

Computers and Control Systems: Pinout Values and Diagnostic Parameters

Reference Value Symptom Chart

The Reference Value Symptom Chart is used to provide guidance in selecting the appropriate parameter identification (PID) or measured signal related to the fault area. Select a symptom from the symptom chart along with the category number and go to the PID/Measured Signal Chart. For multiple symptoms, select the symptom that is the most evident.

Symptom Chart

Symptom Occurs During	Symptom	Category Number
Startup:	No start/Normal crank	1
	Hard start/Long crank	2
	Stall after start	3
	Diesels/Runs on	4
Idle:	MIL	5
	Stalls/Quits	6
	Slow	7
	Slow return	8
	Rolling	9
	Fast	10
	Rough	11
	Misses	12
	Backfires	13
Acceleration:	Stalls/Quits	6
	Misses	12
	Bucks/Jerks	14
	Backfires	13
	Hesitation	15
	Lack/Loss of power	16
	Surge	17
	Spark knock	18
	Cooling system temperature	19
	Poor fuel economy	20
	Emissions compliance	21
Cruise:	Stalls/Quits	6
	Misses	12
	Bucks/Jerks	14
	Backfires	13
	Lack/Loss of power	16
	Surge	17
	Spark knock	18
	Cooling system temperature	19
	Poor fuel economy	20

(Continued)

Reference Value Symptom Chart (Part 1)

Reference Value Symptom Chart

Symptom Occurs During	Symptom	Category Number
	Emissions compliance	21
Deceleration:	Stalls/Quits	6
	Backfires	13
Transmission Operation: (Automatic)	Shift/engagement concerns	22
	No overdrive	23

Reference Value Symptom Chart (Part 2)

Reference Value Parameter Identification (PID)/Measured Signal Chart

The following listing reflects PIDS and/or measured values which may reveal a possible concern within each system shown. Match the category number with the related PID/measured signal and go to the Typical Diagnostic Reference Value Charts.

PID/Measured Signal Chart

Category Number	Related PIDS/Measured Signals
5-9-10-17	ACCR (WAC)
5-9-10-17	ACCS
5-10-17	ACP
5-10-17	ACP V
5-21	AIR
5-21	AIRF
5-21	AIRM
1-23	APP1
1-23	APP2
1-23	APP3
23	BPP (BOO)
18-19	CHT
18-19	CHT V
1-2-3-5-6-7-11-12-13-14-15-16-17-20-21	CMP
1-2-3-5-6-7-11-12-13-14-15-16-17-20-21	CKP
1-2-3-5-6-7-11-12-13-14-15-16-17-20-21	CMP1/2
10	CPP/PNP
3-5-6-7-9-11-15-16-20-21	DPFEGR
4-18-19-21-22	ECT*
4-18-19-21-22	ECT V
3-5-6-7-9-11-15-16-20-21	EGRMC1-4
3-5-6-7-9-11-15-16-20-21	EGRMDS
3-5-6-7-9-11-15-16-20-21	EGRVR
5-18-19-20-21	EOT
5-18-19-20-21	EOT V
22	EPC/EPC1/EPC2/EPC3
22	EPC V
3-5-6-11-21	EVAPC V
3-5-6-11-21	EVAPPDC
3-5-6-11-21	EVMV
19	FCV 3
20	FLI (H)
20	FLI V
1 thru 21	FP
1 thru 21	FPM or FP M
1 thru 21	FRP

(Continued)

Reference Value Parameter Identification (PID)/Measured Signal Chart (Part 1)

Reference Value Parameter Identification (PID)/Measured Signal Chart

PID/Measured Signal Chart

Category Number	Related PIDS/Measured Signals
1 thru 21	FRP V
1 thru 21	FRT
5	FTP
5	FTP V
1 thru 21	FUELPW1/2
1 thru 21	FUELSYS (OL/CLSD-LP) ^a
22-23	GEAR
5	GENFDC/GENRC
5	GFS/GENLI
19	HFC (FC3)
1 thru 21	HTR11/12/13/21/22
1 thru 21	IAC
2-3-5-7-8-10-22	IAT ^a
2-3-5-7-8-10-22	IAT2 ^a
2-3-5-7-8-10-22	IAT V ^a
2-3-5-7-8-10-22	IAT2 V ^a
5-14-15-16-17-20	IMRC
5-14-15-16-17-20	IMRCM
5-14-15-16-17-20	IMTV
6-11-12-14 thru 18-20-21	INJ x F
4-5-16-18-19-20-21	KS1 ^a
4-5-16-18-19-20-21	KS2 ^a
19	LFC (FCI)
1 thru 21	LONGFT1/2 ^a
1 thru 23	MAF ^a
1 thru 23	MAF V
1 thru 23	MAP V
1 thru 22	MISF
1 thru 21	HO2S11/12/13/21/22
15-18-20-21	OCTADJ
22	OSS
10	PSP
10	PSPT
10	PSP V
5	PTO
1 thru 23	RPM ^a
5-14-16-17	SCBC
5-14-16-17	SCIPC
1 thru 21	SHRTFT1/2/11/12/21/22

(Continued)

Reference Value Parameter Identification (PID)/Measured Signal Chart (Part 2)

Reference Value Parameter Identification (PID)/Measured Signal Chart

PID/Measured Signal Chart

Category Number	Related PIDS/Measured Signals
15-16-18-19-20-21	SPRKADV ^a
22-23	SS1(SSA)/SS2(SSB)/SS3(SSC)/SS4(SSD)
1-23	TACM (-)
1-23	TACM (+)
6-14-16-20	TCC
22	TCIL
22-23	TCS
22-23	TFT
22-23	TFT V
1-23	TP
1-23	TP1 NS
1-23	TP2 PS
1-23	TP V
22-23	TR
22-23	TR 1-4
22-23	TR V
22-23	TR D
22-23	TSS
2-4-5-9-10-11-16-17-18-19-20-21	VCT
2-4-5-9-10-11-16-17-18-19-20-21	VCT1/2
1-2-3-5-6-11-12-13-14	VPWR
22-23	VSS

^a Generic PID

Some signals can only be measured and will require the use of a digital multimeter (DMM).

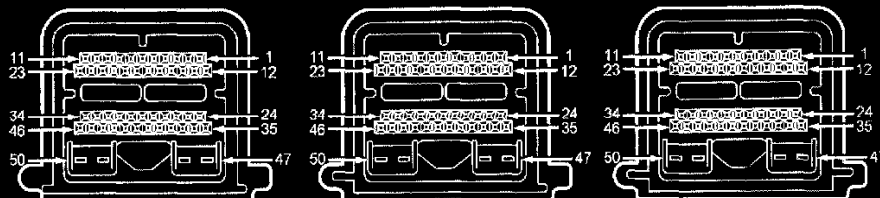
Reference Value Parameter Identification (PID)/Measured Signal Chart (Part 3)

Typical Diagnostic Reference Values

TYPICAL DIAGNOSTIC REFERENCE VALUES

3.0L 4V Five Hundred/Freestyle/Montego

150 PIN PCM HARNESS CONNECTORS



E

ENGINE

B

BODY / COWL

T

TRANSMISSION

N0009449

Typical Diagnostic Reference Values

Sensors/Inputs	PCM Pin/PID only	Measured/PID Values				Units Measured/PID
		KOEO	Hot Idle	48 KM/H (30 MPH)	89 KM/H (55 MPH)	
APP1	B5	4.1	4.2	3.9	3.7	DCV
BPS	B7	0.1/OFF	VBAT/ON (E)	0.1/OFF	0.1/OFF	DCV/OFF-ON
FTP	B9	2.6/57	2.6/48	2.6/65	2.6/36	DCV/kPa
ACET	B15	0.1/OFF	VBAT/ON (A)	0.1/OFF	0.1/OFF	DCV/OFF-ON
APP2	B17	1.6	1.7	1.9	2.1	DCV
FPM	B21	0.1-VBAT / 0-100	0.1-VBAT / 0-100	0.1-VBAT / 0-100	0.1-VBAT / 0-100	DCV/%
IAT (K)	B26	1.7-3.5/120-150	1.7-3.5/120-150	1.7-3.5/120-150	1.7-3.5/120-150	DCV/DEG
APP3	B28	1.0	1.1	1.3	1.5	DCV
ACP	B31	0.1/OFF	VBAT/ON	0.1/OFF	0.1/OFF	DCV/OFF-ON
MAF (A/T)	B32	0	1.12-1.19	0.7-1.5	1.3-2	DCV
MAF (CVT)	B32	0	1.19-1.32	0.7-1.5	1.3-2	DCV
PATSIN	B42	VBAT	VBAT	VBAT	VBAT	DCV
MAF SIGRTN	B43	0	0.6-0.9	1-1.6	1.3-2.3	DCV
FEPS	B44	0.5-0.6	0.5-0.6	0.5-0.6	0.5-0.6	DCV
PSP	B46	0.1/LOW	VBAT/HIGH (I)	0.1/LOW	0.1/LOW	DCV / HIGH-LOW
TP1 NS	E19	4.1	4.4	4.1	4.0	DCV
ECT	E21	0.5-2.7/210-110	0.5-2.7/210-110	0.5-2.7/210-110	0.5-2.7/210-110	DCV/DEG F
MAP	E23	4	1-1.4	1.8-2.1	1.9-2.3	DCV
CMP	E25	0	5-7	13-16	20-23	Hz
GENLI	E26	11.89/0	VBAT/42.97	VBAT/25	VBAT/25	DCV/%
TP2 PS	E29	1.1	0.8	1.1	1.2	DCV
HO2S11	E30	0	switching (C)	switching (C)	switching (C)	DCV
HO2S21	E31	0	switching (C)	switching (C)	switching (C)	DCV

(Continued)

Typical Diagnostic Reference Values (Part 1)

3.0L 4V Five Hundred/Freestyle/Montego

Sen- sors/Inputs	PCM Pin/PID only	Measured/PID Values				Units Mea- sured/PID
		KOEO	Hot Idle	48 KM/H (30 MPH)	89 KM/H (55 MPH)	
KS	E32	0	0	0	0	DCV
CKP	E34	0	400-500	850-1050	1050-1150	Hz
FRT	E36	0.5-3 / 210-110	0.5-3 / 210-110	0.5-3 / 210-110	0.5-3 / 210-110	DCV/DEG
FRP	E37	1.3/14	3.7/39	3.7/39	3.7/39	DCV/PSI
DPFE	E44	0.5-1.3	0.5-1.3	0.5-4.65	0.5-4.65	DCV
SMR	T5	0	0	0	0	DCV
HO2S12	T24	0.1	(D)	(D)	(D)	DCV
HO2S22	T25	0.1	(D)	(D)	(D)	DCV
BPP/BOO	PID	OFF	ON (E)	OFF	OFF	ON/OFF
CPP/PNP	PID	NEUTRAL	NEUTRAL	DRIVE	DRIVE	NEUTRAL / DRIVE
FLI (H)	PID	50	50	50	50	%
LOAD	PID	(L)	10-20	19-30	30-48	%
MISF	PID	OFF	OFF	OFF	OFF	OFF-ON
OCTADJS	PID	NO RETARD	NO RETARD	NO RETARD	NO RETARD	NO RETARD/ RETARD
RPM	PID	0	705-775	1200-1400	1600-1800	RPM
VSS	PID	0	0	30	55	MPH

Actua- tors/Outputs	PCM Pin/PID only	Measured/PID Values				Units Mea- sured/PID
		KOEO	Hot Idle	48 KM/H (30 MPH)	89 KM/H (55 MPH)	
PATSTRT/SMC	B2	0	0	0	0	DCV
FP	B12	8.3/75	3.6/27	3.6/27	3.8/29	DCV/%
EVAPCV	B13	VBAT	0-10/0-100	0-10/0-100 (R)	0-10/0-100 (R)	Hz/%
PATS OUT	B22	0.8	0.8	0.8	0.8	DCV
ACCR (WAC)	B25	VBAT/OFF	1.5/ON	VBAT/OFF	VBAT/OFF	DCV/OFF-ON
EVMV	B34	0	0-10/0-100	0-10/0-100	0-10/0-100	Hz/%
CDA (CYL 1)	E1	VBAT	VBAT	VBAT	VBAT	DCV
INJ1	E2	0	2.6-3.2	2.5-5.5	3.5-8.5	mS
INJ2	E3	0	2.6-3.2	2.5-5.5	3.5-8.5	mS
INJ3	E4	0	2.6-3.2	2.5-5.5	3.5-8.5	mS
INJ4	E5	0	2.6-3.2	2.5-5.5	3.5-8.5	mS
EGRVR	E6	VBAT/0	VBAT/0	(T)	(T)	DCV/%
INJ5	E8	0	2.6-3.2	2.5-5.5	3.5-8.5	mS
INJ6	E9	0	2.6-3.2	2.5-5.5	3.5-8.5	mS
CDC (CYL 2)	E12	VBAT	VBAT	VBAT	VBAT	DCV
GENRC	E13	100/60	0/0	0/0	0/0	Hz/%
FC-V	E14	0/100	0/100	0/100	0/100	%

(Continued)

Typical Diagnostic Reference Values (Part 2)

3.0L 4V Five Hundred/Freestyle/Montego

Actua- tors/Outputs	PCM Pin/PID only	Measured/PID Values				Units Mea- sured/PID
		KOEO	Hot Idle	48 KM/H (30 MPH)	89 KM/H (55 MPH)	
CDE (CYL 3)	E24	VBAT	VBAT	VBAT	VBAT	DCV
CDB (CYL 4)	E35	VBAT	VBAT	VBAT	VBAT	DCV
CDD (CYL 5)	E38	VBAT	VBAT	VBAT	VBAT	DCV
CDF (CYL 6)	E39	VBAT	VBAT	VBAT	VBAT	DCV
TACM (+)	E47	3.7	VBAT	VBAT	VBAT	DCV
TACM (-)	E48	3.7	VBAT	VBAT	VBAT	DCV
HTR11	E49	0.1/ON (O)	0.1/ON	0.1/ON	0.1/ON	DCV/OFF-ON
HTR21	E50	0.1/ON (O)	0.1/ON	0.1/ON	0.1/ON	DCV/OFF-ON
HTR12	T47	0.2/ON (O)	0.2/ON	0.2/ON	0.2/ON	DCV/OFF-ON
HTR22	T48	0.2/ON (O)	0.2/ON	0.2/ON	0.2/ON	DCV/OFF-ON
LONGFT1	PID	(-)20-(+)20	(-)20-(+)20	(-)20-(+)20	(-)20-(+)20	%
LONGFT2	PID	(-)20-(+)20	(-)20-(+)20	(-)20-(+)20	(-)20-(+)20	%
MIL	PID	OFF	OFF	OFF	OFF	OFF-ON
SHRTFT1	PID	(L)	(-)10-(+)10	(-)10-(+)10	(-)10-(+)10	%
SHRTFT2	PID	(L)	(-)10-(+)10	(-)10-(+)10	(-)10-(+)10	%
SPARKADV	PID	0	14-20	36-44	30-40	DEG
TCIL	PID	OFF	OFF	OFF	OFF	OFF-ON

Other	PCM Pin/PID only	Measured/PID Values				Units Mea- sured/PID
		KOEO	Hot Idle	48 KM/H (30 MPH)	89 KM/H (55 MPH)	
ETCVREF	E18/B24/B4	5	5	5	5	DCV
VPWR	B35/36	VBAT	VBAT	VBAT	VBAT	DCV
VREF	B40/E40	5	5	5	5	DCV
KAPWR	B45	VBAT	VBAT	VBAT	VBAT	DCV

Typical Diagnostic Reference Values (Part 3)

NOTES:

The footnotes are referenced throughout the Typical Diagnostic Reference Value Charts. A letter in parentheses next to a value indicates supplemental information is applicable.

An attempt is made to provide as much information as possible; some vehicles may not display all input and output signals.

The Typical Diagnostic Reference Value Charts do not display fault parameter identifications (PIDs). These are PIDs which indicate a hard fault with the circuit. They display a value of YES or NO and are PIDs ending with the letter F.

Reference values may vary +/-20% depending on operating conditions and other factors. RPM values are axle and tire dependent.

Refer to Introduction, Acronyms and Definitions for technical terms applicable to Ford Motor Company products.

Refer to Diagnostic Methods, Parameter Identification, for PID descriptions. See: Scan Tool Testing and Procedures/Parameter Identification (PID)

For detailed transmission diagnostics, refer to appropriate Vehicle System. Transmission signals may be referred to in either alpha or numeric form. For example, 1=A, 2=B, 3=C.

- A. A/C on.
- B. Cooling fan on (single, low or high speed).
- C. Heated oxygen sensors (HO2S) should switch from rich to lean at least once every **3 seconds**. HO2S voltage should toggle above and below **0.450 DCV** and never be a negative value. Valid HO2S switching occurs only during closed loop fuel control.
- D. Downstream HO2S(s) will stay close to a constant voltage when the catalyst monitor is off (positive value only). When the catalyst monitor is on, HO2S will switch rich to lean above and below **0.450 DCV** and never be a negative value. For downstream HO2S(s) (12, 13 22) greater activity will result when the catalyst monitor is active.
- E. Brake pedal applied.
- F. The electric vapor management valve (VMV) commanded current will vary from **0 mA - 1000 mA** depending on the PCM command to purge the EVAP system.
- G. While pressing the transmission control switch (TCS) or switching to manual drive mode.
- H. Value is dependent on fuel tank level. Typical operating range is 15% (empty) to 90% (full).
- I. Steering wheel turned.
- J. Clutch pedal applied.
- K. Value is dependent upon ambient air temperature and may fall outside of range.
- L. Value is not useful under this condition.
- M. If equipped.
- N. Transmission in selected range.
- O. May change state under this condition.
- P. While pressing switch.
- Q. Frequency cycles high within a few seconds of turning headlamps on. Frequency cycles back to **0 Hz** shortly after cycling high.
- R. Canister vent duty cycles to 100% (close) when EVAP monitor test is running.
- S. Refer to Antitheft and Alarm Systems.
- T. EGR voltage and duty cycle will vary from 0-VBAT or 0-100% depending on EGR demand.
- U. RPM dependent. If signal is **0 Hz** at idle, check signal at **900 RPM**.
- V. Crank position.