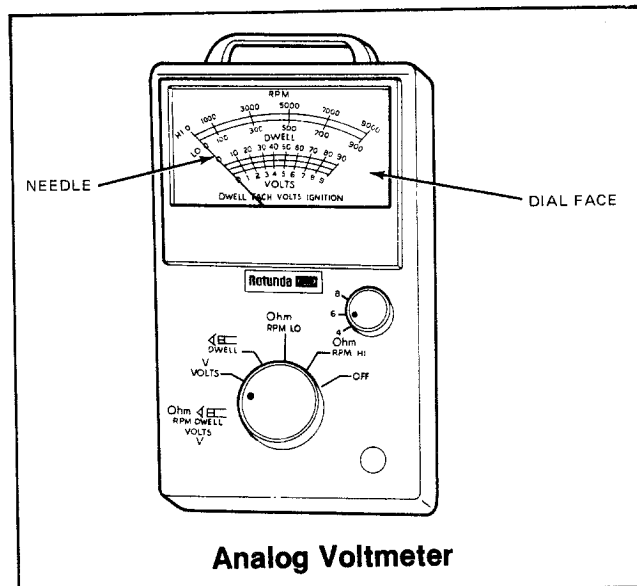
## APPENDIX: Test Equipment

### EQUIPMENT REQUIRED:

- Rotunda Self-Test Automatic Readout (STAR), No. 007-00004 with cable assembly No. 007-00010. Refer to STAR operation.
- Analog volt-ohmmeter, 0 to 20v DC, (alternate to STAR).

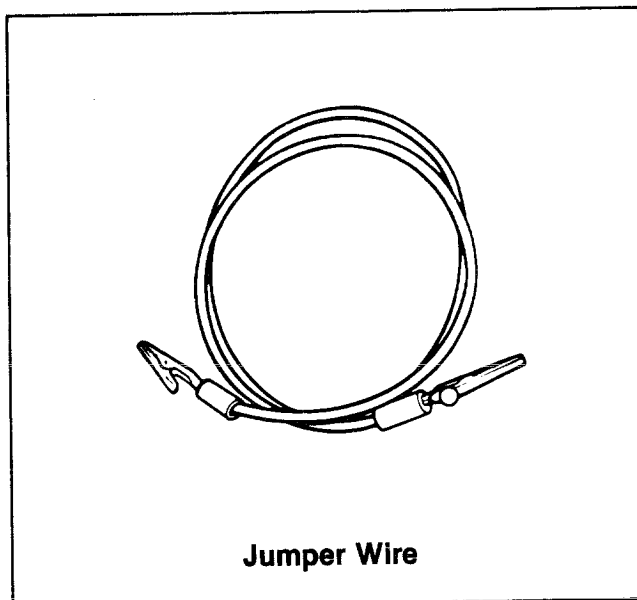


**Automatic Readout (STAR) Tester**

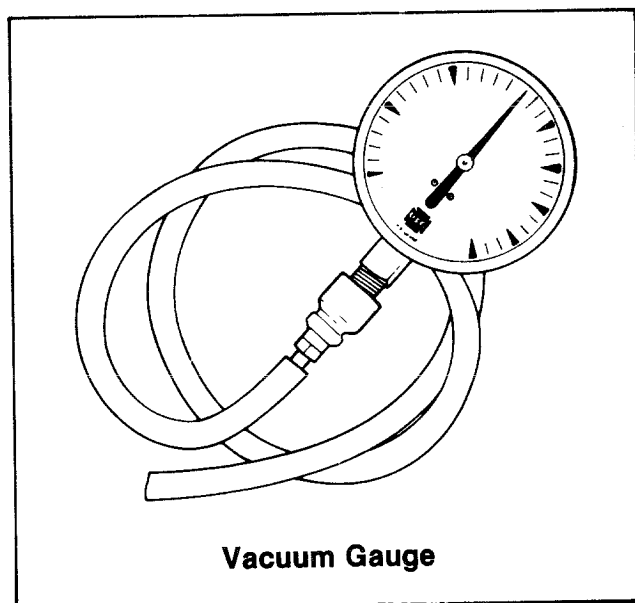


**Analog Voltmeter**

- Jumper wire.
- Vacuum gauge, Rotunda 059-00008 or equivalent. Range 0-30 in. Hg. Resolution 1 in. Hg.



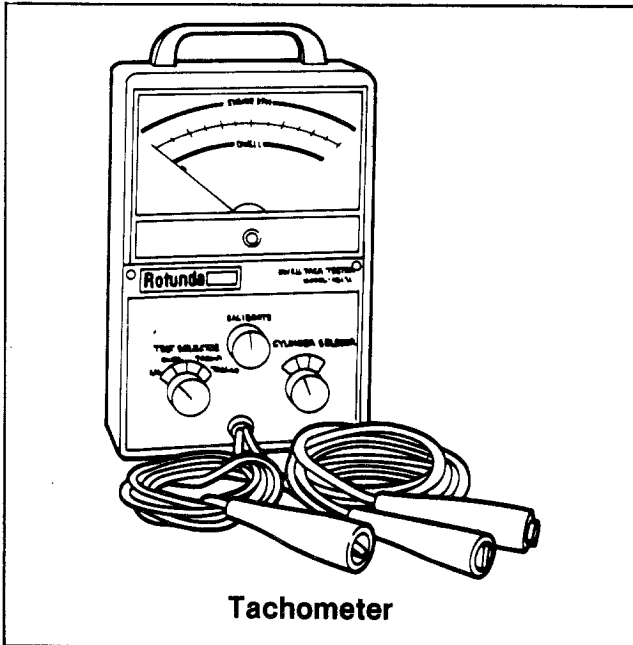
**Jumper Wire**



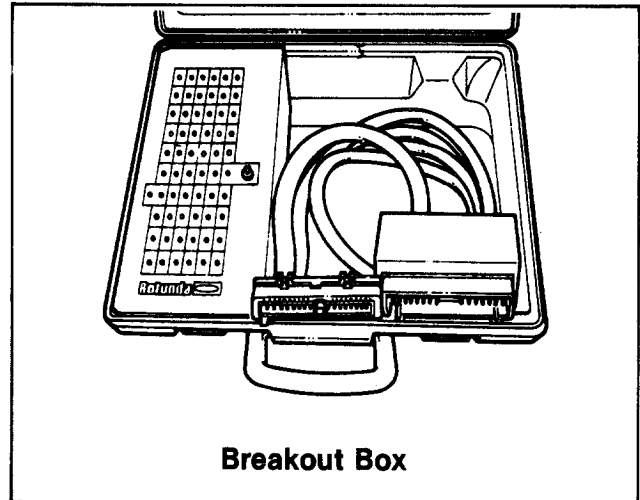
**Vacuum Gauge**

## APPENDIX: Test Equipment (Continued)

- Tachometer, Rotunda No. 059-00010 or equivalent. Range 0-6,000 rpm. Accuracy  $\pm 40$  rpm. Resolution 20 rpm.
- Breakout Box, Rotunda 014-00322, Special Service Tool T83L-50-EEC-IV or equivalent.

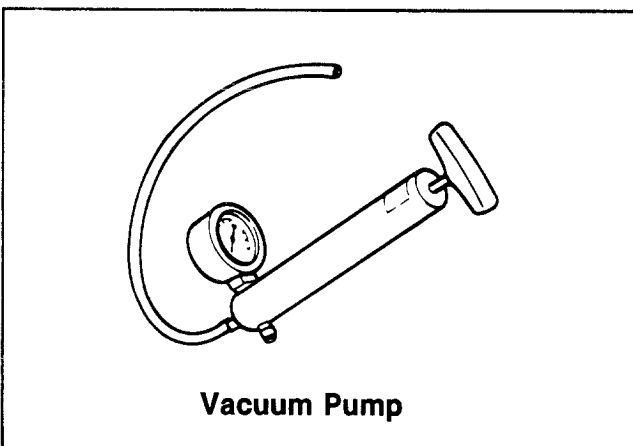


**Tachometer**

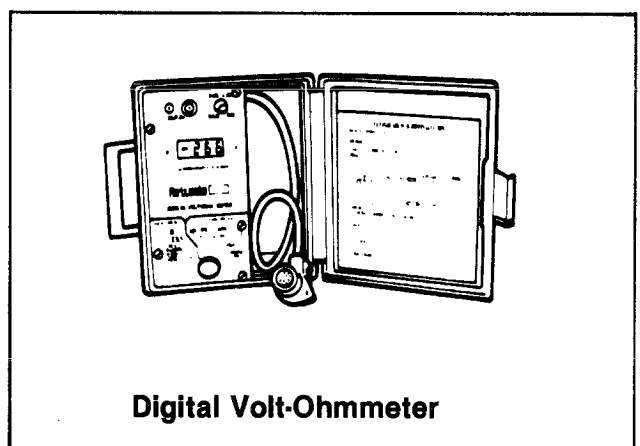


**Breakout Box**

- Vacuum pump, Rotunda No. 021-00014 or equivalent. Range 0-30 in. Hg.
- Digital volt-ohmmeter, Rotunda No. 014-00407 or equivalent. Input impedance 10 Megaohm minimum.



**Vacuum Pump**

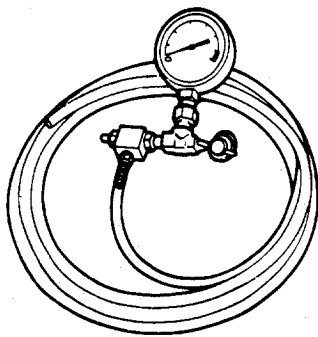


**Digital Volt-Ohmmeter**

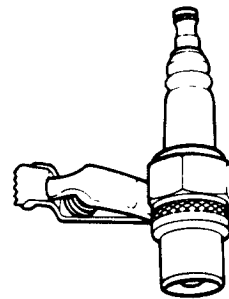
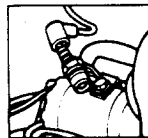


## APPENDIX: Test Equipment (Continued)

- Electronic Fuel Injection Pressure Gauge EFI/CFI only, Tool T80L-9974-A or equivalent. (Use instructions. For specific applications, refer to Shop Manual Group 24.)
- Spark tester (optional modified spark plug with side electrode removed). Tool D81P-6666-A or equivalent.

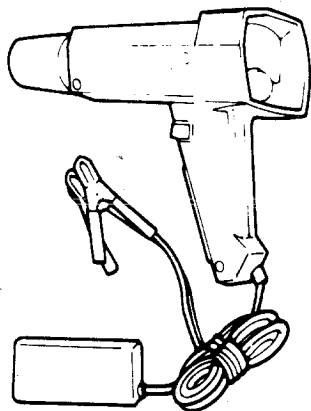


**EFI Pressure Gauge**

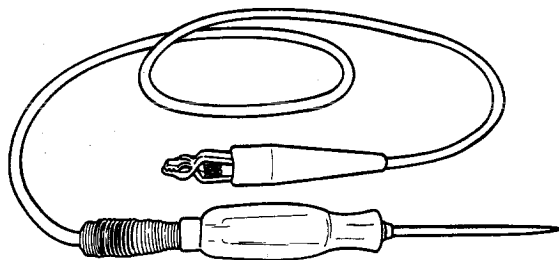


**Spark Tester**

- Timing light, Rotunda model 059-00006 or equivalent.
- Non-powered Test lamp.



**Timing Light**



**Non-Powered Test-Lamp**