

J - PIN VOLTAGE CHARTS

1997 ENGINE PERFORMANCE Pin Voltage/PID Value Charts

INTRODUCTION

Pin voltage (value) charts are used for diagnosing intermittent symptoms and faults that are unable to be resolved during self-diagnostics. Pin tests ensure the Powertrain Control Module is receiving and transmitting proper voltage and other signals.

Parameter Identification (PID) values also check PCM input and output signals. PID values are retrieved using an OBD-II compliant scan tester. PID values can only be accessed on OBD-II models. See **PID TESTING** under TEST PROCEDURES.

Before performing tests, ensure mechanical conditions have been inspected and self-diagnostics has been attempted. Service bulletins may also be helpful in correcting a hard to diagnose problem.

TEST EQUIPMENT

OBD-II

In order to read Parameter Identification (PID) values, a New Generation Star Tester (007-00500) or other OBD-II compliant scan tester is required. A DVOM, 104-pin Breakout Box (014-00950) and appropriate adapter cable are required to check pin values. Manufacturer does not recommend checking values directly at PCM connector, as damage to wiring harness or Powertrain Control Module (PCM) harness connector may occur.

TEST PROCEDURES

CAUTION: When battery is disconnected, vehicle computer and memory systems may lose memory data. Driveability problems may exist until computer systems have completed a relearn cycle. See COMPUTER RELEARN PROCEDURES article in GENERAL INFORMATION before disconnecting battery.

PIN VOLTAGE TESTING

Disconnect negative battery cable. Access PCM, and disconnect PCM connectors. See **POWERTRAIN CONTROL MODULE LOCATIONS** . Connect breakout box to PCM harness connector and PCM. Reconnect negative battery cable. Take desired measurements between ground pin and specified pin on breakout box. See appropriate PIN VOLTAGE/PID VALUE CHART.

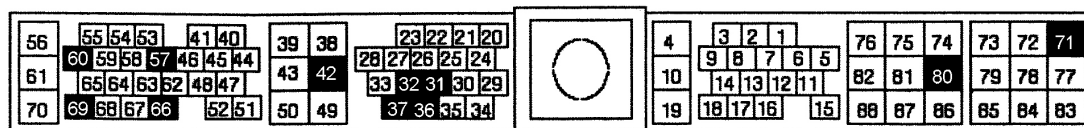
PID TESTING

Connect OBD-II compliant scan tester to Data Link Connector (DLC). See **TEST EQUIPMENT** . Access DIAGNOSTIC DATA LINK menu, and select PCM. Highlight and select PID/DATA MONITOR AND RECORD. Highlight and select the PID desired abbreviation(s). Press the "7" button to view all selected PIDs.

PCM CONNECTORS

1997 Mercury Villager GS

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Fig. 1: Identifying PCM Connector Terminals (EEC-V)
Courtesy of FORD MOTOR CO.

PIN	CIRCUIT	CIRCUIT FUNCTION	PIN	CIRCUIT	CIRCUIT FUNCTION
1	AV01 (BL)	Ignition Power Transistor Output	47	AV16 (W/BL)	Mass Air Flow (MAF) Sensor Input
2	AV91 (W)	Resistor Input	48	AV17 (O/BL)	Mass Air Flow (MAF) Sensor Output
3	AV02 (GN/W)	Tachometer Signal Output	49	AV37 (BR)	Throttle Position (TP) Sensor Output
4	AV04 (W/GN)	PCM Power Relay Control Output	50	AV21 (BK/Y)	Sensor Return
5	—	NOT USED	51	AV18 (LG/R)	ECT Sensor Input
6	—	NOT USED	52	AV66 (W)	Rear Heated Oxygen Sensor Input
7	AV56 (GN/BK)	Transaxle Control Module	53	AV09 (LG)	Crankshaft Position (CKP) Sensor #2 Input
8	AV54 (BL/R)	Fuel Pump Relay Enable Output	54	AV27 (W)	Knock Sensor Input
9	HX01 (BL/BK)	A/C on Request Input	55	AV63A	Idle Air Control (IAC) Valve #2 Output
10	EP06 (BK)	Ground	56	AV38 (BK/W)	PCM Power Input
11	AV05 (O/BK)	Data Input Line Fuel Flow	57	—	NOT USED
12	AV23 (BL/W)	Data Link Connector (DLC)	58	AV42 (Y/GN)	Data Link Connector (DLC) #1
13	FA06 (BR/W)	Coolant Fan HI #1 Speed Relay Output	59	—	NOT USED
14	FA12 (BL/O)	Coolant Fan LO Speed Relay Output	60	—	NOT USED
15	HA41 (LG)	A/C Relay #1 Output	61	AV47 (BK/W)	PCM Power Input
16	—	NOT USED	62	AV08 (W/P)	EGR Temperature Sensor Input
17	—	NOT USED	63	—	NOT USED
18	NR01 (P)	Malfunction Indicator Lamp (Check Engine) Output	64	AV07 (Y/R)	Data Link Connector (DLC) #2
19	EP13 (BK)	Ground	65	AV15 (Y/BK)	Data Link Connector (DLC) #2
20	AV34 (BL/BK)	Power Input (Start)	66	—	NOT USED
21	HA45 (W/R)	High Pressure Input	67	—	NOT USED
22	ZY13 (GN/BK)	Transaxle Control Module (Park/Neutral Position Sensor)	68	AV14 (Y/BL)	Data Link Connector (DLC) #2
23	AV20 (R)	Throttle Position (TP) Sensor Input	69	—	NOT USED
24	AV57 (GN/W)	Transaxle Control Module	70	AV46 (Y)	Power Input (Hot at All Times)
25	AV12 (PK)	Power Steering Pressure (PSP) Input	71	—	NOT USED
26	AV32 (GN/Y)	Vehicle Speed Sensor (VSS) Input	72	AV51 (GN/O)	Injector 1 Output
27	AV33 (BR/Y)	Idle Position Throttle Switch Input	73	AV52 (GY)	EGR Valve Output
28	AV28 (Y/GN)	Intake Air Temperature (IAT) Sensor Input	74	AV53 (GN/R)	Injector 3 Output
29	AV58 (W)	Transaxle Control Module	75	—	NOT USED
30	AV61 (GN/Y)	Transaxle Control Module	76	EP57 (BK)	Ground
31	—	NOT USED	77	AV60 (GN)	Injector 2 Output
32	—	NOT USED	78	—	NOT USED
33	ZY34 (R/GN)	Transaxle Control Module (TP Signal)	79	AV62 (Y/P)	Injector 4 Output
34	—	NOT USED	80	—	NOT USED
35	—	NOT USED	81	AV55 (Y/GN)	Injector 5 Output
36	—	NOT USED	82	EP58 (BK)	Ground
37	—	NOT USED	83	AV59 (BK/W)	PCM Power Input
38	AV36 (BL/Y)	Power Input (Start or Run)	84	AV64 (GY/BL)	Injector 6 Output
39	ES39 (BK/R)	Ground	85	ES90 (BK)	Front Heated Oxygen Sensor Output
40	AV22 (GN/BK)	Camshaft Position Reference Input	86	AV99 (Y)	Rear Heated Oxygen Sensor Output
41	AV31 (GN/Y)	Camshaft Position Sensor Input	87	—	NOT USED
42	—	NOT USED	88	EP66 (BK)	Ground
43	ES48 (BK/R)	Ground			
44	AV30 (GN/BK)	Camshaft Position Reference Input			
45	AV40 (GN/Y)	Camshaft Position Sensor Input			
46	AV19 (LG)	Front Heated Oxygen Sensor (HO2S) Input			

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Fig. 2: Identifying PCM Connector Circuits
Courtesy of FORD MOTOR CO.

POWERTRAIN CONTROL MODULE LOCATIONS

PCM LOCATION

Application	Location
Villager	Behind Glove Box

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Pin	Input	Units Measured	KOEO	Hot Idle	30 MPH	55 MPH
	ACR	OFF-ON	ON (A)	ON (A)	ON (A)	ON (A)
	ECT	DEG	176-220	176-220	.5-6	176-220
	EGRT	DCV	0-4.5	0-4.5	2-1.0	2-1.0
	FUEL	LEAN-RICH	LEAN	LEAN	LEAN-RICH	LEAN-RICH
	IDLE SW	OFF-ON	ON	ON	OFF	OFF
	HO2S	DCV	0	.05-1.2	.05-1.2	.05-1.2
	MAF	DCV	.78	1.71	2.4	2.8
	PNP	OFF-ON	ON	ON	OFF	OFF
	PSP SW	OFF-ON	OFF	ON (B)	ON (B)	ON (B)
	RPM	RPM	0	700-800	1200-1650	1850
	TP	DCV	.46-4.12	.46	.78	1.2
	VPWR	DCV	11-14	11-14	11-14	11-14
	VSS	MPH	0	0	30	55
	VST	OFF-ON	OFF	OFF (C)	OFF	OFF
	Output	Units Measured	KOEO	Hot Idle	30 MPH	55 MPH
	ACR	OFF-ON	OFF	ON (D)	ON (D)	ON (D)
	A/F COR	%	100	100 (E)	75-125 (E)	75-125 (E)
	EGRC	OFF-ON	ON	ON	OFF	OFF
	FUEL PW	mS	0	3.38	4.4-5.5	6.6-7.3
	HFAN	OFF-ON	OFF	OFF	ON (F)	ON (F)
	IAC	%	0	15-28	71	71
	LFAN	OFF-ON	OFF	ON (G)	ON (G)	ON (G)
	S-LEARN	%	100	100	90-110 (H)	90-110 (H)
	SPOUT	DEG	15	15	36	25-35

- A. A/C on.
 B. Steering wheel turned.
 C. VST is on when starting engine and off with engine running.
 D. Engine running and A/C on.
 E. Air/fuel ratio correction. If A/F COR is less than 100 percent, PCM is compensating for a rich signal from HO2S. If A/F COR is greater than 100 percent, PCM is compensating for a lean signal from HO2S.
 F. With A/C off, VSS at 12 MPH or more and ECT temperature 212-219°F (100-104°C). Also on if ECT temperature is more than 221°F (105°C).
 G. With ECT temperature 203-210°F (95-99°C) and A/C off. Also on if A/C is on, VSS is 12 MPH or less and ECT temperature is 212-219°F (100-104°C). Also on if ECT temperature is 212-219°F (100-104°C) and A/C is on.
 H. Self-learning control air/fuel mixture ratio. Automatic compensation for difference between basic and theoretical air/fuel mixture ratio, computed in terms of fuel injection duration. Value is memorized in PCM memory.

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Fig. 3: Pin Voltage/PID Values (Villager)