

Section 4

Troubleshooting Information

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Introduction

The following pages contain a Table of Troubleshooting information for locating and correcting most service trouble which can develop. Careful inspection and accurate analysis of the systems listed in the Table of Troubleshooting Information will localize the trouble more quickly than any other method. This manual cannot cover all possible troubles and deficiencies that may occur. If a specific trouble is not listed, isolate the major component in which the trouble occurs, isolate whether the problem is electrical or hydraulic, and then isolate and correct the specific problem.

The content of this section is separated into “probable cause” and “remedy”. The information preceded by a number represents the “probable cause”. The following line, noted by a dash and a greater indentation represents the “remedy” to the “probable cause” directly above it. See example below for clarification.

1. Probable Cause
 -Remedy

4.1-1. All Controls Inoperative

1. Battery disconnected or discharged.
-Reconnect battery. Recharge if discharged.
2. Loose or dirty battery cables.
-Clean and tighten battery cables.
3. Defective main fuse (F1) 300Amp.
-Check fuse. Replace if defective.
4. Open or defective main power disconnect switch (S1).
-Close switch. Replace if defective.
5. Loose or broken wire #03 from main power disconnect switch (S1) to circuit breaker (CB1).
-Check continuity. Replace if defective.
6. Tripped or defective circuit breaker (CB1).
-Reset breaker. Check for defective wiring. Replace breaker if defective.
7. Loose or broken wire #05 from breaker (CB1) to base terminal block (TB-1).
-Check continuity. Replace if defective.
8. Loose or broken wire #05 from base terminal block (TB-1) to base engine switch (S30).
-Check continuity. Replace if defective.

4.1-2. All Controls Inoperative From Base Control Box (CE)

1. Battery disconnected or discharged.
-Reconnect battery. Recharge if discharged.
2. Loose or dirty battery cables.
-Clean and tighten battery cables.
3. Defective main fuse (F1) 300Amp.
-Check fuse. Replace if defective.
4. Loose or broken wire #7C from * to emergency stop switch (S4).
-Check continuity. Replace if defective.
5. Loose or broken wire #10D from emergency stop switch (S4) to base/platform switch (S10).
-Check continuity. Replace if defective.
6. Loose or broken wire #10D from base/platform switch (S10) to base terminal block.
-Check continuity. Replace if defective.
7. Open diode (D10E) at base terminal block.
-Check diode. Replace if defective.

4.1-3. No Power To Platform (Machines without base control box option)

1. Open or defective base engine switch (S30).
-Check switch. Replace if defective.
2. Loose or broken wire #07 from base engine switch (S30) to base terminal block (TB1).
-Check continuity. Replace if defective.
3. Loose or broken wire #07 from base terminal block (TB-1) to emergency stop switch (S4).
-Check continuity. Replace if defective.
4. Open or defective emergency stop switch (S4).
-Check switch. Replace if defective.

4.1-4. No Power To Platform (Machines with base control box option)

1. Open or defective base engine switch (S30).
-Check switch. Replace if defective.
2. Loose or broken wire #07 from engine start switch (S30) to base terminal block (TB-1).
-Check continuity. Replace if defective.

3. Loose or broken wire #07 from base terminal block (TB-1) to emergency stop switch (S6).
-Check continuity. Replace if defective.
4. Loose or broken wire #07 from emergency stop switch (S6) to PLATFORM/BASE select switch (S10).
-Check continuity. Replace if defective.
5. PLATFORM/BASE select switch (S10) set to base position.
-Set (S10) to platform position.
6. Open or defective PLATFORM/BASE select switch (S10).
-Check switch. Replace if defective.
7. Loose or broken wire #7A from PLATFORM/BASE select switch (S10) to platform emergency stop switch (S4).
-Check continuity. Replace if defective.
8. Open or defective platform emergency stop switch (S4).
-Check switch. Replace if defective.

4.1-5. All Functions Inoperative From The Platform

1. Open or defective emergency stop switch (S4).
-Check switch. Replace if defective.
2. Loose or broken wire #08 from emergency stop switch (S4) to OFF/LIFT/DRIVE select switch (S3).
-Check continuity. Replace if defective.
3. Open or defective OFF/LIFT/DRIVE select switch (S3).
-Check switch. Replace if defective.
4. Open diode (D10) at base terminal block.
-Check diode. Replace if defective.

4.1-6. Engine Will Not Crank From Platform

1. Open or defective key select switch (S3).
-Check switch. Replace if defective.
2. Loose or broken wire #10 from key select switch (S3) to start switch (S15).
-Check continuity. Replace if defective.
3. Defective start switch (S15).
-Check switch. Replace if defective.
4. Loose or broken wire #32 from start switch (S15) to relay (32CR).
-Check continuity. Replace if defective.
5. Defective relay (32CR).
-Check relay. Replace if defective.
6. Loose or broken jumper wire #41 on relay (32CR).
-Check continuity. Replace if defective.
7. Loose or broken wire #02 from relay (32CR) to base terminal block.
-Check continuity. Replace if defective.
8. Loose or broken wire #05 from base terminal block to relay (32CR).
-Check continuity. Replace if defective.
9. Loose or broken wire #32A from relay (32CR) to base terminal block.
-Check continuity. Replace if defective.
10. Loose or broken wire #32A from base terminal block to starter contactor (32ACR).
-Check continuity. Replace if defective.
11. Defective starter contactor (32ACR).
-Check contactor. Replace if defective.
12. Loose or broken wire #00 from starter contactor (32ACR) to base.
-Check continuity. Replace if defective.
13. Loose or broken wire #100 from main power disconnect (S1) to starter contactor (32ACR).
-Check continuity. Replace if defective.

14. Loose or broken wire #104 from starter contactor (32ACR) to starter motor.
-Check continuity. Replace if defective.
15. Defective relay (10BCR2).
-Check relay. Replace if defective.
16. Defective starter motor.
-Check motor. Repair or replace if defective.

4.1-7. Engine Will Not Crank from Base Controls (GM Dual Fuel)

1. Loose or broken wire #10A from base terminal block (TB1) to engine harness plug.
-Check continuity. Replace if defective.
2. Loose or broken wire #10A from engine harness plug to base start switch (S30).
-Check continuity. Replace if defective.
3. Defective base start switch (S30).
-Check switch. Replace if defective.
4. Loose or broken wire #32A from base start switch (S30) to GM engine connector 1.
-Check continuity. Replace if defective.

4.1-8. Engine Will Not Crank from Platform or Base Control (Additional for GM Dual Fuel)

1. Loose or broken wire #10A from base terminal block (TB1) to engine harness plug.
-Check continuity. Replace if defective.
2. Loose or broken wire #10A from engine harness plug to GM engine connector 1.
-Check continuity. Replace if defective.
3. Loose or broken PINK wire from GM engine connector 1 to fuse (F7).
-Check continuity. Replace if defective.
4. Defective fuse (F7).
-Check fuse. Replace if defective
5. Loose or broken PINK/TAN wire from fuse (F7) to ECU connector pin #45.
-Check continuity. Replace if defective
6. Loose or broken RED wire from battery positive to ECU fuse (F8).
-Check continuity. Replace if defective.
7. Defective fuse (F8).
-Check fuse. Replace if defective.
8. Loose or broken RED/TAN wire from fuse (F8) to ECU connector pin #60 and pin #79.
-Check continuity. Replace if defective.
9. Loose or broken BLACK wire from engine ground to ECU connector pin #69 and #81.
-Check continuity. Replace if defective.
10. Loose or broken LT BLUE/PINK wire from GM engine connector 1 to relay (32ACR).
-Check continuity. Replace if defective.
11. Loose or broken PINK/BLACK wire from ECU connector pin #89 to relay (32ACR).
-Check continuity. Replace if defective.
12. Defective relay (32ACR).
-Check relay. Replace if defective.
13. Loose or broken RED wire from battery positive to starter fuse (F12).
-Check continuity. Replace if defective.
14. Defective fuse (F12).
-Check fuse. Replace if defective.
15. Loose or broken RED/TAN wire from fuse (F12) to relay (32ACR).
-Check continuity. Replace if defective.
16. Loose or broken WHITE wire from relay (32ACR) to start solenoid (32BCR).
-Check continuity. Replace if defective.

17. Defective starter solenoid (32BCR).
-Check solenoid. Replace if defective.
18. Loose or broken battery cable from starter solenoid (32BCR) to starter motor.
-Check continuity. Replace if defective.
19. Defective starter motor.
-Check motor. Repair or replace if defective.

4.1-9. Engine Will Not Crank From Engine Controls (Kubota Diesel)

1. Loose or broken wire #05 from base terminal block to base engine switch (S30).
-Check continuity. Replace if defective.
2. Loose or broken wire #05A from base engine switch (S30) to engine start switch (S32).
-Check continuity. Replace if defective.
3. Defective engine start switch (S32).
-Check switch. Replace if defective.
4. Loose or broken wire #32A from engine start switch (S32) to starter contactor (32ACR).
-Check continuity. Replace if defective.
5. Loose or broken wire #00 from starter contactor (32ACR) to base.
-Check continuity. Replace if defective.
6. Defective starter contactor (32ACR).
-Check contactor. Replace if defective.
7. Loose or broken wire #100 from main power disconnect switch (S1) to starter contactor (32ACR).
-Check continuity. Replace if defective.
8. Loose or broken wire #104 from starter contactor (32ACR) to starter motor.
-Check continuity. Replace if defective.
9. Defective starter motor.
-Check motor. Repair or replace if defective.

4.1-10. Engine Will Not Crank From Engine Controls (Nissan Dual Fuel & Kubota Dual Fuel)

NOTE

For further information on Nissan Dual Fuel Troubleshooting,
refer to Section 4, EMS Troubleshooting.

1. Loose or broken wire #05 from base terminal block to base engine switch (S30).
-Check continuity. Replace if defective.
2. Loose or broken wire #7 on base engine switch (S30).
-Check continuity. Replace if defective.
3. Defective base engine switch (S30).
-Check switch. Replace if defective.
4. Loose or broken wire #32A from base engine switch (S30) to starter contactor (32ACR).
-Check continuity. Replace if defective.
5. Loose or broken wire #00 from starter contactor (32ACR) to base.
-Check continuity. Replace if defective.
6. Defective starter contactor (32ACR).
-Check contactor. Replace if defective.
7. Loose or broken wire #100 from main power disconnect switch (S1) to starter contactor (32ACR).
-Check continuity. Replace if defective.
8. Loose or broken wire #104 from starter contactor (32ACR) to starter motor.
-Check continuity. Replace if defective.
9. Defective starter motor.
-Check motor. Repair or replace if defective.

4.1-11. Engine Cranks But Will Not Start (Kubota Diesel)

1. Open diode (D32A) from engine start switch (S32) to glow plug switch (S31).
-Check diode. Replace if defective.
2. Loose or broken wire #37 from base terminal block to diesel valve solenoid (2D37).
-Check continuity. Replace if defective.
3. Loose or broken wire #57 from starter contactor (32ACR) to diesel valve solenoid (2D37).
-Check continuity. Replace if defective.
4. Defective fuel valve solenoid (2D37).
-Check solenoid. Replace if defective.
5. Defective glow plugs.
-Check glow plugs. Repair if necessary.
6. Defective glow plug timer (GPT1).
-Check timer. Replace if defective.
7. Defective glow plug relay (31ACR).
-Check relay. Replace if defective.

4.1-12. Engine Cranks But Will Not Start (Check Engine Light Does Not Come On) (Nissan Dual Fuel)

1. Loose or broken wire #10A from base terminal block (TB1) to engine harness plug.
-Check continuity. Replace if defective.
2. Loose or broken wire #10A from base terminal block to main power relay (10ACR).
-Check continuity. Replace if defective.
3. Loose or broken wire #00 from chassis ground to main power relay (10ACR).
-Check continuity. Replace if defective.
4. Defective main power relay (10ACR).
-Check relay. Replace if defective.
5. Loose or broken wire #100 from engine start solenoid (32ACR) to fuse (F6).
-Check continuity. Replace if defective.
6. Defective fuse (F6).
-Check fuse. Replace if defective.
7. Loose or broken wire #4002 from fuse (F6) to main power relay (10ACR).
-Check continuity. Replace if defective.
8. Loose or broken wire #2002 from main power relay (10ACR) to check engine light (CEL1).
-Check continuity. Replace if defective.
9. Loose or broken wire #2002 from main power relay (10ACR) to white ECU connector at pins #22 and #23.
-Check continuity. Replace if defective.
10. Loose or broken wire #00 from chassis ground to the white ECU connector at pins #20 and #21.
-Check continuity. Replace if defective.
11. Check bulb.
-Replace if defective.

4.1-13. Engine Cranks But Will Not Start (Kubota Dual Fuel)

1. Open or defective diode (D57).
-Check diode. Replace if defective.
2. Loose or broken wire #17 from engine harness plug to coil pack 2 wire connector.
-Check continuity. Replace if defective.
3. Loose or broken wire #00 from coil pack 2 wire connector to engine ground.
-Check continuity. Replace if defective.
4. Loose or broken wire #00 from engine ground to crank position sensor.
-Check continuity. Replace if defective.

5. Loose or broken wire #13 from ignition control module (ICM1) to crank position sensor (CPS1).
-Check continuity. Replace if defective.
6. Defective ignition control module (ICM1).
-Refer to section 5 of this manual for Ohm specifications. Replace if defective.
7. Defective crank position sensor.
-Refer to section 5 of this manual for Ohm specifications. Replace if defective.
8. Loose or broken wire #37 from engine harness plug to fuel relay (37CR).
-Check continuity. Replace if defective.
9. Loose or broken wire #02 from engine harness plug to fuel relay (37CR).
-Check continuity. Replace if defective.
10. Defective fuel relay (37CR).
-Check continuity. Replace if defective.
11. Loose or broken wire #7 from main engine switch (S30) to fuel relay (37CR).
-Check continuity. Replace if defective.
12. Loose or broken wire #56 from fuel relay (37CR) to fuel select switch (S33).
-Check continuity. Replace if defective.
13. Defective fuel switch (S33).
-Check switch. Replace if defective.
14. While in gasoline, loose or broken wire #11 from fuel select switch (S33) to fuel pump (FP11) or gas valve (2G-11).
-Check continuity. Replace if defective.
15. While in propane, loose or broken wire #50 from fuel select switch (S33) to fuel lockoff (2P-50-1) or propane lockoff (2P-50-2).
-Check continuity. Replace if defective.
16. Loose or broken wire #00 from engine ground to propane lockoff (2P-50-1) or (2P-50-2) (propane) or to gasoline (2G-11) or fuel pump (FP11) (gasoline).
-Check continuity. Replace if defective.
17. Defective propane lockoff (2P-50-1) or (2P-50-2) (propane) or gas valve (2G-11) or fuel pump (FP11) (gasoline).
-Check lockoffs, valve or pump. Replace if defective.

4.1-14. Engine Cranks But Will Not Start (GM Dual Fuel)

NOTE

For additional engine troubleshooting refer to diagnostic trouble codes for use with the check engine light.

1. Loose or broken RED wire from battery positive to relay (2002CR).
-Check continuity. Replace if defective.
2. Loose or broken RED/TAN wire from ECU fuse (F8) to relay (2002CR).
-Check continuity. Replace if defective.
3. Loose or broken WHITE/LT BLUE wire from ECU connector pin #71 to relay (2002CR).
-Check continuity. Replace if defective.
4. Defective relay (2002CR).
-Check relay. Replace if defective.
5. Loose or broken PINK/DR GREEN wire from relay (2002CR) to ignition fuse (F10).
-Check continuity. Replace if defective
6. Defective fuse (F10).
-Check fuse. Replace if defective
7. Loose or broken PINK/DR GREEN wire from fuse (F10) to ignition coil (IGC1) pin #D.
-Check continuity. Replace if defective.
8. Loose or broken BLACK wire from ignition coil (IGC1) pin #C to engine ground.
-Check continuity. Replace if defective.

9. Defective ignition coil (IGC1).
- Refer to section 5 of this manual for Ohm specifications. Replace if defective.
10. Loose or broken PINK/DR GREEN wire from fuse (F10) to gas injectors (GI-1, GI-2, GI-3 and GI-4).
-Check continuity. Replace if defective.
11. Loose or broken PINK/WHITE wire from ECU connector pin #82 to throttle actuator (RA1).
-Check continuity. Replace if defective.
12. Loose or broken TAN/ORANGE wire from ECU connector pin #83 to throttle actuator (RA1).
-Check continuity. Replace if defective.
13. Loose or broken LT GREEN/RED wire from ECU connector pin #19 to throttle actuator (RA1).
-Check continuity. Replace if defective.
14. Loose or broken BLACK/LT GREEN wire from ECU connector pin #20 to throttle actuator (RA1).
-Check continuity. Replace if defective.
15. Loose or broken LT BLUE/DR BLUE wire from ECU connector pin #6 to throttle actuator (RA1).
-Check continuity. Replace if defective.

FUEL RELATED PROBLEMS

(GASOLINE ONLY)

16. Loose or broken PINK/TAN wire from fuse (F7) to fuel pump relay (56CR).
-Check continuity. Replace if defective.
17. Loose or broken RED wire from battery positive to fuel pump relay (56CR).
-Check continuity. Replace if defective.
18. Loose or broken TAN/BLACK wire from ECU connector pin #42 to fuel pump relay (56CR).
-Check continuity. Replace if defective.
19. Defective fuel pump relay (56CR).
-Check relay. Replace if defective.
20. Loose or broken PINK/YELLOW wire from fuel pump relay (56CR) to fuse (F11).
-Check continuity. Replace if defective.
21. Defective fuse (F11).
-Check fuse. Replace if defective.
22. Loose or broken PINK/YELLOW wire from fuse (F11) to fuel pump (FP).
-Check continuity. Replace if defective.
23. Loose or broken PINK/YELLOW wire from fuse (F11) to ECU connector pin #85.
-Check continuity. Replace if defective
24. Defective fuel pump (FP).
-Check fuel pump by putting 12 volts and a ground to it. Replace if defective.
25. Loose or broken wire #3002 from fuel pump (FP) to GM engine connector 1.
-Check continuity. Replace if defective.
26. Loose or broken BLACK/RED wire from GM engine connector to ECU connector pin #86.
-Check continuity. Replace if defective.

(PROPANE ONLY)

NOTE

The fuel select switch is defaulted to gasoline. The engine will run on gasoline if propane is selected from the switch and either the switch is bad or a wire is loose or broken from the switch. This is providing there is nothing wrong on the gasoline side of the system. Disconnect fuel pump to test propane side.

27. Loose or broken wire #10A from engine harness plug to fuel select switch (S33).
-Check continuity. Replace if defective.
28. Defective fuel select switch (S33).
-Check switch. Replace if defective.

29. Loose or broken wire #50 from fuel select switch (S33) to GM engine connector 1.
-Check continuity. Replace if defective.
30. Loose or broken TAN/BROWN wire from GM engine connector 1 to ECU connector pin #42.
-Check continuity. Replace if defective.
31. Loose or broken PINK/TAN wire from fuse (F7) to propane lock off (2P-56).
-Check continuity. Replace if defective.
32. Loose or broken WHITE/BLACK wire from ECU connector pin #75 to propane lock off (2P-56).
-Check continuity. Replace if defective.
33. Defective propane lock off (2P-56).
-Check lock off. Replace if defective.
34. Loose or broken PINK/DR GREEN wire from fuse (F10) to fuse (F9).
-Check continuity. Replace if defective.
35. Defective fuse (F9).
-Check fuse. Replace if defective.
36. Loose or broken RED/LT BLUE wire from fuse (F9) to propane regulator (PRV1).
-Check continuity. Replace if defective.
37. Loose or broken BLACK wire from engine ground to propane regulator (PRV1).
-Check continuity. Replace if defective.

4.1-15. Glow Plugs Inoperative From Engine Controls (Diesel Models)

1. Loose or broken wire #31A from glow plug switch (S31) to glow plug relay (31ACR).
-Check continuity. Replace if defective.
2. Loose or broken wire #02 from glow plug relay (31ACR) to base terminal block (TB1).
-Check continuity. Replace if defective.
3. Loose or broken wire #91 from base terminal block (TB1) to relay (31ACR).
-Check continuity. Replace if defective.
4. Loose or broken wire #91A from relay (31ACR) to engine glow plugs (EGP1).
-Check continuity. Replace if defective.
5. Defective glow plug relay (31ACR).
-Check relay. Replace if defective.
6. Defective glow plugs.
-Check glow plugs. Replace if defective.

4.1-16. Glow Plugs Inoperative From Platform (Diesel Models)

1. Loose or broken wire #10 from key selector switch (S3) to glow plug switch (S13).
-Check continuity. Replace if defective.
2. Defective glow plug switch (S13).
-Check switch. Replace if defective.
3. Loose or broken wire #31 from glow plug switch (S13) to glow plug relay (31CR).
-Check continuity. Replace if defective.
4. Loose or broken wire #02 from relay (31CR) to base terminal block (TB1).
-Check continuity. Replace if defective.
5. Loose or broken wire #05 from base terminal block (TB1) to relay (31CR).
-Check continuity. Replace if defective.
6. Loose or broken wire #31A from relay (31CR) to base terminal block (TB1).
-Check continuity. Replace if defective.
7. Loose or broken wire #31A from base terminal block (TB1) to glow plug relay (31ACR).
-Check continuity. Replace if defective.
8. Defective relay (31CR).
-Check relay. Replace if defective.

9. Loose or broken wire #02 from relay (31ACR) to base terminal block (TB1).
-Check continuity. Replace if defective.
10. Loose or broken wire #91 from base terminal block (TB1) to relay (31ACR).
-Check continuity. Replace if defective.
11. Loose or broken wire #91A from relay (31ACR) to engine glow plugs (EGP1).
-Check continuity. Replace if defective.
12. Defective glow plug relay (31ACR).
-Check relay. Replace if defective.
13. Defective glow plugs.
-Check glow plugs. Replace if defective.

4.1-17. Mid Throttle Inoperative (On Demand)

1. Defective diode (D17A) or (D18A).
-Check diode. Replace if defective.
2. Loose or broken wire #33 from base terminal strip (TB1) to engine plug.
-Check continuity. Replace if defective.
3. Loose or broken wire #33 from engine harness plug to white ECU connector at pin #17.
-Check continuity. Replace if defective.

4.1-18. Mid Throttle Inoperative (On Demand) (GM Engine)

1. Open diode (D17A) or (D18A).
-Check diode. Replace if defective
2. Loose or broken wire #33 from base terminal block (TB1) to engine harness plug.
-Check continuity. Replace if defective.
3. Loose or broken wire #33 from engine harness plug to GM engine connector 2.
-Check continuity. Replace if defective.
4. Loose or broken GRAY/DR BLUE wire from GM engine connector to ECU connector pin #51.
-Check continuity. Replace if defective.
5. Loose or broken PURPLE/LT BLUE wire from ECU connector pin #5 to throttle actuator (RA1).
-Check continuity. Replace if defective.

4.1-19. High Throttle Inoperative (Machines without base control box option)

NOTE

If machine is in drive mode and is elevated above high speed limit switch, high throttle is inoperative.

1. Loose or broken wire #10 from key select switch (S3) to LOW/HIGH throttle switch (S14).
-Check continuity. Replace if defective.
2. Defective high/low throttle switch (S14).
-Check switch. Replace if defective.
3. Loose or broken wire #34 from LOW/HIGH throttle switch (S14) to relay (35ACR).
-Check continuity. Replace if defective.
4. Open diode (D09) "when in lift only"
-Check diode. Replace if defective.
5. Open diode (D35-2) "when in drive only"
-Check diode. Replace if defective.
6. Loose or broken wire #35A From diode (D09) to relay (35ACR).
-Check continuity. Replace if defective.
7. Defective relay (35ACR).
-Check relay. Replace if defective.

8. Loose or broken wire #02 from relay (35ACR) to terminal block (TB1).
-Check continuity. Replace if defective.
9. Loose or broken wire #34B from relay (35ACR) to relay (34BCR).
-Check continuity. Replace if defective.
10. Defective relay (34BCR).
-Check relay. Replace if defective.
11. Loose or broken wire #42 from relay (34BCR) to relay (10BCR2).
-Check continuity. Replace if defective.
12. Defective relay (10BCR2).
-Check relay. Replace if defective.
13. Loose or broken wire #02 from relay (10BCR2) to base terminal block (TB1).
-Check continuity. Replace if defective.
14. Loose or broken wire #05 from base terminal block (TB1) to relay (32CR).
-Check continuity. Replace if defective.
15. Defective relay (32CR).
-Check relay. Replace if defective.
16. Loose or broken wire #43 from relay (32CR) to relay (34BCR).
-Check continuity. Replace if defective.
17. Loose or broken wire #34A from relay (34BCR) to engine harness plug.
-Check continuity. Replace if defective.
18. Loose or broken wire #34A from engine harness plug to white ECU connector at pin #19.
-Check continuity. Replace if defective.
19. Loose or broken wire #2A from relay (10BCR2) to engine harness plug.
-Check continuity. Replace if defective.
20. Loose or broken wire #2A engine harness plug to the white ECU connector at pin #14.
-Check continuity. Replace if defective.

4.1-20. High Throttle Inoperative (Machines with base control box option)

NOTE

If machine is in drive mode and is elevated above high speed limit switch, high throttle is inoperative.

1. Loose or broken wire #10 from key select switch (S3) to LOW/HIGH throttle switch (S14).
-Check continuity. Replace if defective.
2. Defective LOW/HIGH throttle switch (S14).
-Check switch. Replace if defective.
3. Loose or broken wire #34 from LOW/HIGH throttle switch (S14) to diode (D34).
-Check continuity. Replace if defective.
4. Diode (D34) open.
-Check diode. Replace if defective.
5. Diode (D34) loose or broken at relay (35ACR).
-Tighten diode. Replace if broken.
6. Open diode (D09) (when in lift only).
-Check diode. Replace if defective.
7. Open diode (D35-2) (when in drive only).
-Check diode. Replace if defective.
8. Loose or broken wire #35A from diode (D09) to relay (35ACR).
-Check continuity. Replace if defective.
9. Defective relay (35ACR).
-Check relay. Replace if defective.
10. Loose or broken wire #02 from relay (35ACR) to terminal block (TB1).
-Check relay. Replace if defective.

11. Loose or broken wire #34B from relay (35ACR) to relay (34BCR).
-Check continuity. Replace if defective.
12. Defective relay (34BCR).
-Check relay. Replace if defective.
13. Loose or broken wire #42 from relay (34BCR) to relay (10BCR2).
-Check continuity. Replace if defective.
14. Defective relay (10BCR2).
-Check relay. Replace if defective.
15. Loose or broken wire #02 from relay (10BCR2) to base terminal block (TB1).
-Check continuity. Replace if defective.
16. Loose or broken wire #05 from base terminal block (TB1) to relay (32CR).
-Check continuity. Replace if defective.
17. Defective relay (32CR).
-Check relay. Replace if defective.
18. Loose or broken wire #43 from relay (32CR) to relay (34BCR).
-Check continuity. Replace if defective.
19. Loose or broken wire #34A from relay (34BCR) to high throttle solenoid (HTS34A).
-Check continuity. Replace if defective.
20. Defective high throttle solenoid (HTS34A).
-Check solenoid. Replace if defective.
21. Loose or broken wire #02 from high throttle solenoid (HTS34A) to engine terminal block.
-Check continuity. Replace if defective.

4.1-21. High Throttle On Demand Inoperative (Kubota Dual Fuel)

NOTE

If machine is in drive mode and is elevated above high speed limit switch, high throttle is inoperative

NOTE

If the above does not repair the high throttle on demand, refer to high throttle inoperative in this section.

1. Throttle switch (S14) in low throttle position.
-Select high throttle position on switch.
2. Open or defective diode (D17A) or (D18A).
-Check diodes. Replace if defective.
3. Loose or broken wire #33 from terminal strip (TB1) to power on demand relay (33CR).
-Check continuity. Replace if defective.
4. Loose or broken wire #02 from engine harness plug to power on demand relay (33CR).
-Check continuity. Replace if defective.
5. Defective power on demand relay (33CR).
-Check relay. Replace if defective.
6. Loose or broken wire #34A from engine harness plug to power on demand relay (33CR).
-Check continuity. Replace if defective.
7. Loose or broken wire #34C from power on demand relay (33CR) to high throttle solenoid (HTS-34C).
-Check continuity. Replace if defective.

4.1-22. High Throttle Inoperative (Additional for GM Dual Fuel)

1. Loose or broken wire #34A from engine harness plug to GM engine connector 2.
-Check continuity. Replace if defective.
2. Loose or broken GRAY/ORANGE wire from GM engine connector 2 to ECU connector pin #52.

-Check continuity. Replace if defective.

3. Loose or broken LT BLUE/DR BLUE wire from ECU connector pin #6 to throttle actuator (RA1).

-Check continuity. Replace if defective.

4. Defective throttle actuator (RA1).

-Check actuator. Replace if defective.

NOTE

For more troubleshooting information, refer to Manufacture Engine Manual.

4.1-23. Drive And Steer Inoperative (Machines without outriggers option)

1. Key select switch (S3) in lift position.

-Turn switch to drive position.

2. Defective drive switch in key select switch (S3).

-Check switch. Replace if defective.

3. Loose or broken wire #12 from key select switch (S3) to joystick controller enable switch (S7-7).

-Check continuity. Replace if defective.

4. Defective joystick enable switch (S7-7).

-Check switch. Replace if defective.

5. Loose or broken wire #12A from joystick enable relay (12BCR) to speed, steer and direction switches (S7-1 to S7-6).

-Check continuity. Replace if defective.

6. Loose or broken wire #12B from joystick enable switch (S7-7) to joystick enable relay (12BCR).

-Check continuity. Replace if defective.

7. Defective joystick enable relay (12BCR).

-Check continuity. Replace if defective.

8. Loose or broken wire #02 from joystick enable relay (12BCR) to joystick harness.

-Check continuity. Replace if defective.

9. Loose or broken wire #10A from base terminal block to relay (28CR).

-Check continuity. Replace if defective.

10. Defective relay (28CR).

-Check relay. Replace if defective.

11. Loose or broken wire #1 from relay (28CR) to terminal block (TB2).

-Check continuity. Replace if defective.

12. Loose or broken jumper wire from #1 to #1A on terminal block (TB2).

-Check continuity. Replace if defective.

13. Loose or broken jumper wire from #1A to #4 on terminal block (TB2).

-Check continuity. Replace if defective.

4.1-24. Drive And Steer Inoperative (Machines with outriggers option)

1. Outriggers not fully retracted

-Fully retract outrigger cylinders

2. Key select switch (S3) in lift position.

-Turn switch to drive position.

3. Defective drive switch in key select switch (S3).

-Check switch. Replace if defective.

4. Loose or broken wire #12 from key select switch (S3) to joystick controller enable switch (S7-7).

-Check continuity. Replace if defective.

5. Defective joystick enable switch (S7-7).

-Check switch. Replace if defective.

6. Loose or broken wire #12B from joystick enable switch (S7-7) to joystick enable relay (12BCR).

-Check continuity. Replace if defective.

7. Defective joystick enable relay (12BCR).
-Check continuity. Replace if defective.
8. Loose or broken wire #02 from joystick enable relay (12BCR) to joystick harness.
-Check continuity. Replace if defective.
9. Loose or broken wire #12A from joystick enable relay (12BCR) to speed, steer and direction switches (S7-1 to S7-6).
-Check continuity. Replace if defective.
10. Loose or broken wire #10A from base terminal block to relay (28CR).
-Check continuity. Replace if defective.
11. Defective relay (28CR).
-Check relay. Replace if defective.
12. Loose or broken wire #1 from relay (28CR) to terminal block (TB2).
-Check continuity. Replace if defective.
13. Loose or broken wire #1 from terminal block (TB2) to pin #7 on connector (CN14) at the outrigger board.
-Check continuity. Replace if defective.
14. Left rear outrigger limit switch (LS64) is out of adjustment or defective.
-Check continuity through switch. Adjust switch if out of adjustment. Replace if defective.
15. Right rear outrigger limit switch (LS63) is out of adjustment or defective.
-Check continuity through switch. Adjust switch if out of adjustment. Replace if defective.
16. Right front outrigger limit switch (LS62) is out of adjustment or defective.
-Check continuity through switch. Adjust switch if out of adjustment. Replace if defective.
17. Left front outrigger limit switch (LS61) is out of adjustment or defective.
-Check continuity through switch. Adjust switch if out of adjustment. Replace if defective.
18. Defective drive enable relay (61CR).
-Check relay. Replace if defective.
19. Loose or broken wire #1A from pin #1 on connector (CN14) at the outrigger board to terminal block (TB2).
-Check continuity. Replace if defective.
20. Loose or broken jumper wire from #1A to #4 on terminal block (TB2) "Machines without 26' drive cutout option only"
-Check continuity. Replace if defective.
21. 26" Drive cutout limit switch out of adjustment or is defective.
-Adjust switch. Check continuity through switch. Replace if defective.

4.1-25. Brakes Will Not Release

1. Loose or broken wire #30 from diodes (D15A-2) and (D16A-2) to relay (30CR).
-Check continuity. Replace if defective.
2. Defective relay (30CR).
-Check relay. Replace if defective.
3. Loose or broken wire #02 from relay (30CR) to base terminal block (TB-1).
-Check continuity. Replace if defective.
4. Loose or broken wire #10A from base terminal block to relay (30CR).
-Check continuity. Replace if defective.
5. Loose or broken wire #30A from relay (30CR) to base terminal block (TB-1).
-Check continuity. Replace if defective.
6. Loose or broken wire #30A from base terminal block (TB-1) to brake dump valve (2H-30A-1) or brake feed valve (2H-30A-2).
-Check continuity. Replace if defective.
7. Defective valve coil (2H-30A-1) brake dump or (2H-30A-2) brake feed.
-Check continuity through coil. Replace if defective.
8. Loose or broken wire #02 from (2H-30A-1) brake dump or (2H-30A-2) brake feed coil to base terminal block (TB-1).

- Check continuity. Replace if defective.
- 9. Open diode (D30).
 - Check diode. Replace if defective.
- 10. Loose or broken wire #25 from diode (D30) to base terminal block (TB-1).
 - Check continuity. Replace if defective.
- 11. Loose or broken wire #25 from base terminal block (TB-1) to quick brake valve coil (2H-25).
 - Check continuity. Replace if defective.
- 12. Defective quick brake valve coil (2H-25).
 - Check continuity through coil. Replace if defective.
- 13. Loose or broken wire #02 from quick brake valve (2H-25) to base terminal block (TB-1).
 - Check continuity. Replace if defective.

4.1-26. Steer Right Inoperative

- 1. Defective steer right switch (S7-2) in joystick controller (S7).
 - Check switch. Replace if defective.
- 2. Loose or broken wire #23 from steer right switch (S7-2) to platform terminal block.
 - Check continuity. Replace if defective.
- 3. Loose or broken wire #23 from platform terminal block to relay (23CR).
 - Check continuity. Replace if defective.
- 4. Defective relay (23CR).
 - Check relay. Replace if defective.
- 5. Loose or broken wire #04 from base terminal block to relay (23CR).
 - Check continuity. Replace if defective.
- 6. Loose or broken wire #23A from relay (23CR) to base terminal block.
 - Check continuity. Replace if defective.
- 7. Loose or broken wire #02 from relay (23CR) to base terminal block.
 - Check continuity. Replace if defective.
- 8. Loose or broken wire #23A from base terminal block to steer right valve coil (4H23A).
 - Check continuity. Replace if defective.
- 9. Defective steer right valve coil (4H23A).
 - Check coil. Replace if defective.
- 10. Loose or broken wire #02 from steer right valve coil (4H23A) to base terminal block.
 - Check continuity. Replace if defective.
- 11. Open diode (D23A).
 - Check diode. Replace if defective.

4.1-27. Steer Left Inoperative

- 1. Defective steer left switch (S7-3) in joystick controller (S7).
 - Check switch. Replace if defective.
- 2. Loose or broken wire #24 from steer left switch (S7-3) to platform terminal block.
 - Check continuity. Replace if defective.
- 3. Loose or broken wire #24 from platform terminal block to relay (24CR).
 - Check continuity. Replace if defective.
- 4. Defective relay (24CR).
 - Check relay. Replace if defective.
- 5. Loose or broken wire #04 from base terminal block to relay (24CR).
 - Check continuity. Replace if defective.
- 6. Loose or broken wire #24A from relay (24CR) to base terminal block.
 - Check continuity. Replace if defective.
- 7. Loose or broken wire #02 from relay (24CR) to base terminal block.
 - Check continuity. Replace if defective.

8. Loose or broken wire #24A from base terminal block to steer left valve coil (4H24A).
-Check continuity. Replace if defective.
9. Defective steer left valve coil (4H24A).
-Check coil. Replace if defective.
10. Loose or broken wire #02 from steer left valve coil (4H24A) to base terminal block.
-Check continuity. Replace if defective.
11. Open diode (D24A).
-Check diode. Replace if defective.

4.1-28. Reverse Drive Inoperative

1. Defective drive/reverse switch (S7-4) in joystick controller (S7).
-Check switch. Replace if defective.
2. Defective joystick controller (S7).
-Check joystick. Replace if defective.
3. Loose or broken wire #15 from joystick (S7) to platform terminal block.
-Check continuity. Replace if defective.
4. Loose or broken wire #15 from platform terminal block to relay (15CR).
-Check continuity. Replace if defective.
5. Defective relay (15CR).
-Check relay. Replace if defective.
6. Loose or broken wire #02 from relay (15CR) to base terminal block.
-Check continuity. Replace if defective.
7. Loose or broken wire #04 from base terminal block to relay (15CR).
-Check continuity. Replace if defective.
8. Loose or broken wire #15A from relay (15CR) to time delay relay (1TD).
-Check continuity. Replace if defective.
9. Defective time delay relay (1TD).
-Check relay. Replace if defective.
10. Loose or broken wire #15B from time delay relay (1TD) to reverse valve coil (4H15B).
-Check continuity. Replace if defective.
11. Defective reverse valve coil (4H15B).
-Check coil. Replace if defective.
12. Loose or broken wire #02 from reverse valve coil (4H15B) to base terminal block.
-Check continuity. Replace if defective.
13. Open diode (D15A-1) or (D15A-2).
-Check diodes. Replace if defective.

4.1-29. Forward Drive Inoperative

1. Defective drive forward switch (S7-5) in joystick controller (S7).
-Check switch. Replace if defective.
2. Defective joystick controller (S7).
-Check joystick. Replace if defective.
3. Loose or broken wire #16 joystick controller (S7) to platform terminal block.
-Check continuity. Replace if defective.
4. Loose or broken wire #16 from platform terminal block to relay (16CR).
-Check continuity. Replace if defective.
5. Defective relay (16CR).
-Check relay. Replace if defective.
6. Loose or broken wire #02 from relay (16CR) to base terminal block.

- Check continuity. Replace if defective.
- 7. Loose or broken wire #04 from base terminal block to relay (16CR).
-Check continuity. Replace if defective.
- 8. Loose or broken wire #16A from relay (16CR) to time delay relay (1TD).
-Check continuity. Replace if defective.
- 9. Defective time delay relay (1TD).
-Check relay. Replace if defective.
- 10. Loose or broken wire #16B from time delay relay (1TD) to forward valve coil (4H16B).
-Check continuity. Replace if defective.
- 11. Defective forward valve coil (4H16B).
-Check coil. Replace if defective.
- 12. Loose or broken wire #02 from forward valve coil (4H16B) to base terminal block.
-Check continuity. Replace if defective.
- 13. Open diode (D16A-1) or (D16A-2).
-Check diodes. Replace if defective.

4.1-30. First Drive Speed And Steering Inoperative

- 1. Loose or broken wire #21 from base terminal block to relay (17ACR).
-Check continuity. Replace if defective.
- 2. Defective relay (17ACR).
-Check relay. Replace if defective.
- 3. Loose or broken wire #18A from relay (17ACR) to small pump dump valve solenoid. (2H18A)
-Check continuity. Replace if defective.
- 4. Defective small pump dump valve coil (2H18A).
-Check coil. Replace if defective.
- 5. Loose or broken wire #02 from small pump dump solenoid (2H18A) to base terminal block.
-Check continuity. Replace if defective.

4.1-31. Second Drive Speed Inoperative

- 1. Defective second speed switch (S7-1) in joystick controller (S7).
-Check switch. Replace if defective.
- 2. Defective joystick controller (S7).
-Check joystick. Replace if defective.
- 3. Loose or broken wire #19 from joystick controller (S7-1) to platform terminal block.
-Check continuity. Replace if defective.
- 4. Loose or broken wire #19 from platform terminal block to relay (35CR).
-Check continuity. Replace if defective.
- 5. Defective relay (35CR).
-Check relay. Replace if defective.
- 6. Loose or broken wire #10A from base terminal block to high drive/tilt override limit switch (LS5).
-Check continuity. Replace if defective.
- 7. Misadjusted or defective high drive/tilt override limit switch (LS5).
-Adjust switch. Replace if defective.
- 8. Loose or broken wire #35 from high drive/tilt override limit switch (LS5) to base terminal block.
-Check continuity. Replace if defective.
- 9. Loose or broken wire #35 from base terminal block to relay (35CR).
-Check continuity. Replace if defective.
- 10. Loose or broken wire #02 from relay (35CR) to base terminal block.
-Check continuity. Replace if defective.
- 11. Defective relay (35CR).

- Check relay. Replace if defective.
- 12. Open diode (D19A)
 - Check relay. Replace if defective.
- 13. Loose or broken wire #17 from diode (D19A) to relay (17CR).
 - Check continuity. Replace if defective.
- 14. Defective relay (17CR).
 - Check relay. Replace if defective.
- 15. Loose or broken wire #02 from relay (17CR) to base terminal block.
 - Check continuity. Replace if defective.
- 16. Loose or broken wire #10A from base terminal block to relay (17CR).
 - Check continuity. Replace if defective.
- 17. Loose or broken wire #17A from relay (17CR) to base terminal block.
 - Check continuity. Replace if defective.
- 18. Loose or broken wire #17A from relay (17CR) to relay (17ACR).
 - Check continuity. Replace if defective.
- 19. Defective relay (17ACR).
 - Check relay. Replace if defective.
- 20. Loose or broken wire #02 from relay (17ACR) to base terminal block.
 - Check continuity. Replace if defective.
- 21. Loose or broken wire #17A from base terminal block to large pump dump valve solenoid (2H17A).
 - Check continuity. Replace if defective.
- 22. Loose or broken wire #02 from large pump dump valve solenoid (2H17A) to base terminal block.
 - Check continuity. Replace if defective.
- 23. Defective large pump dump valve solenoid (2H17A).
 - Check solenoid. Replace if defective.

4.1-32. Third Drive Speed Inoperative

- 1. LOW/HIGH torque switch (S41) in high position or defective.
 - Turn LOW/HIGH switch to low position. Replace if defective.
- 2. Defective third speed switch (S7-6) in joystick controller (S7).
 - Check switch. Replace if defective.
- 3. Defective joystick controller (S7).
 - Check joystick. Replace if defective.
- 4. Loose or broken wire #18B from joystick controller (S7-6) to LOW/HIGH torque switch (S41).
 - Check continuity. Replace if defective.
- 5. Loose or broken wire #18 from LOW/HIGH torque switch (S41) to platform terminal block.
 - Check continuity. Replace if defective.
- 6. Loose or broken wire #18 from platform terminal block to relay (18CR).
 - Check continuity. Replace if defective.
- 7. Defective relay (18CR).
 - Check relay. Replace if defective.
- 8. Loose or broken wire #02 from relay (18CR) to base terminal block.
 - Check continuity. Replace if defective.
- 9. Loose or broken wire #10A from base terminal block to relay (18CR).
 - Check continuity. Replace if defective.
- 10. Loose or broken wire #18A from relay (18CR) to small pump dump valve (2H18A).
 - Check continuity. Replace if defective.
- 11. Loose or broken wire #02 from small pump dump valve (2H18A) to base terminal block.
 - Check continuity. Replace if defective.
- 12. Defective small pump dump valve solenoid (2H18A).
 - Check solenoid. Replace if defective.

4.1-33. HI/LOW Range Speed Inoperative

1. Loose or broken wire #12A from Joystick enable relay (12BCR) to LOW/HIGH range switch (S29).
-Check continuity. Replace if defective.
2. Defective LOW/HIGH range switch (S29).
-Check switch. Replace if defective.
3. Loose or broken wire #20B from LOW/HIGH range switch (S29) to LOW/HIGH torque switch (S41).
-Check continuity. Replace if defective.
4. Defective LOW/HIGH torque switch (S41).
-Check switch. Replace if defective.
5. Loose or broken wire #20 from high/low torque switch (S41) to relay (20CR).
-Check continuity. Replace if defective.
6. Defective relay (20CR).
-Check relay. Replace if defective.
7. Loose or broken wire #02 from relay (20CR) to base terminal block.
-Check continuity. Replace if defective.
8. Loose or broken wire #04 from base terminal block to relay (35CR).
-Check continuity. Replace if defective.
9. Defective relay (35CR).
-Check relay. Replace if defective.
10. Loose or broken wire #44 from relay (35CR) to relay (20CR).
-Check continuity. Replace if defective.
11. Loose or broken wire #20A from relay (20CR) to base terminal block.
-Check continuity. Replace if defective.
12. Loose or broken wire #20A from base terminal block to series parallel valve coil (3H20A).
-Check continuity. Replace if defective.
13. Defective series/parallel valve coil (3H20A).
-Check coil. Replace if defective.
14. Loose or broken wire #02 from series/parallel valve coil (3H20A) to base terminal block.
-Check continuity. Replace if defective.

4.1-34. Up Circuit Inoperative From Platform Or Base (Machines Without Outriggers)

1. LIFT/OFF/DRIVE switch (S3) in drive position or defective.
-Select lift position. Check switch. Replace if defective.
2. Loose or broken wire #09 from OFF/LIFT/DRIVE switch (S3) to lift enable switch (S9).
-Check continuity. Replace if defective.
3. Defective lift enable switch (S9).
-Check switch. Replace if defective.
4. Loose or broken wire #9A from lift enable switch (S9) to UP/OFF/DOWN switch (S5).
-Check continuity. Replace if defective.
5. Defective UP/OFF/DOWN switch (S5).
-Check switch. Replace if defective.
6. Loose or broken wire #14 from UP/OFF/DOWN switch (S5) to diode (D14). (CE Only)
-Check continuity. Replace if defective.
7. Diode (D14) open. (CE Only)
-Check diode. Replace if defective.
8. Loose or broken wire #14 from diode (D14) to base terminal block. (CE Only)
-Check continuity. Replace if defective.
9. Loose or broken wire #14 from base terminal block to relay (14CR).
-Check continuity. Replace if defective.
10. Loose or broken wire #02 from relay (14CR) to base terminal block.

-Check continuity. Replace if defective.

11. Defective relay (14CR).

-Check relay. Replace if defective.

12. Loose or broken wire #10A from terminal block (TB1) to terminal block (TB2).

-Check continuity. Replace if defective.

13. Loose or broken jumper wire from #10A to #36A on terminal block (TB2).

-Check continuity. Replace if defective.

14. Loose or broken wire #36A from terminal block (TB2) to end of stroke limit switch (LS4).

-Check continuity. Replace if defective.

15. Defective end of stroke limit switch (LS4).

-Check switch. Replace if defective.

16. Loose or broken wire #36B from end of stroke limit switch (LS4) to terminal block (TB2).

-Check continuity. Replace if defective.

17. Loose or broken wire #36B from terminal block (TB2) to relay (14CR).

-Check continuity. Replace if defective.

18. Loose or broken wire #14A from relay (14CR) to relay (28CR).

-Check continuity. Replace if defective.

19. Loose or broken wire #14B from relay (28CR) to base terminal block.

-Check continuity. Replace if defective.

20. Loose or broken wire #14B from base terminal block to lift valve solenoid (2H14B).

-Check continuity. Replace if defective.

21. Loose or broken wire #02 from lift valve solenoid (2H14B) to base terminal block.

-Check continuity. Replace if defective.

22. Defective lift valve solenoid (2H14B).

-Check solenoid. Replace if defective.

4.1-35. Up Circuit Inoperative From Base

1. Loose or broken wire #10A from base terminal block to base up switch (S16)

-Check continuity. Replace if defective.

2. Loose or broken wire #14 from base up switch (S16) to base terminal block.

-Check continuity. Replace if defective.

3. Defective base up switch (S16).

-Check switch. Replace if defective.

4.1-36. Up Circuit Inoperative From Base (Base Control Box Option)

1. Loose or broken wire #10E from base terminal block to UP/OFF/DOWN switch (S2)

-Check continuity. Replace if defective.

2. Loose or broken wire #14E from UP/OFF/DOWN switch (S2) to base terminal block.

-Check continuity. Replace if defective.

3. Defective UP/OFF/DOWN switch (S2).

-Check switch. Replace if defective.

4. Open diode (D14E-1 or D10E).

-Check diode. Replace if defective.

4.1-37. Platform Will Not Lift From Platform Or Base Controls With Outriggers Retracted (Lift Operates Correctly With Outriggers Extended)

1. Outriggers not fully retracted.

-Fully retract outrigger cylinders.

2. Loose or broken wire #1 from terminal block (TB2) to pin #7 on connector (CN14) at the outrigger board.

-Check continuity. Replace if defective.

3. Loose or broken wire #1 from outrigger board to outrigger limit switch (LS64).

- Check continuity. Replace if defective.
- 4. Defective outrigger limit switch (LS64).
-Check switch. Replace if defective.
- 5. Loose or broken wire #64 from outrigger limit switch (LS64) to outrigger board.
-Check continuity. Replace if defective.
- 6. Loose or broken wire #64 from outrigger board to outrigger limit switch (LS63).
-Check continuity. Replace if defective.
- 7. Defective outrigger limit switch (LS63).
-Check continuity. Replace if defective.
- 8. Loose or broken wire #63 from outrigger limit switch (LS63) to outrigger board.
-Check continuity. Replace if defective.
- 9. Loose or broken wire #63 from outrigger board to outrigger limit switch (LS62).
-Check continuity. Replace if defective.
- 10. Defective Limit Switch (LS62).
-Check switch. Replace if defective.
- 11. Loose or broken wire #62 from outrigger limit switch (LS62) to outrigger board.
-Check continuity. Replace if defective.
- 12. Loose or broken wire #62 from outrigger board to outrigger limit switch (LS61).
-Check continuity. Replace if defective.
- 13. Defective outrigger limit switch (LS61).
-Check switch. Replace if defective.
- 14. Loose or broken wire #61 from outrigger limit switch (LS61) to outrigger board .
-Check continuity. Replace if defective.
- 15. Open diode (D36) on outrigger board.
-Check diode. Replace if defective.

4.1-38. Platform Will Not Lift From Platform Or Base Controls With Outriggers Extended

- 1. Outriggers not extended enough.
-Extend outriggers to take weight off tires (Refer to operator section).
- 2. Loose or broken wire #10A from terminal block (TB2) to pin #4 on connector (CN14) at the outrigger board.
-Check continuity. Replace if defective.
- 3. Loose or broken wire #10A from outrigger board to outrigger limit switch (LS68).
-Check continuity. Replace if defective.
- 4. Defective outrigger limit switch (LS68).
-Check switch. Replace if defective.
- 5. Loose or broken wire #68A from outrigger limit switch (LS68) to outrigger control module at pin P2-1.
-Check continuity. Replace if defective.
- 6. Loose or broken wire #10A from outrigger board to outrigger limit switch (LS67).
-Check continuity. Replace if defective.
- 7. Defective outrigger limit switch (LS67).
-Check switch. Replace if defective.
- 8. Loose or broken wire #67A from outrigger limit switch (LS67) to outrigger control module at pin P2-2.
-Check continuity. Replace if defective.
- 9. Loose or broken wire #10A from outrigger board to outrigger limit switch (LS66).
-Check continuity. Replace if defective.
- 10. Defective outrigger limit switch (LS66).
-Check switch. Replace if defective.
- 11. Loose or broken wire #66A from outrigger limit switch (LS66) to outrigger control module at pin P2-3.
-Check continuity. Replace if defective.
- 12. Loose or broken wire #10A from outrigger board to outrigger limit switch (LS65).
-Check continuity. Replace if defective.
- 13. Defective outrigger limit switch (LS65).
-Check switch. Replace if defective.

14. Loose or broken wire #65A from outrigger limit switch (LS65) to outrigger control module at pin P2-4.
-Check continuity. Replace if defective.
15. Check for power on wire #65 at outrigger control module at pin P2-8.
-If no voltage present, proceed to Outrigger Control Module Troubleshooting.
16. Loose or broken wire #65 from outrigger control module at pin P2-8 to outrigger board CN.
-Check continuity. Replace if defective.
17. Defective lift enable relay (65CR)
-Check relay. Replace if defective.
18. Defective lift disable relay (17BCR)
-Check relay. Replace if defective.
19. Loose or broken wire #36A from pin #10 on connector (CN14) at the outrigger board to terminal block (TB2).
-Check continuity. Replace if defective.
20. Loose or broken wire #36A from terminal block (TB2) to end of stroke limit switch (LS4).
-Check continuity. Replace if defective.
21. Defective end of stroke limit switch (LS4).
-Check switch. Replace if defective.
22. Loose or broken wire #36B from end of stroke limit switch (LS4) to terminal block (TB2).
-Check continuity. Replace if defective.
23. Loose or broken wire #36B from terminal block (TB2) relay (14CR).
-Check continuity. Replace if defective.
24. Defective relay 14CR.
-Check relay. Replace if defective.
25. Loose or broken wire #14A from relay (14CR) to relay (28CR).
-Check continuity. Replace if defective.
26. Loose or broken wire #14B from relay (28CR) to base terminal block.
-Check continuity. Replace if defective.
27. Loose or broken wire #14B from base terminal block to lift valve solenoid (2H14B).
-Check continuity. Replace if defective.
28. Loose or broken wire #02 from lift valve solenoid (2H14B) to base terminal block.
-Check continuity. Replace if defective.
29. Defective lift valve solenoid (2H14B).
-Check solenoid. Replace if defective.

4.1-39. Down Circuit Inoperative From Platform Or Base

1. Lift/off/drive switch (S3) in drive position or defective.
-Select lift position. Check switch. Replace if defective.
2. Loose or broken wire #09 from OFF/LIFT/DRIVE switch (S3) to lift enable switch (S9).
-Check continuity. Replace if defective.
3. Defective lift enable switch (S9).
-Check switch. Replace if defective.
4. Loose or broken wire #13 from UP/DOWN switch (S5) to diode (D13). (CE only)
-Check continuity. Replace if defective.
5. Diode (D13) Open. (CE only)
-Check diode. Replace if defective.
6. Loose or broken wire #13 from diode (D13) to base terminal block. (CE only)
-Check continuity. Replace if defective.
7. Loose or broken wire #13 from UP/DOWN switch (S5) to control box terminal block.
-Check continuity. Replace if defective.
8. Loose or broken wire #13 from control box terminal block to base terminal block.
-Check continuity. Replace if defective.

9. Loose or broken wire #13 from base terminal block to relay (13CR).
-Check continuity. Replace if defective.
10. Loose or broken wire #02 from relay (13CR) to base terminal block.
-Check continuity. Replace if defective.
11. Defective relay (13CR).
-Check relay. Replace if defective.
12. Loose or broken wire #10A from base terminal block to relay (13CR).
-Check continuity. Replace if defective.
13. Loose or broken wire #13A from relay (13CR) to base terminal block.
-Check continuity. Replace if defective.
14. Loose or broken wire #13A from base terminal block to holding valve solenoid (2H13B-1) or (2H13B-2).
-Check continuity. Replace if defective.
15. Loose or broken wire #02 from holding valve solenoid (2H13A-1) or (2H13A-2) to base terminal block.
-Check continuity. Replace if defective.
16. Defective holding valve solenoid (2H13A-1) or (2H13A-2).
-Check solenoid. Replace if defective.
17. Loose or broken wire #13A from base terminal block to lowering valve solenoid (2H13A).
-Check continuity. Replace if defective.
18. Loose or broken wire #02 from lowering valve solenoid (2H13A) to base terminal block.
-Check continuity. Replace if defective.
19. Defective lowering valve solenoid (2H13A).
-Check solenoid. Replace if defective.
20. See Overload for additional information (CE only).

4.1-40. Down Circuit Inoperative From Base

1. Loose or broken wire #05 from base terminal block to base down switch (S17).
-Check continuity. Replace if defective.
2. Loose or broken wire #13 from base down switch (S17) to base terminal block.
-Check continuity. Replace if defective.
3. Defective base down switch (S17).
-Check switch. Replace if defective.

4.1-41. Down Circuit Inoperative From Base (Base Control Box Option)

1. Loose or broken wire #10E from base key switch (S10) to UP/OFF/DOWN switch (S2).
-Check continuity. Replace if defective.
2. Loose or broken wire #13D from UP/OFF/DOWN switch (S2) to base terminal block.
-Check continuity. Replace if defective.
3. Defective base UP/OFF/DOWN switch (S2).
-Check switch. Replace if defective.

4.1-42. Powered Extension Deck Inoperative

1. Loose or broken battery cable from main power disconnect switch (S1) to 100 Amp. fuse (F2).
-Check continuity. Replace if defective.
2. Open 100 Amp. fuse (F2).
-Check fuse. Replace if open.
3. Loose or broken battery cable #103A from fuse (F2) to contactor (9CR1).
-Check continuity. Replace if defective.
4. Defective contactor (9CR1).
-Check contactor. Replace if defective.

5. Loose or broken battery cable #103B from contactor (9CR1) to motor contactor (99CR).
-Check continuity. Replace if defective.
6. Defective motor contactor (99CR).
-Check contactor. Replace if defective.
7. Loose or broken wire #103B from battery cable #103B to fuse (F5).
-Check continuity. Replace if defective.
8. Defective fuse (F5).
-Check fuse. Replace if defective.
9. Loose or broken wire #103C from fuse (F5) to powered platform enable switch (S34).
-Check continuity. Replace if defective.
10. Loose or broken wire #103D from enable switch (S34) to platform extend retract switch (S11).
-Check continuity. Replace if defective.
11. Defective platform extend/retract switch (S11).
-Check switch. Replace if defective.
12. Defective platform enable switch (S34).
-Check switch. Replace if defective.
13. Loose or broken battery cable #00 from platform power unit (DCM1) to battery (B1).
-Check continuity. Replace if defective.
14. Defective platform power unit (DCM1).
-Check power unit. Repair or replace if defective.

4.1-43. Powered Extension Deck Will Not Extend

1. Defective platform extend/retract switch (S11).
-Check switch. Replace if defective.
2. Loose or broken wire #26 from platform extend/retract switch (S11) to platform extend valve coil (4H26).
-Check continuity. Replace if defective.
3. Diode (D26) open.
-Check diode. Replace if defective.
4. Defective platform extend valve coil (4H26).
-Check coil. Replace if defective.
5. Loose or broken wire #00 from platform extend valve coil (4H26) to battery cable #00.
-Check continuity. Replace if defective.

4.1-44. Powered Extension Deck Will Not Retract

1. Defective platform extend/retract switch (S11).
-Check switch. Replace if defective.
2. Loose or broken wire #27 from platform extend/retract switch (S11) to platform retract valve coil (4H27).
-Check continuity. Replace if defective.
3. Diode (D27) open.
-Check diode. Replace if defective.
4. Defective platform retract valve coil (4H27).
-Check coil. Replace if defective.
5. Loose or broken wire #00 from platform retract valve coil (4H27) to battery cable #00.
-Check continuity. Replace if defective.

4.1-45. Hydraulic Generator Inoperative

1. Key select switch (S3) in drive position.
-Turn switch to lift position.

2. Loose or broken wire #9 from base terminal block (TB1) to generator relay (86BCR).
-Check continuity. Replace if defective.
3. Loose or broken wire #9 from generator relay (86BCR) to generator Switch (S12)
-Check continuity. Replace if defective.
4. Defective generator switch (S12).
-Check switch. Replace if defective.
5. Loose or broken wire #85 from generator Switch (S12) to generator relay (86ACR).
-Check continuity. Replace if defective.
6. Loose or broken wire #85 from generator relay (86ACR) to generator relay (86BCR).
-Check continuity. Replace if defective.
7. Loose or broken wire #86B from generator relay (86ACR) to generator relay (86BCR).
-Check continuity. Replace if defective.
8. Defective relay (86ACR).
-Check relay. Replace if defective.
9. Defective relay (86BCR).
-Check relay. Replace if defective.
10. Open diode (D86B-1).
-Check diode. Replace if defective.
11. Open diode (D2C).
-Check diode. Replace if defective.
12. Loose or broken wire #17 from diodes (D86B-1) to relay (17CR)
-Check continuity. Replace if defective.
13. Loose or broken wire #2A from diodes (D2C) to relay (10BCR-2)
-Check continuity. Replace if defective.
14. Loose or broken wire #85A from circuit breaker (CB4) to relay (86BCR)
-Check continuity. Replace if defective.
15. Tripped or defective circuit breaker (CB4)
-Reset circuit breaker. Replace if defective.
16. Loose or broken wire #3 from circuit breaker (CB4) to circuit breaker (CB1)
-Check continuity. Replace if defective.
17. Loose or broken wire #86C from relay (86BCR) to generator valve coil (2H-86C)
-Check continuity. Replace if defective.
18. Loose or broken wire #02 from base terminal block to generator valve coil (2H-86C)
-Check continuity. Replace if defective.
19. Defective generator valve coil (2H86C).
-Check coil. Replace if defective.

4.1-46. Generator Will Not Shut Off From Generator Switch

1. Defective generator switch (S12).
-Check switch. Replace if defective.
2. Loose or broken wire #86 from generator Switch (S12) to diode (D86)
-Check continuity. Replace if defective.
3. Open diode (D86).
-Check diode. Replace if defective.
4. Defective relay (86ACR).
-Check relay. Replace if defective.
5. Loose or broken wire #02 from base terminal block to relay (86ACR)
-Check continuity. Replace if defective.

4.1-47. All Outriggers Inoperative (Auto Level and Manual)**WARNING**

Scissors lift must be below high speed limit switch for outriggers to function.

NOTE

For the outriggers to function the upper control box must be in the lift position and the scissor stack stowed or fully retracted.

1. No power on wire #44 at relay (35CR).
-If no power is present ensure there is power on wire #35 and relay (35CR) operates correctly.
2. Loose or broken wire #44 from relay (35CR) to terminal block (TB2).
-Check for continuity. Replace if defective.
3. Loose or broken wire #44 from terminal block (TB2) to pin #6 on connector (CN14) on outrigger board.
-Check for continuity. Replace if defective.
4. No power at wire #9 at pin #5 on connector (CN14) on outrigger board.
-If no power is present check for continuity on wire #9 back to the terminal block (TB2) or on wire #9 back to the main terminal block (TB1). Replace if defective.
5. Defective relay (9CR2) or (9CR3) on outrigger board.
-Check relays. Replace if defective.
6. Open diode (D17B) on outrigger board.
-Check diode. Replace if defective.
7. Loose or broken wire #17 from pin #2 on connector (CN14) on outrigger board to terminal block (TB2).
-Check for continuity. Replace if defective.
8. Loose or broken wire #17 from terminal block (TB2) to relay (17CR).
-Check for continuity. Replace if defective.
9. Loose or broken wire #17B or wire #02 from pin #1 (17B) or pin #2 (02) on connector (CN21) on outrigger board to outrigger holding valve coil (2H17B).
-Check for continuity. Replace if defective.
10. Defective outrigger holding valve coil (2H17B).
-Check coil. Replace if defective.

4.1-48. All Outriggers Inoperative (Auto Level and Manual from Platform Controls)

1. Loose or broken wire #35C from pin #1 on connector (CN20) on outrigger board through outrigger cables and plugs to the outrigger enable switch (S9A) in the control box.
-Check for continuity. Replace if defective.
2. Loose or broken wire #35D from outrigger enable switch (S9A) to pin #5 on the outrigger control box plug.
-Check for continuity. Replace if defective.
3. Defective outrigger enable switch (S9A).
-Check switch. Replace if defective.

4.1-49. All Outriggers Inoperative (Base Controls Only)

1. Defective outrigger enable switch (S9B).
-Check switch. Replace if defective.

4.1-50. All Outriggers Inoperative (Auto Level Only)**A: Led Power Indicator Light at Outrigger Control Module (OCM1) Not On (Constant)**

1. Loose or broken wire #10A from pin #1 of the tilt switch connector to pin P2-12 on the outrigger control module (OCM1).
-Check for continuity. Replace if defective.

2. Loose or broken wire #10A from pin #1 of the tilt switch connector to main terminal block (TB1).
-Check for continuity. Replace if defective.
3. Loose or broken wire #02 from pin #3 of the tilt switch connector to pin P2-11 on the outrigger control module (OCM1).
-Check for continuity. Replace if defective.
4. Loose or broken wire #02 from pin #3 of the tilt switch connector to main terminal block (TB1).
-Check for continuity. Replace if defective.
5. Defective outrigger control module (OCM1).
-Replace.

4.1-51. All Outriggers Inoperative (Auto Level Only)

B: Led Power Indicator Light at Outrigger Control Module (OCM1) Flashing

Flash Code	Probable Cause	Remedy
1/1	1. Outriggers are all up and machine is tilted.	1. Level the machine.
1/2	1. Machine is elevated. 2. Loose or broken wire # 35.	1. Lower the scissor stack below high speed limit switch. 2. Check for input voltage on wire #35 at pin P2-10 of the outrigger control module (OCM1). Replace if defective.
2/2	1. At least one outrigger is not fully retracted. 2. Defective outrigger rod limit switch (LS61, LS62, LS63, LS64) or wiring. 3. Defective diode (D36) on outrigger board.	1. Fully retract all outriggers. 2. Replace defective or damaged switch(es) or wiring. 3. Check for continuity. Replace if defective.
2/1	1. Outriggers are all down and the machine is not fully level.	1. Move machine to less sloped terrain if it will not lift.
5/5	1. Power on wire #70 or #79 at power on. 2. Power on wire #70 or #79 when manually operating outriggers.	1. Check for power on wire #70 or #79 at pin P2-5 or P2-6 of the outrigger control module. Replace defective component. 2. Check for power on wire #70 or #79 while manually operating an outrigger.
5/2	1. Low or no voltage on wire #35c. 2. Loose or broken wire on #35c.	1. Check battery and charging system to ensure minimum 9 volts. 2. Check for input voltage on wire #35c at pin P4-9 of outrigger control module (OCM1).
7/1	1. Excessive vibration. 2. Defective outrigger control module.	1. Outrigger control module cannot read tilt sensor. 2. Replace.
6/6	1. Outriggers are being manually controlled.	1. Indicates function activated. No repair necessary.
7/8	1. Error occurred while self diagnosing the hardware fail safe.	1. Turn off power to reset the outrigger control module. Turn power back on and see if the code has cleared. If problem persists, replace outrigger control module.
5/1	1. Low input voltage to outrigger control module.	1. Check for minimum 9 volts between wire #02 at pin P2-11 and wire #10A at pin P2-12 at outrigger control module.
7/7	1. Startup error occurred while self diagnosing.	1. Turn off power to reset the outrigger control module. Turn power back on and see if the code has cleared. If problem persists, replace outrigger control module.
7/5	1. Internal failure of OCM1.	1. Turn off power to reset the outrigger control module. Turn power back on and see if the code has cleared. If problem persists, replace outrigger control module.
7/2	1. Internal failure of OCM1.	1. Turn off power to reset the outrigger control module. Turn power back on and see if the code has cleared. If problem persists, replace outrigger control module.
8/1	1. Internal failure of OCM1.	1. Turn off power to reset the outrigger control module. Turn power back on and see if the code has cleared. If problem persists, replace outrigger control module.
8/2	1. Internal failure of OCM1.	1. Turn off power to reset the outrigger control module. Turn power back on and see if the code has cleared. If problem persists, replace outrigger control module.
8/3	1. Internal failure of OCM1.	1. Turn off power to reset the outrigger control module. Turn power back on and see if the code has cleared. If problem persists, replace outrigger control module.
8/4	1. Internal failure of OCM1.	1. Turn off power to reset the outrigger control module. Turn power back on and see if the code has cleared. If problem persists, replace outrigger control module.
8/5	1. Internal failure of OCM1.	1. Turn off power to reset the outrigger control module. Turn power back on and see if the code has cleared. If problem persists, replace outrigger control module.
7/6	1. Internal failure of OCM1.	1. Turn off power to reset the outrigger control module. Turn power back on and see if the code has cleared. If problem persists, replace outrigger control module.

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4.1-52. Left Front Outrigger Inoperative Manually

1. Defective left front outrigger switch (S20 at platform or S20A at base).
-Check switch. Replace if defective.
2. Loose or broken wire #71(up) or #75 (down) from outrigger control box to pin #6 (up) or pin #7 (down) on connector (CN20) at outrigger board.
-Check continuity. Replace if defective.
3. Open diode (D71) up or (D75) down on outrigger board.
-Check diode. Replace if defective.
4. Loose or broken wire #71(up) or #75 (down) from pin #7 (up) or pin #8 (down) on connector (CN21) at outrigger board to valve coil (4H-71) up or (4H-75) down.
-Check continuity. Replace if defective.
5. Loose or broken wire #02 from valve coil (4H-71) up or (4H-75) down to pin #2 on connector (CN21) at the outrigger board.
-Check continuity. Replace if defective.

4.1-53. Right Front Outrigger Inoperative Manually

1. Defective right front outrigger switch (S21 at platform or S21A at base).
-Check switch. Replace if defective.
2. Loose or broken wire #72(up) or #76 (down) from outrigger control box to pin #8 (up) or pin #9 (down) on connector (CN20) at outrigger board.
-Check continuity. Replace if defective.
3. Open diode (D72) up or (D76) down on outrigger board.
-Check diode. Replace if defective.
4. Loose or broken wire #72(up) or #76 (down) from pin #9 (up) or pin #10 (down) on connector (CN21) at outrigger board to valve coil (4H-72) up or (4H-76) down.
-Check continuity. Replace if defective.
5. Loose or broken wire #02 from valve coil (4H-72) up or (4H-76) down to pin #2 on connector (CN21) at the outrigger board.
-Check continuity. Replace if defective.

4.1-54. Right Rear Outriggers Inoperative Manually

1. Defective right rear outrigger switch (S22 at platform or S22A at base).
-Check switch. Replace if defective.
2. Loose or broken wire #73(up) or #77 (down) from outrigger control box to pin #3 (up) or pin #4 (down) on connector (CN20) at outrigger board.
-Check continuity. Replace if defective.
3. Open diode (D73) up or (D77) down on outrigger board.
-Check diode. Replace if defective.
4. Loose or broken wire #73(up) or #77 (down) from pin #4 (up) or pin #5 (down) on connector (CN21) at outrigger board to valve coil (4H-73) up or (4H-77) down.
-Check continuity. Replace if defective.
5. Loose or broken wire #02 from valve coil (4H-73) up or (4H-77) down to pin #2 on connector (CN21) at the outrigger board.
-Check continuity. Replace if defective.

4.1-55. Left Rear Outriggers Inoperative Manually

1. Defective left rear outrigger switch (S23 at platform) (S23A at base).
-Check switch. Replace if defective.

2. Loose or broken wire #74(up) or #78 (down) from outrigger control box to pin #5 (up) or pin #2 (down) on connector (CN20) at outrigger board.
-Check continuity. Replace if defective.
3. Open diode (D74) up or (D78) down on outrigger board.
-Check diode. Replace if defective.
4. Loose or broken wire #74(up) or #78 (down) from pin #6 (up) or pin #3 (down) on connector (CN21) at outrigger board to valve coil (4H-74) up or (4H-78) down.
-Check continuity. Replace if defective.
5. Loose or broken wire #02 from valve coil (4H-74) up or (4H-78) down to pin #2 on connector (CN21) at the outrigger board.
-Check continuity. Replace if defective.

4.1-56. Individual Outrigger Functions Inoperative (Auto Level)

1. Loose or broken wire #71- #75 (depending on function not working) at outrigger control module plug (P4) pins 1-8.
-Check connections of outrigger functions not working (refer to Section 5 for pin reference chart). Replace if defective.
2. No output from outrigger control module (OCM1) at plug (P4) pins 1-8.
-Turn off power to reset the outrigger control module. Turn power back on and retest. If problem persists, replace outrigger control module.

4.1-57. Auto Level Inoperative

1. Loose or broken wire #35D from outrigger enable switch (S9A) to auto mode outrigger switch (S24).
-Check continuity. Replace if defective.
2. Defective auto mode outrigger switch (S24).
-Check switch. Replace if defective.
3. Loose or broken wire #10A at PIN#P2-12 on outrigger control module (OCM1).
-Check for power at P2-12. If no voltage present, check continuity of wire. Replace if defective.
4. Loose or broken wire #35 at PIN#P2-10 on outrigger control module (OCM1).
-Check for power at P2-10. If no voltage present, check continuity of wire. Replace if defective.
5. Loose or broken wire #02 at PIN#P2-11 on outrigger control module (OCM1).
-Check for ground at P2-11. If no ground present, check continuity of wire. Replace if defective.
6. Loose or broken wire #70 from auto mode outrigger switch (S24) to PIN#P2-5 on outrigger control module (OCM1).
-Check continuity. Replace if defective.
7. For additional information, refer to sections 4 & 5 "Outrigger Control Module - Troubleshooting."

4.1-58. Auto All Up Inoperative (Retract)

1. Loose or broken wire #35D from outrigger enable switch (S9A) to auto mode outrigger switch (S24).
-Check continuity. Replace if defective.
2. Defective auto mode outrigger switch (S24).
-Check switch. Replace if defective.
3. Loose or broken wire #10A at PIN#P2-12 on outrigger control module (OCM1).
-Check for power at P2-12. If no voltage present, check continuity of wire. Replace if defective.
4. Loose or broken wire #35 at PIN#P2-12 on outrigger control module (OCM1).
-Check for power at P2-10. If no voltage present, check continuity of wire. Replace if defective.
5. Loose or broken wire #02 at PIN#P2-11 on outrigger control module (OCM1).
-Check for ground at P2-11. If no ground present, check continuity of wire. Replace if defective.

6. Loose or broken wire #70 from auto mode outrigger switch (S24) to PIN#P2-5 on outrigger control module (OCM1).
[-Check continuity. Replace if defective.](#)
7. For additional information, refer to section 5 "Outrigger Control Module."

4.1-59. EMS Troubleshooting and Flash Codes

Trouble	Probable Cause	Remedy
Engine cranks but will not start. No spark.	1. Loose or broken wire # 2002 from relay (10BCR) to ignition coil. 2. Check ignition system components.	1. Check for continuity. Replace if defective. 2. Replace as required.
No fuel at injector.	1. Fuel level low. 2. Loose or broken wire #56 from white ECU connector at pin #4 to fuel selector switch (S33). 3. Loose or broken wire #11 from fuel selector switch (S33) to fuel pump (gas only) or wire #50 from fuel selector switch (S33) to propane lock valve (SP-50) (propane only). 4. Loose or broken wire #00 from chassis ground to fuel pump (gas only) or wire # 00 from chassis ground to propane lock valve. 5. Defective fuel pump (gas only) or propane lock valve (SP-50) (propane only). 6. Loose or broken wire # 1006 from ignition coil to the white ECU connector at pin #19. 7. Loose or broken wire #1002 from white ECU connector at pin #15 to the gas injector at pin A (gas only) or to the propane injector at pin A (propane only). 8. Loose or broken wire #2001 from white ECU connector at pin #3 to the gas injector at pin B (gas only) or wire # 1001 from the white ECU connector at pin #2 to the propane injector at pin B (propane only). 9. Loose or broken wire #1008 from white ECU connector at pin #5 to the throttle actuator at pin A. 10. Loose or broken wire #00 from chassis ground to the throttle actuator . 11. Defective throttle actuator or fuel selector. 12. Defective ECU.	1. Check fuel level. 2. Check for continuity. Replace if defective. 3. Check for continuity. Replace if defective. 4. Check for continuity. Replace if defective. 5. Check fuel pump (gas only) or propane lock valve (propane only). Replace if defective. 6. Check for continuity. Replace if defective. 7. Check for continuity. Replace if defective. 8. Check for continuity. Replace if defective. 9. Check for continuity. Replace if defective. 10. Check for continuity. Replace if defective. 11. Refer to Section 5 of this manual. 12. Once all above tests have been performed, suspect defective ECU.

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Diagnostic Flash Codes

The check engine light is located near the base start switch at the front of the machine. Below you will find the operation of the light.

Note: It is normal for a 12 flash code at power up, but not started.

Trouble Code Operation

When the engine check light is on continuous there will be trouble codes stored to retrieve.

To retrieve codes:

1. With the engine off, turn the key to the on position.
2. The engine check light will flash once pause and flash twice to indicate a code 12. Code 12 indicates that the fault system is functioning. Code 12 will be flashed 3 times with a double pause between each.
3. The next trouble code will be displayed in the order of occurrence. It will also be flashed three times with a double pause between each.
4. After all trouble codes have been flashed three times, the codes will repeat starting with code 12.

To clear the codes:

1. After all of the codes have been retrieved and conditions repaired, start the engine. With the engine running, momentarily ground the self learn wire #203. You will hear the engine hesitate as the ground is made and the engine check light will go out.
2. To verify the problem has been corrected, shut off the engine. Turn power on and observe flash code.

Flash Code	Trouble	Probable Cause	Remedy
None	Engine shuts down after 5 seconds. Oil pressure switch indicates low oil pressure for one complete second.	1. Engine oil level low. 2. Defective oil pressure switch OPS1.	1. Check oil level. Fill if necessary. 2. Disconnect wire at oil pressure switch. If engine runs normally, replace oil pressure switch.
None	Engine RPM limited to 950 RPM for 60 seconds then engine shuts down (detects coolant temperature above 239°F).	1. Low coolant level. 2. Blocked radiator. 3. Defective thermostat.	1. Check and fill if necessary. 2. Check for debris or blocked cooling fins. Clean and free debris. 3. Ensure thermostat is working correctly. Replace if defective.
None	Engine RPM limited to 950 RPM for 60 seconds then engine shuts down (detects coolant temperature above 266°F).	1. Coolant temperature sensor short circuit. 2. Wire #105 shorted to ground.	1. Check resistance of sensor. Refer to Section 5 of this manual. 2. Check the condition of the wire from pin #1 of the black ECU connector to the coolant temperature sensor.
None		1. Coolant temperature sensor open circuit. 2. Loose or broken wire #1100 from pin #11 of the black ECU plug to the coolant temperature sensor TPS1. 3. Loose or broken wire #105 from pin #1 of the black ECU connector to the coolant temperature sensor TPS1.	1. Check resistance of sensor. Refer to Section 5 of this manual. 2. Check for continuity. Replace if defective. 3. Check for continuity. Replace if defective.

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Flash Code	Trouble	Probable Cause	Remedy
23	Note: Always be sure that proper air filter maintenance has been performed and that the air filter and air intake are free of debris.	1. Air intake temperature sensor open circuit. 2. Loose or broken wire #1100 from pin #11 of the black ECU connector to the air intake temperature sensor TPS2. 3. Loose or broken wire #106 from pin #9 of the black ECU connector to the air intake temperature sensor TPS2.	1. Check resistance of sensor. Refer to Section 5 of this manual. 2. Check for continuity. Replace if defective. 3. Check for continuity. Replace if defective.
24	Note: Always be sure that proper air filter maintenance has been performed and that the air filter and air intake are free of debris.	1. Air intake temperature sensor short circuit. 2. Wire #106 shorted to ground.	1. Check resistance of sensor. Refer to Section 5 of this manual. 2. Check the condition of the wire from pin #9 of the black ECU connector to the air temperature sensor.
33		1. Map sensor indicates high voltage on wire #105 at the map sensor (voltage above 4.98 volts).	a. Check all wire connections at map sensor. b. Check voltage signals for map sensor. Refer to Section 5 of this manual. c. If voltages and connections are OK, replace map sensor.
34		1. Map sensor detects short to ground.	a. Check all wire connections at map sensor. b. Check voltage signals for map sensor. Refer to Section 5 of this manual. c. If voltages and connections are OK, replace map sensor.
44		1. Oxygen sensor detects lean condition.	1. Check for correct fuel pressure at the throttle body (gas-14psi, propane-15psi). Incorrect pressure may require replacing of the following components: a. Fuel filter b. Fuel pump c. Fuel pressure regulator d. Fuel lines e. Oxygen sensor. Refer to Section 5 of this manual. 2. Clean injector. If cleaning does not clear fault, replace injector. 3. Oxygen sensor out of range. Refer to Section 5 of this manual.
45		1. Oxygen sensor detects rich condition.	1. Check for correct fuel pressure at the throttle body (gas-14psi, propane-15psi). 2. Check injector o-rings to ensure proper position. 3. Clean injector. If cleaning does not clear fault, replace injector.

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4.2-1. All Functions Inoperative

1. Hydraulic oil level low.
-Refill tank to proper level.
2. Defective pump (P1).
-Check pump. Repair or replace if defective.
3. Broken engine to pump coupler.
-Check coupler. Replace if defective.
4. Relief valve (R1) open
-Check valve. Replace if defective.

4.2-2. Steering Inoperative

1. Stuck or defective brake feed valve (2H30A-2).
-Check valve. Repair or replace if defective.
2. Stuck or defective steer right valve (4H23A) or steer left valve (4H24A).
-Check valves. Replace if defective.
3. Steer cylinder (C7) damaged or bypassing internally.
-Check cylinder. Repair or replace if defective.

4.2-3. Lift, Steer And First Drive Speed Inoperative

1. Small pump dump valve (2H18A) stuck open.
-Check valve. Repair or replace if defective.
2. Worn or defective small pump section of pump (P1).
-Check pump. Repair or replace if defective.
3. Check valve (CV1) or (CV2) stuck.
-Check valves. Clean or replace if defective.

4.2-4. Second Drive Speed Inoperative

1. Large pump dump valve (2H17A) stuck open.
-Check valve. Repair or replace if defective.
2. Worn or defective large pump section of pump (P1).
-Check pump. Repair or replace if defective.
3. Check valve (CV1) or (CV2) stuck.
-Check valves. Clean or replace if defective.

4.2-5. Drive Inoperative

1. Stuck or defective drive reverse valve (4H15B) or drive forward valve (4H16B).
-Check valves. Repair or replace if defective.
2. Defective motion control valve (MC1).
-Check valve. Repair or replace if defective.
3. Missing or defective check balls in series/parallel valve manifold (3H20A).
-Repair or replace balls. Refer to Section 5 for proper location.
4. Stuck or defective main series/parallel valve spool (V3) in drive motor.
-Check valve. Repair or replace if defective.
5. Defective drive motor (M1).
-Check motor. Repair or replace if defective.
6. Free wheeling valve (2H30A) stuck.
-Check valve. Repair or replace if defective.

7. Cushion cylinder (C8) bypassing internally.
-Check cylinder. Repair or replace if defective.

4.2-6. Reverse Drive Inoperative

1. Stuck or defective drive valve (4H15B).
-Check valve. Repair or replace if defective.
2. Stuck or defective check valve in motion control assembly (MC1).
-Check valves. Clean or replace if defective.

4.2-7. Forward Drive Inoperative

1. Stuck or defective drive valve (4H16B).
-Check valve. Repair or replace if defective.
2. Stuck or defective check valve in motion control assembly (MC1).
-Check valves. Clean or replace if defective.

4.2-8. Brakes Will Not Release

1. Stuck or defective brake feed valve (2H30A-2).
-Check valve. Repair or replace if defective.
2. Stuck or defective brake dump valve (2H30A-1).
-Check valve. Repair or replace if defective.
3. Stuck or defective brake valve (2H25).
-Check valve. Repair or replace if defective.
4. Stuck or defective auto reset valve (V6).
-Check valve. Repair or replace if defective.
5. Defective disc brake cylinder (C5)
-Check cylinder. Repair or replace if defective.

4.2-9. Brakes Will Not Release (Internal Brake)

1. Bad o-rings internal to brake. (If release piston will not hold pressure, brake will not release.)
-Check for hydraulic oil in axle. Replace o-rings if defective.
2. Discs frozen. (These brakes are designed for only limited dynamic braking. A severe emergency stop or prolonged reduced release pressure operation may result in this type of damage.)
-Check for abnormal wear. Replace disc stack if defective.

4.2-10. Brake Slips

1. Excessive pressure in hydraulic system. (If there is back pressure in the actuation line of the brake, holding torque will be reduced.)
-Check filters, hose size, restrictions in other hydraulic components.
2. Oil in brake if designed for dry use. (Wet linings generate 67% of the dry torque rating. If the brake has oil in it, check the type of oil hydraulic or gearbox. i. Gearbox oil ii. Hydraulic oil)
-Replace oil seal in brake. Check motor seal. Check piston seals.

NOTE

Internal components will need to be inspected, cleaned and replaced as required.

3. Disc plates worn. (The thickness of the disc stack sets the torque level. A thin stack reduces torque).
-Check brake's holding torque is sufficient.
i) Make sure the machine is parked on level ground.

- ii) Locate the brake feed valve (2H30A-2) on the main manifold. Disconnect the electrical connectors from this valve. This will prevent the hydraulic system from releasing the brake.
- iii) With the engine running, machine in drive mode, engine on high idle, high torque selected and low speed range selected, hold the enable switch on the joystick and push the joystick forward as if you were to drive forward. This provides torque from the drive motor to the unreleased brake.
- iv) If the brake slips and the machine starts to move in this condition, either the brake plates are worn or the springs have broken. Both the springs and the brake plates must be replaced to return the brake to its original holding torque.

4.2-11. Brake Drags Or Runs Hot

1. Low brake pressure
-Place pressure gauge in brake line. Brakes use system pressure. (Minimum 335 psi required)
2. Bearing failure (If the bearing should fail, a large amount of drag can be generated)
-Replace bearing

4.2-12. Up Circuit Inoperative

1. Stuck or defective lift valve (2H14B).
-Check valve. Repair or replace if defective.
2. Stuck check valve (CV3).
-Check valve. Replace if defective.
3. Misadjusted or defective lift relief valve (R2).
-Adjust valve. Replace if defective.
4. Stuck or defective lowering valve (2H13A).
-Check valve. Repair or replace if defective.
5. Stuck or defective manual lowering valve (V1).
-Check valve. Repair or replace if defective.
6. Open or defective brake feed valve (2H30A-2).
-Check valve. Repair or replace if defective.
7. Open manual override on holding valve (2H13A-1) or (2H13A-2).
-Depress and turn manual override clockwise to close. Replace if defective.
8. Stuck holding valve (2H13A-1) or (2H13A-2)
-Check valves. Repair or replace if defective.

4.2-13. Down Circuit Inoperative

1. Stuck or defective lowering valve (2H13A).
-Check valve. Repair or replace if defective.
2. Stuck holding valve (2H13A1) or (2H13A2).
-Check valves. Repair or replace if defective.
3. Plugged lowering orifice (O1).
-Clean or replace orifice.

4.2-14. Powered Extension Deck Inoperative

1. Defective powered extension pump (P3).
-Check pump. Repair or replace if defective.
2. Misadjusted or defective relief valve (R5).
-Adjust valve. Replace if defective.
3. Stuck or defective deck extend valve (4H26) or retract valve (4H27).
-Check valves. Repair or replace if defective.

4. Defective powered extension cylinder (C3).
-Check cylinder. Repair or replace if defective.

4.2-15. Hydraulic Generator Inoperative

1. Stuck or defective hydraulic generator valve (2H86).
-Check valve. Repair or replace if defective.
2. Misadjusted or defective flow control valve (FC1).
-Adjust valve. Replace if defective.
3. Stuck or defective large pump dump valve (2H17A).
-Check valve. Repair or replace if defective.
4. Defective hydraulic generator hydraulic motor (GM1).
-Check motor. Repair or replace if defective.

4.2-16. All Outriggers Inoperative

1. Stuck or defective outrigger holding valve (2H-17B).
-Check valve. Repair or replace if defective.

4.2-17. Left Front Outriggers Inoperative

1. Stuck or defective retract valve (4H-71) or extend valve (4H-75).
-Clean valve. Replace if defective.
2. Stuck or defective check valve (CV7).
-Check valve. Replace if defective.
3. Bypassing outrigger cylinder (C9).
-Repack cylinder. Replace if defective.

4.2-18. Right Front Outriggers Inoperative

1. Stuck or defective Retract Valve (4H-72) or Extend Valve (4H-76).
-Clean valve. Replace if defective.
2. Stuck or defective Check Valve (CV8).
-Check valve. Replace if defective.
3. Bypassing Outrigger Cylinder (C10).
-Repack cylinder. Replace if defective

4.2-19. Right Rear Outriggers Inoperative

1. Stuck or defective Retract Valve (4H-73) or Extend Valve (4H-77).
-Clean valve. Replace if defective.
2. Stuck or defective Check Valve (CV9).
-Check valve. Replace if defective.
3. Bypassing Outrigger Cylinder (C11).
-Repack cylinder. Replace if defective

4.2-20. Left Rear Outriggers Inoperative

1. Stuck or defective retract valve (4H-74) or extend valve (4H-78).
-Clean valve. Replace if defective.
2. Stuck or defective check valve (CV10).
-Check valve. Replace if defective.

3. Bypassing outrigger cylinder (C12).
-Repack cylinder. Replace if defective

4.2-21. Outriggers Drift In

1. Defective check valve left front (CV7), right front (CV8), right rear (CV9) or left rear (CV10)
-Clean valve. Replace if defective.
2. Outriggers cylinder bypassing left front (C9), right front (C10), right rear (C11) or left rear (C12).
-Repack cylinder. Replace if defective