CEBM010701

Shop Manual

HD1500-5

DUMP TRUCK

SERIAL NUMBERS **A30049 - A30069**



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GENERAL TROUBLESHOOTING PROCEDURES

The following pages list fault codes and troubleshooting procedures for diagnosing Automatic Transmission Controller (ATC) problems.

If a fault occurs, the technician can trace the problem using the Electronic Display Panel (EDP), the MOM "Fault Condition" screens, and the LED displays on the transmission controller.

The Fault Code Tables (see "Powertrain Management Control System"), provide additional information regarding the fault when the fault codes are determined. Specific troubleshooting procedures are listed on the following pages for most of the fault codes listed in the tables.

Harness connector charts at the end of this section list the pin number, circuit function, and signal type for each connector. Refer to Figure 24-5 for the location of each connector on the controller housing. This information should be used in conjunction with the electrical schematics in Section R.

⚠ IMPORTANT ⚠

Before troubleshooting a problem, be certain all harness connectors are installed and properly inserted.Always connect any disconnected connectors before proceeding to the next step.

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RCM WIRING HARNESS CONNECTORS

The Retard and Control Monitor Controller has three external harness connectors (RCM1, RCM2, and RCM3) attached to the bottom of the housing (see Figure 26-2).

The following tables list the pin number, circuit function, and signal type for each circuit in the individual harnesses.

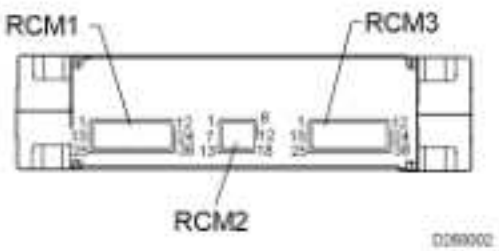


FIGURE 26-2. RCM CONNECTORS

RCM HARNESS CIRCUITS CONNECTOR RCM1		
Pin No.	Function	Type
1	+24 volt supply	DC voltage input
2	+24 volt supply	DC voltage input
3	Ground	Ground
4	Reserved	
5	Reserved	
6	Ground	Ground
7	Rear left PPC signal return	
8	Retard light control	Digital output
9	Output to rear right PPC	Digital output
10	Ground	Ground
11	+18 volt sensor power supply	DC voltage output
12	Ground	Ground
13	Reserved	
14	Brake light control	Digital output
15	Reserved	
16	Reserved	
17	Front brake cut solenoid	Digital output
18	Rear right PPC signal return	
19	Output to rear left PPC	Digital output
20	LF wheel speed freq. signal	Pulse input
21	Reserved	
22	Ground	Ground
23		Ground
24	Ground	Ground
25	+18 volt sensor power supply	DC voltage output
26	+18 volt sensor power supply	DC voltage output
27	+18 volt sensor power supply	DC voltage output
28	LR wheel speed freq. signal	Pulse input
29	Shield	Ground
30	Shield	Ground
31	Shield	Ground
32	Shield	Ground
33	RF wheel speed freq. signal	Pulse input
34	Shield	Ground
35	Ground	Ground
36	RR wheel speed freq. signal	Pulse input

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TABLE 1. OIL SPECIFICATIONS			
Ambient Temperature Range	**Part Number**	**Description**	
-34.5°C & above (-30°F & above)	AK4063	Komatsu Suspension Oil (mixed with 6% Friction Modifier)	19 l (5 gal) container
	AK4064		208 l (55 gal) container
	See Vendor	Shell Koma-Hydro MV (HO-MVK)	
	See Vendor	Shell Tellus T32	
	See Vendor	Shell Tellus 46	
	See Vendor	Castrol Hyspin AWS 46	
-48.5°C & above (-55°F & above)	AK4065	Komatsu Low Temperature Suspension Oil (mixed with 6% Friction Modifier)	19 l (5 gal) container
	AK4066		208 l (55 gal) container
	See Vendor	Mobil EJ44/13AAC	
	See Vendor	Shell White Parrot SL 5W-30	
	See Vendor	Castrol ECWO 5W-30	

NOTE: DO NOT mix arctic oils with higher temperature oils. Oils with varying temperature ranges are not compatible in the same suspension.
DO NOT add friction modifier to suspension oils. Komatsu branded oils are the only oils that are to be used with friction modifier. Komatsu oils contain the correct concentration of friction modifier and do not require further mixing.

TABLE 2. NITROGEN GAS (N_2) SPECIFICATIONS		
	Property	**Value**
Nitrogen gas must meet or exceed CGA specification G-10.1 for Type 1, Grade F Nitrogen Gas	Nitrogen	99.9% Minimum
	Water	32 ppm Maximum
	Dew Point	-55°C (-68°F) Maximum
	Oxygen	0.1% Maximum

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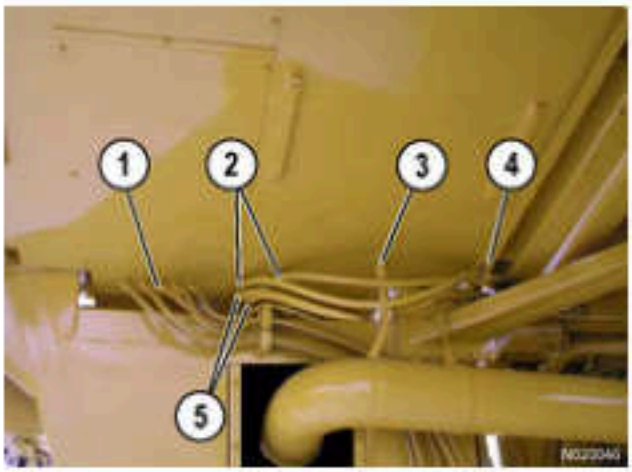


FIGURE 2-4. CAB HYDRAULIC AND HVAC

1. Hydraulic Hoses
2. Heater Hoses
3. HVAC Drain
4. Clamp
5. A/C Hoses

9. Disconnect two heater hoses (2, Figure 2-4) from the fittings underneath the cab. Remove clamp (4) securing the hoses to the bottom of the cab.
10. Disconnect five hydraulic hoses (1).
11. Disconnect two air conditioner hoses (5).
12. Cap all hoses and fittings to prevent contamination.

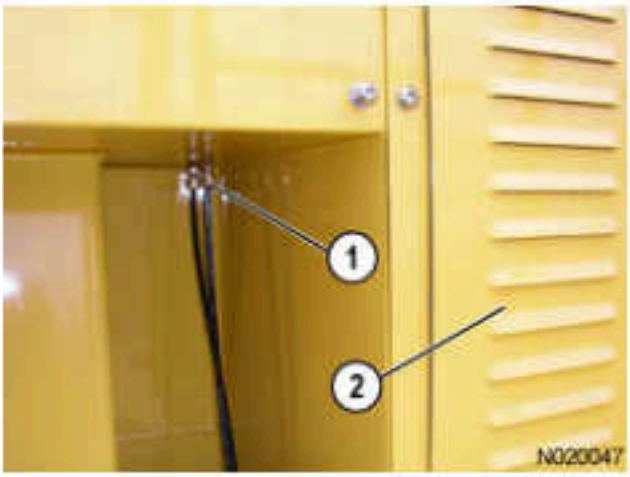


FIGURE 2-5. VACUUM HOSES

1. Vacuum Hoses
2. Filter Cover

13. Remove the access cover from the exterior of the RH side of the cab. Disconnect two vacuum hoses (1, Figure 2-5) from the front of the cab.

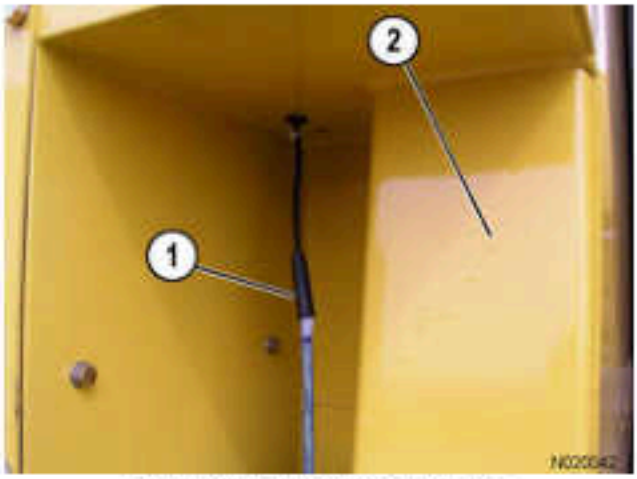


FIGURE 2-6. RADIO ANTENNA

1. Radio Antenna
2. LH Front ROPS Beam

14. Remove the access cover from the exterior of the LH side of the cab. Disconnect radio antenna (1, Figure 2-6).

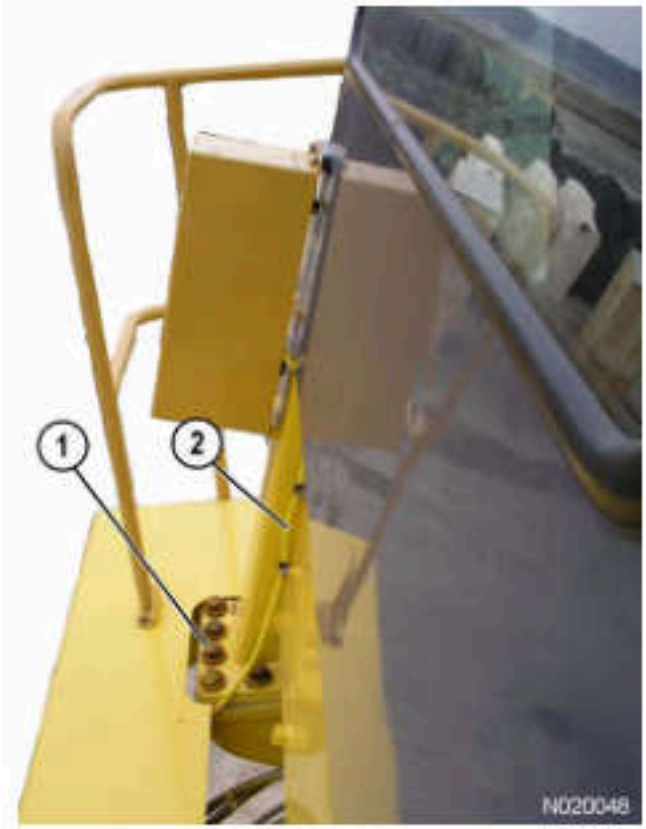


FIGURE 2-7. CAB MOUNT

1. Cap Screw
2. Harness

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Formulas -

Top View: (A + B) / 2 = 3 mm max.

Side View: (C - D) / 2 = 3 mm max.

Example -

Measurements: A = 3 mm B = 7 mm

C = 20 mm D = 6 mm

Top view formula: (3 + 7) / 2 = 5 mm

The quotient of 5 mm in this example is 2 mm over the allowable maximum of 3 mm. Loosen the cap screws at the front transmission mounts and remove the locking plates. Use a hoist to move the transmission 2 to 5 mm towards the center of the truck. Moving the transmission 2 to 5 mm would result in a quotient of 3 mm or less, meeting the specification.

NOTE: Keep the shafts parallel when adjusting the position of the transmission.

Side view formula: (20 - 6) / 2 = 7 mm

The quotient of 7 mm in this example is 4 mm over the allowable maximum of 3 mm. Use a hoist to lift the transmission enough to install shims (2, Figure 5-8) below mounting pins (1). A general guideline to follow is to divide the difference by two. This is the number of shims to install. Since the difference in this example is 4 mm, install two shims at each front mount.

NOTE: DO NOT install additional shims at the rear mounts. Adjust the transmission height by shimming the front mounts, only.

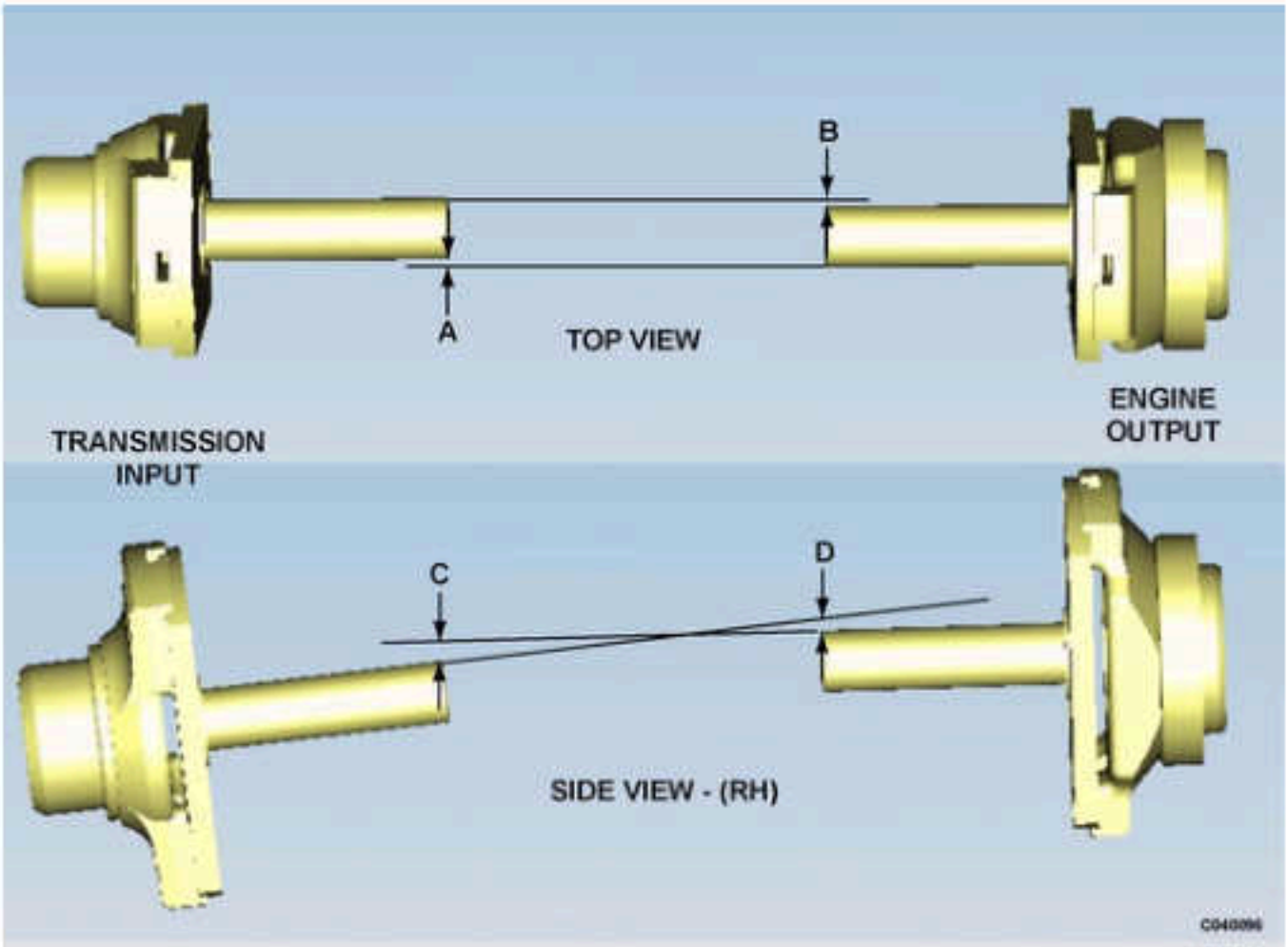


FIGURE 5-7. MEASURING DRIVE LINE ANGLES

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CKT#	DESCRIPTION	SHT/ZONE
0	CHASSIS GROUND	2-A4, 2-B7, 2-C6 3-A6, 4-A6, 6-A7, 7-A4, 8-A4 9-A4, 10-A4, 12-A4 13-A4, 14-A4, 15-A7 16-A6, 17-A5, 18-A5 18-D2, 19-A2, 20-B7, 21-A3, 22-A2
1	BATTERY DIRECT POWER (+24V)	1-A1, 5-A5, 9-A5 10-A1, 12-A5, 16-A1 20-B6, 21-A1
2	BATTERY DIRECT POWER (+12V)	1-A2, 20-B6, 21-A2
3	CONTROL POWER (+24V)	2-B3
4	CONTROL POWER (+12V)	2-B3
11	BATT. DISCONNECT POWER (+24V)	2-A5, 13-A2, 15-A1 16-A1, 17-A1
11CL	RELAY BOARD 1	16-B5
11D	LIGHT CONTROL POWER	15-B2
11DL	RELAY BOARD 5	15-A5
11DR	RELAY BOARD 5	15-B5
11F	RELAY BOARD 1	16-B5
11H	HORN SIGNAL	17-B2
11HL	RELAY BOARD 5	15-B5
11HR	RELAY BOARD 5	15-C5
11PF	PRE-LUBE PUMP PWR SUPPLY	2-B5
11PS	PRE-LUBE	2-B5
11S	SAFETY SWITCH "ON"	2-B2
11T	RELAY BOARD 1	16-A4
11Z	RELAY BOARD 1	16-C4
12	CONTROL POWER (+24V)	2-D5, 5-A5, 6-A4, 9-A5, 10-A1, 11-A6, 13-A2, 14-A1, 17-A1, 18-A1, 19-A4
12H	HOIST LIMIT PROX. SW.	10-D1
12PC	SERVICE TOOL COM PORT 12VDC	11-D7
12V	CONTROL POWER (+12V)	2-C4, 19-A1
13	KEYSWITCH "ON" (ACC)	2-C1 , 3-D4, 4-C4
13A	SWITCHED BATT POWER (+24V)	14-A1
14R	ALTERNATOR "R" SIGNAL	2-C6, 4-A7, 14-C3
14R1	ALTERNATOR "R" OUTPUT	2-C6
15	KEYSWITCH "ON" (BR)	2-B3
201	VB	4-A3
202	TX OUT	4-A3
203	TX IN	4-A3
204	SCK	4-A3
205	LOAD	4-A3
206	COMMON	4-A3
207	RESET	4-A3
21	KEYSWITCH "START" (C)	2-C2
21PS	START SIGNAL (AFTER PRE-LUBE)	2-B6
21PSW	ENGINE OIL PRESS SW.	2-A5
21PT	PRE-LUBE TIMER START	2-C3
21S	KEYSWITCH "START"	2-C2
22C	FAN CLUTCH CNTRL INPUT (7 2	18-C6
22DI	FAN CLUTCH GND FULL ON	18-C7
24DI	ALTERNATE DROOP	8-A6
24EI	ALTERNATE TORQUE	8-A6
24F1	1ST GEAR RANGE FILL SIGNAL	6-D2
24F2	2ND GEAR RANGE FILL SIGNAL	6-D2
24F3	3RD GEAR RANGE FILL SIGNAL	6-D2
24FH	HIGH GEAR RANGE FILL SIGNAL	6-C2
24FL	LOW GEAR RANGE FILL SIGNAL	6-D2
24FLU	L/C FILL SIGNAL	6-C2
24FM	MEDIUM GEAR RANGE FILL SIG.	6-C2
24FR	REVERSE GEAR RANGE FILL SIG.	6-D2
2461	+5VDC SUPPLY	8-D2
25	BATTERY DIRECT POWER SUPPLY	5-A7
25A	PRE-LUBE STARTER START SIG.	2-B6
25B	STARTER START SIGNAL	2-B6
25C1	CONTROL POWER SUPPLY (+24V)	5-A7
25C2	CONTROL POWER SUPPLY (+24V)	5-A7
25D	DRIVE SIGNAL (-)	6-C5
25F1	F1 START SELECT SW. TOP LT.	7-C2
25F2	F1 START SELECT SW BOTTOM LT.	7-D2
25H1	HIGHEST GEAR SELECT SIG. #1	7-A3
25H2	HIGHEST GEAR SELECT SIG. #2	7-A3
25L	LOW GEAR RANGE (-)	6-C5
25L2	SHIFT LIMIT SW. BOTTOM LT.	7-D3
25L3	SHIFT LIMIT SW. TOP LT.	7-D3
25LH	LIMP HOME JUMPER	7-B2
25LMT	SHIFT LIMIT SIGNAL	7-D2
25N	NEUTRAL SIGNAL (-)	2-C3, 6-B7, 14-A3
25NI	NEUTRAL SIGNAL (-)	14-B2
25P	SOLENOID POWER SUPPLY (+24V)	5-B7
25R	REVERSE SIGNAL (-)	6-A5
25SP	SHIFTER SENSOR POWER (+12V)	6-B5
25T	T/M CUT SOLENOID RELAY SIG.	3-A4, 5-B5, 7-A3, 14-B1
25TC	T/M SOLENOID CUT SIGNAL	5-B7
25T2	MODE CHANGE #1 SW. TOP LT.	3-B6
25T3	MODE CHANGE #1 SW. BOTTOM LT.	3-C6
25T4	MODE CHANGE #2 SW. TOP LT.	3-C7
25T5	MODE CHANGE #2 SW. BOTTOM LT.	3-C7
25W	SHIFT WAIT SIGNAL	6-D7
253	3RD GEAR RANGE SIGNAL (-)	6-C5
254	4th GEAR RANGE SIGNAL (-)	6-C5
255	5th GEAR RANGE SIGNAL (-)	6-C5

CKT#	DESCRIPTION	SHT/ZONE
278	BATT DIRECT PWR SUPPLY (+24V)	9-C6
28A1	ETHER START CONTROL	2-A5
30	T/M CONTROLLER GROUND - ATC	2-D5, 5-A7 14-B3, 9-A6
31	WARNING LT & BUZZ PWR (+24V)	3-A1, 4-D4
318	DIMMER POWER CIRCUIT	5-D5
31C	COOLANT TEMPERATURE	5-B4
31F	FUEL LEVEL SIGNAL	7-B2
31M	THROTTLE MODIFICATION SIG.	8-B2
31S1	ENGINE SPEED SIGNAL	7-B5
31S2	ENGINE SPEED SIGNAL	7-B5
31SA	AUTOMATIC IDLE SELECT SIGNAL	3-A7
31SB	AUTO. IDLE SEL. SW. BOTTOM LT.	3-A6
31SE	AUTO. IDLE SEL. SW. TOP LT.	3-A6
31TRQ	TORQUE OUTPUT	8-C6
32L	T/M OIL LEVEL SIGNAL	7-A2
32P1	TORQUE CONVER INLET PRESS (+)	5-A4
32P2	TORQUE CONVER OUTLET PRESS (+)	5-A4
32S1	T/M INPUT SHAFT SPEED SIG (+)	7-A5
32S2	T/M OUTPUT SHAFT SPEED SIG (+)	7-B5
32S3	T/M MID-SHAFT SPEED SIG (+)	7-A5, 14-B3
32SP	SENSOR POWER (+24V)	5-A1
32T1	T/M LUBE INLET TEMP	5-C4
32T2	VALVE INLET OIL TEMP	5-C4
33AP1	BRAKE ACCUMULATOR PRESSURE	9-B2
33AP2	BRAKE ACCUMULATOR PRESSURE	9-B2
33AP3	BRAKE ACCUMULATOR PRESSURE	9-B3
33AP4	BRAKE ACCUMULATOR PRESSUR	9-B3
33B1	SENSOR POWER (+18V)	12-D2
33B2	LEFT REAR BRAKE PRESSURE	12-C2
33B3	SENSOR POWER (+18V)	12-C2
33B4	RIGHT REAR BRAKE PRESSURE	12-C2
33F	STEERING SYSTEM PRESSURE	9-B2
33G1	STEERING SYSTEM PRESSURE	9-C3
33LF	LEFT FRT BRAKE DISK WEAR SIG	10-A6
33LR	LEFT REAR BRAKE DISK WEAR SIG	10-A6
33RF	RT FRT BRAKE DISK WEAR SIG	10-A6
33RR	RT REAR BRAKE DISK WEAR SIG	10-A6
33T1	RETARDER COOL OIL TEMP-RIGHT	5-C4
33T2	RETARDER COOL OIL TEMP-LEFT	5-C4
33T3	TORQUE CONVERTER OIL TEMP	5-B4
33T4	FRT BRAKE COOL OIL TEMP	5-D4
34L	BATTERY LEVEL SIGNAL	10-B6
35B	BODY FLOAT SIGNAL	7-B2, 14-D4
35C1	AUTO CRUISE CANCEL	10-C2
35C2	AUTO CRUISE SET/DOWN	10-C2
35C3	AUTO CRUISE RESUME/UP	10-C2
35C4	AUTO CRUISE ON/OFF	10-D2
35E1	MAXIMUM SPEED SET UP SIGNAL	10-B2
35E2	MAXIMUM SPEED SET DOWN SIG	10-B2
35E3	MAXIMUM SPEED SET LOADED SIG	10-B2
35E4	MAXIMUM SPEED SET EMPTY SIG	10-C2
35E5	MAXIMUM SPEED SET SIGNAL	10-C2
35L1	USER SUPPLIED PC	11-A5
35L2	PC INTERFACE	11-D2
35L3	PC INTERFACE	11-D2
35L4	PC INTERFACE	11-D2
35L5	USER SUPPLIED PC	11-A5
35S1	RGT FRT WHL SPEED +18V SUPPLY	12-C7
35S2	RGT FRT WHEEL SPEED SIG	12-C7
35S3	RGT FRT WHEEL SPEED GROUND	12-C7
35S4	LFT FRT WHL SPEED +18V SUPPLY	12-C7
35S5	LFT FRT WHEEL SPEED SIG	12-C7
35S6	LFT FRT WHEEL SPEED GROUND	12-C7
3557	RGT REAR WHL SPEED +18V SUPPLY	12-C7
3558	RGT REAR WHEEL SPEED SIG	12-C7
3559	RGT REAR WHEEL SPEED GROUND	12-C7
35S10	LFT REAR WHL SPEED +18V SUPPLY	12-D7
35S11	LFT REAR WHEEL SPEED SIG	12-D7
35S12	LFT REAR WHEEL SPEED GROUND	12-D7
35TM	THROTTLE MODIFICATION	8-B6
37F1	OIL FILTER RESTRICTION SIG	10-B6
37F2	OIL FILTER RESTRICTION SIG	10-B6
37F3	T/M OIL FILTER RESTRICT SIG	7-C2
37F4	OIL FILTER RESTRICTION SIG	10-B6
37F5	OIL FILTER RESTRICTION SIG	10-C6
37G1	FRT BRAKE COOL FILTER RESTRI	10-B7
37G3	TRANS FILTER RESTRICT SW. #1	7-C4
37G4	RETARDER BRAKE COOL FILTER	10-C7
37G5	RETARDER BRAKE COOL FILTER	10-C7
37H	HYDRAULIC OIL LEVEL SIGNAL	10-C6
38	OVERHEAD DISPLAY PWR SUPPLY	4-C7
38L	LATERAL INCLINATION SIGNAL	7-C2
39A	GREEN PLM LIGHT CONTROL	14-D3
39AA	GREEN PLM LT POWER SUPPLY	14-D3
39B	AMBER PLM LIGHT CONTROL	14-C3
39BA	AMBER PLM LT POWER SUPPLY	14-D3
39C	RED PLM LIGHT CONTROL	14-C3
39CA	RED PLM LT POWER SUPPLY	14-C3
39F	SENSOR POWER SUPPLY (+18V)	14-A6
39FA	RIGHT REAR SUSPENSION PRESS	14-B6
39FB	LEFT REAR SUSPENSION PRESS	14-B6
39FC	RIGHT FRONT SUSPENSION PRESS	14-B6
39FD	LEFT FRONT SUSPENSION PRESS	14-A6
39FE	INCLINOMETER	14-C6
39G	SW HD BATT PWR SUPPLY (+24V)	14-A2
39J	SW HD BATT PWR SUPPLY (+24V)	14-B2
39JA	PLM LIGHT POWER SUPPLY	14-B2

CKT#	DESCRIPTION	SHT/ZONE
310	WARNING BUZZER	3-D6
320	SENSOR GROUND	5-A1, 6-A7, 8-A5
390	SENSOR GROUND	14-A7
41	HEADLIGHT CONTROL	15-B2
41C	LIGHT POWER (+24V)	4-A7, 16-A3
41D	MOM DIMMER SW. BOTTOM LT.	4-C7
41H	HIGH BEAM CONTROL	15-B4
41HA	RT LOW MTD HI BEAM HOLT	15-C7
41HB	LEFT LOW MTD HI BEAM HOLT	15-B7
41HL	LFT HI BEAM HEADLIGHT POWER	15-B6
41LA	RT LOW MTD LO BEAM HOLT	15-B7
41LB	LFT LO MTD LO BEAM HOLT	15-A7
41LL	LFT LO BEAM HEADLIGHT POWER	15-A6
41T	CLEAR. LT. CONTROL TOP LT.	15-B3, 16-C5
41TS	CLEAR. LT. CONTROL BOTTOM LT	15-B3, 16-A3
419	ENGINE CHECK WRN LAMP	17-A6
42	FOG LIGHT SWITCH	15-D5, 17-B5
42A	LEFT ENGINE SERV LT SW.	17-C7
42A1	MOM DIMMER SW. TOP LT.	4-C7
42B	LEFT ENGINE SERV LT SW.	17-C7
42EL	RIGHT ENGINE SERV LT SW.	17-D7
43	HYDR CAB, BUDDY SEAT	17-C4
44	BRAKE LIGHT	13-A4
44A	BRAKE LIGHTS	13-A3
44B1	BRAKE LIGHT SIGNAL	13-A2
44D	CENTER BRAKE LIGHT	13-B4
44R1	RETARD LIGHT SIGNAL	13-A2
45L	LEFT TURN SIGNAL	16-B3
45LL	LEFT TURN LIGHT POWER	16-B4
45R	RIGHT TURN SIGNAL	16-B3
45RL	RIGHT TURN SIGNAL POWER	16-C4
46	HAZARD SWITCH POWER SUPPLY	16-B2
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47A	BACK-UP SIGNAL SUPPLY (+)	6-A5
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47B1	BACKUP LIGHT SW TOP LT	6-B5
47B2	BACKUP LIGHT SW BOTTOM LT.	6-B5
47D	DECK MTD BACK-UP LT SUPPLY	6-B6
48	GROUND LEVEL LADDER LT SW.	17-B7
48A	GROUND LEVEL LADDER LT.SW.	17-B7
48B	GROUND LEVEL LADDER LT.SW.	17-B7
48F	FOG LIGHT SW. BOTTOM LT.	15-D6
48F1	FOG LIGHT SW. TOP LT.	15-C6
49	DISPLAY LIGHT POWER SUPPLY	4-A5
49B	PARKING BRAKE WARNING LIGHT	3-D1, 4-D5
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509	ENGINE PROTECTION LAMP	17-A6
51A1	STEERING ACCUMULATOR PRESS	9-A2
51A2	STEERING ACCUMULATOR PRESS	9-A2
51B1	STEERING ACCUMULATOR PRESS	9-A3
51B2	STEERING ACCUMULATOR PRESS	9-A3
51P	+12V SENSOR POWER SUPPLY	9-B6
51S	ACCUM BLEED DOWN SOL. POWER	17-B3
51SR	STEERING SPEED SIGNAL	9-B6
52AR	AUTO RETARD COMMAND	12-A2
52BC	BRAKE COMMAND	12-A2
52BL	BRAKE LOCK SOLENOID POWER	13-D2
52BP	ACCUMULATOR BRAKE PRESSURE	12-A2
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