





DIAGNOSTIC TABLE					
NOTE: USE THE FOLLOWING TABLE/TESTS ALONG WITH THE CATERPILLAR ELECTRONIC TROUBLESHOOTING MANUAL.					
WITH THE IGNITION OFF, DISCONNECT THE LOWER 40 PIN DEUTSCH CONNECTOR LOCATED ON THE LEFT SIDE OF THE ENGINE AT THE ECM.					
BE CAREFUL NOT TO DAMAGE OR SPREAD THE TERMINALS WHILE PROBING. SEE FLAG NOTE 19 FOR CIRCUIT PIN OUTS. DO NOT PROBE OR ATTEMPT TO TEST THE ECM.					
CHECK	TEST EQUIP	CONNECT METER TO PINS:	ADDITIONAL OPERATION/ CONNECTION	KEY SWITCH	DESIRED RESULTS
VOLTAGE TO ECM	VOLT METER	(+) TO PIN 6 (-) TO GND	NONE	OFF	0.0V 10.5-14.4V
CHECK ENGINE LAMP	JUMPER WIRE	JUMPER PIN 22 TO GROUND	NONE	ON	CHECK ENGINE LAMP "ON" - FUSE @ PD BOX 10A "WARN LPS" - BULB @ WARNING LAMP MODULE - WIRING CONNECTIONS CKT D799 (GRN) & CKT L1 SWFL (BRN/WHI) - FAULTY WARNING LAMP MODULE
STOP ENGINE LAMP	JUMPER WIRE	JUMPER PIN 27 TO GROUND	NONE	ON	STOP ENGINE LAMP "ON" - FUSE @ PD BOX 10A "WARN LPS" - BULB @ WARNING LAMP MODULE - WIRING CONNECTIONS CKT 659 (PNK) & CKT L1 SWFL (BRN/WHI) - FAULTY WARNING LAMP MODULE
CRUISE CONTROL ON/OFF SWITCH	OHM METER	(+) TO PIN 20 (-) TO PIN 29	CRUISE SWITCH "OFF" CRUISE SWITCH "ON"	OFF OFF	NO CONTINUITY CONTINUITY
CRUISE CONTROL SET/RES SWITCH	OHM METER	(+) TO PIN 25 (-) TO PIN 29	NONE DEPRESS SET/ACCEL SW	OFF OFF	NO CONTINUITY CONTINUITY
CLUTCH SWITCH	OHM METER	(+) TO PIN 15 (-) TO PIN 29	NONE DEPRESS RES/DECEL SW	OFF OFF	NO CONTINUITY CONTINUITY
"S" SERVICE BRAKE SWITCH	OHM METER	(+) TO PIN 14 (-) TO PIN 29	NONE DEPRESS BRAKE PEDAL	OFF OFF	NO CONTINUITY CONTINUITY
AC HIGH PRESS SWITCH	OHM METER	(+) TO PIN 38 (-) TO PIN 29	NONE	OFF	CONTINUITY - FAULTY PRESSURE SWITCH LOCATED NEAR TOP LH CORNER OF RADIATOR. - WIRING CONNECTIONS CKT E971 (GRN) & CKT C993 (BRN)
** TEST REQUIRES AIR SYSTEM TO BE CHARGED					

ENGINE FAN OPERATION:	
MANUAL MODE: ENGINE FAN "ON" CONTINUOUSLY WITH KEY SWITCH IN THE "ON" AND "START" POSITIONS.	
AUTO MODE: THE COOLING FAN ENABLE CIRCUIT WILL OPERATE THE FAN BASED ON COOLANT TEMP, INTAKE MANIFOLD AIR TEMP, ENGINE BRAKE OPERATION, A/C AND HIGH ENGINE SPEEDS. THE ENABLE CIRCUIT SENDS A SIGNAL TO TURN THE FAN "OFF" DURING NORMAL OPERATION. REMAIN "ON" FOR A MINIMUM OF 30 SECONDS FOLLOWING CONTROL INITIATED ACTIVATION EXCEPT FOLLOWING ENGINE STARTUP, OR IF THE ECM AC HIGH PRESSURE SWITCH INPUT IS USED. DURING ENGINE STARTUP, THE FAN DRIVER WILL KEEP THE FAN "ON" FOR 2 SECONDS AFTER THE ENGINE HAS REACHED THE PROGRAMMED LOW IDLE (620-720 RPM).	
FAN "ON" ACTIVATIONS:	FAN "OFF" ACTIVATION:
ENGINE SPEED < 2250 RPM	ENGINE SPEED > 2300 RPM
AND	OR
ANY OF THE FOLLOWING EXIST:	ALL OF THE FOLLOWING EXIST:
- ENGINE NOT RUNNING (KEY SWITCH IN "ON" POSITION)	- COOLANT SENSOR TEMP < 82 -C (188-F)
OR	AND
- DURING ENGINE CRANKING	- NO ACTIVE DIAGNOSTIC CODE FOR COOLANT TEMP. SENSOR
OR	AND
- COOLANT TEMPERATURE > 96 -C (205-F)	- ENGINE BRAKE (NOT AUXILIARY BRAKE) IS NOT OPERATING IN HIGH MODE W/ COOLANT TEMP < 75 -C (167-F)
- ACTIVE COOLANT TEMPERATURE SENSOR DIAGNOSTIC CODE	AND
OR	- A/C HIGH PRESSURE SWITCH (UNITARY SW) IS CLOSED AND ECM IS NOT COUNTING (OR ECM PARAMETER PROGRAMMED TO 0 SECONDS)
- ENGINE BRAKE (NOT AUXILIARY BRAKE) "ON" IN HIGH MODE > 10 SECONDS W/ COOLANT TEMP > 80 -C (176-F)	AND
OR	- THE FAN HAS BEEN ON FOR AT LEAST 30 SECONDS
- A/C HIGH PRESSURE SWITCH (UNITARY SW) IS OPEN OR ECM IS COUNTING (AND ECM PARAMETER PROGRAMMED TO 30-600 SECONDS)	AND
OR	- INTAKE MANIFOLD AIR TEMPERATURE < 66 (151 -F)
- A/C HIGH PRESSURE DIAGNOSTIC IS ACTIVE	AND
OR	-C (189-F)
- INTAKE MANIFOLD AIR TEMPERATURE > 87 -C (188-F)	OR
OR	-C (162-F)
- INTAKE MANIFOLD AIR TEMPERATURE > 72 AND BOOST IS ABOVE 70KPa (10 PSI)	

40 PIN DEUTSCH CONNECTOR LOCATED ON LH SIDE OF ENGINE AT ECM. (CONNECTOR P1, SEE CATERPILLAR SUPPLIED DIAGRAM)

CIRCUIT POSITION CHART

TERM	CIRCUIT	TERM	CIRCUIT	TERM	CIRCUIT	TERM	CIRCUIT
1	B792	11	451	21	PLUG	31	PLUG
2	C983	12	D785	22	D799	32	PLUG
3	E720	13	E717	23	C984	33	PLUG
4	E715	14	C982	24	C977	34	PLUG
5	C988	15	C979	25	C978	35	C985
6	C987	16	C974	26	PLUG	36	C987
7	B793	17	450	27	659	37	C986
8	C976	18	D784	28	D745	38	E971
9	E721	19	E716	29	C983	39	PLUG
10	C973	20	C975	30	PLUG	40	E718

20 BLACK SINGLE BULLET CONNECTOR BEHIND SPEEDO/TACH PANEL.

21 GREY 8-WAY DEUTSCH CONNECTOR:
LOCATED AT REAR OF TRANSMISSION.
LOCATED AT POWER DISTRIBUTION BOX, ENGINE SIDE.

22 BLACK 2-WAY PACKARD METRI-PACK CONNECTOR:
LOCATED NEAR TOP LH CORNER OF RADIATOR.
LOCATED UNDER SHIFT LEVER KNOB SKIRT.

23 BLACK 4-WAY PACKARD METRI-PACK CONNECTOR:
LOCATED NEAR TOP OF RADIATOR.
LOCATED UNDER SHIFT LEVER KNOB SKIRT.

24 BLACK 4-WAY PACKARD WEATHER PACK CONNECTOR:
LOCATED ON TOP FRONT SIDE OF ENGINE.
LOCATED NEAR FIREWALL (ENGINE SIDE).
LOCATED ON FIREWALL.
LOCATED ON TOP OF TRANSMISSION.

25 BROWN 8-WAY MOLDED CONNECTOR AT POWER DISTRIBUTION BOX. (SEE R115-4017 FOR CIRCUIT CONFIGURATION)

26 PRESSURE SWITCH SHOWN IN THE "AIR OFF" POSITION.

27 SPEEDOMETER AND TACHOMETER DRIVER SIGNALS FROM THE ECM ARE ZERO-CROSSING SQUARE WAVES WITH AN AMPLITUDE OF 10 VOLTS. THE OUTPUT SIGNAL FOR THE SPEEDOMETER IS 30,000 PULSES PER MILE AND THE TACHOMETER IS 113 PULSES PER REVOLUTION.

28 TWISTED PAIR OF WIRES.

29 DESIGNATES POINT OF REFERENCE ON ANOTHER DIAGRAM OR DETAIL.

30 CLASSIFICATION OF CHARACTERISTICS
THIS DRAWING/SPECIFICATION USES SYMBOLS TO CLASSIFY CHARACTERISTICS. THESE SYMBOLS ARE DEFINED IN QMS002 "CLASSIFICATION OF CHARACTERISTICS".
THE CLASSIFICATION OF THE CIRCUIT APPLIES TO ALL CHARACTERISTICS OF THAT CIRCUIT AS IT PERTAINS TO THIS HARNESS, INCLUDING BUT NOT LIMITED TO: WIRE GAUGE, CONNECTORS, POSITION IN CONNECTORS, TERMINALS.

31 SUPERSEDES R115-5532

32 MALE SLIDE TERMINAL.

CATERPILLAR ENGINE PROTECTION SYSTEM

1994 ENGINES ARE STANDARD WITH A LOW OIL PRESSURE/ HIGH WATER TEMP/ HIGH AIR INTAKE TEMP PROTECTION SYSTEM. LOW COOLANT LEVEL IS OPTIONAL WITH THIS SYSTEM. THE ENGINE PROTECTION SYSTEM HAS THE FOLLOWING FOUR PROGRAMMABLE LEVELS.

LEVEL 1: ENGINE PROTECTION DISABLED
OFF

LEVEL 2: SYSTEM ONLY WARNS DRIVER OF POTENTIAL ENGINE DAMAGE. WARNING "ENGINE" LAMP WILL REMAIN ON AS LONG AS CONDITIONS EXIST. DIAGNOSTIC CODE IS STORED.

LEVEL 3: ENGINE PROTECTION SYSTEM WARNS DRIVER WITH FLASHING OR SOLID "ENGINE" LAMP. LAMP DEPENDS ON WHICH CONDITIONS EXIST. THEN WILL DERATE ENGINE. "STOP ENGINE" WARNING LAMP WILL FLASH WHEN ENGINE DERATING IS IN EFFECT. DIAGNOSTIC CODE IS STORED.

LEVEL 4: ENGINE PROTECTION SYSTEM WILL GO THROUGH WARNING AND DERATE SHUTDOWNS, THEN WILL SHUT DOWN ENGINE. DIAGNOSTIC CODE IS STORED.

NOTE: CHECK ENGINE LAMP WILL FLASH "ON" FOR FIVE SECONDS, BLINK "OFF" THEN FLASH "ON" FOR FIVE SECONDS, ETC. AS LONG AS A FAULT CONDITION EXISTS REGARDLESS OF PROTECTION LEVEL SETTING. SEE OWNER'S MANUAL ON HOW TO RETRIEVE DIAGNOSTIC FLASH CODES.

GENERAL NOTES:

1) USE FOR CAT 3176B OR 3406E ELECTRONIC ENGINES WITH OR WITHOUT ENGINE BRAKE.

2) THIS DIAGRAM APPLIES TO CHASSIS BUILT STARTING APPROX. APR 1995 ENDING APPROX. XXX XXXX (SEE R115-4017 FOR CIRCUIT CONFIGURATION)

3) 8-WAY MOLDED CONNECTOR AT POWER DISTRIBUTION BOX. (SEE R115-4017 FOR CIRCUIT CONFIGURATION)

4) BLACK 3-WAY MOLDED CONNECTOR BEHIND TACH PANEL.

5) BLACK 8-WAY MOLDED CONNECTOR BEHIND SWITCH PANEL.

6) BLACK 16-WAY MOLDED CONNECTOR LOCATED AT FIREWALL.

7) BLACK 8-WAY MOLDED CONNECTOR AT POWER DIST BOX. (SEE R115-4017 FOR CIRCUIT CONFIGURATION)

8) GREY 3-WAY DEUTSCH CONNECTOR LOCATED BEHIND SAFETY GAUGE PANEL.

9) 16-WAY MOLEX CONNECTOR AT 16-WAY WARNING LAMP MODULE IN CAB HEADER.

10) 8-WAY MOLEX CONNECTOR AT 16-WAY WARNING LAMP MODULE IN CAB HEADER.

11) BLACK 8-WAY PACKARD METRI-PACK CONNECTOR BEHIND LH GAUGE PANEL.

12) BLACK 16-WAY MOLDED CONNECTOR AT POWER DISTRIBUTION BOX, ENGINE SIDE. (SEE R115-4012 FOR CIRCUIT CONFIGURATION)

13) BLACK 3-WAY PACKARD METRI-PACK CONNECTOR BEHIND LH GAUGE PANEL.

14) BLACK 6-WAY MOLDED CONNECTOR NEAR POWER DISTRIBUTION BOX ON ENGINE SIDE.

15) BLACK 6-WAY PACKARD METRI-PACK CONNECTOR LOCATED BEHIND SWITCH PANEL.

17) BLACK 2-WAY PACKARD WEATHER PACK CONNECTOR:
LOCATED ON LH SIDE OF STEERING COLUMN. (USED FOR DIAGNOSTIC HARNESS CONNECTION)
LOCATED NEAR HEATER BOX ON FIREWALL.
LOCATED NEAR POWER DISTRIBUTION BOX ON ENGINE HARNESS.
LOCATED AT REAR OF TRANSMISSION.

18) 4-WAY DEUTSCH CONNECTOR LOCATED ON FIREWALL.

CIRCUIT POSITION CHART

TERM	CIRCUIT	TERM	CIRCUIT	TERM	CIRCUIT
A	C993	J	D799	R	D745
B	C979	K	659	S	PLUG
C	C978	L	C977	T	E716
D	C975	M	B793	U	PLUG
E	C992	N	B792	V	PLUG
F	C976	O	E718	W	PLUG
G	C986	P	E715	X	PLUG
H	E717	Q	C985		

SIGNATURE ON FILE COLSON
SIGNATURE ON FILE WILHOYTE
SIGNATURE ON FILE MIN
A. LABRADO
TOE CROCKER
SIGNATURE FILE HERMAN
DIAG-CAT ELEC ENG

ECN 9500643 1 P
688319S REI 34759-70 R115-5913 SHT 3 OF 3