Troubleshooting Manual

Models
T350
T500J

3121203
September 7, 2005



JLG®

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1.5 BATTERY CHARGER NOT FUNCTIONING PROPERLY

Delta-Q Charger Normal Operation Description

Stage	Description
Startup	The charger will automatically turn on and go through a short self-test with the LED indicator alternating red-green for two seconds. If the charger is connected to a battery pack, a trickle current will be applied until a minimum voltage is reached. If the charger is used in an off-board application and the charger is waiting to be plugged into a battery pack, the charging algorithm number will be displayed for 11 seconds before ultimately displaying an under-voltage fault (fault disappears when plugged into battery pack). Typically lasts from 5 seconds to 2 ½ minutes.
Bulk	Typically, 80% of the total recharge is restored during the bulk phase where a constant 25 Amp output is being delivered. This time varies depending upon the depth of discharge.
Absorption	Output reduced to prevent sulfation build up. Time depends upon the initial level of battery charge and varies from 1hour minimum to 5 ½ hours. At completion of this phase, 90% charge has been obtained.
Finish	Delivers 6A for at least 1 hour to finish charge.

There will be a cut back in output any time the charger is below 108 VAC. ANY interruption where there is power loss causes the charger to reset. If left plugged in, the charger will restart in 30 days or when the Voltage drops

Battery Charge Level and Normal Charging Time

Number of Cycles	Battery Charge Level	Recharge time (hours)
15	75% (24.8V)	12
30	50% (24.2V)	13.1
50	20% (23.4V)	14.7
66	0% (less than 23.2V)	15

Step	Pretest Instructions	Test	Result	Corrective Action
1.5.1		Does charger go through proper LED sequencing upon start up?	Yes No	Go to step 1.5.2 Check AC power supply.
1.5.2		Is the red LED on?	Yes No	Possible Causes: 4.1.1, 4.1.3, 4.1.4 Do some function to cause draw on the battery, then start again. Otherwise, go to step 1.5.3
1.5.3	Check the voltage on each battery. 25% - 6.12 V, 100% = 6.32 V	Do all batteries have at least 6.12V?	Yes No	Go to step 1.5.4 Possible Causes: 4.1.4
1.5.4	Using a hydrometer - Check the specific gravity in each battery cell. 25% charged is 1.155, 100% = 1.265	Is the specific gravity of all battery cells between 1.155 and 1.265?	Yes No	Possible Causes: 4.1.8 Possible Causes: 4.1.4

SECTION 2. TROUBLESHOOTING BY FAULT MESSAGES

2.1 ACCESSORY FAULT

Distress Lamp: 9 ADE Code: 6-7

An attached accessory is communicating a fault to the ground control.

Step	Pretest Instructions	Test	Result	Corrective Action
2.1.1		Is an accessory installed?	Yes	Refer to Information Supplied with Accessory
			No	Possible Causes: 4.1.2

2.2 BATTERY VOLTAGE TOO HIGH - SYSTEM SHUTDOWN

Distress Lamp: 3 ADE Code: 4-4

The system detected a battery voltage above 36 Volts for an electric powered machine.

ELECTRIC POWERED MACHINES ONLY

Functions Disabled (Electric Powered Machines Only): Lift Up, Lift Down, Swing Left, Swing Right, Telescope In, Telescope Out, Jib Up, Jib Down, Level Up, Level Down, Front Left O/R, Front Right O/R, Rear Left O/R, Rear Right O/R, Set (Extend O/R), Stow (Retract O/R), Drive

Possible Causes: 4.1.2, 4.1.3, 4.1.4

2.3 BATTERY VOLTAGE TOO HIGH - SYSTEM SHUTDOWN

Distress Lamp: 5 ADE Code: 4-4

The system detected a battery voltage above 18 Volts for an engine powered machine.

ENGINE POWERED MACHINES ONLY

Functions Disabled (Engine Powered Machines Only): Lift Up, Lift Down, Swing Left, Swing Right, Telescope In, Telescope Out, Jib Up, Jib Down, Level Up, Level Down, Front Left O/R, Front Right O/R, Rear Left O/R, Rear Right O/R, Set (Extend O/R), Stow (Retract O/R), Engine Start, Engine Throttle Pull, Engine Throttle Hold, Engine Choke Pull, Engine Choke Hold, Drive

Possible Causes: 4.1.2, 4.1.3, 4.1.4

2.4 BATTERY VOLTAGE TOO LOW - SYSTEM SHUTDOWN

Distress Lamp: 3 ADE Code: 4-4

The system detected a battery voltage below 16 Volts for an electric powered machine.

ELECTRIC POWERED MACHINES ONLY

Functions Disabled (Electric Powered Machines Only): Lift Up, Lift Down, Swing Left, Swing Right, Telescope In, Telescope Out, Jib Up, Jib Down, Level Up, Level Down, Front Left O/R, Front Right O/R, Rear Left O/R, Rear Right O/R, Set (Extend O/R), Stow (Retract O/R), Drive

Possible Causes: 4.1.2, 4.1.3, 4.1.4

2.21 DRIVE & O/R PREVENTED - PLACE BOOM ON REST

Distress Lamp: 2 ADE Code: 2-5

In Platform Mode, an attempt was made to operate Drive or Outriggers but the Boom was not detected by the Turntable position sensor at X073, or an error was detected with the sensor. When the boom is against the rest, TURNTABLE1 input, X074.3 = +B and TURNTABLE2 input, X074.4 = 0V. This could be caused by the boom not being properly stowed on the rest, an obstruction over the switch, the switch adjusted too far from the boom (should be within 0.188" of the boom), or a faulty transport limit switch or turntable position switch. If an error has been detected, the switch must be reset before drive will function.

DRIVE OPTION MACHINES ONLY

Functions Disabled (Drive Option Machines Only): Drive

See 3.5 Drive Sensor Reset

2.22 DRIVE & O/R PREVENTED - SET HAND BRAKE

Distress Lamp: 2 ADE Code: 2-5

In Platform Mode, an attempt was made to operate Drive or Outriggers but the Hand Brake was not detected by the hand brake position sensor at X072 as set (applied) or an error was detected with the sensor. If the hand brake appears to be in the proper position, examine the Hand Brake Sensor wiring and adjustment. When the hand brake is applied, BRAKE1 input, X074.5 = +B and BRAKE2 input, X074.6 = 0V.This could be caused by the brake linkage or cable not being properly adjusted, an obstruction over the switch, the switch adjusted too far from the cylinder (should be within 0.188" of the extended cylinder), or a faulty switch. If an error has been detected, the switch must be reset before drive will function.

DRIVE OPTION MACHINES ONLY

Functions Disabled (Drive Option Machines Only): Drive

See 3.5 Drive Sensor Reset

2.23 DRIVE ENABLE SOLENOID SHORT TO BATTERY

Distress Lamp: 9 ADE Code: 3-3

Drive module feedback shows that the Drive Enable Valve PWM output may be shorted to battery or the solenoid may be defective

DRIVE OPTION MACHINES ONLY

Functions Disabled (Drive Option Machines Only): Drive

Step	Pretest Instructions	Test	Result	Corrective Action
2.23.1	Run system test	Do other functions fail system test?	Yes	Possible Cause: Black ground wire broken, 4.1.1, otherwise go to step 2.23.2
			No	Go to step 2.23.2
2.23.2	Disconnect solenoid at X071and isolate wires	Rerun System Test	Analyzer Message “DRV ENABLE SHORT TO GROUND OR OPEN CIRCUIT“	Replace solenoid
			Analyzer Message “DRV ENABLE VALVE SHORT TO BATTERY“	Go to step 2.23.3
2.23.3	Remove wire Orn 55-1 from X074.11	Rerun System Test	Analyzer Message “DRV ENABLE SHORT TO GROUND OR OPEN CIRCUIT“	Wire Orn 55-1 shorted to battery. Repair or replace
			Analyzer Message “DRV ENABLE VALVE SHORT TO BATTERY“	Possible Cause: 4.1.10

2.45 EXTEND O/R SOLENOID OPEN CIRCUIT

Distress Lamp: 9 ADE Code: 3-3

Ground module feedback shows that Extend Outrigger digital output may be disconnected from the relay or the relay may be defective.

Functions Disabled: Set (Extend O/R)

Step	Pretest Instructions	Test	Result	Corrective Action
2.45.1	Run system test	Do other functions fail system test?	Yes	Possible Cause: Black ground wire broken, 4.1.1, otherwise Go to step 2.45.2
			No	Go to step 2.45.2
2.45.2	Disconnect solenoid at X086. Short X086.1.soc to X086.2.soc	Rerun System Test	Analyzer Message “EXTEND VALVE SHORT TO GROUND“	Replace solenoid and/or connector
			Analyzer Message “EXTEND VALVE OPEN CIRCUIT“	Go to step 2.45.3
2.45.3	Replace X003.13 with a jumper to X003.3	Rerun System Test	Analyzer Message “EXTEND VALVE SHORT TO GROUND“	Wire Orn/Wht 55-3-1 or Orn/Wht 55-3 broken. Repair or replace
			Analyzer Message “EXTEND VALVE OPEN CIRCUIT“	Possible Cause: 4.1.10

2.46 EXTEND O/R SOLENOID SHORT TO BATTERY

Distress Lamp: 9 ADE Code: 3-3

Ground module feedback shows that the Extend Outrigger Valve digital output may be shorted to battery or the solenoid may be defective.

Functions Disabled: Set (Extend O/R)

Step	Pretest Instructions	Test	Result	Corrective Action
2.46.1	Run system test	Do other functions fail system test?	Yes	Possible Cause: Black ground wire broken, 4.1.1, otherwise go to step 2.46.2
			No	Go to step 2.46.2
2.46.2	Disconnect solenoid at X086 and isolate wires	Rerun System Test	Analyzer Message “EXTEND VALVE OPEN CIRCUIT“	Replace solenoid
			Analyzer Message “EXTEND VALVE SHORT TO BATTERY“	Go to step 2.46.3
2.46.3	Remove wire Orn/Wht 55-3-1 from X003.13	Rerun System Test	Analyzer Message “EXTEND VALVE OPEN CIRCUIT“	Wire Orn/Wht 55-3-1 or Orn/Wht 55-3 shorted to battery. Repair or replace
			Analyzer Message “EXTEND VALVE SHORT TO BATTERY“	Possible Cause: 4.1.10

2.65 FUNCTION PROBLEM - LEVEL UP PERMANENTLY SELECTED

Distress Lamp: 1 ADE Code: 2-3

The ground level up switch was closed when the machine was powered. The switch could be accidentally held, mechanically stuck, or electrically shorted.

Functions Disabled at Ground Only: Level Up

Step	Pretest Instructions	Test	Result	Corrective Action
2.65.1		Is the switch mechanically stuck?	Yes No	Repair or replace the switch Go to step 2.65.2
2.65.2	Disconnect X034. Place key switch in ground position and pull the emergency stop switch.	Is fault "Function Problem - Level Up Permanently Selected" still present?	Yes No	Go to step 2.65.3 Possible Causes: 4.1.18
2.65.3	Remove X014.27.pin from X014. Place key switch in ground position and pull the emergency stop switch.	Is fault "Function Problem - Level Up Permanently Selected" still present?	Yes No	Go to step 2.65.4 Possible Causes: Short in Pink 25-2 wire
2.65.4	Place key switch in ground position and pull the emergency stop switch.	Measured voltage at X004.17 = Vbatt?	Yes No	Possible Causes: Short in Pink 25-2-1 wire, 4.1.10 Possible Causes: 4.1.10

2.66 FUNCTION PROBLEM - LIFT DOWN PERMANENTLY SELECTED

Distress Lamp: 1 ADE Code: 2-3

The ground lift down switch was closed when the machine was powered. The switch could be accidentally held, mechanically stuck, or electrically shorted.

Functions Disabled at Ground Only: Lift Down

Step	Pretest Instructions	Test	Result	Corrective Action
2.66.1		Is the switch mechanically stuck?	Yes No	Repair or replace the switch Go to step 2.66.2
2.66.2	Disconnect X031. Place key switch in ground position and pull the emergency stop switch.	Is fault "Function Problem - Lift Down Permanently Selected" still present?	Yes No	Go to step 2.66.3 Possible Causes: 4.1.18
2.66.3	Remove X014.22.pin from X014. Place key switch in ground position and pull the emergency stop switch.	Is fault "Function Problem - Lift Down Permanently Selected" still present?	Yes No	Go to step 2.66.4 Possible Causes: Short in Tan 4-2 wire
2.66.4	Place key switch in ground position and pull the emergency stop switch.	Measured voltage at X004.33 = Vbatt?	Yes No	Possible Causes: Short in Tan 4-2-1 wire, 4.1.10 Possible Causes: 4.1.10

2.89 JIB DOWN SOLENOID SHORT TO BATTERY

Distress Lamp: 9 ADE Code: 3-3

Ground module feedback shows that Lift Down PWM output may be shorted to battery or other function

T500J MODELS ONLY

Functions Disabled: Jib Down

Step	Pretest Instructions	Test	Result	Corrective Action
2.89.1	Disconnect solenoid at X056 and isolate wires	Rerun System Test	Analyzer Message "JIB DOWN VALVE OPEN CIRCUIT" Analyzer Message "JIB DOWN VALVE SHORT TO BATTERY"	Repair/Replace solenoid Go to step 2.89.2
2.89.2	Remove wire Blue 28-3-1 from X002.20	Rerun System Test	Analyzer Message "JIB DOWN VALVE OPEN CIRCUIT" Analyzer Message "JIB DOWN VALVE SHORT TO BATTERY"	Wire Blue 28-3-1 or Yel/Blk boom wire shorted to battery. Repair or replace Possible Cause: 4.1.10

2.90 JIB DOWN SOLENOID SHORT TO GROUND

Distress Lamp: 9 ADE Code: 3-3

Ground module feedback shows that Jib Down PWM output may be shorted to ground or the solenoid may be defective

T500J MODELS ONLY

Functions Disabled: Jib Up

Step	Pretest Instructions	Test	Result	Corrective Action
2.90.1	Disconnect solenoid at X056 and isolate wires	Rerun System Test	Analyzer Message "JIB DOWN VALVE OPEN CIRCUIT" Analyzer Message "JIB DOWN VALVE SHORT TO GROUND"	Repair/Replace solenoid Go to step 2.90.2
2.90.2	Remove wire Blue 28-3-1 from X002.20	Rerun System Test	Analyzer Message "JIB DOWN VALVE OPEN CIRCUIT" Analyzer Message "JIB DOWN VALVE SHORT TO GROUND"	Wire Blue 28-3-1 or Blue 28-3 shorted to ground. Repair or replace Possible Cause: 4.1.10

2.106 LIFT DOWN SOLENOID SHORT TO BATTERY

Distress Lamp: 9 ADE Code: 3-3

Ground module feedback shows that Lift Down PWM output may be shorted to battery or other function

Functions Disabled: Lift Down

Step	Pretest Instructions	Test	Result	Corrective Action
2.106.1	Disconnect solenoid at X039 and isolate wires	Rerun System Test	Analyzer Message “LIFT DOWN VALVE OPEN CIRCUIT“ Analyzer Message “LIFT DOWN VALVE SHORT TO BATTERY“	Repair/Replace solenoid Go to step 2.106.2
2.106.2	Remove wire Tan 4-3-1 from X002.22	Rerun System Test	Analyzer Message “LIFT DOWN VALVE OPEN CIRCUIT“ Analyzer Message “LIFT DOWN VALVE SHORT TO BATTERY“	Wire Tan 4-3-1 or Tan 4-3 shorted to battery. Repair or replace Possible Cause: 4.1.10

2.107 LIFT DOWN SOLENOID SHORT TO GROUND

Distress Lamp: 9 ADE Code: 3-3

Ground module feedback shows that the Lift Down PWM output may be shorted to ground or the solenoid may be defective

Functions Disabled: Lift Down

Step	Pretest Instructions	Test	Result	Corrective Action
2.107.1	Disconnect solenoid at X039 and isolate wires	Rerun System Test	Analyzer Message “LIFT DOWN VALVE OPEN CIRCUIT“ Analyzer Message “LIFT DOWN VALVE SHORT TO GROUND“	Repair/Replace solenoid Go to step 2.107.2
2.107.2	Remove wire Tan 4-3-1 from X002.22	Rerun System Test	Analyzer Message “LIFT DOWN VALVE OPEN CIRCUIT“ Analyzer Message “LIFT DOWN VALVE SHORT TO GROUND“	Wire Tan 4-3-1 or Tan 4-3 shorted to ground. Repair or replace Possible Cause: 4.1.10

2.108 LIFT UP & TELE OUT PREVENTED - TILTED & ABOVE ELEVATION

Distress Lamp: 2 ADE Code: 2-5

The ground module senses the controls in the lift up or tele out position, but RETRIEVAL-A is active. While RETRIEVAL-A is active, the boom cannot be lifted up or telescoped out any further to prevent further destabilization.

Functions Disabled: Lift Up, Telescope Out

Step	Pretest Instructions	Test	Result	Corrective Action
2.108.1		Is the machine tilted more than 4.5 degrees?	Yes No	Retract, lower the boom and level the machine before lifting or telescoping out. Go to step 2.108.2
2.108.2		ANALYZER -> DIAGNOSTICS -> SYSTEM -> TILT >= 4.5 DEG (platform tilt LED illuminated)	Yes No	See 3.16 Tilt Sensor Possible Causes: 4.1.10

2.132 REAR-RIGHT O/R SOLENOID OPEN CIRCUIT

Distress Lamp: 9 ADE Code: 3-3

Ground module feedback shows that the Rear Right Outrigger digital output may be disconnected or the solenoid may be defective.

Functions Disabled: Rear Right O/R

Step	Pretest Instructions	Test	Result	Corrective Action
2.132.1	Run system test	Do other functions fail system test?	Yes	Possible Cause: Black ground wire broken, 4.1.1, otherwise go to step 2.132.2
			No	Go to step 2.132.2
2.132.2	Disconnect solenoid at X049. Short X049.1.soc to X049.2.soc	Rerun System Test	Analyzer Message "R-R OUTRIGGER VALVE SHORT TO GROUND"	Replace solenoid and/or connector
			Analyzer Message "R-R OUTRIGGER VALVE OPEN CIRCUIT"	Go to step 2.132.3
2.132.3	Replace X003.10 with a jumper to X003.3	Rerun System Test	Analyzer Message "R-R OUTRIGGER VALVE SHORT TO GROUND"	Wire Orn/Red 49-8 or White wire between X020 and X049 broken. Repair or replace
			Analyzer Message "R-R OUTRIGGER VALVE OPEN CIRCUIT"	Possible Cause: 4.1.10

2.133 REAR-RIGHT O/R SOLENOID SHORT TO BATTERY

Distress Lamp: 9 ADE Code: 3-3

Ground module feedback shows that the Rear Right Outrigger digital output may be shorted to battery or other function

Functions Disabled: Rear Right O/R

Step	Pretest Instructions	Test	Result	Corrective Action
2.133.1	Run system test	Do other functions fail system test?	Yes	Possible Cause: Black ground wire broken, 4.1.1, otherwise go to step 2.133.2
			No	Go to step 2.133.2
2.133.2	Disconnect solenoid at X049 and isolate wires	Rerun System Test	Analyzer Message "R-R OUTRIGGER VALVE OPEN CIRCUIT"	Replace solenoid
			Analyzer Message "R-R OUTRIGGER VALVE SHORT TO BATTERY"	Go to step 2.133.3
2.133.3	Remove wire Orn/Red 49-8 from X003.10	Rerun System Test	Analyzer Message "R-R OUTRIGGER VALVE OPEN CIRCUIT"	Wire Orn/Red 49-8 or White wire between X020 and X049 shorted to battery. Repair or replace
			Analyzer Message "R-R OUTRIGGER VALVE SHORT TO BATTERY"	Repair/Replace wire Orn/Red 49-8

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2.154 TELESCOPE IN SOLENOID SHORT TO GROUND

Distress Lamp: 9 ADE Code: 3-3

Ground module feedback shows that the Telescope In digital output may be shorted to ground or the solenoid may be defective.

Functions Disabled: Telescope In

Step	Pretest Instructions	Test	Result	Corrective Action
2.154.1	Disconnect solenoid at X083	Rerun System Test	Analyzer Message “TELESCOPE IN VALVE OPEN CIRCUIT“ Analyzer Message “TELESCOPE IN VALVE SHORT TO GROUND“	Repair/Replace solenoid Go to step 2.154.2
2.154.2	Remove wire Brown 13-3-1 from X002.4	Rerun System Test	Analyzer Message “TELESCOPE IN VALVE OPEN CIRCUIT“ Analyzer Message “TELESCOPE IN VALVE SHORT TO GROUND“	Wire Brown 13-3-1 or Brown 13-3 shorted to ground. Repair or replace Possible Cause: 4.1.10

and Turntable2 should always be in opposite states. To reset the switch, lift boom till transport switch opens, then lower onto rest again.

Step	Pretest Instructions	Test	Result	Corrective Action
3.5.1	Place boom on rest, Check Analyzer -> Diagnostics -> Drive	"TURNTBL SW ERR" displayed	Yes No	Go to step 3.5.2 Switch is already reset
3.5.2	Check Analyzer -> Diagnostics -> Drive	"TURNTABLE1 ON" displayed	Yes No	Go to step 3.5.3 Go to step 3.5.5
3.5.3	Check Analyzer -> Diagnostics -> Drive	"TURNTABLE2 OFF" displayed	Yes No	Go to step 3.5.4 Possible Causes: Orn/Red 59-1 wire shorted, 4.1.18
3.5.4	Check Analyzer -> Diagnostics -> System	"TRANS LMT SW CL" displayed	Yes No	Lift boom till transport switch opens, then lower onto rest again to reset the switch Possible Causes: Bad transport switch, see 3.17 Transport Limit Switch
3.5.5		Is boom on rest?	Yes No	Possible Causes: Switch obstructed, 4.1.20, Orn/Red 58-1 wire broken, 4.1.18 Place boom on rest and try again

Hand Brake Position Sensor

If an error is detected with the switch, "HAND BRK SW ERR" is displayed in the diagnostics. As the hand brake is applied, Brake1 should change from Off to On, and Brake2 should change from On to Off. Brake1 and Brake2 should always be in opposite states. To reset the switch, cycle the hand brake.

Step	Pretest Instructions	Test	Result	Corrective Action
3.5.6	Apply hand brake, Check Analyzer -> Diagnostics -> Drive	"HAND BRK SW ERR" displayed	Yes No	Go to step 3.5.7 Switch is already reset
3.5.7	Check Analyzer -> Diagnostics -> Drive	"BRAKE1 ON" displayed	Yes No	Go to step 3.5.8 Go to step 3.5.9
3.5.8	Check Analyzer -> Diagnostics -> Drive	"BRAKE2 OFF" displayed	Yes No	Cycle hand brake to reset the switch Possible Causes: Orn/Red 57-1 wire broken, 4.1.18
3.5.9		Is hand brake applied?	Yes No	Possible Causes: Switch obstructed, Orn/Red 56-1 wire broken, brake cable broken, 4.1.20, 4.1.18 Place boom on rest and try again

4.1 POSSIBLE CAUSES

Item	Possible Cause	Possible Solution
4.1.74	(Gas Only) Dump Valve may be defective	Repair or replace
4.1.75	(Gas Only) High Idle Inoperable	See1.8 Engine High Idle Inoperative - Engine Models
4.1.76	(Gas Only) Engine may be mechanically defective	Contact Factory
4.1.77	(Gas Only) Engine start solenoid may be defective	Repair or replace
4.1.78	(Gas Only) Engine throttle pull solenoid may be defective	Repair or replace
4.1.79	(Gas Only) Engine start motor may be defective	Repair or replace
4.1.80	(Gas Only) Engine throttle relay may be defective	Repair or replace
4.1.81	(Gas Only) Engine stop relay may be defective	Repair or replace
4.1.82	(Gas Only) Engine speed feedback incorrect	Repair Wht/Yel 48-7 between X001.16 and X095 or contact factory
4.1.83	(Gas Only) Engine may be out of fuel	Refuel
4.1.84	(Gas Only) Fuel may be old or bad	Drain fuel tank and carburetor. Refuel with fresh gasoline
4.1.85	(Gas Only) Fuel valve may be turned off	Move engine fuel lever to ON
4.1.86	(Gas Only) Engine choke may be open	Engage the choke, unless engine is warm
4.1.87	(Gas Only) Engine oil level may be low	Check/Add oil
4.1.88	(Gas Only) Spark plug may be faulty	Gap or replace spark plug
4.1.89	(Gas Only) Fuel filter may be clogged	Clean or replace
4.1.90	(Gas Only) Air filter may be clogged	Clean or replace
4.1.91	(Gas Only) Fuel system may be clogged	Repair or replace
4.1.92	(Gas Only) Carburetor may be flooded	Dry and reinstall spark plug. Start engine with throttle in fast position
4.1.93	(Gas Only) Engine idle setting may be too low	Increase idle speed to specified value

5.67 DRV RIGHT FWD VALVE SHORT TO BATTERY

DRIVE OPTION MACHINES ONLY

The system test detected a short to battery in the drive right forward valve circuit.

See 2.35 Drive Right Forward Solenoid Short To Battery

5.68 DRV RIGHT FWD VALVE SHORT TO GROUND

DRIVE OPTION MACHINES ONLY

The system test detected a short to ground in the drive right forward valve circuit.

See 2.36 Drive Right Forward Solenoid Short To Ground

5.69 DRV RIGHT REV

DRIVE OPTION MACHINES ONLY

System test prompt indicating that it is currently testing this circuit.

5.70 DRV RIGHT REV VALVE OPEN CIRCUIT

DRIVE OPTION MACHINES ONLY

The system test detected an open circuit in the drive right reverse valve circuit.

See 2.37 Drive Right Reverse Solenoid Open Circuit

5.71 DRV RIGHT REV VALVE SHORT TO BATTERY

DRIVE OPTION MACHINES ONLY

The system test detected a short to battery in the drive right reverse valve circuit.

See 2.38 Drive Right Reverse Solenoid Short To Battery

5.72 DRV RIGHT REV VALVE SHORT TO GROUND

DRIVE OPTION MACHINES ONLY

The system test detected a short to ground in the drive right reverse valve circuit.

See 2.39 Drive Right Reverse Solenoid Short To Ground

5.73 DUMP VALVE

ENGINE POWERED MACHINES ONLY

System test prompt indicating that it is currently testing this circuit.

5.74 DUMP VALVE OPEN CIRCUIT

ENGINE POWERED MACHINES ONLY

The system test detected an open circuit in the dump valve circuit.

See 2.40 Dump Solenoid Open Circuit

5.156 R-L O/R VALVE

System test prompt indicating that it is currently testing this circuit.

5.157 R-L OUTRIGGER LAMP ON

System test prompt to check that the ground Rear-Left Outrigger lamp is illuminated.

Step	Pretest Instructions	Test	Result	Corrective Action
5.157.1		Does this indicator illuminate properly?	Yes No	Press ENTER on the analyzer to continue the system test Go to step 5.157.2
5.157.2		Do other indicators illuminate instead?	Yes No	Possible Causes: Check wiring Go to step 5.157.3
5.157.3		Voltage at X030.3 = 12VDC?	Yes No	Possible Causes: 4.1.27 Go to step 5.157.4
5.157.4		Voltage at X004.29 = 12VDC?	Yes No	Possible Causes: Check wires Brn/Wht 47-24, Brn/Wht 47-24-1, and Black Possible Causes: 4.1.10

5.158 R-L OUTRIGGER VALVE OPEN CIRCUIT

The system test detected an open in the Rear-Left Outriggers valve circuit.

See 2.129 Rear-Left O/R Solenoid Open Circuit

5.159 R-L OUTRIGGER VALVE SHORT TO BATTERY

The system test detected a short to battery in the Rear-Left Outriggers valve circuit.

See 2.130 Rear-Left O/R Solenoid Short To Battery

5.160 R-L OUTRIGGER VALVE SHORT TO GROUND

The system test detected a short to ground in the Rear-Left Outriggers valve circuit.

See 2.131 Rear-Left O/R Solenoid Short To Ground

5.161 ROTARY TO JIB/TELE

Platform system test prompt to turn the rotary select switch to the Jib/Telescope position.

5.162 ROTARY TO LEVEL

Platform system test prompt to turn the rotary select switch to the Platform Leveling position.

5.163 ROTARY TO LIFT/SWING

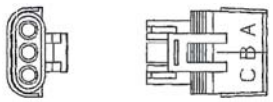
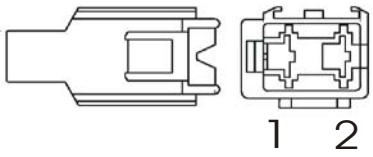
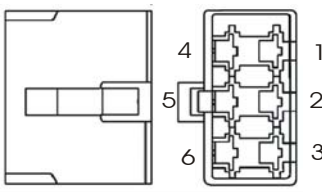
Platform system test prompt to turn the rotary select switch to the Lift/Swing position.

SECTION 7. ELECTRICAL REFERENCE

Table 7-4. X003 (J3) Ground Module Pinout

PIN	T-SERIES FUNCTION	TYPE	I/O	RANGE (V)
1	Depopulated	-	-	-
2	FRONT-LEFT O/R	Digital	Output	12VDC
3	GROUND	Power	Output	0VDC
4	CHOKE PULL RELAY	Digital	Output	12VDC
5	Depopulated	-	-	-
6	FRONT-RIGHT O/R	Digital	Output	12VDC
7	CHOKE HOLD SOLENOID	Digital	Output	12VDC
8	REAR-LEFT O/R	Digital	Output	12VDC
9	THROTTLE PULL RELAY	Digital	Output	12VDC
10	REAR-RIGHT O/R	Digital	Output	12VDC
11	THROTTLE HOLD SOLENOID	Digital	Output	12VDC
12	GROUND	Power	Output	0VDC
13	EXTEND O/R	Digital	Output	12VDC
14	RETRACT O/R	Digital	Output	12VDC

Table 7-11. Connector Loading Diagrams

ID	Description	Diagram
PWP03P	Packard 3 position receptacle	
SUM02N	Sumitomo 2 position natural	
SUM06N	Sumitomo 6 position natural	

7.6 WORKING WITH AMP CONNECTORS

Applying Silicone Dielectric Compound to AMP Connectors

Silicone Dielectric Compound must be used on the AMP connections for the following reasons:

- To prevent oxidation at the mechanical joint between male and female pins.
- To prevent electrical malfunction caused by low level conductivity between pins when wet.

Use the following procedure to apply Silicone Dielectric Compound to the electrical connectors.

1. To prevent oxidation and low level conductivity, silicone dielectric grease must be packed completely around male and female pins on the inside of the connector after the mating of the housing to the header. This is easily achieved by using a syringe to fill the header with silicone dielectric compound, to a point just above the top of the male pins inside the header. When assembling the housing to the header, it is possible that the housing will become air locked, thus preventing the housing latch from engaging.
2. Pierce one of the unused wire seals to allow the trapped air inside the housing to escape.
3. Install a hole plug into this and/or any unused wire seal that has silicone dielectric compound escaping from it.

8.1 SOLENOIDS

Connector	Function	Nominal Resistance (Ohms)
X077	Swing Left	8.0
X078	Swing Right	8.0
X079	Jib Up (T500J)	8.0
X056	Jib Down (T500J)	9.8
X080	Level Up	8.0
X081	Level Down	8.0
X082	Telescope Out	8.0
X083	Telescope In	8.0
X084	Lift Up	8.0
X039	Lift Down	9.8
X085	Outrigger Stow	8.0
X086	Outrigger Set	8.0
X087	Dump Valve (Engine Powered)	6.0
X046	Front Left Outrigger	7.2
X047	Front Right Outrigger	7.2
X048	Rear Left Outrigger	7.2
X049	Rear Right Outrigger	7.2
X067	Drive Left Forward Solenoid	9.8
X068	Drive Right Forward Solenoid	9.8
X069	Drive Left Reverse Solenoid	9.8
X070	Drive Right Reverse Solenoid	9.8
X071	Drive Enable Solenoid	7.2

8.2 MINIMUM OPERATING PRESSURE

Function	T350 Minimum Pressure For Operation	T500J Minimum Pressure For Operation
Swing Left	Min. Swing Left Pressure psi (bar)	Min. Swing Left Pressure psi (bar)
Swing Right	Min. Swing Right Pressure psi (bar)	Min. Swing Right Pressure psi (bar)
Jib Up (T500J)	Min. Jib Up Pressure psi (bar)	Min. Jib Up Pressure psi (bar)
Jib Down (T500J)	Min. Jib Down Pressure psi (bar)	Min. Jib Down Pressure psi (bar)
Level Up	Min. Level Up Pressure psi (bar)	Min. Level Up Pressure psi (bar)
Level Down	Min. Level Down Pressure psi (bar)	Min. Level Down Pressure psi (bar)
Telescope Out	Min. Tele Out Pressure psi (bar)	Min. Tele Out Pressure psi (bar)
Telescope In	Min. Tele In Pressure psi (bar)	Min. Tele In Pressure psi (bar)
Lift Up	Min. Lift Up Pressure psi (bar)	Min. Lift Up Pressure psi (bar)
Lift Down	Min. Lift Down Pressure psi (bar)	Min. Lift Down Pressure psi (bar)
Outrigger Stow	Min. O/R Stow Pressure psi (bar)	Min. O/R Stow Pressure psi (bar)
Outrigger Set	Min. O/R Set Pressure psi (bar)	Min. O/R Set Pressure psi (bar)

*These values not available at time of printing

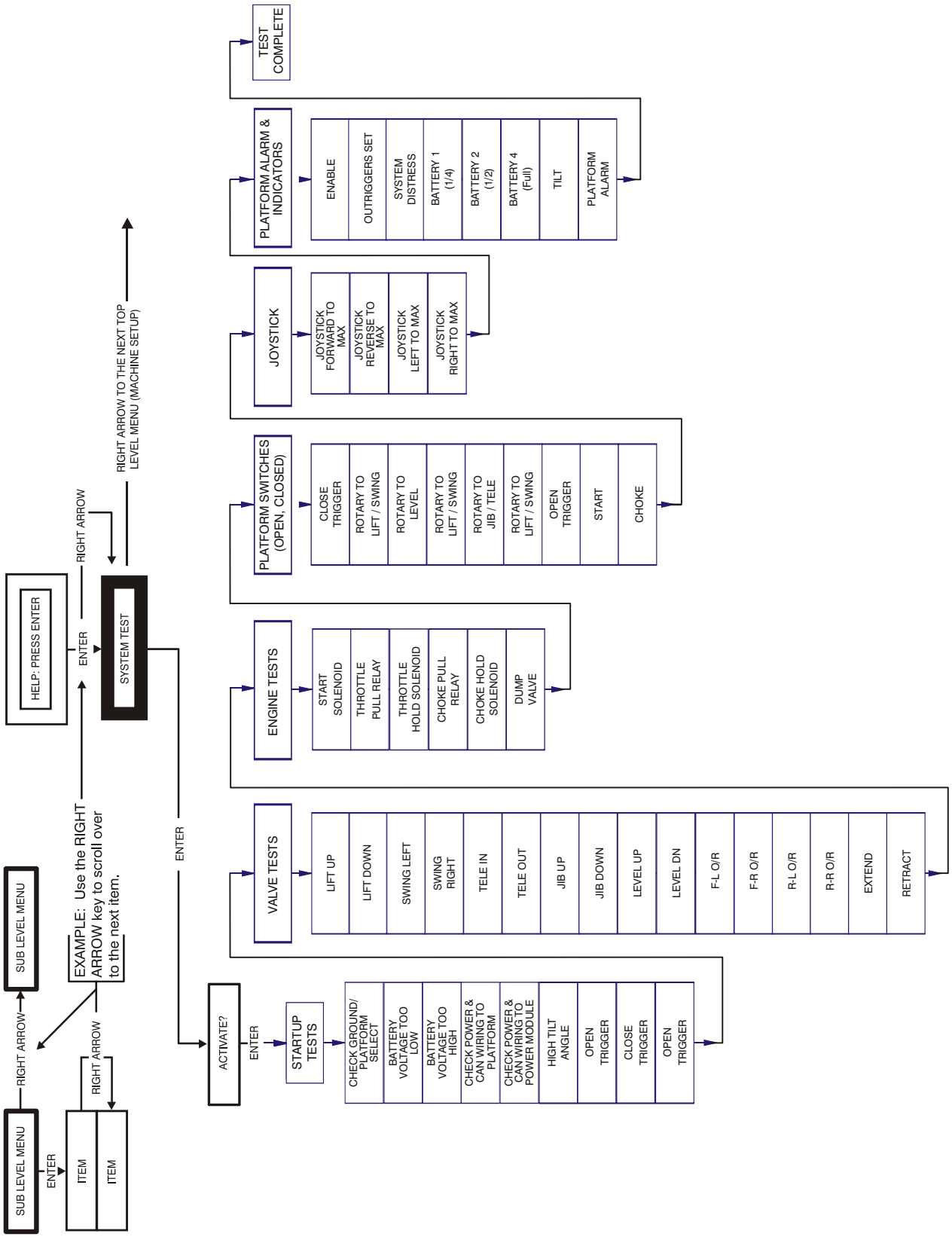


Figure 9-5. System Test Flow Chart - Platform Tests

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