DIAGNOSING COMPUTER FAULT CODES

FROM THE

1988 EA FORD FALCON - NA FORD FAIRLANE - DA FORD LTD

FITTED WITH EEC-IV (VERSION IV)

ELECTRONIC ENGINE CONTROL SYSTEMS MP EFI & EFI(CFI)

INTRODUCTION TO SELF TEST DIAGNOSTIC PROCEDURES

The EEC-IV system self test can be performed using an analog voltmeter. The test is divided into three segments:

KEY ON-ENGINE OFF

In this segment the system inputs and outputs are checked for existing faults. In this test procedure these types of faults are referred to as HARD FAULTS, because they represent a failure that is always present.

Also during this segment, the EEC-IV system is checked for INTERMITTENT FAULTS. These types of faults indicate there was a problem recently somewhere in the system, the fault is not present now, but it did occur recently. This usually means a loose connection, a broken wire that opens periodically, or some failure similar to these.

However, a significant point must be made here for the technician to check with the customer about recent work done on the vehicle that could produce an intermittent fault. A good example would be that the customer had recently flushed the radiator.

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E. & O. E.

While the engine is running during the flushing procedure it is possible that the Engine Coolant Temperature (ECT) sensor produced a low engine coolant temperature output to the ECA. This could possibly be put into memory as an intermittent fault.

If this information was not known, the technician could spend a lot of time looking for a nonexistent fault. Obviously then, it is very important for the technician to quiz the customer about this type of information prior to starting diagnosis.

WITH ENGINE RUNNING

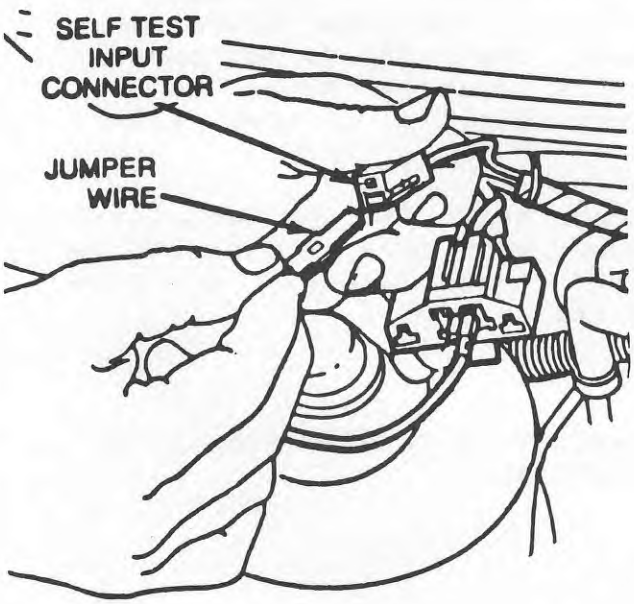
In this segment the system is checked under operating conditions. The output devices are all activated to check for proper operation. Only HARD FAULTS are noted during this segment.

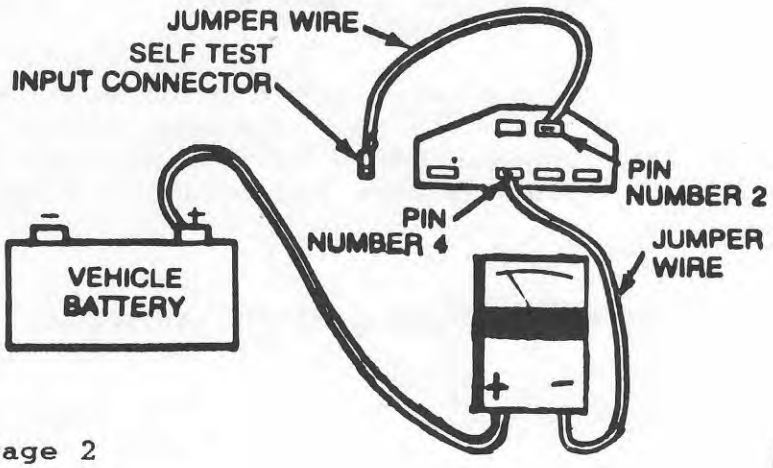
INTERMITTENT FAULT CONFIRMATION CHECK

This test is also referred to as the "wiggle test" because connectors, wires and components are wiggled during the check. This check is performed if intermittent faults are indicated during the KEY ON-ENGINE OFF segment of the self test.

To extract the fault codes from the Ford EA26 multi point or CFI fuel injection systems from the vehicles computer. Firstly, locate the diagnostic plug located on the left hand side of the brake master cylinder on the drivers side (these plugs are shaped as per the diagram below). DO NOT use the additional round plug with the pink wire and blue tracer, as this is the connection for the tachometer.

THE ENGINE MUST BE AT OPERATING TEMPERATURE BEFORE TESTING.





ENGINE TUNING - 15/8/6

Step 1 - Connect terminal number 2 to self test input connector using a jumper wire, as per the diagramme on page 2.

Step 2 - Connect an analog voltmeter (0-20v dc range) with a metering impedance not exceeding 1 MEG OHM to terminal number 4 and to the battery positive.

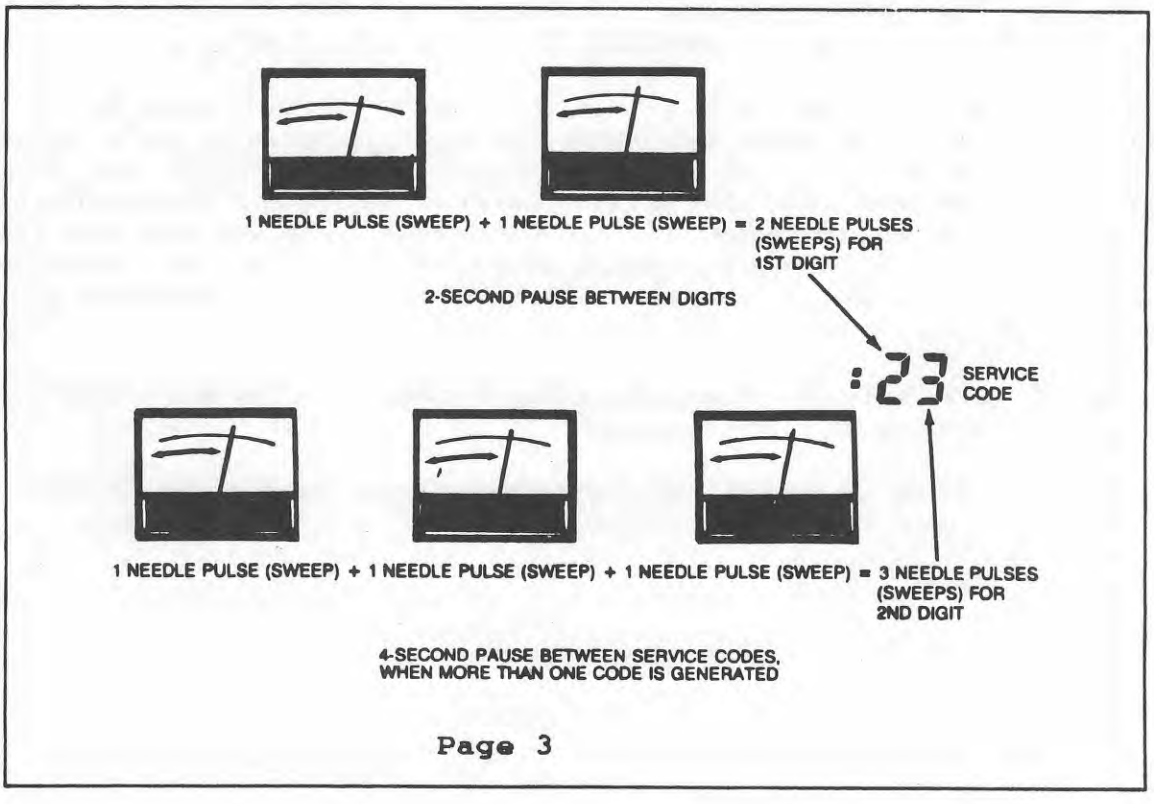
Step 3 - TURN IGNITION ON, DO NOT START ENGINE and watch meter function. The codes are transmitted as 2 digit numbers in timed voltage signals or pulses and are represented as a needle movements across the voltage scale.

SERVICE CODES

Once the EEC-IV system completes its self test it must have a way to communicate this information to the technician. This is done by the use of service codes. With the analog voltmeter connected as described above, the codes are represented by a pulse or sweeping movement of the voltmeter needle, back and forth across the scale. To obtain the correct code simply count the number of needle sweeps.

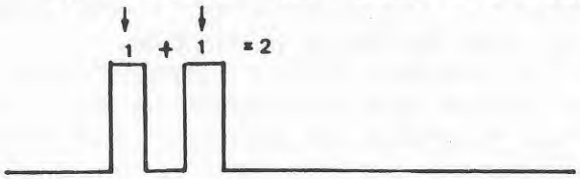
* All of the service codes are two-digit numerals, but the ECA generates them only as one digit at a time during self test.
* Each digit is actually generated as a number of electrical pulses (two pluses for numeral 2, three pulses for numeral 3, and so forth). The analog voltmeter will simply register them as wide needle sweeps across the scale.
* The digits are separated by a two-second pause.

Example: A code 23 (Throttle Position Sensor out of range) would be represented by two needle sweeps, a two-second pause, and then, three more needle sweeps. (fig. 10)



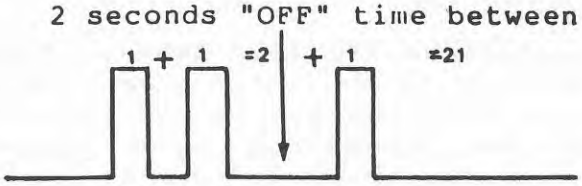
1/2 second "ON" time for each digit

EXAMPLE (a)



2 seconds "OFF" time between digits

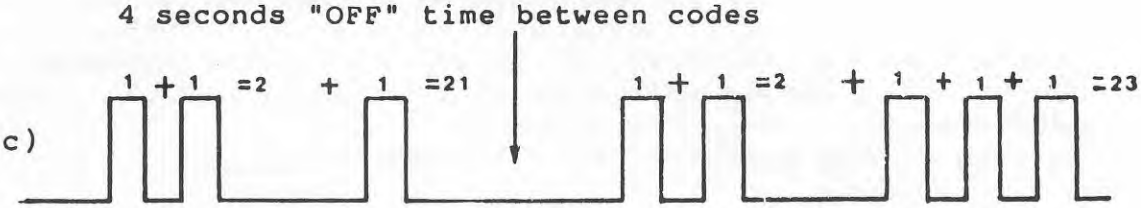
EXAMPLE (b)



If more than one service code is present, a 4 second pause separates them.

4 seconds "OFF" time between codes

EXAMPLE (c)



The codes displayed in Example (c) are "21" and "23".

If no faults are found code 11 will show twice,
e.g. 11 - 11 - 10 - 11 - 11 end.

Code 10 is a separation code only and not a diagnostic code, it only appears once. The test can only be repeated after the ignition key has been turned off for 15 seconds at the conclusion of the test before again repeating the test if necessary.

Now start the engine with the voltmeter still connected and bridging wire AG50 in position, now the engine running self test is initiated. The engine will almost immediately build up RPM to approx. 1600 rpm and stay there for several seconds, the codes will then be transmitted by means of the voltmeter same as the KEY ON - ENGINE OFF test. Again make sure engine is at operating temperature otherwise incorrect codes will be transmitted at the conclusion of this test.

TURN ENGINE OFF before disconnecting bridging wire and voltmeter, do not start engine for 15 seconds.

The following page is Fords' abbreviated terms used when diagnosing fault codes as per the remaining pages of this bulletin set.

FORD ON-BOARD COMPUTER TESTING
EEC IV SYSTEMS

REFERENCE 150 FORD ABBREVIATIONS

ACT	Air Change Temperature
A/C	Air Conditioning
BP	Barometric Pressure
BVT	Back Pressure Variable Transducer
CANP	Canister Purge
CFI	Central Fuel Injection
ECA	Electronic Control Assembly
ECT	Engine Coolant Temperature
EEC	Electronic Engine Control
EFI	Electronic Fuel Injection
EGO	Exhaust Gas Oxygen
EGR	Exhaust Gas Recirculation
EGRC	EGR Control Solenoid
EGRV	EGR Vent Solenoid
EHC	Exhaust Heat Control
EVP	EGR Valve Position Sensor
FBC	Feedback Carburetor
FP	Fuel Pump
ISC	Idle Speed Control
ITS	Idle Tracking Switch
KAM	Keep Alive Memory
MAP	Manifold Absolute Pressure Sensor
MCU	Microprocessor Control Unit
NDS	Neutral Drive Switch
PIP	Profile Ignition Pickup
SIG.RTN	Signal Return
STI	Self Test Input
STO	Self Test Output
TAB	Thermactor Air By-pass
TAD	Thermactor Air Diverter
TCP	Temperature Compensated Pump
TFI	Thick Film Ignition
TKS	Throttle Kicker Solenoid
TP	Throttle Position
TSP	Throttle Solenoid Position
VAF	Vane Air Flow
VAT	Vane Air Temperature
Vref	Reference Voltage
VVC	Variable Voltage Choke
WAC WOT	A/C Cutoff
WOT	Wide Open Throttle

SERVICE CODE	EXPLANATION OF SERVICE CODE	POSSIBLE CAUSES OF CONCERN	POSSIBLE SYMPTOMS
12 Key On-Engine Running	Indicates the system is not capable to raising engine speed above idle.	Non-EEC -Engine running rough -Throttle linkage binding -Improper vehicle prep. e.g. warm-up EEC ISC motor/TKS system /ISC -Solenoid problems -Wire harness prob's -ECA problems	-Rough idle or stalls due to lack of RPM Increase with added loads e.g power steering lock or a/c on
13 Key On-Engine Running	Indicates that the engine did not return to a specified lower rpm prior to entering the "goose" test portion of Quick Test	Non-EEC -Improper curb idle set -Throttle/TVS linkage binding -Improper throttle set -Improper cruise control set EEC -ISC motor/ISC solenoid problems Idle tracking switch problems -Wire harness problems -ECA problems	-Idle speed concerns (may be accompanied by code 58)
14 CONT	Indicates that erratic operation or intermittent loss of PIP Information to the ECA has occurred during operation.	Non EEC -Distributor pickup problems EEC -Wire harness prob's -ECA problems	-Engine miss -Surge -Rough idle -Stall
15	Indicates an ECA failure	EEC -ECA problems	-Erratic operation or no start

SERVICE CODE	EXPLANATION OF SERVICE CODE	POSSIBLE CAUSES OF CONCERN	POSSIBLE SYMPTOMS
16 Key On-Engine Running	Indicates that the fuel system has been driven "lean" until the rpm drops, but the EGO sensor continues to indicate "rich"	EEC -Contaminated EGO sensor -Wire harness problem -ECA problems	-System may correct "lean" Inducing stumbles or hesitation
21 Key On-Engine Off	Indicates that the engine coolant temperature is out of range.	Non EEC -Engine not up to operating temperature or, in the case of a no start, test performed in cool ambient conditions -Engine over operating temperature Low coolant Stuck thermostat Cooling fan problems EEC -ECT sensor problems -Wire harness problem -ECA problems	-Reduced MPG -Rough idle -Improper Idle Speed -Detonation
21 Key On-Engine Running	Indicated the engine coolant is not at normal operating temperature.	Non EEC -Engine not warmed up -Thermostat stuck open -Low coolant level -Coolant fan not operating -Thermostat stuck closed -Radiator blockage (internal or external) -Improper spark timing -Fuel problems EEC -ECT sensor problems -Wire harness problem -ECA problems	-Reduced MPG -Rough Idle -Improper idle speed -Detonation

SERVICE CODE	EXPLANATION OF SERVICE CODE	POSSIBLE CAUSES OF CONCERN	POSSIBLE SYMPTOMS
22 Key On-Engine Off	Indicates the MAP/BP sensor is out of range The sensor(s) should read atmospheric pressure	Non EEC -Usually high atmospheric pressure -Vacuum trapped at MAP sensor EEC -MAP/BR sensor problems -Wire harness problem -ECA problems	-No start -Stalls -Detonation -Reduced MPG -Loss power
23 Key On-Engine Off	Indicates the TP sensor is not at the proper closed throttle position. Failure may occur either above or below the proper closed throttle position	Non EEC -Improper base adjustment of curb set, ISC motor, TSP, TKS or cruise control linkage EEC -TKS/ISC motor problems -Wire harness problem -TP sensor problems -ECA problems	-No start -EFI/CFI -Hesitation -Stalls -Low/High Idle -Poor performance -Reduced MPG
23 Key On-Engine Running	Indicates the TP sensor is not at the normal throttle position for Quick Test conditions	Non EEC -Improper base adjustment of curb set, ISC motor, TSP, TKS or cruise control linkage EEC -TKS/ISC motor problems -Wire harness problem -TP sensor problems -ECA problems	-Hesitation -Stalls -Low/High Idle -Poor performance -Reduced MPG
24 Key On-Engine Off	Indicates the Air Charge/Vane temperature is out of range	Non EEC -Vehicle testing performed in ambient temperature less + 50 deg. F -Improper air cleaner duct/door operation EEC -ACT sensor problems -Wire harness problem -ECA problems	-Poor idle -Reduced MPG

SERVICE CODE	EXPLANATION OF SERVICE CODE	POSSIBLE CAUSES OF CONCERN	POSSIBLE SYMPTOMS
24 Key On-Engine Running	Indicates the ACT/VAT sensor is not at normal engine operating temperature.	Non EEC -Improper operation of the air cleaner duct door -Cooling system problems -Base timing problems EEC -ACT/VAT sensor problems -Wire harness problem -ECA problems	-Poor idle -Reduced MPG
41 Key On-Engine Running	Indicates the EGO sensor out put voltage is always less than 0.5 V. ("lean") during the fuel test	Non EEC -Improper fuel delivery -Carburetor/Throttle Body Injector problem -Vacuum leaks -Unmetered air -Thermactor air is always upstream. EEC -EGO sensor problems -Wire harness problem -ECA problems	-Runs rough -Stalls -Hesitates -Runs "lean" -May correct "rich" If sensor or harness related. -Spark plugs -Reduced MPG
42 Key On-Engine Running	Indicates the EGO sensor out put voltage is always greater than 0.5 v ("rich") during the fuel test.	Non EEC -Improper fuel -Carburetor/Throttle Body injector problem -Obstructed air intake -Ignition system problems -Canister purge problems EEC -EGO sensor problems -Wire harness problem -ECA problems	-Runs rough -Runs "rich" -Reduced MPG -Spark plugs fouled -May correct "lean" if sensor or harness related -Hesitation -Stalls

SERVICE CODE	EXPLANATION OF SERVICE CODE	POSSIBLE CAUSES OF CONCERN	POSSIBLE SYMPTOMS
51 Key On-Engine Off	Indicates the ECT signal failed at the at the high and (approx 5.0 v). Failure mode indicates - 40 deg. F.	EEC -ECT sensor problems -Wire harness problem -ECA problems	-Hard to start Hot -Black smoke -Reduced MPG
52	Power Steering Switch open circuit		
53 Key On-Engine Off	Indicates the TP signal failed at the high and (aprox 5.0 v) Failure mode indicates WOT	EEC -Wire harness problem Open signal return circuit TP signal shorted to VREF -TP sensor problems -ECA problems	-No start (EFI /CFI) -Poor part throttle performance
54 Key On-Engine Off	Indicates the ACT signal has failed at the high end (aprox 5.0 v) Failure mode indicates 40 deg. F	EEC -Wire harness problems Vref open ACt signal shorted to signal return ACT signal open -ACT sensor problems -ECA problems	-Reduced MPG -Black smoke
55	Internal Power to the EEC IV module is too low.		
58 Key On-Engine Running	Indicates the ITS is not in contact with the throttle lever with the ISC motor extended.	Non EEC -Improper throttle plate stop adjustment -Throttle linkage binding -Cruise control misadjusted EEC -ITS problems -Wire harness problem -ECA problems	-Improper idle speeds -Stalls

SERVICE CODE	EXPLANATION OF SERVICE CODE	POSSIBLE CAUSES OF CONCERN	POSSIBLE SYMPTOMS
61 Key On-Engine On	Indicates the ECT signal has failed at the low end (approx 0.0 v). Failure mode indicates +240 deg. F	EEC -ECT sensor problems -Wire harness problem -ECA problems	-Hard start/no start (cold)
63 Key On-Engine Off	Indicates the TP signal has failed at the low end (approx 0.0 v). Failure mode indicates closed throttle	EEC -Wire harness problem -Vref open -TP signal shorted to signal return -TP sensor problems -ECA problems	-Runs rough -Stumbles -Stalls
64 Key On-Engine Off	Indicates the ACT/VAt signal has failed at the low end (approx 0.0 v). Failure mode indicates + 240 deg. F.	EEC -ACT/VAT sensor problems -Wire harness problem -ECA problems	-Runs rough -Stumbles -Stalls
67 Key On-Engine Off	Indicates the system is receiving an improper neutral/drive or A/C clutch status input.	Non EEC -Vehicle in gear or AC "on" EEC -Neutral/drive switch problems -Wire harness problem -ECA problems	
68 Key On-Engine Off	Indicates the ITS in contact with the throttle lever with the ISC motor retracted	Non EEC -Improper ISC motor adjustment EEC -ITS problems -Wire harness problem	-Improper idle speed control -Stalls
85 Key On-Engine Off	Indicates a CANP circuit fault	EEC -Open/shorted CANP valve -Wire harness problem -ECA problems	-Customer complaints of gasoline odour

SERVICE CODE	EXPLANATION OF SERVICE CODE	POSSIBLE CAUSES OF CONCERN	POSSIBLE SYMPTOMS
87 Key On-Engine Off	Indicates a fuel pump relay circuit fault	EEC -Inertia switch problems -Open/short fuel pump relay -Wire harness problem -ECA problems	-No start -Pump runs with key in "off" position
99	Idle speed correction not learnt		

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