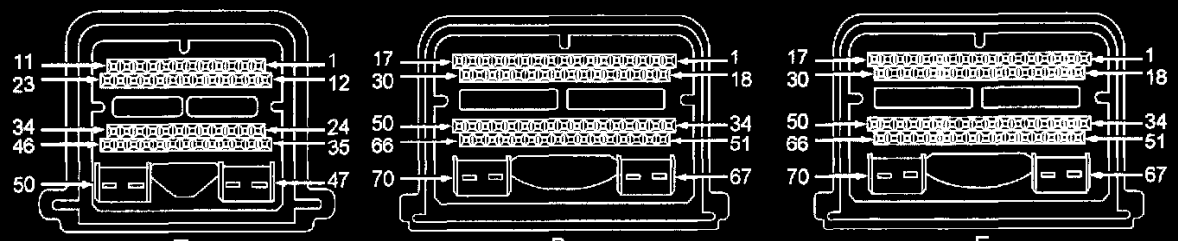
Computers and Control Systems: Pinout Values and Diagnostic Parameters
Typical Diagnostic Reference Values
TYPICAL DIAGNOSTIC REFERENCE VALUES

4.6L 2V E-Series (4R70E)

190 PIN PCM HARNESS CONNECTOR



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TRANSMISSION

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BODY/COWL

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ENGINE

N0009447

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)	
FTP V/FTP	B3	2.6/0	2.6/0	2.6/0	2.6/0	DCV/IN-H2O
APP1	B5	4.1	4.2	3.9	3.7	DCV
BPP	B8	0.1/OFF	VBAT/ON (E)	0.1/OFF	0.1/OFF	DCV/OFF-ON
APP2	B17	1.64	1.72	1.9	2.1	DCV
FPM	B21	0.1/OFF	VBAT/ON	VBAT/ON	VBAT/ON	DCV/OFF-ON
TCS	B27	0.1/OFF	VBAT/ON (G)	0.1/OFF	0.1/OFF	DCV/OFF-ON
APP3	B28	1	1.1	1.3	1.5	DCV
FEPS	B44	0.5-0.6	0.5-0.6	0.5-0.6	0.5-0.6	DCV
ACCS	E4	0.1/OFF	VBAT/ON (A)	0.1/OFF	0.1/OFF	DCV/OFF-ON
DPFEGR	E21	0.25-1.3	0.25-1.3	0.25-4.65	0.25-4.65	DCV
IAT	E22	1.7-3.5/120-50 (K)	1.7-3.5/120-50 (K)	1.7-3.5/120-50 (K)	1.7-3.5/120-50 (K)	DCV/DEG
MAF V	E25	0	0.6-0.9	0.9-1.5	1.2-2.3	DCV
HO2S11	E28	0	switching (C)	switching (C)	switching (C)	DCV
HO2S21	E29	0	switching (C)	switching (C)	switching (C)	DCV
FRP	E32	3.0/40	2.8/40	2.8/40	2.8/40	DCV/PSI
CHT V/CHT	E41	0.67 or 3.7/194	0.67 or 3.7/194	0.67 or 3.7/194	0.67 or 3.7/194	DCV/DEG
CMP	E45	0	5-7	10-12	12-14	Hz
CKP	E47	0	390-430	600-700	850-1050	Hz
KS (+)	E49	0	0	0	0	DCV
TP2 PS	E60	1.2	0.8	1.1	1.2	DCV
TP1 NS	E61	4.1	4.4	4.1	4.0	DCV
MAP	E62	4/99	1-1.1/40	1.8-2/25	1.9-2.3/25	DCV/kPA

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Typical Diagnostic Reference Values (Part 1)

4.6L 2V E-Series (4R70E)

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)	
BPS	E65	0.1/OFF	VBAT/ON (E)	0.1/OFF	0.1/OFF	DCV/OFF-ON
OSS	T3	0	0	120/1200	215/2150	Hz/RPM
TSS	T15	0	325/610	740/925	0/1660	Hz/RPM
TR1	T16	0	0	11.1	11.1	DCV
TR2	T17	0	0	11.1	11.1	DCV
HO2S12	T24	0.1	(D)	(D)	(D)	DCV
HO2S22	T25	0.1	(D)	(D)	(D)	DCV
TR V/TR	T27	0/PARK	0/PARK	1.7/OD	1.7/OD	DCV/MODE
TR4	T28	0	0	11.1	11.1	DCV
TFT	T29	0.5-2/210-110	0.5-2/210-110	0.5-2/210-110	0.5-2/210-110	DCV/DEG
CPP/PNP	PID	ON	ON	OFF	OFF	OFF-ON
ECT	PID	160-200	160-200	160-200	160-200	DEG
FLI (H)	PID	50	50	50	50	%
GEAR	PID	1	1	4	4	GEAR
LOAD	PID	(L)	15-23	20-30	40-50	%
MISF	PID	OFF	OFF	OFF	OFF	OFF-ON
OCTADJS	PID	NO RETARD	NO RETARD	NO RETARD	NO RETARD	NO RETARD/ RETARD
RPM	PID	0	680-830	1000-1100	1500-1600	RPM
VSS	PID	0	0	30	55	MPH

Actuators/ Outputs	PCM Pin/PID only	Measured/PID Values				Units Measured/PID
		KOEO	Hot Idle	48 KM/H (30 MPH)	89 KM/H (55 MPH)	
VSO	B1	0	0	65	125	Hz
FP	B12	VBAT/0	0.1/100	0.1/100	0.1/100	DCV/%
EVAPC V	B13	VBAT/0	VBAT/0	VBAT/0 (R)	VBAT/0 (R)	DCV/%
CTO	B25	0	35-49	65-90	90-120	Hz
TCIL_D	B43	VBAT/OFF	VBAT/OFF	VBAT/OFF	VBAT/OFF	DCV/OFF-ON
EVAPPDC	E1	0	0-10/0-100	0-10/0-100	0-10/0-100	Hz/%
PCV-HC	E2	OFF	OFF	OFF	OFF	ON-OFF
ACCR (WAC)	E3	VBAT/OFF	0.1/ON (A)	VBAT/OFF	VBAT/OFF	DCV/OFF-ON
CDH (CYL 8)	E9	VBAT	VBAT	VBAT	VBAT	DCV
CDF (CYL 5)	E10	VBAT	VBAT	VBAT	VBAT	DCV
CDD (CYL 2)	E11	VBAT	VBAT	VBAT	VBAT	DCV
CDB (CYL 3)	E12	VBAT	VBAT	VBAT	VBAT	DCV
CDG (CYL 4)	E14	VBAT	VBAT	VBAT	VBAT	DCV
CDE (CYL 6)	E15	VBAT	VBAT	VBAT	VBAT	DCV
CDC (CYL 7)	E16	VBAT	VBAT	VBAT	VBAT	DCV

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Typical Diagnostic Reference Values (Part 2)

4.6L 2V E-Series (4R70E)

Actuators/ Outputs	PCM Pin/PID only	Measured/PID Values				Units Measured/PID
		KOEO	Hot Idle	48 KM/H (30 MPH)	89 KM/H (55 MPH)	
CDA (CYL 1)	E17	VBAT	VBAT	VBAT	VBAT	DCV
IAT	E22	1.7-3.5 / 120-50(K)	1.7-3.5 / 120-50(K)	1.7-3.5 / 120-50(K)	1.7-3.5 / 120-50(K)	DCV/DEG
TACM (+)	E34	3.7	VBAT	VBAT	VBAT	DCV
INJ2	E35	0	2.7-4.1	4.5-8	5.5-11	mS
INJ4	E36	0	2.7-4.1	4.5-8	5.5-11	mS
INJ6	E37	0	2.7-4.1	4.5-8	5.5-11	mS
INJ8	E38	0	2.7-4.1	4.5-8	5.5-11	mS
TACM (-)	E51	307	VBAT	VBAT	VBAT	DCV
INJ1	E52	0	2.7-4.1	4.5-8	5.5-11	mS
INJ3	E53	0	2.7-4.1	4.5-8	5.5-11	mS
INJ5	E54	0	2.7-4.1	4.5-8	5.5-11	mS
INJ7	E55	0	2.7-4.1	4.5-8	5.5-11	mS
EGRVR-CC	E63	VBAT/0	VBAT/0	(T)	(T)	DCV/%
HTR11	E69	0.1/ON (O)	0.1/ON	0.1/ON	0.1/ON	DCV/OFF-ON
HTR21	E70	0.1/ON (O)	0.1/ON	0.1/ON	0.1/ON	DCV/OFF-ON
EPC	T13	7.7/5	8.7/5	10/40	10/40	DCV/PSI
SSA (SS1)	T42	0.1/ON	0.1/ON	0.1/ON	0.1/ON	DCV/OFF-ON
SSB (SS2)	T43	VBAT/OFF	VBAT/OFF	0.1/ON	0.1/ON	DCV/OFF-ON
TCC	T46	0.2/100	VBAT/0	VBAT/0	0.2/90-100	DCV/%
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
CHTIL	PID	OFF	OFF	OFF	OFF	OFF-ON
FUELPW1	PID	(L)	2.7-4.1	4.5-8	5.5-11	mS
FUELPW2	PID	(L)	2.7-4.1	4.5-8	5.5-11	mS
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	14-19	15-35	20-39	DEG

Other	PCM Pin/PID only	Measured/PID Values				Units Measured/PID
		KOEO	Hot Idle	48 KM/H (30 MPH)	89 KM/H (55 MPH)	
KAPWR	B45	VBAT	VBAT	VBAT	VBAT	DCV
VPWR	B35/36	VBAT	VBAT	VBAT	VBAT	DCV

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Typical Diagnostic Reference Values (Part 3)

4.6L 2V E-Series (4R70E)

Other	PCM Pin/PID only	Measured/PID Values				Units Measured/PID
		KOEO	Hot Idle	48 KM/H (30 MPH)	89 KM/H (55 MPH)	
APPVREF	B4/16	5	5	5	5	DCV
BVREF	B40/E57	5	5	5	5	DCV
TPVREF	E66	5	5	5	5	DCV

Note: All generic OBD readings under no load (PARK or NEUTRAL).

GENERIC OBD PID VALUES

PID	Hot Idle	2500 RPM	Units
LONGFT1	(-)20-(+)20	(-)20-(+)20	%
LONGFT2	(-)20-(+)20	(-)20-(+)20	%
LOAD	23-34	15-20	%
MAF	4-5.1	15-24	G/S
SHRTFT1	(-)10-(+)10	(-)10-(+)10	%
SHRTFT2	(-)10-(+)10	(-)10-(+)10	%
SHRTFT11	(-)10-(+)10	(-)10-(+)10	%
SHRTFT12	95-100	95-100	%
SHRTFT21	(-)10-(+)10	(-)10-(+)10	%
SHRTFT22	95-100	95-100	%
SPARKADV	19-23	44	DEG

Typical Diagnostic Reference Values (Part 4)

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 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 an "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 "example" 1=A, 2=B, 3=C.

gs-green state
fs-federal state

A. A/C on.
B. Cooling fan on (single, low or high speed).
C. HO2S(s) 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 only occurs 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 heated oxygen sensor (HO2S) (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.