CEBM013401

Shop Manual

HD1500-5

DUMP TRUCK

SERIAL NUMBERS **A30072 - A30076**

KOMATSU®

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			FILL SWITCH				
			Connected		Disconnected		Resistance (to Ground) @ Switch
FAULT CODE	CLUTCH	ATC5A Pin #	Volts	Ohms	Volts	Ohms	Ohms
b051	Lockup	17	1 volt or less	1Ω or less	15 - 25V	1MΩ or more	1MΩ or more
b052	High	12	1 volt or less	1Ω or less	15 - 25V	1MΩ or more	1MΩ or more
b053	Low	10	1 volt or less	1Ω or less	15 - 25V	1MΩ or more	1MΩ or more
b054	1st	13	1 volt or less	1Ω or less	15 - 25V	1MΩ or more	1MΩ or more
b055	2nd	14	1 volt or less	1Ω or less	15 - 25V	1MΩ or more	1MΩ or more
b056	3rd	15	1 volt or less	1Ω or less	15 - 25V	1MΩ or more	1MΩ or more
b058	Reverse	16	1 volt or less	1Ω or less	15 - 25V	1MΩ or more	1MΩ or more
b059	Middle	11	1 volt or less	1Ω or less	15 - 25V	1MΩ or more	1MΩ or more

Case 2 : Check transmission input speed signal and H, M, or L clutch.
If the T/M controller detects b042, b043, or b049, perform the b022, b023, or b029 code troubleshooting.

Case 3 : Check transmission output speed signal and 1st, 2nd, 3rd, and R clutch.
If the T/M controller detects b044, b045, b046, or b048, fault code, perform the b024, b025, b026, and b028 code troubleshooting.

b051 - b056, b058, b059:
CLUTCH ECMV FAILURE 3

Perform troubleshooting steps described previously for b041 - b046, b048, b049 codes.
Refer to the Table below for the b05xx fault codes and corresponding codes listed in the Tables on the previous page.

FAULT CODE	REFER TO TROUBLESHOOTING PROCEDURES FOR THE CODES BELOW
b051	b041
b052	b042
b053	b043
b054	b044
b055	b045
b056	b046
b058	b048
b059	b049

b071 - b076, b078, b079:
CLUTCH SOLENOID FAILED HIGH
b091 - b096, b098, b099:
CLUTCH SOLENOID FAILED LOW

Turn key off, disconnect ATC2 from T/M controller, and verify the resistance between each pin of ATC2 shown in the chart below (harness side) and the resistance between the ATC2 pins (harness side) and chassis is as shown below.

		RESISTANCE	
FAULT CODE	ATC2Pin #	Pin to Pin	Pin to Chassis
b071, 91	10, 20	5 – 25Ω	1MΩ or more
b072, 92	9, 19	5 – 25Ω	1MΩ or more
b073, 93	7, 17	5 – 25Ω	1MΩ or more
bo74, 94	2, 13	5 – 25Ω	1MΩ or more
b075, 95	4, 15	5 – 25Ω	1MΩ or more
b076, 96	3, 13	5 – 25Ω	1MΩ or more1MΩ
b078, 98	5, 15	5 – 25Ω	1MΩ or more
b079, 99	8,18	5 – 25Ω	1MΩ or more

Yes. Connect ATC2 and turn key on. Check whether T/M controller still detects the same fault.

Yes. Turn key off, return to the first step, and check again. If the result is the same as before, change T/M controller.

No. The fault is recovered.

No. Disconnect the connector near solenoid, measure the resistance between plus line (solenoid side) and minus line (solenoid side) of solenoid, and the resistance between plus line (solenoid side) and minus line (solenoid side) of solenoid and chassis. Verify resistance agrees with Table.

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Test Set Up Procedure

1. Setup valve on test stand as shown in Figure 3-12.
2. Attach the pilot input supply line to the port labeled "PX" on the side of the valve.
3. Attach the main supply input pressure line to the port on the front of the valve labeled "P".
4. Attach the tank return line to the port labeled "T".
5. Attach the regulated output ports "B1" and "B2" to the test lines. Pressure monitoring devices in these two lines must be capable of 3000 psi (20.7 MPa) minimum. Connect all ports. The connections should be according to the diagram shown in Figure 3-12. All ports must be used and connected.

⚠DANGER

All ports must be used. Relieve pressure before disconnecting hydraulic and other lines. Tighten all connections before applying pressure.

Avoid spillage and contamination! Avoid contact with hot oil if the machine has been operating. The oil will be at very high pressure.

Hydraulic fluid escaping under pressure can have sufficient force to enter a person's body by penetrating the skin and cause serious injury and possibly death if proper medical treatment by a physician familiar with this injury is not received immediately.

6. Start hydraulic pump and regulate output pressure to 2750 psi (18.96 MPa) at pressure gauge (3). Pressure gauges (9 & 10) should read zero.
7. Adjust pressure regulator (4) to set pilot supply pressure to 2200 ± 66 psi (15.17± 0.11MPa) on gauge (7).
8. Return line pressure during this test is not to exceed 0 psi (0 kPa).
9. Test the valve with ISO 32 grade oil or hydraulic oil meeting specifications listed in Section "P" at 120° ± 10° F (49° ± 3° C).

Relay Valve

Output Pressure Adjustment

1. With pump operating and supply and pilot pressure adjusted as described in setup instructions, inspect valve for leakage.
2. With 2200 psi (15.17 MPa) pilot pressure applied, verify the following regulated output pressures:
   - ❑ "B1" port gauge (10) reads: 2100 ± 63 psi (14.479 ± 0.434 MPa)
   - ❑ "B2" port gauge (9) reads: 2100 ± 63 psi (14.479 ± 0.434 MPa)
3. Close the pilot supply needle valve (5) and open the pilot pressure release needle valve (6) to bleed pressure back to the reservoir.
   - ❑ Pilot pressure gauge (7) should drop to 0 psi (0 kPa).
   - ❑ Regulated output pressure lines "B1" and "B2" should drop to 0 psi (0 kPa) on gauges (10) and (9) respectively.
4. Repeat steps 2 and 3 approximately 50 times to cycle valve from minimum to maximum apply pressure.
5. Verify output pressure remains within specification. If not, the valve must be rebuilt.
6. Reduce pilot pressure to 0 psi (0 kPa). Apply 2200 psi (15.17 MPa) pilot pressure as quickly as possible.
   - ❑ Regulated output pressure must increase to 2100 ± 63 psi (14.479 ± 0.434 MPa) within 1.0 second after pressure is applied to pilot line.
7. Check internal valve leakage from port "T" with full supply pressure (port "P") applied:
   - ❑ With pilot pressure released, leakage must not exceed 100 cc/minute.
   - ❑ With 2200 psi (15.17 MPa) pilot pressure applied, leakage must not exceed 150 cc/minute.

⚠WARNING

Be certain all hydraulic pressure has been released prior to disconnecting hoses and valve.

8. Remove hoses from valve and remove valve from test stand.

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Testing and Adjustment

1. Shut off the engine. Depressurize the steering accumulators before opening the circuit.
2. Disconnect the return to tank line (3, Figure 6-1) from the bleed-down manifold.
3. Start the engine and operate at low idle.
4. With the hydraulic oil at normal operating temperature, check the leakage. Maximum allowable leakage is 32.8 ml (1 oz) per minute.

⚠WARNING

DO NOT turn the key switch to OFF to depressurize the accumulators while the steering return lines are open. The return lines will contain accumulator oil flow during the depressurization cycle.

5. If leakage is excessive, reconnect the return line.
6. Turn the key switch to the OFF and allow at least 90 seconds for the accumulators to depressurize.
7. Remove bleed-down solenoid valve (10) and relief valve (4). Replace the O-rings on both valves and reinstall.
8. Repeat the test procedure.
9. If leakage is still excessive, replace both the bleed-down solenoid valve and the relief valve.

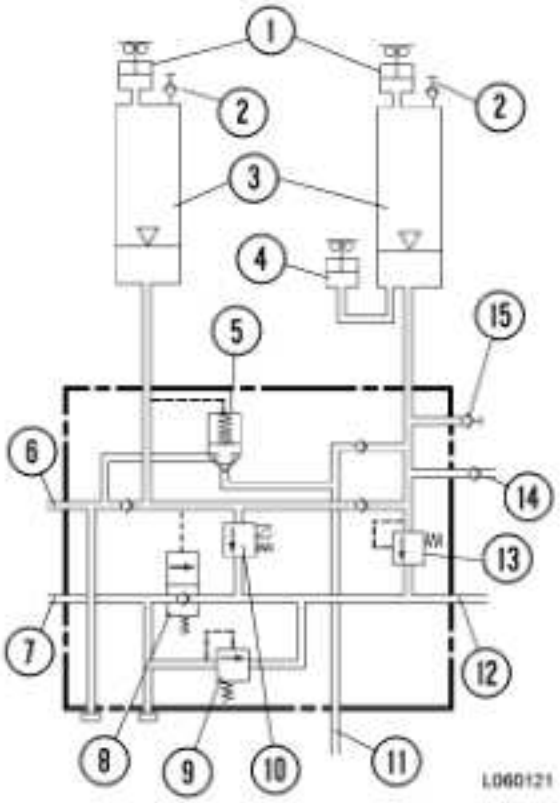


FIGURE 6-2. BLEEDDOWN VALVE SCHEMATIC

1. Accumulator Precharge Pressure Switch [5861 kPa (850 psi)]
2. Nitrogen Charging Valve
3. Accumulators
4. Steering Pressure Switch [12 755 kPa (1850 psi)]
5. Differential Valve
6. Outlet to Flow Amplifier
7. Return from Flow Amplifier
8. Piloted Check Valve
9. Relief Valve: [3447 kPa (500 psi)]
10. Accumulator Bleed-down Solenoid
11. Supply to Brake System
12. Return to Tank
13. Relief Valve: [22 408 kPa (3250 psi)]
14. Supply from Steering Pump / Check Valve
15. Pressure Test Port

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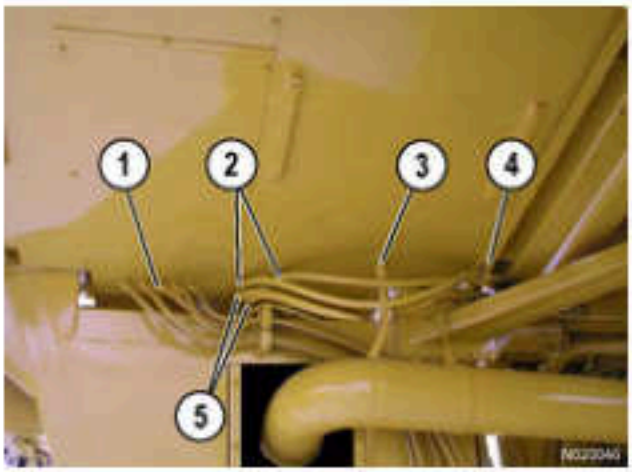


FIGURE 2-4. CAB HYDRAULIC AND HVAC

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.

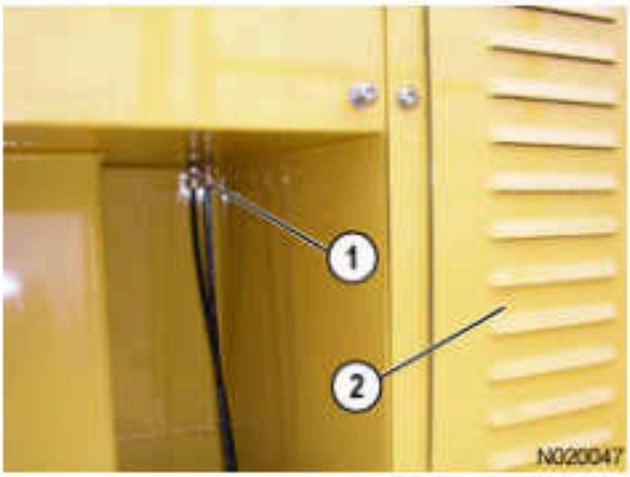


FIGURE 2-5. VACUUM HOSES

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.

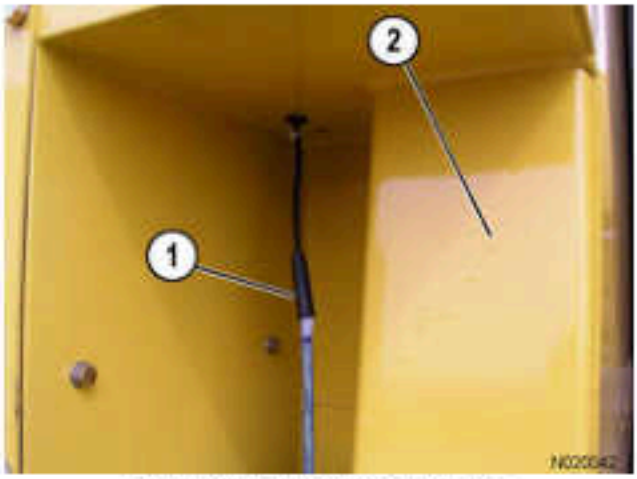


FIGURE 2-6. RADIO ANTENNA

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).

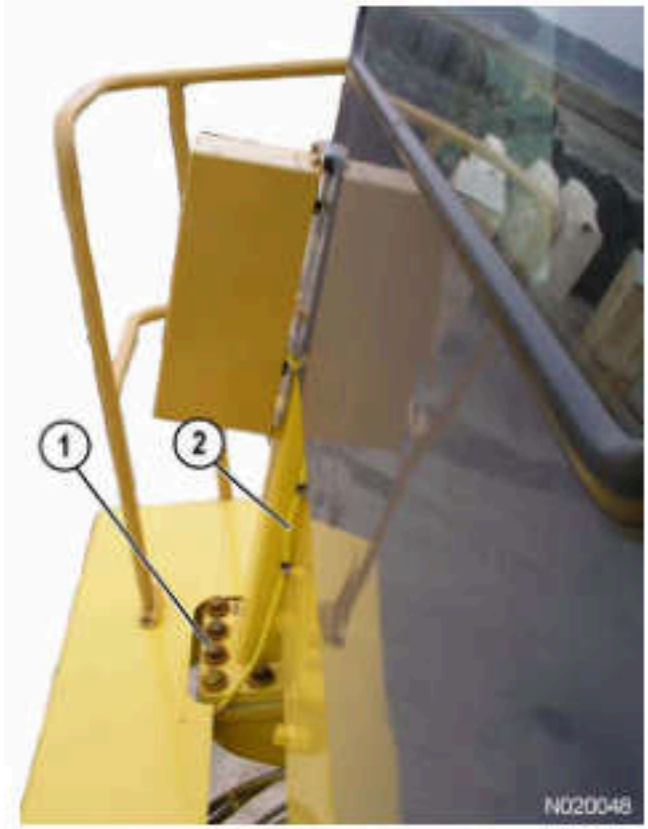


FIGURE 2-7. CAB MOUNT

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.

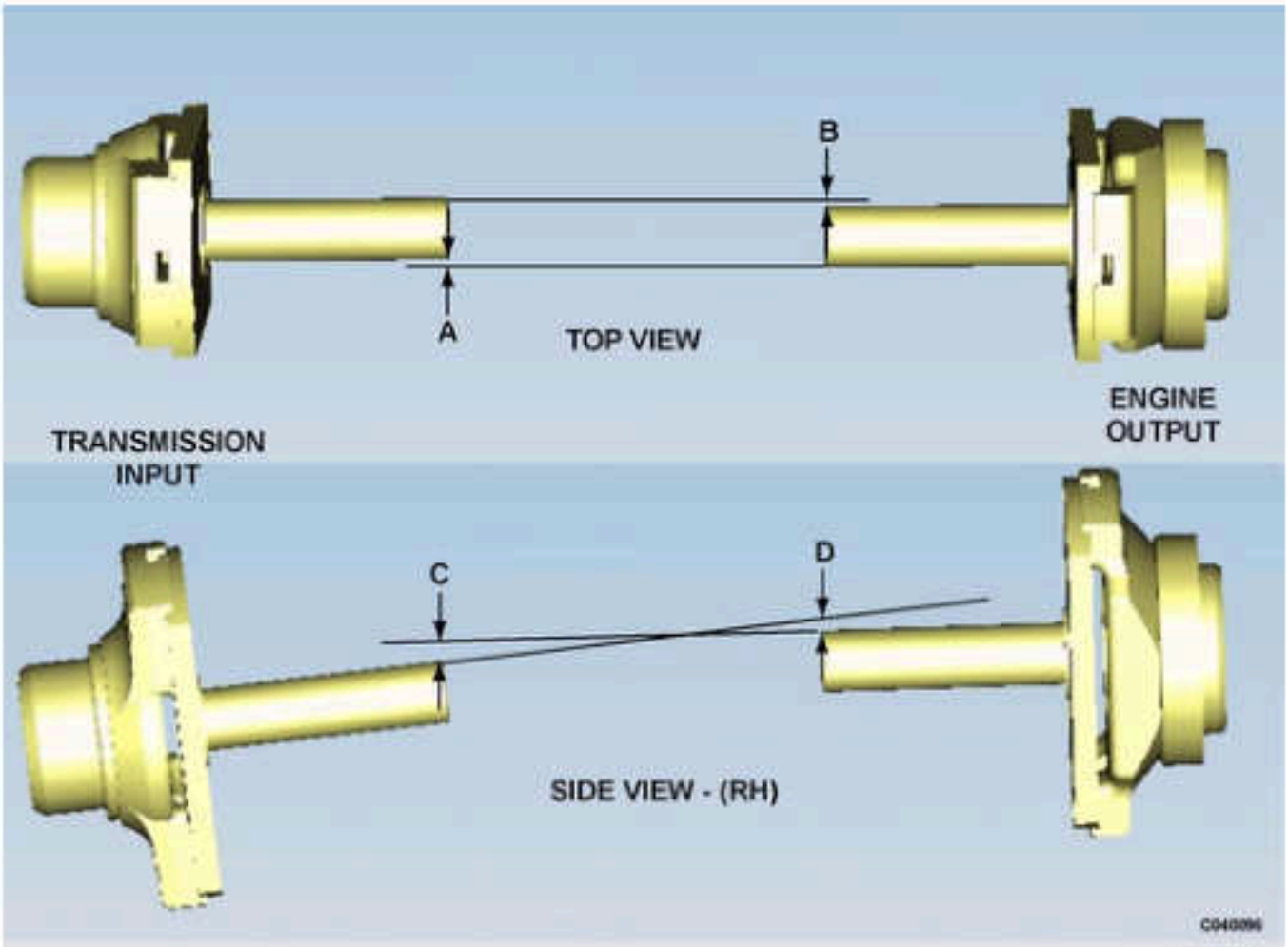


FIGURE 5-7. MEASURING DRIVE LINE ANGLES

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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, 6-A4, 9-A5, 10-A1, 11-A6, 13-A2, 14-A1, 17-A1, 18-A1, 19-A4
12H	HYD TK LVL & HST LIM 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 1 7 2	18-C6
22D1	FAN CLUTCH END FULL ON	18-C7
24D1	ALTERNATE DROOP	8-A6
24E1	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
24G1	+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
25N1	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
27B	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 4-C7, 11-B-2
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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
31SC	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
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32T2	VALVE INLET OIL TEMP	5-C4
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33AP3	BRAKE ACCUMULATOR PRESSURE	9-B3
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33B2	LEFT REAR BRAKE PRESSURE	12-C2
33B3	SENSOR POWER (+18V)	12-C2
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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
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35E3	MAXIMUM SPEED SET LOADED SIG	10-B2
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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
35S7	RGT REAR WHL SPEED +18V SUPPLY	12-C7
35S8	RGT REAR WHEEL SPEED SIG	12-C7
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39C	RED PLM LIGHT CONTROL	14-C3
39CA	RED PLM LT POWER SUPPLY	14-C3
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39FC	RIGHT FRONT SUSPENSION PRESS	14-B6
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39FE	INCLINOMETER	14-C6
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41H	HIGH BEAM CONTROL	15-B4
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41LA	RT LOW MTD LO BEAM HDLT	15-B7
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41TS	CLEAR. LT. CONTROL BOTTOM LT	15-B3, 16-A3
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51A2	STEERING ACCUMULATOR PRESS	9-A2
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CKT#	DESCRIPTION	SHT/ZONE
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